Forest Products and Household Incomes
A Review and Annotated Bibliography

by
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CENTRE FOR
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Cover illustration (photo: Mary Stockdale)
Small rattan furniture enterprise, Sabah, Malaysia
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# Table of Contents

1. INTRODUCTION ....................................................................................................................... 1

2. FUELWOOD AND CHARCOAL ............................................................................................... 4

3. FUELWOOD AND CHARCOAL - SELECTED ABSTRACTS .................................................. 12

4. FOREST FOODS ..................................................................................................................... 43

5. FOREST FOODS - SELECTED ABSTRACTS ......................................................................... 48

6. BASKETS AND HANDICRAFTS ............................................................................................. 66

7. BASKETS AND HANDICRAFTS - SELECTED ABSTRACTS .................................................. 71

8. EXTRACTIVE PRODUCTS ....................................................................................................... 85

9. EXTRACTIVE PRODUCTS - SELECTED ABSTRACTS ............................................................ 92

10. FURNITURE AND CARPENTRY .......................................................................................... 112

11. FURNITURE AND CARPENTRY - SELECTED ABSTRACTS ................................................ 135

12. BIBLIOGRAPHY .................................................................................................................. 159
1. INTRODUCTION

The reviews, abstracts and bibliography presented in this paper form one output of a three-year project to investigate the sustainability of small-scale production and trading activities based on non-timber forest products (NTFPs) that contribute to household incomes. Other components of this project include an examination of data from small-scale enterprise surveys in a number of countries in southern and eastern Africa; a household-based survey of income-generating NTFP activities in the forest zone of southern Ghana and; a related study of small-scale woodworking enterprises in Ghana\(^1\). The focus in this paper, as in the project, is on identifying which such enterprise activities are the most important, on assessing patterns of change in their composition and contributions, and on exploring the factors that help explain such change.

Sale to generate cash income is, of course, only one way in which rural households draw upon forest products within their livelihood systems. Forest fuels, foods, medicines and construction and other materials form important components of subsistence usage in many areas. Forest product activities can also help households in building up a stock of assets. Some products and uses are also culturally important. The present paper (and project), concentrates just on the widely growing, but as yet poorly understood, role of forest products in generating household incomes, dealing with subsistence and other roles only to the extent that these bear on this.

Earlier work (see list of previous general reviews below) has shown that small forest-based enterprise activities constitute one of the largest sources of non-farm income in the rural areas of developing countries. In many areas they also account for a large part of the total forest harvest. However, it is evident that the contribution of different of the activities varies very considerably - in terms both of the employment and income they generate at present and of their future prospects. Some of the simpler activities provide very low returns to labour, and may thus provide only minimal and short-lived components of livelihood systems. Some saleable forest products face uncertain markets, because they are goods that fall out of consumption patterns as incomes rise, or because they are displaced by alternative products made from synthetic materials or plantation grown raw materials. As demand grows, some activities are also threatened by depletion of, or reduced access to, forest resources.

In developing interventions in support of forest activities that will generate household incomes, it is therefore important to be able to distinguish between those that have a potential to survive and grow and those that do not, and to understand the reasons for these differences. The present bibliographical review consequently focuses on literature items that help illuminate these dynamic aspects of forest-based activities (for a fuller discussion of the hypotheses pursued in the study see Arnold, 1994).

\(^1\) Reported on in Arnold et al. (1994), Townson (1995) and Adarkwah et al. (1995) respectively.
The study is based on the following definition of non-timber forest products:

"all the biological material (other than industrial roundwood and derived sawn timber, wood chips, wood-based panels and pulps) that may be extracted from natural ecosystems, managed plantations, etc., and be utilised within the household, be marketed, or have social, cultural or religious significance. Thus, non-timber forest products include plants used for food, forage, fuel, medicine, fibres, biochemicals, etc.; as well as animals, birds, fuel, fibres, biochemicals, etc." (Anon, 1991/2).

The present exercise covers five product groups or subsectors. These have been selected on a number of criteria. Between them they account for the majority of employment in NTFP-based activities in most countries, and represent a range of different gathering, processing and trading enterprises. Each represents activities that have in common a particular use, raw material, or/and production process, and therefore represent a subject area in which it can be expected that more can be learned by studying the experience of the group as a whole. Different groups involve activities at different levels of technological or organisational complexity, serve markets that come into prominence at different levels of economic development - and so offer the potential to study contrasts across groups.

The five groups are the following:

- fuelwood and charcoal
- forest foods
- basketry and handicrafts
- extractive products
- furniture and carpentry.

The coverage thus includes artisanal and small workshop scale production of wood products (as distinct from use of timber in formal sector forest industries) in recognition that these are an important part of the forest products base that contributes to household incomes. It also includes activities based in part or whole on raw materials from trees grown on farms or other domesticated sources, rather than from the forest. Their inclusion reflects the continuum from forest to domesticated stock, and the light that these studies of activities based on the latter contribute to understanding of the dynamics of the raw material supply situation in the different activities

Information specifically on household incomes from forest products is very limited, reflecting difficulties in measurement and valuation, and the small size of the body of research directly focused on this issue. The reviews and bibliography therefore of necessity range across a number of related areas of research and data gathering. Each of the five reviews thus attempts to draw together what is sometimes conflicting information from a range of case and other studies, and is structured to examine employment in forest product activities; incomes; the structure and organisation of production; raw material supplies; markets and marketing; and patterns of change. Numbers in parentheses refer to the abstracts following the review. The reviews have also drawn on the larger body of literature relating to non-timber forest products, forestry and small-scale enterprises listed in the bibliography. The latter represents
the results of a literature search and screening conducted between September 1993 and May 1994. Some additional items have been added which were brought to the author's attention after this date, but this does not represent a systematic review of the post-May 1994 literature. The search focuses mainly on work published after 1985, as a number of earlier reviews (see below) cover much of the material that appeared prior to this date.

Much of the material still exists as "grey literature". This was located in a number of ways, but primarily through searches in libraries and institutions in the UK. It consequently focuses on material available in English.

In addition to the items relating to specific products that have been reviewed in this paper, the following publications present more general accounts of, or contain collections of papers on, NTFP use:-

2. FUELWOOD AND CHARCOAL

2.1 Introduction

Concerns over the predicted "woodfuel crisis" in the developing world also drew attention to the extent and nature of fuelwood and charcoal commercialisation. Many people, predominantly in small enterprises, earn incomes from the production, transport and marketing of forest fuels. The sources of raw materials for these industries are often decreasing, although tree growing specifically to supply woodfuels is rare. Technological improvements are also rare, except in transporting. In some areas increased commercialisation has resulted in changes in the organisation of the industry, either with larger firms emerging or with changes in marketing channels. The presence or absence of alternatives to the typically low-paid employment in woodfuel industries can have a great influence on the extent of involvement in this activity. Although markets for woodfuels are generally expanding with increased incomes and urbanisation there is no single pattern for their evolution.

2.2 Employment and contributions to income

Fuelwood and charcoal enterprises have traditionally been under-represented in census-type surveys of small-scale industries as a result of their often itinerant and illicit nature, and their inaccessible rural location. However, it is now clear that incomes from the forest fuels sector make a contribution to the livelihoods of a large proportion of both the rural and urban populations of the developing world. Although figures are available for only a few areas, these case studies give an idea of the scale of involvement. In Rufiji district, Tanzania, Havnevik found over 5,000 people, mostly men, engaged in charcoal production, representing over 8% of the economically active population (Havnevik, 1980). In Las Maderas, the traditional woodfuel supply area for Managua, Nicaragua, 16% of respondents identified themselves as fuelwood cutters (5). In Cebu, Philippines, it is estimated that production of fuelwood and charcoal provides at least supplemental employment and income to 35,000 rural families, or 15% of the population (17). Cutting and selling *Prosopis juliflora* as firewood has been observed to provide off-season employment to a large proportion (at least 10% in Andhra Pradesh) of the landless labourers in several Indian states (20). In Pakistan, over 85,000 people were employed in the firewood trade, three quarters of whom were permanent employees (26). Well over 10,000 women and children in Addis Ababa, Ethiopia rely on earnings obtained from work as woodfuel carriers and sellers (19). The industry supplying charcoal to Nairobi has been estimated to provide employment to 40,000 full-time, itinerant or intermittent charcoal-makers (25). Based on figures for average production and total volumes traded, Koopmans (14) estimates that 1,000,000 people (8% of the population) are involved in the forest fuels trade in the Philippines.

The incomes earned from these occupations varies greatly, both between countries and activities. Fuelwood cutting tends to be an activity offering poor remuneration, and often one in which people engage only when there is no other work available (3, 5, 21). Returns to labour in two rural areas of Sierra Leone were slightly below those obtained in upland rice
production (23). Where people engage in firewood cutting on a more full-time basis, returns can match or exceed those from the principal alternative - agriculture. A study of the Raichur district, Karnataka, found that the 80% of families who gave *P. juliflora* cutting as their main occupation were obtaining net returns of Rs 24.61 per day, an additional net return per family over total cost of Rs 3.75, compared with that earned in agricultural labour (20). In the Department of Boaco in the interior zone of Nicaragua, farmers near main roads were found to be obtaining 50% of their cash income from woodfuel cutting and selling (5). Both of these examples appear, however, to indicate an agricultural economy incapable of offering sufficient employment or returns, rather than a successful fuelwood industry.

Charcoal production, however, tends to offer slightly better rewards, particularly when measured over one charcoal cycle and compared with alternative occupations - for example, charcoal makers in Kenya were found to be earning 2.5 times the official farm wage rate (25). Charcoal producers around Pokhara in Nepal were earning returns 2.5 times the wage rate for labouring in the construction industry (cutters and sellers of fuelwood were making returns comparable with wages for work in the villages) (11i). In Majalaya, West Java, average net incomes for charcoal making were Rp 2,000 (US$ 1.08) per day, compared with Rp 1,250-1,500 (plus lunch) for farm labouring (11iii). Havnevik found charcoal producers earning hourly returns of Shs. 1.09 - less than other extractive activities such as mangrove cutting or fishing, but almost double that of most craft activities (mat-making and basketry) (Havnevik, op. cit.).

Income data for the service activities of transporting, wholesaling and retailing forest fuels are much less numerous. The literature appears to suggest that transporters and middlemen can make considerable profits (3, 8, 25), although these returns may only be commensurate with the risk and effort involved (17). Presenting data for all urban traders (wholesalers and retailers), Kamara (23) found that those in the capital, Freetown, were earning more than 2 times the official wage rate, while those in the smaller urban centres of Bo and Makeni were earning slightly less than this wage rate. While the high profits of Nairobi’s wholesalers may not be shared by those involved in the retail trade, Kinyanjui (25) suggests that the latter’s earnings compare well with the alternatives available to them. In Pakistan, the majority of retail traders were earning incomes (Rs38,000 in rural areas, Rs 43,000 in urban areas) only slightly higher than those paid to a skilled urban manual worker such as a carpenter or mason (26). The most successful traders, the roadside traders, were receiving incomes of approximately Rs70,000 (US$2,800).

### 2.3 Raw material supplies

The location of firewood and charcoal producing enterprises in rural areas results primarily as a consequence of the availability of raw materials supplies in those areas. Supplies come from a number of sources - primarily large estates (where landowners or dealers hire workers to cut the wood)(5), large- and small-scale land clearances where wood tends to be seen as a by-product (6, 8, 9, 18, 25), the clearing and site-preparation activities of smallholders (6, 11iii, 11iv, 18, 21, 27) and, gathering and cutting operations in natural or plantation forests (often government-owned) (2, 3, 6, 7, 8, 9, 11i, 11iii, 13, 15, 16, 19, 20, 22, 23, 24, 25, 29).
Growing of trees by private individuals specifically for fuelwood production occurs very rarely and is usually associated with the production of at least one other output (6, 8, 17, 21, 25, 26). The relative importance of these different sources within a country is dependent upon a number of factors. The scale and extent of large-scale land clearance schemes can be largely determined by prevailing government policy (5, 9) with the retrieval of timber and firewood from felled trees often being dependent on the organisation and ability of government departments in administering such activities (5). Although small-scale land clearance, particularly in forest fallow systems, may be a potentially major source of woodfuel in many countries, few of the studies examined here indicate that this wood is traded to any significant extent. In both large-scale and small-scale (especially in pioneer communities) land clearing operations any profits accruing from sales of wood or licenses are viewed as subsidies to the land clearing operation (5, 9, 11ii, 18).

In examining the motivation behind the sale of firewood or firewood cutting rights by large landowners in Nicaragua, van Buren (5) also found that such decisions were more often influenced by considerations of land management than of the economic returns received. Production of wood for charcoal was also found to be an integral part of land management in the kaingin farms of Laguna, Philippines (11ii).

The extent to which forests are used as a source of supply in production activities which are not associated with clearance operation depends on availability and access. In cases where forest resources have become uniformly scarce or more distant the use of wood resources on private, claimed or common lands becomes more common (11ii, 11iv, 17). Restrictions on access to forests, whether government or private, often has the same effect as physical non-availability of forest resources (27). Those cases where farmer tree-growing has been partly or fully influenced by the commercial demand for fuelwood or charcoal are also associated with physical or legally-enforced non-availability of resources from forests (6, 8, 17). However, even in cases where forest resources have all but disappeared tree-growing for fuelwood production may be made uneconomic by competition from other supply areas (9) or other fuels.

2.4 Small-scale firewood production

In contrast to the large landowners in Nicaragua (5), the participation of smallholders and landless labourers in the fuelwood trade is frequently determined by economic motivations, but often within the wider context of their predominantly agricultural livelihoods. Production by smallholders from their own plots tends to result as a by-product of land clearing and site preparation operations and can be an important source of income as such activities are often carried out during slack agricultural periods (6, 11iv, 21). In contrast, tree-cropping, typically from field boundary trees, is an integral part of agricultural production for many farmers in Pakistan (26). Fuelwood and gathering activities that depend on non-farm sources show greater variety. While some, such as the women fuelwood carriers of Addis Ababa (19) or the woodfuel cutters of Karnataka (20), may depend on such activities for the majority of their income, other studies (5, 7, 11i, 11iii, 23) point to the seasonal nature of such employment in some areas. Again, these latter studies stress the importance of agriculture in determining the
levels of participation in fuelwood production, and in particular the need to find employment during slack agricultural periods. While fuelwood gathering is an activity in which men, women and children may participate, cutting of firewood for sale is usually (though not always (7)) carried out by men.

2.5 Charcoal production

Charcoal production shares many of the characteristics of fuelwood production in terms of its importance to poorer households and in stress years and the seasonal peak in production during the agricultural off-season (3, 7, 8, 9, 11ii, 11iii, 11iv, 13, 16, 17, 27). The lack of involvement of women in the charcoal-making activities is one of the few features that distinguishes this subsector from the fuelwood trade. In some areas it also involves a level of organisation not encountered with fuelwood production systems (8, 9, 11iii, 17). The illegal nature of charcoal production in some areas (11i, 11iii) and the risks of the charring process being unsuccessful (11iii, 27) perhaps partly explain the higher returns to charcoal producers than fuelwood cutters and gatherers. Other reasons may include the higher levels of skills involved in charcoal production and the difficulties of becoming established in the activity.

Most of these enterprises are located at considerably greater distances from the eventual markets than fuelwood enterprises, a phenomenon explained by the trade-off between higher transport costs for fuelwood (per unit of energy) and the loss of energy in the charring process (2, 8, 9, 25). The distance at which the switch from charcoal to fuelwood occurs will be greatly dependent on the efficiency of the charring operations and the costs of transport (distances of 200km and 214km are given for Mogadishu (29) and Hyderabad (2), respectively). In Vietnam, such economies of transportation for charcoal do not appear to exist as transport charges are determined by volume and not by weight (12).

2.6 Transporting businesses

The transport of fuelwood tends to involve a number of modes of transport, but operations utilising motorised transport (usually trucks but also rail, buses and other passenger vehicles), generally account for the vast majority of trade both in terms of distance travelled and weight of wood carried (1, 4). The example given by Haile (19) of the women fuelwood carriers of Addis Ababa is perhaps unusual, with the existence of the peri-urban forest close to the city making this activity feasible. Although the women expressed the view that this was an activity of last resort and that they were seeking alternative employment, new migrants to the city are continually swelling the ranks of fuelwood carriers and replacing those who do manage to find more rewarding work. This example also points to the fact that headloading or animal-driven transport are often intimately associated with production and/or retailing stages in the supply chain (11i, 11iii, 16, 20, 21).

Motorised transport is more usually engaged in as a separate enterprise (1, 8, 9, 11iv, 17, 25) or as a secondary economic activity for bus and truck drivers (11i, 11iv, 17, 27). Where charcoal transporting is engaged in as a separate business it involves considerable capital
outlay, ensuring that relatively few can afford to enter the business (8, 23, 25). Those that do are typically urban-based, male, relatively wealthy and involved full-time in the occupation (8, 25). Although in some areas forest fuels are transported by general goods carriers, Kinyanjui (25) states that in Kenya few of the specialised charcoal or fuelwood carriers can become involved in formal sector transporting (as a way of subsidising return journeys) due to the often poor condition of their trucks. Thus, although forest fuel transporters may make lower returns than other transporting businesses, such comparisons are not entirely appropriate. The example given by Dewees (9) of charcoal being carried as a return journey cargo in Sudan illustrates how such arrangements can reduce the cost of transportation. Minimising transport costs can have an important influence on the costs of charcoal to the consumer, as transport costs generally account for a sizeable proportion of the final retail price (2, 5, 8, 9).

Transporting small quantities of charcoal and fuelwood on haulage and passenger vehicles often occurs when marketing and distribution systems are relatively undeveloped (3, 7, 11i, 11iii). However, government regulations and restrictions on the movement of forest fuels in a number of countries, appear to be having the effect of promoting this type of transporting even when the fuelwood trade is well-developed (11ii, 11iv, 27). It is not clear what effect this has on the efficiency and cost of transporting or the effect it has on the organisation of production and marketing. In Pakistan the complex and poorly understood system of taxes on the import and export of wood across provincial and district boundaries reduced profit margins for producers transporters and traders (and so reduced farmer incentives to plant trees) and were reported to be open to abuse by officials (26).

### 2.7 Wholesale and retail marketing

In the retailing and wholesaling sectors there is typically an increase in complexity from rural to urban areas and from small to large urban areas (23, 26, 27). As the distances to markets increase the small-scale combined producer/retailers decline in importance (3, 17). While larger-scale combined operations may appear (8, 29), the trend is generally for specialised retailers and wholesalers to emerge (2, 9, 17, 23). Wholesalers often operate on a full-time basis, are run by men and occasionally employ regular workers although some recruit labour as and when required (2, 13, 23, 25). Although they tend to be larger scale enterprises (when compared to retailers) family and individual ownership still tends to be the norm (2, 23). In contrast, the retail sector is characterised by a large number of small firms (2, 17, 11iv, 23, 25) and part-time involvement (especially in combination with other retailing activities in smaller urban centres) (2, 11i, 11iv). Although a high proportion of women may be involved, this is usually at the smaller end of the size range (2, 23, 25). In larger urban centres such activities provide increasing incomes and increasing shares of total income as more of them become full-time operations requiring greater labour and capital inputs (17, 23).

A small number of the studies also discovered that a significant proportion of the traded fuels passed directly from rural areas to consumer. This occurs not only when marketing systems are just developing (20, 21), but also in more developed situations where large consumers such as industries and institutions have supply arrangements with larger-scale producers or rural traders (2, 13, 17).
2.8 Patterns of change

It is possible, on the basis of these studies, to discern a number of patterns of change in the forest fuels sector. One of the key dynamic factors leading to expansion in this sector is the rapidly increasing demand which results from high growth rates of urban areas (the main markets for fuelwood and charcoal) (25). Even in situations where rising incomes may favour substitution of biomass energy sources by higher quality fuels, the increasing numbers of urban dwellers can ensure that markets for forest fuels are still expanding (17). It would be expected, however, that in cases of slower urban growth accompanied by rising incomes, the demand for forest fuels would decline as increasing numbers of people are able to switch to fossil fuels and electricity. In North-east Thailand, where this appears to have occurred to some extent, the quantities of forest fuels traded has not declined, however. Increased inter-village trade has more than offset the decline in consumption in urban areas (27). The switch to alternative fuels is also dependent on their relative prices, and so changes in the costs of these fuels (whether due to market price changes or changes in government energy pricing policy) can have a great influence on the forest fuels markets (5, 8, 9, 11i, 26). This is not always the case - in Kenya, Dewees (8) found no significant correlation between demand for charcoal and the price of paraffin. Choice of fuel is also dependent on availability (11i, 15) and levels of income (2, 11iv, 17, 27). A number of these studies (2, 11iii, 13) have identified a decline in household demand (resulting from increased prices or fuel switching) and a rise in the importance of commercial consumers, including small industries, food vendors and restaurants.

The participation by smallholders and landless labourers in the production activities of this sector depend to a large extent on the availability of alternative income sources and the supply of raw materials. Full-time year round involvement in fuelwood or charcoal producing activities appears to indicate a stagnant or declining agricultural sector, which cannot provide sufficient employment even during times of peak agricultural labour demand (5, 7, 11ii, 20). The example from North-east Thailand records the decline in the involvement in charcoal after the initial charcoal boom which occurred during the establishment of pioneer farms in the uplands (11iv). In both the Philippines (11ii) and Nicaragua (5) it is speculated that agrarian reforms will lead to a reduction in the numbers of full-time producers of charcoal or fuelwood, as individuals who are granted land devote their time to agriculture. Those with other, non-agricultural, sources of income such as a shop or other small enterprise may have a part-time involvement in production that continues throughout the year (5). Those who see themselves primarily as farmers may engage in forest fuel production on a part-time basis throughout the year, but typically there will be a peak in their activities during the agricultural off-season when labour demands are lowest (3, 5, 11i, 25, 27). Involvement in production activities also tends to increase during stress periods, such as during years of drought or after typhoons (8, 9, 11ii, 13, 24). The activity is not always associated with a lack of other alternatives, as the example from Nepal (11i) demonstrates, with increasing involvement of individuals of higher caste and higher socio-economic status as fuelwood production becomes more profitable.

The availability of raw material supplies is another important factor determining involvement in the forest fuels sector. In the dry tropical areas the majority of sources for small-scale
enterprises are either located off-farm in natural or plantation forests (2, 6, 13, 29) or are obtained as a result of land clearing operations (8, 9). In either case these sources tend to become depleted around major demand centres and the source of supply becomes more distant (2, 8, 9, 13, but see 6). The increasing distance between supply and markets is the most important factor encouraging a switch to charcoal production (2). In the wet Tropics biological production can be much higher, and thus even in situations where most off-farm sources have been depleted supplies can still be obtained through annual site clearing and preparation operations on-farm (3, 11ii, 11iv, 27). A lower level of year-round production can also be maintained through occasional clearing and pruning operations on trees growing on the farm (3, 11ii). Competition from alternative sources can also affect the level of production from any particular area. Although production from other small-producers who are perhaps closer to the eventual markets may play a role in some regions (18), the occurrence of government and private land clearance (both on a large and small-scale) can have widespread consequences, flooding markets and excluding other producers (5, 9). It appears to be the case that there must be a decline in the quantities available, leading to a rise in real prices, before production of fuelwood and charcoal from private lands emerges as an industry unto itself (11ii, 26). When the rate of land clearance slows, the potential earnings from sales of fuelwood or charcoal can act as an additional incentive to farmer tree-growing, although this will often be associated with the production of other outputs such as timber, fruits, fodder or bark (3, 6, 8, 17, 26). The switch to smaller and more dispersed sources of wood also seems to be associated with a change in charcoal production methods to smaller and more easily constructed kilns (11iv, 27).

The scale of service activities (transporting, wholesaling and retailing) in this sector are by-and-large determined by the above demand and supply factors. Except in cases where supply areas are located close to markets (11i, 19, 20), human and animal transport tends to be succeeded by motorised transport, especially trucks (1, 2, 4, 8, 9). The number of operations is related to the supply of trucks, spare parts and fuel and the existence of entrepreneurs with sufficient capital to start their own business (8, 16, 23, 25). The existence of regulations and restrictions on the movement of forest fuels may prevent the development of larger-scale transporting, with "piggybacking" of small quantities on buses and trucks becoming the main means of transport (11i, 11ii, 17, 27).

The large amounts of capital (particularly start-up capital) required is also an important factor in restricting the number of large wholesaling operations (2, 23, 25). Retailing operations become more full-time and more financially rewarding in larger urban areas (17, 23). However they still remain overwhelmingly small-scale, with the low capital costs of entry and large numbers of people with few alternatives resulting in there being a ready supply of new entrants to the occupation (2, 17, 23, 25). The retailing and wholesaling activities can also be affected by the change in demand. A decline in household demand (15, 27) or an increase in the importance of commercial customers (13) both seem to result in a reduction in the number of traders (even though in the latter case quantities traded were increasing). In North-east Thailand the rise in the importance of inter-village trade has resulted in an increasing involvement of rural producers in the trade with former urban traders now employed in other occupations (27).
In addition to the annotated items that follow see also the following studies on this subject listed in the bibliography:

3. FUELWOOD AND CHARCOAL - SELECTED ABSTRACTS


Charcoal is the most important source of domestic energy for 70% of urban households in Ghana. The working hypothesis in this study - "transportation cost of charcoal is a function of size of load, distance traversed, and quality of road used" - is formulated to identify and explain the determinants of transportation costs of charcoal. About 80% of supply comes from the Savannah zone, and production is dominated by men except in the northern sector of the country where women figure prominently. The key identifiable modes of transport involved in the charcoal trade are headloading, motorised canoes, tractors and trucks. Transportation of wood to charcoaling points is either very minimal or absent as the Weberian principle of locating a processing unit at the source of heavy raw material inputs operates. The only exception is in the Anloga suburb of Kumasi where off-cuts from saw-mills are trucked in. The cost of headloading to the roadside represents 8-50% of the roadside price. In the main charcoal producing area in Ashanti and Brong-Ahafo roads are built to the charcoaling points and locally-owned tractors are used to deliver the charcoal to the roadside. Trucks are the dominant mode of transport for charcoal distribution. Most of the trucks used are imported used-trucks in the ten tonne capacity range, carrying 200% or more of the weights they are actually licensed to carry. Transportation charges are positively related to the distance and about 20% of haulage expenses goes into the purchase of fuel. Sample calculations of vehicle operational costs indicate that for conveying charcoal from Kintampo to Kumasi or Accra the vehicle operator makes about $100 and $180 respectively on a 50kg bag of charcoal or about 9% and 12% respectively of the final retail price to the consumer. Inefficiencies in charcoal transportation by specialised transporters in Ghana arise due to the poor quality of roads in the main charcoal producing areas and the number of days a truck may have to wait for a load in between trips. Many trucks also return empty to the charcoaling area after discharging the load in the urban centre. It is suggested that by forming a cooperative the charcoal traders could reduce these inefficiencies by encouraging companies and individuals to hire their services for return journeys and by improving communication in the charcoaling trade to enable better co-ordination between producers and traders. A more lasting solution of establishing peri-urban woodlots is also proposed.


This study of the fuelwood trade in Hyderabad was undertaken to fill part of the gap in knowledge of urban fuelwood use. It focuses on the following aspects: 1) estimating the quantity of firewood and charcoal arriving in a major Indian city, Hyderabad, in 1981; 2) analysing the organisation and structure of the trade; 3) analysing energy consumption patterns among household and commercial users in order to identify substitution possibilities for firewood and charcoal; 4) projecting fuelwood consumption to the year 2,000. Limited resources meant that the study focused mainly
on the consumption side of the fuelwood issue. Thus the details of the supply from private wood lands (where most of the fuelwood was found to come from) are not considered.

The study found that yearly consumption figures for firewood and charcoal for the city were 137,000 tonnes and 21,000 tonnes respectively. Private sources (i.e. non-government reserve forests) are by far the major source of firewood. Most pass through the wholesale centre (less through the retail market), but substantial supplies (about 25%) arrive directly from producers to consumers. Most charcoal supplies pass directly from 'producer' to consumer, even though retail centres are also a major source of supply. Wholesale centres are relatively unimportant. Trucks are the major form of transport for wood; rail for charcoal. In firewood, domestic consumers are the largest of the final consumers. In charcoal, commercial consumers are the largest. The household survey indicated that firewood was a major source of fuel only in the lower income households. Relatively small amounts of charcoal are consumed in households over a wide range of incomes. There are fewer sources of supply of charcoal than of firewood, and the average distance to them is much greater (224km as compared to 88km for firewood).

The fuelwood trade was found to be predominantly in private hands with little government regulation. In the six wholesale centres for firewood, commission agents, acting as intermediaries between buyers and sellers, auction the firewood by the truck load. Two of the wholesale centres account for 70% of all firewood arrivals in the city. The two smallest centres deal mainly in low-quality and low-priced firewood, delivered mainly by bullock cart. The real cost of firewood declined in the early 1970s, but has risen steadily since 1975; 1981 prices were about 30% higher in real terms than in 1975. The locations of the six wholesale charcoal centres are determined (as are the locations of the firewood wholesale centres) by proximity of supply and markets. Wholesale charcoal traders have to obtain a licence from the city administration to carry on trade. Of the seven wholesale businesses in the city (two are located in the same wholesale centre), three are owned by individuals, three by families, and one by a group of individuals in partnership. All the shops have considerable space (over 200m²), both covered and uncovered. Only one shop space is owned by the shopkeeper, while the remaining six are in rented premises. The monthly rent paid by the wholesalers for shop space varies from Rs 18 to 400 per month. The investment in the wholesale trade ranges from Rs 3,000 to 25,000, with an average of Rs 9,700. Four of the shops employ regular workers, while the others engage workers periodically as and when required. All of the traders have been in business for a long time - five for more than 10 years, and the other two for more than five years. Charcoal prices are not much higher in real terms than in 1975.

472 firewood retailers were enumerated in Hyderabad, although a number of other establishments who sell firewood along with other merchandise were not included. The scale of operations of the former establishments was typically small. Average investment is Rs 2,800. About 75% of the retail outlets are owned by individuals, and 25% by families. Less than 1% are owned and managed on a partnership basis. A large number of the retail shops are managed by women. In general, the income from firewood trade supplements the family income rather than providing the main source of family income. The retail outlets are clustered in those areas of relatively low-income
where the demand for firewood is greatest. Retail prices, closely tracking wholesale prices, fell in the early 1970s, but have since risen sharply in real terms, by 12 to 33%. There are a total of 115 charcoal retailers in the city, as well as 57 retailers who sell both charcoal and wood. Their average investment appears to be much higher, at about Rs 4,000, than in firewood retailing. As in firewood, though there are retail locations throughout the city, there is greater concentration in the central city. Prices of charcoal at the retail level have shown an upward trend since 1975, but this increase is not as marked as the rise in wood prices.

Estimated components of the final consumer price of 1 tonne of firewood are presented. The cost of the wood at the forest is about 18% of the consumer price. Transport, from the forest to the city gate accounts for 25%, retailers overhead charges for 12%, and the remaining 45% is accounted for by the profits of forest contractors, commission agents, and retailers. It is concluded that the retail end of the trade in both firewood and charcoal appears to be reasonably competitive, with a relatively easy access, large numbers of outlets and the possibility for consumers to bypass the retailers and buy direct from wholesalers. The wholesale trade also appears competitive. However, as little is known on the functioning of this market, it is suggested that the Forest Service should sell its wood directly in the auction markets rather than through a forest contractor. This would provide data on the working of the wholesale markets and ensure that the market is more transparent.


Fifty eight farmers in Barangay Pagkalinawan, Jalajala, Rizal were selected to determine and document the method and system of marketing charcoal. Respondents were mostly migrants from Batangas province who settled in the barangay more than twenty years previously. Very few of the settlers were engaged in charcoal production before their arrival in Pagkalinawan, but due to the abundance of woods and the high demand for charcoal from nearby markets, charcoal-making and selling became a very important source of additional income for the farmers. Average annual income was P8,165, and that from charcoal-making was P708 (range P100-P2,000). The pit is the only method employed by the farmers in the production of charcoal. Although it requires less capital inputs, this method was found to be inefficient and labour-intensive. Ipil-ipil, kakawate, and aroma gathered from the farms are the major source of raw materials for charring.

Charcoal-making is primarily a male task, associated with clearing and site preparation operations in the farms. It is concentrated during summer when farmers are not busy on other farm activities and transport and charring are not made difficult by the rains. The average frequency of charcoal-making by farmers was found to be five times in summer and only three times during the rainy season.

Most of the charcoal produced from the community goes to the market. Marketing is not organised. Rather, most individuals sell their products to farmer-middlemen or a few sell directly to the market any time at their convenience. The cost of transport is
relatively high so that fellow farmers who buy charcoal from the community and trade to dealers/consumers do so in bulk. Difficulty in obtaining sufficient charcoal and high overhead expenses reduce the ability of middlemen to pay higher prices to producers. The middlemen were relatively better off (some owned motorised banca) and engaged in buying and selling as one of their major off-farm secondary economic activities. Farmer-producers usually borrowed money from middlemen to be paid later with charcoal.

Although many farmers reported planting ipil-ipil for a number of end-uses, the recent infestation with psyllid had removed any incentives to continue this practice. Other sources of charcoal have also been steadily depleted.

The recommendations of the study include the encouragement of tree-planting; improvement in charcoal production methods; establishment of a charcoal-makers cooperative; better road links; planning charcoal sales for when demand is high; and investigation of alternative economic activities.


The fuelwood trade in the Sahel is part of the informal sector. Its organisational patterns are similar to those of traditional trade networks. Fuelwood is first cut into logs or faggots and then transported to roads, by either donkey carts or on human backs, and is taken to towns in small-capacity motor vehicles where it is usually sold to primary or secondary wholesalers. Within the towns the marketing networks are complex, involving many individuals from primary wholesalers to micoretailers who sell small volumes of wood chips measured by the 'plate'. A practical distinction can be made between two standard situations for fuelwood transport, depending on whether the predominant means of transport, usually trucks, is used on a specialised basis or whether fuelwood is carried by general goods carriers (as return journey freight). Analysis of firewood pricing structures for three Sahelian towns indicates that a relatively high portion of income (about 30%) and expenditure (40-50 %) remains in rural areas. Consequently there are reduced portions remaining for carriers and city retailers. This contradicts the "myth" of firewood trade generating large amounts of income for the "traders". However, such a generalisation should be avoided because of the specific situation in each town, particularly as regards transport conditions. Both in trade inside towns and in wood purchases in the bush, and then in transport to the towns, profit margins that were substantial in 1975 have shrunk considerably in recent years. Farmers in areas around towns are becoming more interested in firewood production, which can provide them with a reliable and regular flow of income so as to offset the disastrous effects of poor harvests. It is suggested that it may be possible to make them more aware of the potential of wood as a private income crop.


This is a study of the market for woodfuel in Nicaragua during 1979-84, its importance in energy supply, its role in deforestation, the nature of the woodfuel 'problem' and the appropriateness of government woodfuel policies. The research is
based on data collected during 1983-85, covering historical land use since 1950 and recent developments up to 1989. Half of Nicaragua's energy comes from woodfuel. This demand is expected to double by 2,000, mostly in the Pacific Zone, and to a lesser extent in the Interior Zone. The Pacific Zone has only 10% of the country's forest and 4% of its sustainable tree resources. Although there is no shortage of woodfuel nationally, scarcity is apparently increasing in the Pacific Zone.

The analysis of the woodfuel market is based on 201 interviews. The traditional supply of woodfuel was provided by either large estates (where transporters or dealers purchased from the landowners woodfuel which has been already cut, or the rights to cut), or alternatively from smaller properties where the wood was often cut by the smallholder. A cost breakdown shows 3-8% of the final consumer price accruing to the landowners, 20-40% to the woodfuel cutters and 10-30% to the dealers (with 30-60% being transport costs).

Large landowners allowed wood to be cut on their land for land management reasons rather than for the income they derived from fees. All the smallholders interviewed sold wood for off-farm income during the dry season when there was no other work available and transport was easier, but saw themselves primarily as farmers. In two of the supply areas for Leon most said they had been active in the trade for 12-15 years. The increasing distance to wood sources was seen as a major problem. There is also another group of woodfuel cutters who are hired by woodfuel dealers and see this as their primary occupation. In Las Maderas, the traditional woodfuel supply area for Managua, 16% of respondents identified themselves as woodfuel cutters. In the Department of Boaco in the interior zone farmers near main roads were found to be obtaining 50% of their cash income from woodfuel cutting and selling (25% in more isolated areas). The Director of the Peasant Programme in the Ministry of Agrarian Reform (MINDIRA), has called "maize the basis of subsistence and woodfuel the basis of accumulation" for most peasants.

Fuelwood transporters fell into one of a number of categories - comerciantes, running an entire operation including cutting, delivery and final sale; simple transporters to the city; individual farmers selling locally using a bullock cart; and co-operatives or syndicates. They identified their major problems as being difficulties in obtaining fuel and spares; depletion of nearby sources and increased time to find fuelwood; and prohibitions on the taking of green wood.

The study also identifies the importance of woodfuel supply from large-scale land clearance, particularly government agricultural schemes. Since the revolution these clearances have released large quantities of fuelwood onto the market, effectively flooding it and reducing the supply from traditional areas. Once these clearances end it is postulated that woodfuel prices, which have remained relatively static in real terms, would rise as producers have to travel further to obtain supplies. The dynamic of woodfuel supply thus depends more on land management for agriculture than on the market demand for fuelwood.

Future options for managing woodfuel supply and demand include taxation, organising transporters' co-operatives, and planting trees. Most probably, woodfuel will continue to come from existing resources, raising transport costs for vehicles and fuel. The
alternative costs of producing wood in plantations are compared to those of growing food.


The Kano Rural Energy Research Project was established to investigate the quantitative and organisational dimensions of wood fuel production, consumption and exchange, and the ecological implications of wood fuel resource management. This paper summarises some of the major and most interesting findings of the study. The area chosen for the study was the Kano region, in northern Nigeria, where a major urban metropolis is extending its firewood hinterland beyond the Kano close-settled zone (where intensive agroforestry is practised) to woodlands at ever greater distances.

This long term study shows how urban demands for fuelwood have affected local resource management systems. The commonly accepted hypothesis of an urban firewood hinterland constrained by transport costs to a proximate and widening zone around urban centres, and subject to progressive deforestation, is inappropriate under northern Nigerian conditions. The burden of providing for urban demand has been effectively shifted from the Inner close-settled zone to the further Kano region, but without deforestation of the near areas. The fuel hinterland of Kano has widened, with merchants taking advantage of improvements in the transport infrastructure, intensifying motor traffic and subsidised fuel costs. Farmers in areas close to the urban centre have retained and increased the tree cover on their farms with small scale production of wood fuel as a component of an intensive system of agroforestry.

In view of the evidence of the importance given by woodcutters to sustained yield, it is out of place to diagnose an ecological crisis in the local wood fuel hinterland of Kano, even under present conditions of inflation and recurrent food shortages. However, in the distant hinterland an ecological crisis is in the making, unrestricted large-scale cutting of firewood will lead to massive environmental degradation. It is these areas that are in need of immediate management with restrictions imposed on wood cutting.


This study is concerned with problems involved in the procurement and consumption of fuelwood in Haiti. It is based on a review of the literature and field research in three separate areas of Haiti. A study of the firewood procurement system revealed that the quality and accessibility of firewood are decreasing. One result of this has been the increased commercialisation of firewood distribution at the local level. Firewood is collected largely by women and children; commercial harvesters of firewood tend to be older women with no other economic possibilities. Individuals engaging in charcoal production also only did so when they perceived that they had no other economic alternatives. It is estimated that full-time charcoal producers can earn between $1.05 and $2.22 (at the extremes) in a six-day working week. Charcoal production fluctuates seasonally, especially as producers switch to attempts at agricultural production.
The most important factors in marketing strategies are capital, means of transport, distance from shipping points and degree of competition. Charcoal producers without any capital are forced to accept lesser payment in advance. Producers without means of transport must sell to intermediaries who make a modest profit on their investment. Intermediaries in turn sell to shippers who transport charcoal to Port-au-Prince via truck or sail boat.

Fuelwood procurement for charcoal production and the setting up of kilns are usually performed by individuals rather than groups. There is some group activity in areas which are still forested and experiencing the first wave of charcoal production.

A review of the history of charcoal production in the various research sites reveals certain similarities. Deforestation takes place more rapidly on public lands than on privately held lands. There is an increase in full-time participation in charcoal production by both men and women as production reaches a peak in an area, especially in time of drought. At such times there is also an increase in the number of outsiders involved in charcoal production. As deforestation proceeds, there is a decrease in both the quality and quantity of fuelwood resources.

Charcoal production is perceived by local people as the cause of deforestation. Poverty is seen as the cause of deforestation because only poverty leads a person to make charcoal. Rather than resentment against charcoal makers as destroying a natural resource, there is great sympathy for such people.

The study goes on to examine domestic firewood and charcoal consumption patterns and efforts at reforestation. Recommendations for future actions are made.


Appendix 8 of this thesis provides details of charcoal production, marketing and pricing in Kenya. Currently the largest sources of charcoal supplies for urban areas come from the non-sustainable "mining" of closed-forests, bush, and savannah rangelands. In both cases, charcoal production is largely the result of land improvement practices which are carried out in preparation for agricultural development. In some areas, particularly in arid and semi-arid lands, charcoal burning is being undertaken only to supplement household incomes and is not associated with any particular land clearance exercises. Charcoal becomes a dominant form of income generation and increases in intensity when other types of activities fail to produce sufficient household income, for instance, during the dry season or during extended periods of drought. Production from wattle bark plantations has also been an historically important source of fuelwood, and one which has again risen in importance in recent years. The coastal forests were important sources of supply to the charcoal export trade (banned in 1975).

In describing the present-day production from wattle woodlots, it is noted that traditional producers range from small (less than 10 sacks per cycle) to large-scale (more than 100 sacks per cycle). Conversion efficiencies are quite high, and the final
product of high quality. Burners work in teams, producing up to a dozen stacks for burning each month. Payment arrangements vary. Usually the landowner evenly splits the earnings from the sale of the bark and the charcoal with the burners. In other charcoal production systems in Kenya producers pay virtually nothing for their wood.

Transportation is the most crucial link between rural producers and urban wholesalers and retailers. The efficiency of this part of the supply/demand network is perhaps the most critical determinant of how, and at what price, charcoal will be delivered to urban markets. Transport from the roadside to the city contributes most significantly to the cost of delivered charcoal (45% of Nairobi retail price). Long-haul primary charcoal transporters operate wherever charcoal demands and prices are sufficiently high enough to guarantee a market for a lorry-load of charcoal. Most carriers are "return transporters", i.e. dedicated charcoal transporters who travel up-country empty and return with full loads of charcoal (only 10% were backhaul transporters, returning up-country with a load of goods for local delivery). Most common amongst the return transporters are those who operate exclusively in the charcoal delivery business. Drivers of these lorries are very familiar with areas where supplies can be obtained. They will buy only in relatively large quantities - 40 to 250 sacks from any single supplier. Suppliers may produce everything themselves, or instead will act as local marketing agents, collecting the production from numerous producers to sell to one transporter. Transporters will usually deliver to a number of urban dealers, or will sell a few sacks to small-scale dealers off the back of the truck. While return transporters, for the most part, operate independently of urban wholesalers and retailers, an increasingly common trend is the emergence of the retailer-transporter who either owns or has direct interest in a lorry. For high volume retailers who have access to capital, the acquisition of a lorry gives them much better control over their supplies and costs and enables them to widen their margins. These margins can be quite large. Transport problems during the rainy season reportedly lead to an increase of 10-40% in retail prices in Nairobi.

Transporters ultimately deliver their loads of charcoal to distribution points in the city, seldom delivering more than 100 sacks to a single dealer, and often selling single sacks off-the-truck. Dealers sell by the sack or by small quantities - usually in amounts of 1 or 2 kg (but by volume). Household users generally buy charcoal in small quantities, rather than by the sack (except around the end of the month when salaries have been received). In areas where there are high demands for charcoal, secondary retailers buy single sacks off-the-truck, and divide them, usually by volume, for sale to urban household consumers. The mark-up for small quantities of charcoal can be as high as 25 percent above the price of charcoal sold by the sack.

Effects on the price of charcoal have been introduced by: price controls on charcoal and paraffin; fluctuations in paraffin prices; paraffin subsidies; fluctuations in petroleum prices; export markets; monopolies on production and sale; local political events; and periods of low rainfall.

Price controls on charcoal are relics from the colonial era. Both charcoal and fuelwood prices are controlled. In practice, however, these controls are ignored, and they remain only due to political expediency. The main impact of paraffin subsidies has been to limit the consumer's exposure to large price fluctuations. Although the government's
Our current policy towards paraffin subsidies is that they are necessary to reduce charcoal consumption, since 1985 there has been no clear relationship between the price of paraffin and the price of charcoal.

Recent prices increases in charcoal may have been moderated by improvements in the transportation infrastructure in Kenya. Prices have increased since 1985, however. This may be related to slowing in the pace of land clearance, with supplies increasingly being produced as the sole object of land clearance (which raises costs). At the same time the proportion of charcoal supplied to Nairobi as a result of the burning of wattle has increased from 0.05% to almost one third. Movement and transport controls on charcoal transportation may have also limited supplies to the market (for example from the wattle woodlots of Murang'a - an historically important supply source for Nairobi).


This report summarises some of the key economic and financial constraints and opportunities for investments in the fuelwood/forestry sector in Sudan. It is based on information collected in Sudan in November and December of 1986. The principal commercial woodfuel in Sudan is charcoal. The charcoal market in Sudan is characterised by a complex network of entrepreneurs, agents, and labourers who produce huge quantities of charcoal in highly-efficient earth kilns, operating from as far away as 500 km from urban markets. This type of production is dependent on large, contiguous areas of savannah forests which, for the most part, are being cleared for agricultural development (rainfed mechanised farming schemes). In 1985 as much as 80% of Khartoum's demands for charcoal were supplied from Blue Nile and Kassala provinces. Here production is controlled, financed and organised by around 25 of the leading businessmen in the trade. These, in turn, employ between 1 and 3 foremen/agents who oversee production at particular sites and are responsible for recruiting anywhere from 50 to 100 labourers to work at each site. Labourers are drawn from a large pool of seasonal, migrant workers, mostly from Western Sudan, who are employed primarily in mechanised rainfed farming schemes. Charcoal production activities are financed by credit arrangements which are made between businessmen, agents, and labourers. During the earliest period of labour recruitment, charcoal prices are highest, and working capital is often generated by the sale of charcoal which has been stored since the previous season. As soon as charcoal production has commenced, additional capital is generated through the sale of charcoal, more labour is hired, and production accelerates. Some production will be stored in anticipation of higher demands between July and January and in anticipation of capital requirements to recruit labour in the fall, but the balance will be sold to settle immediate labour accounts. Production slow down in June and ceases completely from July when the rainy season commences.

The costs of wood used for making charcoal, accounted for by royalties collected by the Forestry Administration and by local authorities, makes up a very small percentage (around 4%) of the Khartoum retail price.

The market framework becomes quite complex from the point of production or storage to the market. The more integrated an entrepreneur is in the market structure, the
greater the profit margin and the greater the ability to compete in the market. Charcoal transporters travelling by road play a key role in ensuring that supplies reach urban markets in a timely and efficient manner. Charcoal transport can be especially cheap, as it is seen as a means of carrying a profitable load to Khartoum or to Port Sudan in order to pick up more valuable primary commodities for transport to the interior. Transport distance from centres of production in Blue Nile province to Khartoum are around 470km. Transportation costs account for between 20 and 25 percent of the Khartoum retail price for charcoal: the largest single cost-component of the retail price. Despite the very long transport distances which are involved, by comparison with other African charcoal markets, these costs are low (c.f. 45% for Kenya).

In urban areas, charcoal is generally delivered to large or medium sized depots (zaribas) for both wholesale and retail selling. Wholesalers generally sell by the sack. Retailers sell by the sack and small quantities (by volume). Examination of the long term price trends for charcoal show that real prices have shown little change over the period 1976 to 1986. Periodic fluctuations in the price of charcoal are the result of a range of factors, and are not solely accounted for by an abundance or scarcity of roundwood for burning into charcoal. These could include: petroleum price increases, increasing the cost of transport and of bottled gas for household use; good agricultural harvests resulting in higher labour demands and thus higher labour costs; high prices for agricultural crops contributing to higher rates of agricultural land clearing, increasing the supply of available wood; pressures on capital markets which have traditionally financed charcoal operations; efforts at price control could have contributed to hoarding and therefore higher prices; collusion among producers and dealers (although this is thought unlikely); and charcoal exports to the Middle East. Because charcoal is generally produced as a salvage operation - as a by-product of agricultural land clearing - the availability of future supplies will be defined by the extent of future land clearing activities. Mechanised farming is expected to move into South Kordofan, Upper Nile, and White Nile Provinces, and into Southern Darfur, and so these areas are likely to become major sources of charcoal in the future. Labour costs are predicted to be lower in these areas whereas transportation costs will be higher. The net effect on the price of charcoal is calculated as being a 5% annual increase over a period of 5 years.

Finally the author considers the economics of developing sustainable systems of production to meet market urban demands. He concludes that, except for wood which is grown very cheaply and close to urban markets, it will be cheaper to continue transporting traditionally produced charcoal from great distances for some time to come.


After an introduction to marketing in tropical countries (which covers both general features and the marketing of forest and tree products), the results are given of a survey carried out in Gunung Kidul in 1986. The survey was conducted by interviews at 2 levels: the assembly level (rural wood trading middlemen) and the urban market
level. Descriptions are given of the survey villages (which were selected to cover a variety of land uses and locations) and survey markets.

The wood marketing system is described as traditional (i.e. it has no price coordination by public or governmental bodies), and is seen to be less efficient than systems marketing other products, although its structure is competitive. The dispersed and small-scale production of wood typically leads to the high profit margin earned by the wood-traders. Recommendations for actions in the sphere of marketing focus on reducing the marketing margin (consisting mostly of traders’ return). It is suggested that this may be achieved not by improvements in transportation (as the road network is well-developed) but rather through economies of scale achieved by increasing the supply of wood with reforestation and tree-planting schemes.


i) Wood energy flows, RRA study in Pokhara, Nepal: reports on fieldwork carried out in the summer of 1990. The study area is located in Kaski district in the Western Development Region of Nepal. The business of supplying woodfuel to the major town of Pokhara has recently become very profitable. Although the industry is traditionally considered to be a low status activity in Nepal and participants appear to be mostly from low-income groups and the low caste "untouchables", increasing numbers of urban people, and those of higher caste and socio-economic status participate in it. The main source of wood energy, both fuelwood and wood for conversion into charcoal, is government forest. Exploitation of government resources for cutting either fuelwood or timber is prohibited by law. In practice, villagers make extensive use of the forests and considerable illegal cutting is common in the hills surrounding Pokhara (as it is throughout Nepal), although there is always the risk of being caught by forest officials. In the Pokhara urban area and the countryside around it, major participants in the fuelwood production and distribution system include: fuelwood producers, market travellers, roadside vendors, bus and truck operators, and middlemen. Similarly, in the charcoal production and distribution system, the participants involved are: producer, market travellers and middlemen.

Most of the producers are landless labourers or very small land owners who depend on the sale of fuelwood for earning their livelihood or to supplement their income from other work. Such people have very few economic alternatives because the traditional occupation associated with their caste is already overcrowded, generating intense competition. Most of the people engaged in the production and distribution of fuelwood do this work mainly in the winter months when there is nothing to do in the fields. Fuelwood collecting for sale also peaks during days of the new moon or the full moon (when, according to traditional belief, agricultural work is inauspicious) and during the week before major festivals when villagers require cash for food, clothes, etc. Women mainly collect dead branches and twigs and leftovers of felled trees. Men cut large trunks into pieces and then split the pieces into smaller ones for use as fuelwood. The two day's work of collecting a backload of fuelwood and then carrying and selling it in
Pokhara brings in about Rs 50-60 (U.S.$1.66-2.00). This is about the same as two days wages for working in the village.

Bus and truck operators driving to Pokhara from distant places act as fuelwood middlemen, buying a few small bundles of split fuelwood from roadside vendors or middlemen and reselling them in Pokhara. The findings of the team suggest that this type of fuelwood entrepreneurship started about five or six years ago. It increased in 1989 because of a trade blockade by India, which led to severe fuel scarcity and the relaxation of forest protection activities by the government officials. Up to 4,000-5,000kg per day comes into Pokhara this way, although truck and bus drivers are limited in the amount that they can carry (both by forest officials' advice and by lack of space). Profit margins for this business are very high. One group of middlemen is the shopkeepers who buy backloads from villagers at the entry points into the town, making an average Rs 5-10 (U.S.$ 0.17-0.33) per backload of fuelwood. The degree of involvement varies, although some traders are reported to make considerable profits solely from the fuelwood trade. Traders who purchase wood from the incoming trucks and buses usually engage in the trade as a secondary business to supplement income from their shops.

The charcoal production system is also dominated by members of low income or low caste groups. Often those from the blacksmith or goldsmith castes will sell charcoal to fellow villagers or in Pokhara, as well using it in their work. Although the activity is illegal it is the most economically attractive alternative for its participants (returns to a father and son were 2½ times those from construction labouring). Men are involved in the production of the charcoal, the seasonal pattern of production and sale of charcoal is similar to that of fuelwood. It is usually women who take the charcoal to the market. Producers also sell to middlemen, again these traders are often metalworkers. The largest customers are the metal workers of Pokhara or the surrounding villages.

ii) Rural-urban dependence on wood energy in a selected area in Laguna province, Philippines. A rapid rural appraisal: reports on an intensive study of woodfuel use in the municipality of Siniloan. Although the population of this area has been steadily rising since the beginning of the century, a new wave of migrants arrived during the 1980s, attracted by the potential profits to be made by producing charcoal and fuelwood from the abundant woodland and the extensive conversion of forests to agricultural uses in the pioneer upland settlement areas. About 60% of the woodfuels for the town of Siniloan come from upland barangays (villages) of the municipality, the balance comes from neighbouring municipalities. The producers are mostly subsistence farmers in the uplands, exploiting their lands or forest lands. For most of them, charcoal and fuelwood are an integral part of the management and expansion of their kaingin farms. Wood for charcoal production becomes available after an area is logged over and again when it is initially cleared for cultivation and maintained later in the cycle. Some people, particularly landless people or those with low productivity farms, also make charcoal as a primary source of income. They often procure wood from other farmers, under a number of arrangements including provision of 1/3 of charcoal produced to the farmer and payment in wood for clearing operations. Other individuals become more involved in charcoal making during times of cash needs, when typhoons destroy crops, or when they are waiting for their farms to become productive. When charcoal-making started in the area in the early 1980's the main source of wood was
from the nearby University of the Philippines - Quezon Land Grant. After logging, and before establishment of plantations, salvaging groups were contracted to clear damaged and defective trees from the area. This served as the major source of wood for charcoal and fuelwood makers. Presently the newly logged-over areas are more than 15 kms away from the main road of barangay Magsaysay where charcoal makers reside. This makes it impractical for charcoal makers to get wood from there. Fuelwood production for sale also occurs in the study area. The bulk of fuelwood production activities are done by women and children. Fuelwood production in the area is declining as the preferred fuelwood species become less abundant.

A number of constraints and issues related to the charcoal production industry are considered. Problems that producers mentioned include the health hazards involved in charcoal making, the declining accessibility of the source of wood materials, and transport problems. It is also speculated that recent agrarian reforms may result in fewer full-time charcoal makers, as the farmers spend more time working their land. Others who make charcoal as a supplementary source of income may be inspired to pursue agricultural activities more aggressively, which may have an effect on charcoal production.

After processing and packing, charcoal makers transport their produce to roadside traders. To ensure that they will have charcoal to sell, especially if they already have orders from lowland buyers, roadside traders often give cash advances to some charcoal makers and then deduct this amount from the cash value of the charcoal delivered. Some local traders also provide subsistence allowance to certain producers who are waiting for the "harvest", this is often used as a way of ensuring supplies during the wet season. Direct buying (cash on delivery) is usually done by assembler-transporters who collect and deliver charcoal in bulk to commercial users, town traders and urban traders as far away as Metro Manila. Transport to Siloan and other towns in Laguna province is by delivery vehicle or hired jeepney. Transport to Manila is made difficult by checkpoints along the road at which documentation and proof that the charcoal is from a legal source may be required. This encourages transport of smaller quantities (20 to 50 bags) on passenger jeepneys, which are not checked at monitoring stations. Although some individuals have made considerable profits from charcoal trading, generally profit margins are not very high and volume and frequencies of capital revolving must be high for an enterprise to be very profitable.

The price of charcoal is generally lower in the dry season due to the better transporting situation, lack of labour requirements on-farm, better charring weather, and the need on the part of producers to earn income to use as capital for wet season farming.

The problems of traders and retailers related principally to the inconsistency in the enforcement of regulations and changing policies of regulating agencies and dishonesty/non-commitment by producers and other traders.

Although the quantities of charcoal traded are declining as raw material supplies diminish, the study concludes that wood fuel production in the area seems to be emerging into an industry unto itself, and one which is a valuable component of the subsistence economy. In some areas it seems that wood fuel is produced in a sustainable manner (e.g. through the pollarding of *Gliricidia* spp. and *Leucaena* spp.)
for fuel). In other areas tenurial arrangements and the growing demand to convert land to agricultural purposes, coupled with the income that people can expect to receive from wood fuel production, has gradually replaced more sustainable patterns with a more extractive system of wood fuel production. It is suggested that there are many opportunities to turn wood energy production into an (additional) income generating activity in the uplands in the same way that it has become a flourishing industry in the lowlands.

iii) Rural-urban interdependencies in the commercial wood energy system in Majalaya sub-district, West Java: reports on the woodfuel trade in the subdistrict town of Majalaya. While households use kerosene more than fuelwood or charcoal, sidewalk food vendors, small restaurants and small industries all rely on fuelwood for most of their energy needs. As in other regions, charcoal producers in Majalaya sub-district come mainly from low income rural families. They are small-scale farmers or landless labourers who engage in charcoal production to supplement inadequate incomes. Charcoal production is an activity usually performed by men only. Charcoal makers are usually backed by an investor who has obtained a concession from forestry officials (sometimes the investor does not obtain a concession and the wood is taken illegally). Usually charcoal makers work in groups for a company. There are also some small-scale producers who get their own raw materials from the forest illegally. Production of charcoal from on-farm tree resources is rare. People usually make more money by producing charcoal than by working as agricultural labourers, but the risks are higher. When working on a farm, a labourer would be paid Rp. 1,250-1,500 (U.S.$0.68-0.81), plus lunch, for a workday lasting from seven a.m. until one p.m.. But the average net income from making charcoal is about Rp. 2,000 (U.S.$1.08) per day.

Farmers who are involved in charcoal production as an off-season supplementary economic activity will often carry and sell charcoal in town. A second system involves charcoal makers selling their labour, but at higher wages than they would receive for agricultural work. This system is more elaborately organised, usually by relatively well-to-do absentee middlemen. It has larger working areas and better transportation facilities. There are seven such big middlemen living outside the production area. This second production system provides a greater and more regular supply of charcoal to Majalaya town than the system composed of small-scale individual producers. Middlemen supply retail shops in town where the inhabitants purchase their charcoal. These retailers also buy from the small vendors who have brought their charcoal to town. The bulk of charcoal produced is used either in food processing or by small industries.

Commercial fuelwood gathering is also carried out in the forests to the south and south-east of Majalaya town. Again fuelwood pickers are usually landless or near-landless. This work pays less than farm labour. Adult men, women and children are all involved. Although the activity goes on to some extent throughout the year, it is more common and more productive during the dry season, when movement in and around the forest is easier. Other employment opportunities are also scarce during this time. The gatherers are divided between "professionals" who usually have a vehicle to transport the wood and sell fuelwood in large amounts, and "amateurs" who usually sell fuelwood by the pikul (in lots of two small bundles) in individual transactions.
Amateurs can earn about Rp. 1,500-2,000 in a two day period. Occasionally they band together to hire a vehicle to transport their wood to a better market - this can raise returns to Rp. 2,750-5,000. Although tree-cutting is forbidden and gatherers claimed only to take dry wood, fresh fuelwood was frequently observed on the market. Fuelwood is either sold direct to customers by producers or sold to middlemen based in Majalaya town.

iv) Urban-rural wood energy interdependency in a district of Northeast Thailand: the study area for this research was the municipality of Ban Phai, a district seat in Khon Kaen Province in North-eastern Thailand. In this area woodfuel consumption has been decreasing in urban areas as incomes have risen. Most of the surrounding forest lands have been cleared for timber and fuel and converted into agricultural land. Changes in agricultural systems have also resulted in the removal of large numbers of trees from farmlands. Most of the charcoal makers of years past have turned into full-time farmers. Only those who have no other economic options, such as landless villagers, now earn their living by making charcoal or selling fuelwood. Those migrant villagers who arrived in the area in the early 1970s and turned to making charcoal for their livelihood are still, for the most part, landless villagers. Another group of low or middle income land owning households occasionally make some charcoal for home consumption and sell some once in a while to get additional income. Most wood for producing charcoal now comes from privately owned or claimed lands and from village common lands. Only small dead trees not fit to use for lumber, branches stumps and roots, or crooked trees are available for making charcoal. Landless producers of wood energy are forced to "beg, barter, buy, or even collect without permission" from those who have a source of wood. Wood scarcity has also resulted in a change in production methods with much smaller kilns and ones which can be built with little labour input.

Fuelwood production is not carried out commercially in Ban Phai. Supplies come from a neighbouring district where landless labourers are the principal producers. They supply fuelwood instead of charcoal because they get cash quicker and they do not know how to produce charcoal.

Those producers who make charcoal for sale but do not want to take it to Ban Phai market themselves, usually sell it either to those fellow villagers who do charcoal retailing in town on a regular basis or to collectors who serve as local middlemen. Any distribution of charcoal outside the producer's own village is greatly affected by legal regulations. At present only a few types of vehicles are used to carry charcoal from production sites to the market: small and medium-sized trucks owned by local middlemen, mini-buses running from the villages to town, and horse carts: pushcarts are not used to transport charcoal. This may be because the charcoal-producing villages are so far away from town. The big buses do not permit charcoal aboard because it is too dirty.

Retailers of charcoal include rural retailers (mainly women, earning low incomes from this activity), some of the urban collectors and small stores.
The woodfuel trade is briefly reviewed. Production by rural households is often an irregular activity, dependent on the season and economic conditions. Fuelwood is transported by various means ranging from shoulder and headloads for short distances to the use of draft animals, bicycles and other means for longer distances. For long distances or for larger quantities, trucks are used, though they are avoided where possible due to high costs. In fact, many other types of transport are common, such as buses and logging trucks, often carrying bags of charcoal and bundles of fuelwood. Fuelwood traders tend to buy supplies where they can, and do not normally have a regular supply source through the same people or from the same forest. Bigger traders tend to buy fuelwood in the form of larger pieces or trunk wood, which they sell as such to fuelwood retailers or chop into smaller pieces, either for sale to retailers or directly to consumers. Big consumers, e.g. brick and roof tile factories, often bypass the system by either buying directly from harvesters or middlemen or by employing their own labour to cut and transport fuelwood to the factory. Charcoal is used to a relatively small extent. The use of it is mainly limited to southern Vietnam, where it is typically used for cooking. Ho Chi Minh city is a major market for charcoal producers, as charcoal is made from mangroves and hardwoods growing nearby. It is commonly sold by producers to urban wholesalers in sacks of 25-40 kg, which are transported by trucks and boats to urban areas. There the charcoal stacks are sold first to retailers and vendors, who in turn sell charcoal to households by kilograms.

Reports on the features of charcoal production, trade and marketing in Gujarat. The study revealed that in Ahmedabad city itself charcoal continued to be used by a large number of manufacturing and service industries. Traditional uses of charcoal for domestic cooking and textile processing have drastically declined because of the rising price of charcoal. Outside Ahmedabad, the calcium carbonate and calcium carbide industries consume sizeable quantities of charcoal. It is noted that about 90% of charcoal which was routed through Ahmedabad market actually came from only 4 districts of Gujarat. All these four districts fell into the low rainfall region of Western Gujarat. The trend also indicated that charcoal was produced in relatively drier regions with irregular rainfall. Supply patterns from these districts were also not regular. Informal discussions with the trade revealed that charcoal manufacturing provided much needed employment during stress years. Most of the charcoal produced comes from *Prosopis juliflora* stands growing on wastelands. A case study in Vadgam village on cultivating *Prosopis juliflora* in problematic soils showed that it was economically more favourable to use wastelands for *Prosopis*-based charcoal production. Marketing of *Prosopis* as fuelwood was less beneficial than selling it as charcoal. A well developed market in Ahmedabad for charcoal facilitated the success. Although with charcoal production administrative formalities are reduced, the procedure for
harvesting and converting *Prosopis* into charcoal remains cumbersome, involving seven separate administrative steps.

While charcoal arrivals in Ahmedabad market are increasing, the number of active traders is declining. Instead of retailing charcoal to the local small users, traders are now despatching nearly 80% of the arrivals to almost 180 towns and cities spread all over the north and north-western parts of India. This is coupled with the decline in demand from household users and increased demand from industries. Active traders and their Association are unfamiliar with the new users of charcoal and, therefore, of the marketing functions to be performed. Cheaper production from southern states, such as Tamil Nadu, is increasing competition in the trade. The demand for charcoal exists and appears to be growing. Therefore, a need to step up production systems appears highly desirable as charcoal meets important development objectives like improvement of wastelands, development of drought-prone areas, promotion of farm forestry, generation of income/employment and the fulfilment of needs for cottage, small-scale, and other industries. It is suggested that charcoal production should, therefore, merit stronger policy support.


This volume presents papers from an expert consultation held in Chiang Mai, Thailand, on 23-27 February, 1993. In addition to a number of papers dealing with data collection and analysis, summaries of the FAO RWEDP field document No. 42 and Panya et al. (1988) are given.


This study focuses on marketing of wood fuels in Peshawar city, Pakistan. The national picture reveals an apparent decline in the role of wood fuels, with growth in consumption considerably less than for gas and kerosene. A sample survey of households in Peshawar city conducted in 1992 revealed that 38.7% of the households use natural gas, 33.8% use kerosene, 13.4% use wood fuels, 7.8% use LPG and 6.3% use cow dung. A household's choice of cooking fuel is influenced mainly by the availability of natural gas supply in the area. Other factors include household income level and occupation of the head of household. The choice of fuelwood is associated with the non-availability of gas and a low level of household income. Most of the fuelwood supplies come from the natural forests in tribal areas (50%), some from the Punjab (16%) while the remaining 34% is derived from local farmlands, sawmill offcuts, etc. The future demand for wood fuels in Peshawar market will largely depend upon the supply of natural gas. If the gas supply system were to be extended to all areas, the demand would be expected to drop drastically. However,
even under the most optimistic scenario, the fuelwood demand is likely to remain at the present level.

Distribution takes place through middlemen which include local assemblers and retailers. There are about 200 retail fuelwood depots in Peshawar city. Trucks are the preferred transport mode for wood fuels from the production sites to Peshawar. The transport distances involved are far, with 200km in the case of supplies from the tribal areas and about 350 km in the case of supplies from the Punjab. The current retail price per maund of 40 kg varies with species, from 50 rupees to 65 rupees. Charcoal sells at 5 rupees per kg. The profit margin of local assemblers and retailers was found to be about 12-14%. The middlemen rely on non-institutional sources for finance.

The study recommends that in the future the marketing effort will have to be directed towards retention and expansion of the existing market system.


This report focuses on a particular fuel resource area around Pyinyaung and Yinmabin of Thazi Forest Township, a hilly region which supplies fuelwood to the central plains of the dry zone. Fuelwood gathering and selling is considered as a secondary source of income, particularly during the off-farm season. Most of the people involved with woodfuel are young. The Forest Department at Thazi issues identity cards for genuine woodfuel gatherers. Traders are expected to use only registered woodfuel gatherers and they should keep a list of those gatherers under their control. Only those gatherers who are registered and appear on the list are allowed to enter the area for which an extraction permit has been granted to the traders. The same relationship exists between gatherers and middlemen, who are often employed by traders on a per truck or piece-rate basis. Most woodfuel gatherers work for the woodfuel traders and/or middlemen in their own villages. The relationship between them is simple and based on trust and legal contracts between them do not exist. The traders and/or the middlemen normally pay a certain amount of money in advance to the gatherers. The gatherers deliver woodfuel to the woodfuel yard or depot of the trader. The income of fuel gatherers from fuel collection is considerable but their socio-economic status is quite low, mainly due to the increase in the price of essential commodities.

Nearly half of the woodfuel traders are engaged in trade of bamboo fuels. Traders prefer bamboo because permits are not required for extraction (unlike fuelwood and charcoal), extraction levies need only be paid once, and recruitment of workers is easy as even youngsters can be employed in cutting and transporting the culms. Woodfuel traders are much better-off than the collectors but their net income is declining due to the increase in the price of oil and spare parts for transportation. In addition as supplies have dwindled and prices have risen, consumers have switched over to less expensive alternative fuels such as rice husks and mesquite wood. This, in turn, has resulted in many woodfuel traders switching to other trades, mainly in transportation services along the Yangon to Mandalay highways.
This report presents the results of a local study of woodfuel trade in the city and province of Cebu, Philippines. The province is widely regarded as one of the most environmentally denuded areas in the country, with less than 1% remaining forest cover and severe soil erosion throughout the island's extensive upland areas. Woodfuel use remains widespread in Cebu, with 90% of rural and 60% of urban households still dependent upon various forms of biomass fuel for some or all of their cooking needs. Fuel-choice decisions in the residential sector appear to be strongly affected by income, with 75% of the low-income households utilising woodfuels as their primary cooking fuel while 80% of high-income households utilize LPG. Between 1960 and 1990, the percentage of households in Cebu City using fuelwood as their primary cooking fuel declined from 92% to a little over 40%, with LPG use increasing from 1% to over 30%. The absolute number of households utilising woodfuels as their primary cooking fuel, however, actually increased by close to 10,000 due to a near tripling of the residential sector population. Woodfuel-using businesses and institutions account for 37% of the fuelwood and 49% of the charcoal consumed annually in Cebu City. The larger commercial establishments were found to be receiving much of their woodfuel directly from rural traders, by-passing the urban trading network altogether.

The bulk of commercially-traded woodfuels in the province are produced from planted trees grown and managed on agricultural lands. Fast-growing varieties like Leucaena leucocephala and Gliricidium sepium account for close to 60% of fuelwood (excluding non-woody biomass) and over 70% of charcoal being sold. Fruit bearing trees are the second most important source, but only fallen branches or storm-damaged trees are used. Naturally-growing trees species from shrub and secondary forest areas in the central Cebu hillylands still provide some wood for the fuelwood and charcoal trade, but much less than in the past. On the whole, however, most of the commercially-traded woodfuel in Cebu meets government requirements of originating from a planted variety harvested from titled lands. The existence of a strong urban demand for woodfuels even appears to have induced more widespread tree-planting by Cebuano farmers, a development which is beneficial both in terms of the environment and for rural living standard as well.

Fast-growing tree species like Leucaena and Gliricidia are typically harvested on a two-year rotation, with the most common approach being to coppice these trees at a height of about 25 cm above the ground. Depending on conditions, harvested trees are either cut up for fuelwood bundles and/or converted to charcoal at the point of extraction, or are hauled as is to a roadside for further conversion. Most charcoal is produced in simple earth-pit kilns. Smallholders growing trees in woodlots or as part of an agroforestry approach will tend to harvest these trees on their own. In cases where trees are being grown in larger fallow areas or in plantations, cutting and conversion is usually done by tenants and/or hired wood-cutters on either a sharing or wage basis. The harvesting and conversion of trees for sale in commercial woodfuel markets of the province is estimated to provide at least supplemental employment and income to 35,000 rural families, or 15% of the population.
There is no single "system" of rural woodfuel trading in Cebu, instead the approach taken and the number of intermediaries involved varies greatly depending on distance to the city, the fuel being traded, and the history of the commercial woodfuel trade in that particular area. Rural traders were found to perform a critical role in the trade, expending large amounts of time and financial capital in the process, and earning returns generally commensurate with their effort and the risks involved in the trade. This contrasts with the widely held view of them as "exploitative middlemen".

Woodfuels are transported from rural to urban areas in a variety of conveyances. Six-wheel drive cargo trucks with capacities of from 2 to 10 tons generally ply the longer-distance routes originating from points north and south of the city. Passenger jeepneys are more commonly used for loads of woodfuel originating from mountain barangays west of the city in the Central Cebu hillyland area. Although there was significant variation throughout the province, wood-cutters and charcoal-makers typically earned from 30 to 50% of the final selling price of these fuels, landowners 15 to 20%, vehicle owners 10 to 25%, rural traders 10 to 20%, and urban traders 10 to 20%.

Of all the woodfuels originating from rural areas of the province and ultimately consumed in the urban areas, close to 80% first pass through the hands of one of hundreds of woodfuel wholesalers and retailers found throughout Metro Cebu. Large wholesalers stock bulk fuelwood logs and sacks of charcoal for sale to bakeries and other commercial establishments. Small retailers carry split fuelwood sticks in bundles weighing as little as .6kg each, and re-packed charcoal in cellophane bags of ten weighing only .2kg each, for sale to low-income residential consumers. With a few notable exceptions, the urban woodfuel traders were found to be relying on this activity for most of their income, and they generally belonged to a lower socio-economic bracket than their rural counterparts. They also reported that the business is less profitable today than in the past due to a combination of increased competition in the trade and fuel-switching in urban households and commercial establishments.

The study recommends a change to the way that the woodfuel trade is regulated in Cebu. The regulations that are currently in place are largely ineffective and may be discouraging more wide-spread tree-planting on the part of farmers. An alternative regulatory system is proposed which is based on the licensing of larger traders and enforced solely on the basis of tree species being shipped, as opposed to the current system which attempts to determine the origin of each shipment. Further examination of the total potential woodfuel supply on the island, the costs and benefits of improved end-use efficiency programmes, and the potential for propagation of fast-growing tree species primarily for woodfuel purposes are also recommended.


This paper examines interactive change and adaptation of human and natural systems in two pioneer forest communities in the Philippines. Annual cereal and cash cropping did not prove to be either profitable or sustainable because of high rainfall, weeds, insect pests and poor soil. A shift to root and mixed perennial cropping was made, financed by boom and bust incomes from small-scale logging and charcoal making. In Calminoe illegal logging was the principal income earner. Charcoal production was
carried out for about one year but ceased with the depletion of logging slash and competition from more accessible areas such as Magsaysay. Barred from logging by legal loggers (and the resulting depletion of timber), residents of Magsaysay instead planted homegardens and practised shifting cultivation. They also cut fuelwood and produced charcoal when fuel prices increased nationwide in 1984. 61% of families engaged in charcoal production, an activity undertaken solely by men, providing them with an average US$357 p.a. - by far the largest source of family income. Only 12% of families were involved in the fuelwood trade (in which women also participated), it contributed only US$28 p.a. to family income.


This report presents the findings of an action-research project to assist women fuelwood carriers in Addis Ababa, Ethiopia. Women and children backloading mostly branch-wood and leaves supply about one-third of the town’s fuelwood requirements. In spite of the extremely arduous work, they have very low incomes and belong to the most disadvantaged sections of the society. For want of alternative livelihoods, the women contribute to the depletion of the peri-urban forests of Addis Ababa. Guarding and harassment have been ineffective in dissuading the women from pursuing their illegal activity.

A revised estimate puts the number of urban-based fuelwood carriers at well over 10,000 women and children. Women were found to walk 30 km on average (round trip) and to carry an average load of 30 kg. Studies of the fuelwood supply system (not under the project) suggest that human and animal transport are very competitive and would probably continue to play an important role, but the former would only be acceptable if the drudgery of the work could be alleviated.

Socio-economic surveys revealed that about half the carriers had been on the job for 1-9 years only. More than 40 per cent are below 20 years of age. Migration is a major reservoir of new entrants into the occupation. About 60 per cent of the carriers are the heads of their respective households. Education levels are low: almost three-quarters of the carriers are illiterate. Housing, water supply, access to health services and child care facilities are all extremely poor.

Of an average working day of 10 hours, about 7 hours are spent fuelwood gathering and carrying. Two-thirds of the women depend entirely on fuelwood carrying for their livelihoods. The remainder get some additional income from farming, food processing or handicrafts. The monthly expenditure of a household ranges between 24-54 EBirr and averages 37 EBirr (US$18).

Self-help groups were set up to enable the women to improve their present situation. Interventions proposed by the women all aimed at finding an alternative occupation. Such activities included grain-grinding, soap-making, vegetable farming and beekeeping with ornamental plant production. It is also suggested that while alternative sources of income can be developed, these will have to be complemented by a lasting
solution on the forestry side. Unless the carriers are integrated into forest management and harvesting in an orderly and legal fashion, intolerable working conditions and forest degradation will continue because new carriers will take the place of those transferred to other jobs.


The introduced legume, Prosopis juliflora (Swartz) DC, has aggressively invaded almost all the waste lands in a number of Indian states. Cutting and selling *P. juliflora* as firewood has been observed to provide off-season employment to a large proportion of the "economically backward classes" (at least 10% in Andhra Pradesh). The present study was conducted in Raichur district, Karnataka, to investigate the economics of this activity. Over 80% of the 45 families interviewed gave *P. juliflora* cutting and selling as their main occupation. All were landless agricultural labourers with few possessions other than a pair of bullocks, bullock cart, one or two axes and a temporary house. The cost-return analysis, on a per unit basis, indicated that the profit per cartload of fuelwood was Rs 26 and Rs 34.5 in the case of long and small sized wood, respectively, showing a net return of Rs 10.76 and Rs 11.78 per man day. However, considering the total quantity of wood handled, the net returns over paid out costs accrued to a family were Rs 24.61 per day. Hence, the additional net return per family over total cost was Rs 3.75 per day, compared with that earned in agricultural labour. Similarly, the employment generation potential of the activity was considerably higher (at 250 man days per year) than that for agricultural labour (208 man days per year).


A survey of fuelwood sellers and commercial charcoal makers was conducted in the wood-scarce province of Ilocos Norte in the Philippines as part of a study of rural energy consumption and policies. The woodfuel enterprises are small-scale (usually involving no more than 2 people) and dispersed; many of the participants are involved in this occupation seasonally or part-time (39% for less than 3 months p.a.). Retail prices vary according to location, volume of sale, responsibility for delivery and special relationships between the seller and buyer. Nearly half of the sellers grow their own wood, while one-sixth are middlemen and a few collect wood for free. In contrast to household collection which is often a task for adult females and children, commercial cutting and transport of fuelwood is usually handled by adult males. Most sellers retailed along a street within a town or village, the remainder either delivered direct or sold their produce at a local market or along a road leading to a town. Household income was significantly related to total revenue from selling firewood even though most firewood sellers had additional sources of income from other occupations. Annual household income had a mode of P6,375 in urban areas and P4,750 in rural areas; mean gross revenue from firewood sales was P680 around which there was substantial variation. A government project for the production of dendrothermal electricity from fast-growing wood plantations may cause disruptions in the fuelwood market if the associated plantations are unsuccessful.
Charcoal is unimportant as a marketed fuel in the area but this is expected to change after construction of two government pig iron blast furnaces to be operated with charcoal as the fuel. The pig iron project would require improvements in the efficiency of charcoal production and the quality of the output.


This paper details the conflicts between users of a forest resource, showing how urban needs for firewood are threatening the local economy of a rural village. The economy of Sussex is primarily dependent on two renewable natural resources: fish and trees. The local wood cutters collect most of their fuelwood from the lower slopes of the peninsula mountains which are separated from the flat degraded land by the main road to Freetown. The mountain slopes are privately owned up to the Government Forest Reserve boundary. The local woodcutters do not have formal or financial rights of access agreements with landowners. However they are not physically prevented from entering the area or harvesting firewood. Shebro women (who tend to be poorer than the local Creole population) collect the majority of fuelwood that is used in Sussex and some of the woodcutter women are also commercial fishmongers. Amongst this group of female woodcutters are six women from different tribes (Mende, Temne). They operate as woodcutters and traders throughout the year, selling fuelwood to the fishmongers and to the Creole women who do not cut and collect their own firewood but who depend on it for cooking. A few unemployed males (non-Sherbros and Sherbros too young to be fishermen) also cut wood to sell in Sussex but only in the dry season.

In recent years, however, the woodcutters have been joined on the lower mountain slopes by urban woodcutters and traders - mainly males of the Fullah tribe. The Fullahs have formal and informal financial arrangements with the landowners in Freetown for entry to these lands to cut firewood. The Fullahs have acquired a reputation of being very industrious and this characteristic extends to their woodcutting activities on the lower slopes. Large trees are felled, split into firewood with axes and the tied bundles are then left to dry for a few months before they are transported to the city. They also harvest the forest regrowth, cutting all coppice wood and small trees which are popular locally, leaving no regeneration. Groups of 2-4 men work from early morning until mid-afternoon, every weekday during the dry season and 2 days each week during the rainy season.

The stress that local firewood demands are placing on the forest resource have been estimated to be sustainable from the forest. However, if the male urban woodcutters/traders are permitted by absentee landowners to continue and even to expand their exploitative operations on the lower mountain slopes, then the local community and in particular the women fishmongers and woodcutters will suffer. A number of alternative approaches to the situation are suggested: 1) do nothing, 2) allow urban traders to cut and collect firewood in the Forest Reserve, 3) reduce the demand for firewood in the capital (through stove programmes) and 4) help the Sussex community to put pressure on the absentee landlords, to stop them allowing urban
traders access to their land, and giving local woodcutters priority over rights of access to firewood on the land.


The study investigates factors affecting the level of household firewood energy consumption in Sierra Leone. It briefly considers the characteristics of firewood producers - most of whom are women, although women are increasingly being replaced by men in firewood provision because of the increased distance to the wood sources. In both the rural areas around Bo (southern Sierra Leone) and Makeni (northern Sierra Leone) the quantity sold per household (4.1 tonnes and 4.4 tonnes respectively) just exceeded the quantity consumed (both 3.5 tonnes). The quantity collected was negatively related to income - more was collected for the market the poorer a household was. In the areas studied men provided over 20% of the total firewood sold. Returns to labour at Le1.07 per man-equivalent day for rural Bo and 0.46 for rural Makeni were only slightly less than for upland rice production.

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In the rural areas the marketing of firewood is still not highly developed. Most activity is located near to main roads leading to urban areas. Incomes are generally used to augment household income - the average household income from selling firewood for rural Bo was Le56 p.a. and Le27 for rural Makeni (average per capita incomes Le219 and Le196 respectively).

87% of urban consumers obtained their fuelwood through a chain of middlemen. The distances to the sources of firewood were progressively greater for Makeni, Bo and Freetown. This was reflected in the price of fuelwood - the price in rural Makeni being 13.3% of that in Freetown.

In the urban markets it was found that 80% of sellers were female. The market is still extremely fragmented with many small vendors selling "hand to mouth". Many of the economic variables show a trend from Makeni (average annual household income Le1,709) through Bo (Le2,005) to Freetown (Le2,800). The proportion of full-time sellers increases from 58% for Makeni (through 80% for Bo) to 85% for Freetown.

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The percentage contribution of firewood income to average annual household cash income also increases from 4.6% in Makeni to 42.8% for Freetown (Bo, 10.1%). Monthly sales range from 0.5-1.7 tonnes (for more than 60% of sellers) in Makeni to 6.7 tonnes (for most sellers) in Freetown. Labour inputs, usually from family members, are 42, 90 and 218 man-equivalent (ME) days for Makeni, Bo and Freetown respectively. Returns per ME-day in Freetown are slightly higher than two times the wage rate of Le2.50, returns in Bo and Makeni are slightly below this wage rate.

High capital costs are associated with both transporting operations and also selling operations in Freetown. Only people with high levels of capital can undertake these activities.

The report presents the results of research carried out in 1983 on aspects of the trade in firewood between urban Gaborone and rural Kweneng in order to understand trends in firewood demand and supply. Trade between Kweneng district and Gaborone is seen as a major factor contributing towards the deflection of this energy source in the district.

Most firewood cutters were of low socio-economic status, engaging in the activity to supplement their incomes due to low agricultural productivity and recurrent drought. They harvested wood from up to 15 km around their homes, devoting an average of 20 hours per month to this activity. Monthly earnings were slightly lower than the lowest paid industrial workers in Botswana. The study recommends enforcing existing legislation on the cutting of live trees, and programmes of afforestation in urban areas and reforestation in rural areas, both accompanied by integrated rural development.


The charcoal industry supplying Nairobi has been estimated to provide employment to 40,000 full-time, itinerant or intermittent charcoal-makers. The key dynamic factors in its expansion have been the accelerating urban growth, agricultural land clearance and the sector's profitability (especially for dealers). Demand, mainly from urban areas, is growing at 6.7% p.a.. Of the enterprises sampled in this study, 26% were small-scale (employing 1-2 people), typically supplying local markets with a small surplus sold at the roadside; 64% were medium-sized (3-5 people), selling charcoal to Nairobi-based transporters; and 10% were large-scale enterprises (employing usually 15-20 people) and fulfilling long-term contracts to supply specific Nairobi-based transporters.

A gradual decline in the number of full-time producers (mostly found in the high agricultural potential zone) is noted, they now represent only 3% of enterprises. Seasonal producers, who produce charcoal when woodlots mature, when there is a drought or crops fail or when cash is needed (e.g. for school fees), make up 78% of the total number of enterprises. Finally there are the casual or infrequent producers who, in contrast to the other two types, normally use makeshift techniques and trees felled for other purposes (usually for land clearance). Profits to charcoal makers over the charcoal cycle can be about 2.5 times (KSh 39) the official minimum farm wage, depending on the technology, efficiency, distance to market, input costs and tree species. Capital productivity is also high. These incomes generally form only a small part of the total income of the charcoal-maker.

Although transport to the roadside (usually by the seller using headloading or donkeys) and within the city (via push carts or bicycles) are important, the major transport business is trucking the charcoal from the roadside to the city. Enterprises at this level have grown both in number and operational complexity. Each truck usually employs a driver and two or three workers. 60% of the trucks surveyed were involved full-time in
transporting charcoal. Good returns can be made by the driver (KSh 2,500 per month), proprietor (KSh 5,800-7,600) and assistants (KSh 900), with transporter/dealers making more than simple transporters. Although other trucking business may be more profitable most trucks are old and therefore unsuited to formal sector work.

Retailing (and to a much lesser extent, wholesaling) provides probably the largest number of full-time jobs in the charcoal industry. In some densely populated areas 95% of the full-time charcoal sellers are women. In most other residential areas the selling business is dominated by men - they represent 85% of all retailers and wholesalers. These selling enterprises, which offer stable self-employment (average 3 years in full-time operation) are generally growing in number rather than size, springing up in every new residential area established. Profits to wholesalers are high, averaging KSh 6,000-7,000 per month on a turn-over of 600-700 bags. With a net profit of KSh 15 per bag and typical sales of 3-5 bags per day, an average retailer can expect a daily income of KSh 45-75. This compares favourably with and is in many cases better than incomes earned by workers with qualifications and skills similar to those of the charcoal retailers - many of whom are women assisted by their older children. Frequently, however, they have problems in passing on price rises to the consumer and often make a loss on sales.


Chapter 4: The firewood trading system. This chapter examines in detail the system of firewood marketing in Pakistan. Results from surveys suggest that close to 45,000 traders are involved in this system, employing just over 85,300 people. Three quarters of these workers are permanent (including enterprise owners) and the vast majority (85%) are employed in the retail sector (as are the vast majority of part-time workers). On average, firewood retailers have 1.42 permanent personnel including the owner and 0.59 workers. Wholesalers have about 70% more staff, with an average of 2.61 personnel and 0.78 part-time workers. Total firewood sales for all traders amounted to roughly Rs 11,300 million in a full year - Rs 100 annually for every person in the country or close to 10% of the value of all Pakistan's exports in 1991-2.

Three broad categories of trader are identified: 1) retailers (and a very few wholesalers) operating in villages; 2) retailers and wholesalers operating on roadsides outside urban centres; and 3) retailers and wholesalers operating in urban areas. Many firewood traders also deal in timber. Retailers frequently cut out the middleman and buy wood direct from producers, while wholesalers often sell direct to the final consumer.

Analysis of urban retail firewood and kerosene prices shows that whereas firewood prices have increased overall by some 40% during the 35 year period between 1957-92, most of this increase occurred in two distinct jumps in 1973-74 and 1980-82, with fairly steady or falling prices in the intervening periods. These price trends are not taken as indicating a scarcity of firewood resources, rather there is a strong suggestion
that firewood price changes have been determined to a large extent by the price of the main competing fuel - kerosene - and possibly also by diesel prices, which have moved in step with kerosene, and their effect on transport costs. The second steep rise in firewood prices in 1980-82 coincided with a near doubling of kerosene prices following the 1979 global oil price rise. The first large firewood price increase coincided with the large world oil price hikes of 1973/74, although the match to Pakistani kerosene price rises is less clear-cut. While the free market prices for timber and firewood have increased very sharply since 1974/75 the controlled prices of the major crops (wheat, rice and cotton) have declined in real terms by about 15-30% over the 1957-92 period. The policy of holding down crop prices has a major effect in making farm tree plantations more economic than agriculture.

The majority of firewood and timber entering commercial markets comes from farmland trees, in particular, larger-scale farm tree plantations (c.f. boundary plantings). Typically trees are sold standing to a "farm commission agent" - a specialised rural wholesaler who may be working on behalf of an urban trader - or to a local trader, usually with a roadside yard to facilitate onward transport and sales to passing truck drivers. The tree price is normally negotiated only through visual assessment of the standing wood volumes.

Just over half of all the firewood traders operate in rural areas (villages), 17.2% work from roadside depots, and 32.4% are found in urban areas. Supply routes to rural consumers are relatively simple, passing either through rural retailers or through the roadside yards. Urban consumers obtain their supplies from either urban retailers or urban wholesalers, who in turn may be supplied either by the roadside yards, rural wholesalers or direct by the producer.

Trader incomes are determined by a number of factors but depend most on the turnover and percentage mark-ups. When urban, rural and roadside retailers were compared the percentage mark-ups were found to have a small range - from 26% to 37% - with an overall average of 30%: atypical figure for this type of commodity according to the market research consultants who conducted the survey. The traders who are doing best - the roadside retailers - are doing so mainly because of their larger sale volumes, although they also have the highest percentage price mark-up. Annual net margin (or owner's income) for a typical roadside trader was Rs70,000 (US$ 2,800) which is approximately double the typical annual earnings of a skilled urban manual worker such as a carpenter or mason. The average urban and retailer business, with net incomes of Rs 38,000 and Rs 43,000 respectively, gives the owner an income only a little higher than these craftsmen. Considerable differences in traders earnings were found between regions with Sindh being relatively low (due to low mark-ups and volumes) and Baluchistan relatively high (due to high volumes traded by roadside and urban traders and high mark-ups by roadside and rural traders). The author suggests that there may be an element of "profiteering" by the Baluchistan traders who, with scarce local supplies, are in command of a strong seller's market.

The wood trading system involves large volumes of freight traffic - of the order of 107 million ton-km for the month of the survey. Much of this (93%) is accounted for by Baluchistan, which only reported 45% of wood bought in the most recent purchase. This is largely attributable to the very long haulage distances, which range from an
average of 138 km for roadside traders to 546 km for rural retailers. For the same reason, the unit cost of transporting wood was by far the highest, at Rs 284 to Rs 353 per ton, as is the share of this cost in the total landed cost (27% to 35%). The author suggests that firewood supplies and prices to this area, and also some large cities in other provinces could be severely affected if transport costs (e.g. diesel prices) increased markedly. There are large differences in the unit costs of wood transport - i.e. the costs per ton-km - with very low values for the long haulage trips to Baluchistan, with a range from Rs 0.55 to 0.85 per ton-km, and tend to be highest where trip distances are short. This phenomenon is explained by the way in which truck operators who do most wood hauling over medium to long distances use a two part tariff: a fixed overhead for undertaking a haulage trip at all and a distance-dependent price. The latter rises with distance but with a marginal rate of less than unity. As a consequence the average cost per ton-kilometre falls as the haulage trip increases. Lower costs for long-haul trips are also partly explained by the use of larger trucks, and the frequency of "back-hauling" in which trucks pick up wood for their otherwise empty return trip to the city after delivering goods.

The author concludes that the wood trading and transporting system performs with good economic efficiency, with operators making reasonable but not excessive profits. There is therefore little that the government can or should do to intervene in this complex free market.

However, it is suggested that there is one important measure that the government could undertake to promote tree growing and wood production while at the same time holding down consumer prices. This is to reform and simplify the presently inconsistent, poorly understood and frequently abused system of taxes on the export and import of wood across provincial and district boundaries. These taxes can be large in comparison to wood producer prices and transport costs, eating into profit margins and incentives for tree producers as well as transporters and dealers. The author suggests a country-wide review of these taxes and also the permits and payments for wood harvesting required in some provinces, with a view to simplifying them and standardising them and then publicising the changes.

The author also suggests that the government should educate farmers and provide them with good information on the true value of their products and how best to sell them to various markets. Farmers frequently sell their standing trees at low prices because they have little idea of the actual volumes, weights and wood quality they are selling. This recommendation relates much more to the sale of wood as timber than as firewood.


This report summarises the findings of a study of the small-scale charcoal production and distribution system in sampled sites of six provinces of Northeast Thailand. It was found that charcoal is produced in rural areas for two basic reasons: 1) to provide an alternative or supplementary cooking fuel for use, particularly during the rainy and agricultural seasons and 2) to generate needed household income through sale. At
present, the people who engage in small-scale charcoal production and distribution in the studied sites tend to be members of medium or lower income rural households, the latter including the landless. Charcoal activity tends to be most pronounced among, and most critical to, households at the lowest end of the income spectrum because many have few or no other options for income generation. The involvement of medium and medium-low income households seems to be sensitive to yearly or seasonal variation in the success (or the lack thereof) of other economic activities (e.g. agriculture). Small-scale entrepreneurs have in the last decade also become extensively involved in the transportation and sale of charcoal. At present, they appear to be the dominant actors in the transporting of charcoal, both within rural areas and from rural areas to urban areas. During this same period, there has also been a decreasing involvement of larger-scale middlemen, wholesalers, and retailers who once dominated the rural to urban flow of charcoal as well as its sale in urban areas. Various factors appear to be involved in this changing pattern of actors, e.g., the increasing difficulty of moving larger quantities of charcoal at any one time due to new regulations and more effective enforcement, a change in the supply and spatial distribution of wood resources (smaller and more dispersed resources) in many areas which favours the production and distribution of smaller amounts of charcoal, and finally the increased knowledge of small-scale, village-based entrepreneurs about urban markets.

The data gathered by the field research strongly suggest that most lower or medium income households which produce charcoal obtain the wood they use from privately owned or claimed lands and common areas rather than from areas of reserved forest. Increasing wood scarcity has led to dead wood, prunings, stumps and branches being used, species selectivity is also rare now.

Some producers with no other economic options make charcoal throughout the year to meet the year-round demand of urban areas. Many others are seasonal producers who make charcoal during the dry season to prepare for their own later needs and to generate needed additional household income during the off-season. Smaller and more temporary kilns are used as wood resources become more reduced and dispersed. The use of more permanent fired-clay kilns is restricted to areas where there is a continued availability of smaller quantities of wood from the same general area. It appears to be particularly favoured in Sisaket province where small wood resources in paddy fields are increasingly managed in an apparently sustainable manner.

Charcoal is sold within villages (it is also shared, bartered or borrowed), to neighbouring villages and to urban areas. Inter-village distribution seems to be a relatively new but increasing phenomenon and directly linked in most cases to an increasing scarcity of wood resources in other areas. It may also be linked, to a lesser extent, to changes in employment patterns in villages near urban areas (as more people find work in the towns) or to increased off-season farming (e.g. tobacco planting). The study found that the transportation of charcoal to other villages and to urban areas involves a number of different types of small-scale entrepreneurs, including individuals who push cartloads of charcoal, who transport charcoal by bicycle or motorcycle, or who take advantage of the local bus system to move charcoal. Sometimes these individual are specialists, sometimes they are producers as well as transporters. In general, transporters move small amounts of charcoal, although the amounts are often in excess of the legal limit (0.5 cubic metres). Cart pushers and cyclists moving
charcoal into urban areas can either sell their charcoal directly to urban users or they can sell it to urban retailers who resell it. In many areas transporters using the bus system to take charcoal into urban areas are frequently met at the bus station by charcoal retailers, in other areas, such as Nakhon Phanom and Sakon Nakhon, however, these bus travelling transporters are often local traders who market charcoal, along with other goods, in urban areas. Interregional movement of charcoal produced in rural areas of the Northeast to urban points outside the region is believed to be substantial although this trade was not examined in detail. Much of the distribution seems to involve small-scale, part-time entrepreneurs, for example, truck drivers and other motorists transporting amounts of charcoal that are basically within the legal limit in order to supplement their income. Although demand from urban areas may decline in the future as a consequence of rising incomes, it is thought that this will be off-set by increased use and purchase of charcoal in many rural areas due to an increasing scarcity of wood.


The results of a survey into fuel use in urban Bangladesh are presented. The fuels considered include wood, gas, kerosene, electricity and other biomass. The survey shows a dominance of biomass use except in towns where natural gas and LPG are available. The consequences of this for energy planning in Bangladesh are discussed.


This report is based on the findings of a technical and economic assessment of charcoal production technologies. Whilst much of the report is concerned with comparing improved against traditional kilns, the charcoal trade itself is briefly detailed. The major source of wood for charcoal manufacture in Somalia are the woodlands and wooded bushlands which comprise just under half of the total land area. The principal locations for access to the Mogadishu market are in the Bay region, 300-350 km distant from the capital. In the Bay region, producers are licensed by the National Range Agency to exploit given areas and live trees are felled. In the Lower Juba region only dead or "over-mature" trees are used, most biomass cleared for large-scale agriculture is burned. The Cadceed Charcoal Production Co-operative supplies most of the charcoal needs of Mogadishu. Fuelwood is mainly supplied by the Galol Wood Production Co-operative. The Cadceed co-operative has 114 camps, mostly in the Bay region. Camps consist of: a manager, who normally resides at a nearby town or village; a foreman; and around 14 charcoal workers and their families. Cost breakdowns show that transport, wages and equipment (drums for flattening into the metal sheets for covering the kiln) are the major components of the co-operative's production and distribution costs. Distribution from the producers in the Bay region to Mogadishu is by means of trucks and trailers hired by the Cadceed Production Co-operative. The charcoal, transported loose, is weighed on arrival at Mogadishu where it is then purchased by the Xilaac Marketing Co-operative whose members represent 349 charcoal stores in the city. There is no central charcoal store and Xilaac Co-operative distributes the charcoal direct to the retailers without transhipment.
storekeepers sell well above the official retail price. This introduces an element of inequity, the producers adding most of the value (but with payments to them stringently controlled against weighbridge receipts) but the storekeepers receiving the lion's share of the proceeds. It is suggested that decontrolling both wholesale and retail prices may be more equitable.
4. FOREST FOODS

4.1 Introduction

Forests can provide a number of food and beverage products, some of which have become commercialised. The production, transport and trade of four groups of products - bushmeat (or game meat), fruits and leaves, beverages, and leaf wraps and plates - is considered below, followed by a discussion of common patterns of change (and differences) in these industries.

4.2 Employment and income

Employment figures for the forest foods sub-sector are almost totally absent. This may partly be a result of the illegal nature of some of the activities (e.g. bushmeat and palm wine), the fact that many collecting activities are also for subsistence use, and the seasonal nature of some of the activities. The study of uppage collection in Karnataka, India, found that at least one woman from each household in the study villages collected uppage during the season (7). In the Ashante region of Ghana, it was found that the collection of food wrapping leaves was the major source of income in some villages, and in many it was the main source of income during the early rains (6i). Caldecott (3) found that hunting represents the major source of income for many rural people in Sarawak. Marketing and processing aguaje provided employment and income to over 500 people (mostly women) in Iquitos, Peru (17).

Income data is more available. For hunting, Anadu (1) found that in south-western Nigeria the average monthly incomes from the sale of bushmeat were three times the national minimum wage at the time of the survey. In the villages around the Korup National Park in Cameroon it was found that hunting is the single most important source of cash income for the majority of village households and for the village as a whole (10). On average hunters earned approximately 350,000 CFA per annum which accounts for approximately 38% of total village income. Trappers earned on average approximately 75,000 CFA which accounts for 18% of total village income. Falconer found that the bushmeat trade in southern Ghana could be particularly lucrative for wholesalers, with retailers receiving similar returns to other NTFP retailers (6ii). The sale of fruits provided the inhabitants of Combu Island, near Belem in the Brazilian Amazon, with a "reasonably high level of income" (2). The $2,265 p.a. which was earned from the sale of açai (out of a total of $3,171 from açai, rubber and cacao) compares well with the $1,828 p.a. earned from the sale of all agricultural products by shifting cultivators in Tomé-Açu, Pará. In the southern Indian state of Karnataka it was found that more money could be made collecting uppage fruit in good yield years, than could be earned working as temporary field labourers transplanting rice (7). Padoch found that the trade in aguaje could be very lucrative, especially for the large-scale wholesalers but also for many of the smaller retailers and vendors of the raw and processed fruit (17). Although she does not provide income data, she estimates that the earnings of one retailer on a good day were eight times the official minimum wage.
In contrast to these general findings, those of Lim et al. (12) in peninsular Malaysia may point to the future prospects for these products as economies develop. They discovered that the sales value of NTFPs (mostly food items) was low compared with other goods and they provided a below average income for sellers.

4.3 Bushmeat

The hunting of game animals for meat is, in most of the examples found here, a part-time activity (1, 6ii, 21) although in the areas surrounding the Korup National Park, where hunting appears to be of particular importance, hunters would on average hunt for sixteen days of the month (10). In most cases it is a year-round activity, though there is an increase in intensity during agricultural slack seasons (1, 6ii, 10). Hunting is almost exclusively a male pursuit (1, 3, 6ii, 10). One of the major investments for hunting is a gun and ammunition (6ii). The lower financial investment required is one of the reasons why more men were actively involved in trapping than hunting in the Korup National Park area (10). In some cases meat undergoes some primary processing (dressing, cooking or smoking, etc.) before sale, although few details are provided on this (3, 6ii). In most cases the game laws which apply to the hunting of wild animals are ignored or circumvented (1, 10, 21). Wild animals are frequently treated as a common property or, more commonly, an open access resource (3, 6ii). Hunting pressure often appears to have resulted in a decline in animal populations with smaller species and those species that can survive in agricultural areas remaining (1, 3, 6ii, 10). Evidence from Cameroon points to a reduction in the availability of meat in rural areas as supplies have been diverted from rural subsistence use and markets to the Yaounde market (Franqueville, 1972).

Although in Ghana it was found that most hunters sold their catch in their own village (6ii), in other areas improvements in access to markets (as a result of improved transport and storage facilities in Sarawak (3) and as a result of logging operations in Congo (21)) have resulted in large increases in the sale of game meat to urban markets. Increased demand has also resulted from increasing urbanisation (21) and perhaps also increased incomes (6ii). A variety of marketing channels may exist (3), often these are well-developed and highly commercialised (1, 3, 6ii). Traders, particularly wholesalers, can make substantial profits (1, 3, 6ii). In the market in Kumasi, Ghana, wholesalers play an important role in ensuring the continued supply of meat by providing financing and credit services to hunters, traders and chop bar owners. In West Africa women dominate both the wholesale and retail sale of bushmeat (1, 6ii).

Most of the studies make recommendations about management of the wildlife resource. Usually these relate to the control of hunting (with the enforcement of existing laws), creation of reserves and sanctuaries and the domestication of preferred species (1, 3, 10, 21).

4.4 Fruits and leaves

The collection and sale of forest fruits is heavily dependent on the natural fruiting season of the trees (2, 7, 8, 13). Generally, this restricts activities to a only a few months in a year, although in the case of the aguaje palm (Mauritia flexuosa) fruiting can occur throughout the
year with only a short period of relative scarcity between mid-August and mid-November (17). During the peak fruiting season the collection and sale of fruits can become the primary economic activity (2, 7, 8). Variability in yields between years can greatly influence the degree of involvement and the returns obtained (7, 17). The degree of involvement can also be highly dependent on agricultural practices (8), although in the case of uppage collection in Karnataka (7) the relatively high returns have resulted in an increase in its collection even though the fruiting season coincides with the rice paddy transplanting season. Little can be concluded on the gender division of labour, except that it appears to be dependent on cultural factors as well as a number of other factors, such as socio-economic status, caste status, etc. (7, 8, 13, 14, 17). In the case of uppage collection the study suggests that men may take over collection as the activity becomes more profitable (7). Considerable differences were found in both Orissa (8, 9) and Karnataka (7) between rich and poor collectors. Wealthier collectors were able to store fruit and take advantage of higher prices later in the year (7), they were also able to hire workers to collect produce for them and had access to more lucrative marketing channels (8, 9). Nationalisation and sale of forest produce by state governments in India is concluded by one author (9) to have benefited government by earning more revenue, rather than to have assisted tribal development. In Peru, the government requirement for commercial harvesters of aguaje to obtain a licence and pay a tax has discouraged small-scale extractors and resulted in production being dominated by large-scale dealers (17). Collectors of the fruit are hired labourers, recruited by an extractor-contractor.

There is often no sharp distinction between wild and domesticated sources of fruit tree products. Although in some cases the majority of the trees are naturally occurring and unmanaged (7, 8, 16, 17), often there is some degree of management ranging in intensity from selective weeding and thinning (2) to planting and management in common or state lands (11, 13). In a number of cases access to fruit tree products is restricted by tenurial claims (2, 7, 8, 9, 11, 13), often based on land claims or on active management. In Orissa (8, 9), access to trees in village lands is highly dependent on class and caste status. Differences in access to trees can make a large difference in the pattern and quantity of collection (8, 16). The existence of oligarchic forest, such as those in the Amazon floodplain (2, 18, 17), can be important in greatly increasing the income from collection. Destructive harvesting activities have had negative impacts on resource quality in a number of cases (2, 7, 14, 17, 19, 20). In the Peruvian Amazon the increase in these destructive harvesting techniques is directly linked to the commercialisation of the products (20). It is suggested that in the case of the Brazilian Amazon land reform may result in more sustainable management practices (19). Deforestation has also significantly reduced the availability of forest produce in Orissa (8, 9), with the poorer members of communities being most affected.

On Combu Island in the Brazilian Amazon, where land tenure is relatively secure, management practices can result in significant economic gains for producers (2). Increased commercialisation appears to be one of the factors in encouraging the increased planting of petai in Malaysia (13). In the Peruvian Amazon native fruit species are increasingly being grown as crops (20).

Although in most cases fruits do not undergo any significant processing before marketing, some processing may occur where only part of the fruit is required (7). In Iquitos, Peru (17)
the processing of aguaje fruits to produce drinks, frozen drinks and popsicles was carried out exclusively by small-scale enterprises, although the manufacture of aguaje ice-cream was performed by larger, "more professional" (17) operations. Few studies provide much detail on the marketing of forest fruits. Generally marketing channels appear to be relatively undeveloped. This may be a result of the short distances to markets for a number of fruits, necessitated by their perishability (19). A positive aspect of this may be that a higher proportion of the sales value accrues to the producers (19). The aguaje trade in Iquitos contrasts with this general picture (17). The license-holding dealers who dominate the trade appear to benefit most, and the marketing system is relatively complex with wholesalers, secondary wholesalers, retailers and secondary retailers of raw fruit and retailers and vendors of processed products (17). The importance of the dealers, the relatively large size of Iquitos and the variety of forms in which aguaje is sold may all contribute to this marketing structure. Patterns of marketing in India appear to have been heavily influenced by government intervention, although even in cases where state corporations are now responsible for marketing many of those involved previously are now agents of the corporations (8).

It is difficult to make any conclusions on demand prospects for this group of forests foods, as many of the products have attracted the attention of researchers simply because their markets are expanding (2, 7, 13, 19, 20). However, it is possible that those factors responsible for the increased commercialisation of these products (increased urbanisation and increased popularity of certain products) may equally apply to other fruit and leaf products. It may be significant that in Malaysia it was found that of the few NTFPs that continued to be consumed by households as markets became a more important source of goods, all but one of these products were foods (12).

4.5 Beverages

The production of (mainly alcoholic) beverages can be a source of supplementary income in some areas. No general statements can be made from the few studies identified here. In Natal, South Africa, palm wine tapping was found to occur equally throughout the year (4). In Orissa it was found to be dependent on the flowering of the tree from which the liquor was produced (8). In most cases tapping was not destructive in Natal (8). Palm wine tapping was performed by those unemployed or to supplement incomes. The money earned could be used for a variety of purposes including the purchase of goods, payment of school fees and the payment for the assistance of herd boys. In Orissa (8) the relatively wealthy families often owned flower-producing trees near their homes. While they mostly used these flowers for producing liquor, the poorer families depended on the flowers for nutrition.

4.6 Leaf wraps and plates

The production of wrapping leaves in Ghana (6i) and the production of sal plates and thals in West Bengal (15) share some features, although the end markets for the two products are different (general trading and food vending in the former and marriages and ceremonies in the latter). In both cases it is women who are predominant in production. Both have fluctuating
patterns of supply (due to supply of labour or leaves) and demand (due to harvests or marriage/festive seasons). In both cases it is poor communities who are involved in the activity. In Ghana the collection of leaves serves an important role as a buffer in times of scarcity and instability (6i). The producers have no usufruct rights to the source of leaves. In Ghana there is limited evidence to suggest that supplies are dwindling although it is not clear how widespread such a decline may be (6i). In India the supplies are threatened by the increasing establishment of monoculture plantations in place of natural sal forests (15). A variety of trade patterns existed in Ghana with some established wholesale traders relying on produce to be brought to them at the central market, some buying leaves at regional markets and villages, and a further group of rural-based traders who combined this activity with other urban trading. Retail traders were again mainly women and purchased leaves direct from gatherers or from wholesalers before carrying the leaves around the market to sell to other traders. Wholesalers (Ghana) or contractors/middlemen (India) can receive high profits from their trading activities. Retail leaf traders in Ghana earned considerably less than wholesalers and, with the exception of Kumasi central market, only engaged in trade on a part-time basis.

Markets for these two products seem assured, at least in the short- to medium-term. Food vendors in Ghana have few alternatives to Marantaceae leaf wrappers and the use of plastic bags by traders is restricted to areas which are more distant from supply sources and prices for leaves are consequently higher. The introduction of sal thals (sal plates with a plastic liner) has helped this traditional product to maintain its popularity in India.

4.7 Patterns of change

Although some of the dynamics of change in these industries have already been discussed, this final section will consider whether any common patterns can be identified from the assembled evidence. In most of the studies it appears that the demand for forest foods is increasing, primarily as a result of a growing urban population and improved infrastructure allowing access to markets (1, 3, 6ii, 7, 13, 17, 19, 21). This increase in demand has usually stimulated an increase in the number of people involved in production rather than any great change in the organisation of production (3, 7, 13, 21). In a number of cases the increased demand has resulted in resource degradation as unsustainable harvest levels or destructive harvesting practices have become more common (1, 3, 7, 10, 17, 20, 21). In a few cases the increasing commercialisation of forest foods has resulted in increasing management (2, 19) and, in some cases, domestication (11, 13). This has principally occurred with fruit tree species. In those cases where no controls on harvesting have been introduced and enforced or where management of the resource is absent, the future sustainability of the activity is questionable (1, 2, 3, 14, 17, 20).

In addition to the annotated items that follow see also the following studies on this subject listed in the bibliography:

5. FOREST FOODS - SELECTED ABSTRACTS


Results from interviews with hunters and bushmeat traders in Bendel State, Nigeria are presented. Only six of the twenty hunters interviewed were full-time hunters, the others being schoolteachers, roadside mechanics, farmers, etc. who hunted for the pot and/or to supplement their income. Average monthly incomes from the sale of bushmeat were calculated to be nearly three times the national minimum wage at the time of the survey. Hunting was found to take place in all months of the year, but became more intense during the dry season. Game animals were found to be shot and sold with little regard to existing laws, with the result that the larger mammals have become rare in Bendel and populations of the smaller ones have come under severe pressure. The bushmeat trade is highly commercialised, and substantial profits accrue to middlemen (who were almost exclusively women). It is suggested that the wildlife resource can be conserved through a combination of education, better enforcement, the creation of reserves and sanctuaries and the domestication of preferred species.


This article examines the production of extractive products in the Amazon estuary, taking the case of Combu Island, located 1.5 kilometres from the major port city of Belem, as an example. The floodplain forest here is dominated by a few species, many of which are of economic importance and form the basis for extractive economies. Over half of the families on Combu own land, 23% have free access to forest resources and 24% have restricted access through contractual arrangements. The area of floodplain forest outside the house garden is managed at low intensity to eliminate or reduce undesirable species and favour desirable species. On Combu, açai palm is the most important component of forest-based extraction systems, as well as of the entire island economy; in fact, this species has recently overtaken rubber as the highest revenue-generating extractive plant resource in the Brazilian Amazon. Açai is also the most ecologically abundant tree species in the floodplain forests of Combu. In addition to a wide range of subsistence uses, açai furnishes two products that have a significant role in regional markets: edible fruits and palm hearts. The fruits of the palm are used to make a thick beverage that serves as a staple food both on the island and throughout much of eastern Amazonia. Açai's clumped habit makes palm heart extraction analogous to pruning: the process results in the demise of stems but not of individual palms, which include a cluster of stems that regenerate readily following selective cutting. Palm hearts are not part of the popular diet in the Amazon estuary, and a regional market for this product developed only in the 1970s, when other extractive sources of palm heart (i.e., nonclumping palm species) had been destroyed in southeastern Brazil. In many areas of the Amazon estuary, palm heart extraction is undermining fruit harvesting of açai, due to indiscriminate cutting of stems.
Inhabitants on Combu Island and at numerous other locales in the estuary reconcile these two activities by applying selective pruning (rather than clearcutting) of acai stems. These practices result in substantial economic gains for extractive producers.

Acai production exhibits seasonal peaks, corresponding to the peak fruiting season from April to November. Fruiting of cacao from December to March allows the sale of this product to complement the production from acai. Data from five producers on Combu Island indicate that reasonably high levels of income can be obtained from extractive activities. Sale of acai gave an average return of $2,265 p.a. out of a total income from rubber, cacao and acai of $3,171 p.a. (compared with $1,828 p.a. from the sale of all agricultural products by shifting cultivators near Tomé-Açu, Pará). Not only is the gross income derived from extraction greater, but it exhibits less variability from year to year, thus reducing risk - a crucial factor for small-scale producers.


Wild meat is routinely sold for cash throughout Sarawak, although in some communities it may be more often bartered (or just shared). Where cash is involved, marketing may be handled by the individual hunter selling to his neighbours, through shops in the larger longhouses, or through organised meat-trading facilities in the towns. Distribution may be by longboat and foot, by road, or by river express, and meat processing and storage may be by simple dressing and cooking or smoking, or involving refrigeration.

One major trade route was investigated, whose great artery is the Batang Rajang river and whose main market is Sibu. This Rajang trade depends for its supply of wild meat on hunters working from longhouses on and around the Baleh, upper Rajang and Balui. It is organised by a number of private businesses based in Belaga, Kapit and Sibu, and can be highly profitable because of low transport costs and high price differentials between source and market. Bearded pig meat, for example, may be bought for M$0.50-1.00/kg upriver and sold for M$6.00-7.00/kg or more in Sibu, having incurred a transportation charge of only M$0.33/kg by public river express in between. The Rajang trade has grown up very rapidly since the mid-1970's, its volume and value being sufficient to justify substantial investment in commercial freezer facilities at longhouses and on boats, transforming local hunting patterns by providing a large and permanent market for wild meat. It is difficult to assess the trade fully since it is almost completely unregulated and its few records are in private hands. However the author estimates that the total value of this trade at average 1984 prices was about M$4 million.

Wild animals are not usually thought to be owned by anyone in particular, and they are generally treated as common property. In sparsely-populated Sarawak, the concept of exclusive hunting rights to an area of forest by each community is not highly developed, and the near-universal right to kill wildlife is often casually assumed. Although some communities are beginning to demand more exclusive use of local wildlife resources, especially where they perceive their interests to be threatened by "outsiders", this is not really compatible with existing legal and administrative procedures. Thus, for example, the establishment of Communal Forests under the
Forest Ordinance has proceeded extremely slowly in comparison with schemes more in line with traditional priorities.

A follow-up survey in January 1986 suggested that the volume of traffic had declined in Kapit by about 25% during 1985 as against 1984, and perhaps by more than this at Belaga. Such changes could reflect inadequate documentation, natural variance in bearded pig populations and/or the impact of excessive harvesting.

The author states that the rajang trade must make a substantial contribution to the economy of the Seventh Division overall, and that proportion of revenue which reaches the longhouse level represents the major source of cash income for many rural people. Among the Kejaman of the lower Balui, it has been estimated that hunters receive an average return of M8.00 in cash per man-day's hunting effort. The author questions how long the trade can be sustained at its present level. Recommendations for management, regulation of hunting and trade, and protection of habitats are made.


Within the Natal region of South Africa, *Hyphaene coriacea* and *Phoenix reclinata* are tapped to produce wine. Palm wine tappers were interviewed to determine the number of palms tapped at a particular time and the yields obtained. The yields of one representative tapper were then followed throughout the year. He had tapped 712 palms to produce 4,846 litres of palm wine. Tables of total income and yields are given. Production does not vary with the seasons. After 10 months damage to palms was assessed and it was found that the majority recoppiced. Wine tapping is performed by those who are unemployed or as a means to earn supplementary income by those with jobs. Palm wine tapping is an important source of income for those with few alternatives in this area with marginal agricultural potential. This study is significant in that it actually measures yields in order to evaluate best sustainable management strategies and to improve production.


This study found that within the Natal region of South Africa, 980,000 litres of palm wine was harvested and sold from November 1981 to October 1982. The species tapped were *Hyphaene coriacea* and *Phoenix reclinata*. It was estimated that a total of US$145,113 (1982 US$) was generated as income from the tapping, transport and resale of palm wine. On average the yearly income for individual tappers and sellers respectively equalled US$359 and US$175 (1982 US$). In an area with marginal agricultural productivity, these activities are particularly important for the rural poor. The money earned can buy other goods, pay for school fees or pay for the assistance of herdboys. Palm wine is the beverage consumed most by local people and is a source of nicotinic acid and vitamin C. Palm fibre is also used for basketry. Given these varied uses of palms and their significance to the rural community, the author recommends that land-use planning should combine palm tapping with pastoral activities and the

50
cultivation of cashews and mangoes, rather than the promotion of *Eucalyptus* monocultures.


i) Chapter 3.4: Food wrapping leaf trade. Leaves from a variety of species in the Marantaceae family are widely used by traders and food-sellers as packaging material. These herbaceous forest plants are widely found in disturbed and swampy sites. The leaves are very strong and durable, withstand heat and are somewhat liquid-proof characteristics which contribute to their value as packaging material. Most traders and food-sellers preferred Marantaceae leaves to the alternatives such as plastics; for cooked foods most food sellers claimed that there was no effective alternative. Leaf wrappers are sold in all urban and town markets and in most rural markets as well. Thus there is a year-round demand, especially in urban centres. There are peak demand periods (for different species) during the fishing season and during the cola nut harvest. There is a marked seasonal variation in supply of leaves with them becoming scarce in the dry season and flooding the market in the rainy season. This rise in supply is due to an increased availability of leaves, as well as an increase in the numbers of people gathering leaves. The vast majority of gatherers are women and school children (boys and girls) who collect during holiday periods. In one village studied, leaf gathering had become the major economic activity for women after bush fires destroyed the cocoa farms as well as other farm resources such as cola and palm trees. On average women gathered leaves worth 600 cedis in one day. The author points out that the importance of leaf gathering in the early rains (the lean season) and also in the case of this village highlights one of the forest’s most vital functions in this and other areas: providing a buffer in times of scarcity and instability. Leaves are collected on a rotational basis in the forest reserve surrounding this village. There is no usuary right system: women from other villages are allowed to collect even on the villages' stool lands. Some women claim that supplies of leaves are dwindling as the numbers of people gathering has increased. It is not clear however, whether it is those resources near the villages and farms which are dwindling or whether the forest supplies are also being heavily exploited. All the women who gather leaves have a regular trade relationship with village buyers or traders who come to the village regularly. Some women also take leaves to the local weekly market and to Kumasi.

Most traders and food sellers purchase leaves daily in the same market where they work. Most do not have regular suppliers, although more do in Kumasi than in Accra. In Accra, where leaves are more expensive, many traders prefer plastic to leaves.

This study of the Marantaceae leaf trade was centred on Kumasi where the wholesale trade supplies only other traders in sub-urban markets. Retail leaf traders are mostly women and buy leaves from wholesale traders or from gatherers who enter the market. They sort the leaves into retail bundles (sometimes this has already been done) and then carry the leaves around the market (few have their own stalls). They sell between 20 and 200 bundles a day (earning between 500 and 200 cedis a day). Demand for leaves fluctuates considerably being much lower during the rainy season. Unlike
traders at the regional and rural weekly markets, the retail leaf traders in Kumasi generally sell on a full-time basis.

Wholesale leaf traders are of three kinds. Those who trade only in Kumasi rely on leaves being brought to them by traders as well as on buying leaves from gatherers. They sell only leaves and do not sell any other items as part of their trade. Most have been in the business for a number of years. They sell mainly to retail leaf traders. Often they act as financial brokers for gatherers; advancing them monies against future goods. The women sell between 60 and 300 bundles of leaves daily. The returns from this level of the chain are high: they earn an estimated 600 to 4,000 cedis a day (before costs). There are also a great deal of wholesale go-between traders who regularly bring leaves into Central market. These wholesale traders buy leaves at regional markets or they go directly to villages where they have established contacts. The returns vary considerably depending on the cost of transportation. There is a great range in the level of trading activity; some traders sell only one or two bales a week while others sell hundreds. Wholesale traders who live in rural regions and bring leaves to Kumasi generally combine this activity with other urban trading. They buy leaves from women and transport them to urban markets. It is only in villages where the majority of people are involved in collection that regular traders can be sustained.

A crude estimate of the quantity of leaves traded in Kumasi per week is 233,070 bundles worth 5,989,520 cedis.

The author finally considers management issues related to leaf gathering. The exploitation of Marantaceae leaves presents the Forestry department with a good opportunity for co-operative management. The leaves are harvested with no damage to the forest. They regenerate quickly. There is a steady market for the product, and a large number of people with an interest in sustaining their exploitation. There are a number of information gaps related to leaf gathering: these include the identification of exploitable populations, the effect of harvesting practices on plant populations and the effect of different forest management practices (including the establishment of plantations) on leaf abundance. The author also suggests that reform of the permitting system may lead to substantial positive benefits to the Forestry department as well as local communities.

**ii) Chapter 3.6: The bushmeat trade in Kumasi.** The bushmeat trade in Ghana involves many thousands of people: both men and women. Bushmeat marketing is dominated by women. Men are involved as hunters, butchers, transporters and in a few cases as chop bar owners. This study examined the bushmeat trade in Kumasi in the Ashante region of Ghana. In Kumasi there are two main markets - one dealing in smoked meat from the savannah area and one dealing with fresh meat from surrounding areas. Only hunters from the surrounding areas of Kumasi were interviewed. Most hunters hunt irregularly. Most of those who sell their catch (31% never do) sell it only in their home villages. Hunters don't usually own their guns - they obtain supplies (amunition, carbide for lamps, etc.) from a trader or the gun owner and either pay back the trader in meat or share the kill with the gun owner. The quantities traded have not declined but some evidence indicates a decline in wildlife abundance. Some hunters agreed with this conclusion, but the majority stated that reduced success in hunting was due to increased difficulties in hunting (such as greater
abundance of dense *akyempong* weed) as opposed to reduced wildlife populations. Most game is caught on or at the periphery of farm fields. It is not clear what is the main habitat of these species and what to what extent they rely on cultivated land for food.

Entry to the bushmeat trade is difficult and trade networks are well developed (and often long established, being passed from mother to daughter) and the key to success in the business. The primary wholesaler in the fresh meat market is an "armchair" trader who relies on hunters bringing their produce to the market. Primary wholesalers in the smoked meat market must travel to the supply source in the savannah. The main functions of the wholesale traders are ensuring a continual supply of meat and providing financing and credit services to both hunters, traders and chop bar owners. The author states that it is clear that the wholesale bushmeat trade is lucrative. Retailer traders receive similar returns to other NTFP retail traders.

There are three main markets for bushmeat for those selling in Kumasi: the general public, chop bars and traders from other Ashante markets. Bushmeat is of equally high demand in urban and rural areas. Prices for bushmeat are equivalent or higher than meat from domestic animals. Limited evidence suggests that consumption increases with increasing income. Although data from the Game and Wildlife Department suggests that the quantity of meat brought into Kumasi has not diminished there are seasonal fluctuations. These are related to the hunting season, seasonal fluctuations in farming activities, and other cash earning opportunities, as well as people's spending power. A rough estimate of the quantities of bushmeat traded in Kumasi in a year is 159,210 kgs worth 115,176,987 cedis.


**Case study 1: Uppage collection.** This report examines uppage fruit collection in the south Indian state of Karnataka. The collection of uppage is the traditional occupation of a group of women of a particular Brahmin caste who collect the fruit for its seed and use it to prepare a substitute for ghee (clarified butter). Uppage is the most commonly used name of *Garcinia cambogia*, a medium sized evergreen tree which grows in tropical moist evergreen, semi-evergreen, and wet temperate forest types in southern India. Uppage fruits ripen in the monsoon season, from June to August. They are collected primarily during that period. Because uppage fruit production has a two-year cycle, yields vary from year to year considerably. Most uppage ghee is consumed by the family.

A recent development has been that dried uppage fruit rinds are now experiencing a commercial boom with a growing market in the neighbouring state of Kerala where they are used as a condiment. Businessmen from Kerala came to the study area to purchase uppage and the forest department began officially auctioning collection rights to uppage separately. As a result of the link with the Kerala market, collection of uppage rind has become an important seasonal economic activity for increasing numbers of villagers. What was once the traditional activity of Havyak Brahmin
women has become economically attractive to women from other caste and class groups, and to growing numbers of men. Uppage collection now offers many women a more convenient means of seasonal self-employment; even though it coincides with the rice paddy transplanting season (which peaks in July-August), when jobs are readily available. Village women the case study team interviewed said that more money could be made collecting uppage fruits in good yield years, than could be earned working as temporary field labourers transplanting rice. Uppage collection has the added benefit of fitting into a flexible schedule. In good years some women reported that they could make as much in half a day of uppage collection as they could working all day in the fields. With increased collection of the rind, more women have also begun extracting ghee from the seeds. Total production of both ghee and rind has substantially increased as new markets have developed.

Uppage fruits are collected during the monsoon months (June to September) from forest lands or from residual forest patches known as betta lands. Men, women and children from most caste and class groups now collect uppage. Women, especially from the Havyak Brahmin and Nayak castes, form the most important groups of uppage collectors. In the villages visited, the research team was informed that at least one woman from each household collected uppage during the season. The wealthier Havyak Brahmin women have access to uppage trees on their arecanut orchards and betta lands, while others must search in the forests. Destructive collection methods have become more common. Amounts collected vary depending on the yield, ranging from 0.375 kg/hour in poor years to 1.7 kg/hour in good years. According to one estimate, the total availability of uppage in the Utara Kannada and Sagar areas is 1,000 tons, which implies that there is potential for 330,000 person days of employment. Once collected the uppage undergoes some processing to remove rinds and dry them. Then the rinds are sold to a village agent. These wealthy villagers have established themselves as NTFP collection facilitators. Because these village agents are often the local shopkeepers, landlords, money lenders or traders who supply necessities to the collectors, payments are often adjusted against outstanding debts or credits, maintaining a cycle of dependency. Uppage collectors are often agricultural labourers, employed by the trader-cum-landlord; this facilitates payment in kind. Uppage is also sometimes used to make payments on loans provided by the intermediary. The price that is paid to collectors varies from Rs 3 to Rs 8/kg of dried uppage, with higher prices towards the end of the season. Wealthier collectors are sometimes able to collect and store the dried uppage, taking advantage of these higher prices. The sometimes even wait until the season ends or the next calendar year before they sell their dried rind. However, poor villagers, especially the landless and marginal farmers, exchange their dried uppage for cash or kind immediately after a few kilos are ready. Collection agents procure uppage on behalf of a contractor. Contractors must bid for collection rights in area. A recent attempt at co-operative collection of uppage failed due to a combination of poor management, insufficient organisation and resistance from established marketing networks. In recent years the uppage collection contract has been heavily contested, increasing its value to the government. One contractor, who wants to diversify uppage processing, has a virtual monopoly over uppage in Karnataka. Wholesalers either come to Karnataka to collect uppage or buy it from contractors in Kerala. As uppage collection increases, serious questions arise as to the sustainability of the resource base, particularly in view of the destructive collection methods sometimes employed. Proposals for longer-term contracts and the
auctioning of rights to smaller user groups have been made, but it is not clear how beneficial these will be. Similarly it is not known whether the introduction of improved drying technologies will have a beneficial environmental effect. Finally the authors ask whether, with increased profitability of the uppage trade, men may increasingly take over uppage collection.


Reports on studies of the forest use of scheduled castes and scheduled tribes in Orrisa. It is stated that though deforestation has reduced the availability of forest produce, minor forest products still play a major role in the forest dweller economy. 75 persons in the study area (or 28 per cent of the total population) declared the collection and sale of firewood or minor forest produce as their primary occupation. It is the subsidiary occupation for 27 per cent of the total population. The dependence of the women is greater than that of the men. Deforestation has, however, reduced considerably the availability of minor forest produce. This, and the increasing workload of activities such as agriculture, has resulted in most of the minor forest produce collection being presently restricted to a peak season of three or four months.

The traditional practice of men climbing the tree and shaking it, and the women picking up the fallen flowers, fruits, etc. is observed also today. For several days in the peak season, women spend the entire day collecting or processing minor forest products, though on most days these operations take 5-6 hours. There are regional and class differences in this. In the Kerandimals region the shifting cultivation and minor forest product seasons (of tamarind etc.) coincide, the former beginning in March-April and the latter in February. Hence the people divide their time between the two. Often they collect minor forest produce on their way back from the boro plot. On the other hand, minor forest produce collection is a more intensive activity for the lower classes in Kalahandi. Since a large number of families there are landless, their very sustenance depends on minor forest produce and men may spend 8 to 10 hours a day and women about 6 to 7 hours on its collection and processing. While most minor forest produce collected in the Kerandimals are consumed since very little is available at present and what they get is insufficient even for consumption. In Kalahandi, many families sell datun, kenda leaves etc., as well as many processed articles such as siali leaf plates and mahua liquor. They are sold in the Bhawanipatna market, about 12 kms away from the village. Men do the work of selling firewood as well as that of selling liquor while women attend to the sale of other minor forest produce. Processing of minor forest produce is primarily women's work, the only exception being liquor making from mahua flowers which is done exclusively by men. Even for this, the drying and clearing is done by women. Considerable differences exist between scheduled castes and scheduled tribes in the gender division of labour. The pattern of minor forest produce collection by men and women differs according to the socio-economic status of the family. In the Kerandimals and in Mohana very few families own trees. Minor forest produce are collected mostly from common lands. But in both these regions the ownership of a few trees does make a difference in terms of work. The women and men in these slightly better off families collect produce themselves only in the peak season from trees near their houses. The information gathered showed that in some cases the
upper class women employ others to collect minor forest produce for them or buy minor forest produce from poorer families at a low price and sell them at a profit. This disparity is much more visible in the village of Bhawanipatna. All upper class families own trees, mostly mango and mahua from which they earn an average of Rs. 423 per year. They get this big amount partly because of their higher negotiating power and partly because they can afford to sell all the minor forest produce they collect since they get enough food from settled agriculture. There is also a considerable difference in the workload of different classes. In the peak minor forest produce season, the upper class men do not go to collect minor forest produce. But, as in Ganjam and in Kalahandi, upper class women collect a few products like mahua from near their house. Since they have many trees, they employ labourers from poorer families both to collect mango and mahua near their house and other items like kendu far away, since these fetch a good price in the market. Thus, the upper class women have an extremely limited workload. On the other hand, the poorer families do not have access to trees near the village and have to walk 4-5 kms everyday to collect some minor forest produce. Thus, though they work for 3-4 hours to collect it, they get much less than the upper class families do.


This study gives details of the tribal economy in Orissa, where in a number of study villages 13% of the population were found to be engaging in minor forest produce (MFP) collection as their main occupation and 34% as a secondary occupation. This is an area where job opportunities are few and viable economic alternatives all but non-existent. Not all forest dwellers are uniformly dependent on MFP. The higher classes are less dependent on the MFP but have greater access to them than the lower classes. Although upper class families collect more fruits (mainly mango, mahua and kendu) the lower classes earn more from sale of fruits as they sell a larger proportion of what they collect. The upper classes collect more flowers (mostly mahua) than the lower classes but use them mostly for preparing liquor for sale, while the lower classes depend more on the mahua flowers for nutrition. Overall, however, the lower classes rely on MFP for a greater proportion of their income than the upper classes. Access to MFP resources is heavily dependent on class status. Higher status fruits such as mango are accessible only to the upper classes, and in only two districts are fruits accessible to the poor for collection. There are many trees in the village commons but in most villages they are monopolised by the politically powerful and economically rich families of the village. Deforestation has thus had a greater impact on poorer families as the only supply of MFP accessible to them is more distant. The result has been a vicious circle of impoverishment as they have become more reliant on incomes from MFP (in part to pay back moneylenders). In some cases where the villagers have not had the option of selling fruits, seeds and leaves they have turned to firewood selling. When these MFPs have become accessible they have abandoned the selling of firewood. The greater tendency to sell MFP (even where MFP has become less available) has also been encouraged by the activities of the Tribal Development Cooperative Corporation. People now sell sal seeds to the TDCC when once they used to eat them. Most people prefer to sell the high protein sal leaves to buy rice because it is easier to cook. The TDCC has affected the sale of scheduled tribes but not helped the
scheduled castes. Exploitation by middlemen has not been reduced by the actions of the TDCC and similar organisations. In many cases the former middlemen now act as agents for these organisations. Nationalisation and sale of forest produce by the government has tended to be seen as a way for the state to earn revenue rather than as a way of further tribal development.


Reports on research conducted in a number of villages bordering and within the Korup National Park. The study found that hunting is carried out during both the day and night. The average hunter hunts on sixteen days in the month. Hunting is carried on throughout the year though its intensity declines during the four month farming season between December and March. Hunting is an exclusively male pursuit. Boys may begin from an early age (as young as fourteen) but because hunting is strenuous and requires much experience, commercial hunters are usually at least twenty, and have generally stopped by the age of fifty. Hunting is the single most important source of cash income for the majority of village households and for the village as a whole. The main impetus for hunting is the need for cash income rather than the need for protein. The average hunter earns approximately 350,000 CFA per annum which accounts for approximately 38% of total village income. Within these figures there is great individual variation. Hunting also produces large amounts of protein for consumption, estimated to be as high as 100kg of bush meat per villager per year.

Trapping is largely a rainy season activity and is carried out at a high level for five or six months of the year. The average trapper sets approximately 130 traps of three designs, all of which use steel wire to construct the snare or noose. More men are actively involved in trapping than hunting because it is easier to perform and requires little financial investment. Trapping has a crop protection function but is mainly carried out as a money earning activity. The average trapper earns approximately 75,000 CFA which accounts for approximately 18% of the total village income.

The value of bush meat harvested from the Park per year is worth approximately 135 million CFA (£271,000) and is thus an important local industry. Current prices for bush meat are low (between 400 and 700 CFA per kg) and, despite being the favoured meat, it is cheaper than domestic meat.

To conserve the wildlife populations of the KNP and surrounding areas, reductions in hunting and trapping levels will be required. However, full implementation of Cameroon's wildlife regulations would result in a significant loss of earnings for affected communities. This would compromise a stated objective of the Korup Project to raise standards of living in the area. A number of recommendations relating to the control of hunting are made.


Data is presented on the household income from NTFPs of a Semai community living in Bukit Tapah Forest Reserve area of Peninsular Malaysia. Over 63% of household
income was obtained from the sale of fruits, mainly durian and petai. Most of these trees are planted by villagers.


This article reports on a preliminary survey of markets around Pasoh Forest Reserve. At the time of the study non-timber forest products (NTFP) were sold in all markets, except permanent shops. However, only 9 types of NTFP were sold. All, except one, were foods, including 3 leguminous fruits, 2 leafy vegetables, fern shoots, bamboo shoots and an herb. The authors suggest that although the Malaysian rain forest may contain many plants with traditional uses, very few continue to be consumed by households that rely on markets as their source of goods. The sales value of NTFPs is low relative to other goods, and they provide a below-average income for sellers.


*Parkia speciosa*, a leguminous forestry tree species, is gaining popularity in Malaysia. Known in that country as "petai", *P. speciosa* has important food uses. The main source of petai is the forest. Aborigines (forest-dwellers and forest fringed villagers) and Malays living near the forests harvest the fruit. Able-bodied, young men climb the trees and pluck fruits using their hands or sickles. Fallen fruits are collected mainly by women and children. Middlemen buy the fruits from villagers and distribute them to towns and cities. Some aborigines, realising the commercial value of petai fruits, are now selling them directly to consumers by displaying the fruits along main roadways. Increasing demand for petai by the Malaysian population has resulted in some aborigines and Malays planting the species near their villages and houses. Domestication of this species is a form of security for present and future generations. To ensure that regular supplies meet the needs of domestic and external markets the authors suggest that the government should consider establishing petai plantations and provide incentives for the private sector to domesticate the species on a larger scale.


The leaves of *Gnetum* form an important part of the diets of almost all the social strata in central Africa, providing protein, essential amino acids and mineral elements. Its leaves can be eaten raw and green, but generally they are added to meat and fish dishes at the end of the cooking time. The role played by women in the process of supplying leaves, from gathering them in the forest (from the tiny understorey lianas of the genus *Gnetum*) to selling them in the market, is paramount. In the Congo, for example, the leaves are gathered by women who deliver *Gnetum* to traders who transport it either by train to the Kouilou region, or by vehicles to other regions where other women wait to sell it as small traders in the markets. An investigation in 1980 found that the trade in *Gnetum* in the Kouilou region was employing 400 people, exclusively women. Sale of the leaves is a year-round activity. *Gnetum* consumption has been evaluated at 2g per
capita per day in the Congo, a level of consumption which may be high enough to endanger *Gnetum* populations, as it only grows spontaneously. This plant has disappeared in certain parts of the country. The author concludes that there is a need for the establishment of a gene bank of *Gnetum* resources and for further research on the biology and physiology of *Gnetum*.


Reports on the findings of a study of the production, marketing, and sale of *Sal thal* (leaf plates) in the Midnapore district of West Bengal. The sal tree (*Shorea robusta*) is a monsoon forest tree prevalent in India, Pakistan and Bangladesh. As far as leaf collection is concerned, it is carried out up to the point when the tree is three years old and the coppice growth is thinned. The communities involved in sal plate making live within the vicinity of sal forests, are not affluent and have few other skills. Sal leaf plates are made by stitching together 8-9 leaves with small sticks to form a circular plate. Collection and stitching of the leaves is done mainly by women. It takes approximately ten days for one person to produce 1,000 plates which would sell for Rs. 8. Monthly earnings are therefore of the order of Rs. 24. There are no costs involved in leaf production. Plates are sold in bundles of 1,000 (although normally one bundle does not contain more than 600-650 plates). The plates have traditionally been used in marriages and other ceremonies. The process of making plates has recently been improved upon such that the sal plates are further processed to obtain sal thals. This method involves placing a sheet of polythene between two sal plates and using a mechanised press (utilising heat) to weld the three into a thal. Sal thals are sold in bundles of 100. Demand for sal plates and thals fluctuates through the year, rising during the marriage seasons and during religious occasions. On the supply side, since plate making is a secondary occupation done mainly during the agriculturally lean periods, the prices fall during the lean period time as supply increases.

The completed plates are taken in bundles of 1,000 to village depots (also organised by individual members of a village) to be sold for approximately Rs. 8 a bundle. These depots are areas of storage and stocking and the bundles of plates are stored here till contractors from Calcutta send their trucks (on an average of twice a week) to buy the material from the depots. The depot owners sell the plates to the contractors at a rate of Rs 10-12 a bundle (these prices can vary depending on the demand-supply situation prevailing at a given time). The contractor pays a royalty to the Forest Department of Rs. 416 per truck. In Calcutta, the contractors sell the plates to wholesalers at the rate of Rs. 14 to Rs. 16 a bundle. The profit margin (of almost Rs. 4-6 per bundle) of the contractors /middlemen is high. The wholesalers make a profit of Rs. 2-3 per bundle when selling to the retailers, who in turn, sell directly to the consumers at the rate of between Rs. 20 and Rs. 24 a bundle, once again, making a high profit.

In conclusion the author notes the threat to traditional NTFP-based livelihoods from deforestation and the establishment of mono-culture plantations. She also notes the low prices paid to producers and their dependence on intermediaries. Although nationalisation was supposed to reduce these problems, its primary effect has been to maximise revenues for state governments. earnings from sal plate production can be greater than from the sale of sal poles. The sal plate industry is particularly important
for women and low income groups. It is therefore suggested that the Forestry Department should attach more importance to industries based on non-timber forest resources.


This article presents a review and analysis of the marketing of forest and fallow products in the Iquitos region of Peru. It begins with a historical background of the trade of such products as rubber, vanilla and sarsaparilla to North America and Europe. Marketable products were divided into ten categories consisting of intensively managed crops, fish and eight categories of forest products (e.g. cultivated fruits, forest fruits, firewood and construction wood, handicrafts and medicinals). Households in thirteen communities were interviewed regarding the income they received from these products. Villages could be divided into those whose households derived the majority of their income from staple crop production and/or fishing and those dependent upon forest product extraction. For the latter, household averages for annual income earned from forest products ranged from 61% to 86%. Households in the village of Tamshiyacu were reported to earn an income of US$1,200 per year from forest products. Even in those villages dependent upon staples and fishing, households could earn as much as 39% of their income from forest products. Location of villages and their relative access to land and water resources influence not only opportunities to engage in other occupations but also the type and quantity of forest and fallow products that can be collected. Few villagers will exploit stands of fruit-bearing palms such as aguaje (Mauritia flexuosa) or ungurahui (Jessenia bataua) located more than about two hours' walking distance from their homes or from sites where the heavy fruits can be loaded into boats. Some communities located not far from stands of forest fruits have no access to these resources because residents of other villages claim tenure to these sites and exclusive rights to harvest and sell the products. Within villages differences in household income could be due to access to forest resources, as well as the number of men in the family to carry produce. Transport costs as percentages of sale price were also assessed for eleven villages. In 1980 the production of just thirteen forest products in the Iquitos region was valued at US$952,780. The article is completed with a thorough analysis of the complexity involved in marketing forest products. This includes a description of the trade network of collectors, wholesalers and retailers. The influence of price fluctuations, government policies, transport and seasonal variations on supply and demand are explored.


This article discusses the role of the fruits and other products of aguaje (Mauritia flexuosa L.f.), a naturally occurring palm, in the economy of Iquitos, Peru. The author states that aguaje is of considerable economic importance for rural areas, although this is not examined in detail in the article. The urban population employed and deriving at least some of their income from aguaje processing and marketing is estimated at over 500 individuals. Most of these are individuals, especially in the retail vending and "ripe" aguaje trades, are women, (unusually, even at the large-scale wholesale level over the half of the traders were female), many of them with large families, and most
of them of modest economic resources. In Iquitos aguaje fruit is sold in several forms: raw, *maduro* (ripe, that is, made soft by soaking it in lukewarm water for a few hours), as *masa* (that is, the pulp mashed and the seeds extracted), as *aguajina* (a drink), as *curichi* (a frozen drink in a plastic bag), as *chupetes* (popsicles), or as ice-cream. The raw and *masa* forms are sold in the market and *aguajina* is sold mostly from stalls, juice bars and restaurants. The manufacturer and sale of the other products becomes progressively larger-scale and more formal (respectively) as one goes from *curichis* through *chupetes* to ice-cream. The author estimates that the daily demand for aguaje is approximately 15 metric tons.

The fruits are obtained from the poorly drained lands where extensive palm-dominated forests (*aguajales*) occur. *Aguajales* located less than a day's travel to the city are now generally very poor in fruit because of destructive harvesting practices: palms are generally cut down to harvest the fruit. The maximum distance from Iquitos of commercially workable *aguajales* generally depends on the rapidity with which the fruit spoils and the slowness of river transport. Although some farmers have planted aguaje palms cultivation is rare - the majority of farmers believe that the *aguajales* of the region are an infinite resource and therefore planting is unnecessary.

The Department of Forestry and Fauna requires that all commercial harvesters of aguaje should obtain a license (which specifies the are and amount to be harvested) and pay a tax. Few small, rural-based extractors wish to do so (because of the bureaucratic complications) and consequently the harvesting industry is dominated by a few (probably about 8), mostly large-scale, urban-based dealers. The work of harvesting the fruit is usually contracted out to extractor-contractors (often resident in the extraction area) who either hire harvesters, or further sub-contract the work. Aguaje is taken downriver to market by the contractor in his own boat or the fruit is sent by *lancha* (public cargo boats). Although contractors are supposed to deliver the fruits direct to the dealer, frequent cases of contractors selling to the highest bidder were reported. Some fruit that arrives has no predetermined buyer and may be bought directly from the boat by smaller-scale wholesalers (who operate with much more modest funds than the large dealers) or retailers. These wholesalers and retailers tend to be a flexible group, changing the produce in which they deal with the varying prospects for profit that each item offers. Once the fruit is in Iquitos, it is packed into sacks (if not already so divided) and then transferred from the boat to the dealer's storage or selling area. At the wholesale marketing area, retailers (and a few secondary wholesalers) purchase aguaje by the 50 kg sack. These retailers either sell the product in the raw state or process the fruit in some way. Some retailers also sell to other retailers, for example, many of the streetcorner sellers of "ripe" fruits buy the raw fruit in quantities of less than a sack, i.e., in retail quantities. Makers of *chupetes*, *aguajina* and ice cream often purchase their aguaje, not as fruit, but already processed as *masa*, adding another link to the marketing chain.

Although the author was unable to estimate the incomes of those involved in the aguaje trade, from anecdotal evidence she suggests that the large-scale wholesaling business can be very lucrative, allowing its participants to accumulate considerable wealth. At the level of street corner vending, the earnings of one woman were estimated to exceed $1/200 or about $11.50 on good days, which was eight times the government minimum wage and more than some domestic servants earn in a month. While the income of
many other street vendors may be lower, the author suggests that the aguaje business offers considerable opportunity for profit and for women to move beyond the most basic subsistence level. It can, however, be a risky business as well, requiring a good knowledge of varieties, seasons, and possible defects in the fruit.

The future of the aguaje trade is threatened by the decline in the number of fruit-bearing trees in swamps near the city. The effect on marketers of an increase in transport costs (from more distance sources) and a drop in volumes traded is difficult to predict, although increased costs will obviously affect all levels of the trade. The author recommends that some change in harvesting methods will have to be made if the trade is to continue in its present form, and especially if it is to increase and the presently small export trade is to be expanded. Although the women involved in the trade would most likely continue as traders, but dealing in other produce, they would be adversely affected if the trade were to change.


Tropical forest dominated by only one or two tree species extend over tens of millions of hectares in Amazonia. In many cases, the dominant species produce fruits, nuts, or oilseeds of economic importance. Oligarchic Amazonian forests may contain from 100 to 3,000 useful trees/ha and produce up to 11.1 metric tons of fruit/ha/year. Given their density and yield, the sustainable exploitation and management of plant resources is easier, and considerably more profitable, in oligarchic forests, than in the species-rich forests within which most extractive reserves have been located.

The rural inhabitants of Amazonia are well aware that many valuable tree species occur naturally in high-density populations. Oligarchic forests play an important role in the subsistence and market economies of the region, and large quantities of fruit are harvested from them every year. Some of these tree populations are actively managed to increase the density and yield of useful products. The actual pattern and intensity of exploitation is primarily controlled by the size of available markets for each species. Orbignya phalerata, Mauritia flexuosa, and Euterpe oleracea are undoubtedly the most widely exploited oligarchic forest resources in Amazonia today. Over 250,000 tons of O. phalerata kernels were marketed in Brazil in 1982 alone, this species providing over 80% of all the vegetable oil obtained from non-domesticated sources. In addition to producing large quantities of fruit, oligarchic forests of O. palerata in Maranhão also form the basis for traditional agroforestry systems in which rice, corn, and cassava are cultivated under the palms. The fruits of Mauritia flexuosa are collected in large quantities from natural populations in Western Amazonia, and most of this material is sold in local markets. The extensive oligarchic forests of Euterpe oleracea found in the Amazon estuary are exploited commercially for both fruits and palm hearts. Official Brazilian sources report that almost 85,000 tons of fruits and 99,000 tons of palm hearts were extracted in 1982. In response to the rising demand for these products, floodplain farmers have started to use weeding and pruning techniques to increase the density and yield of E. oleracea in local forests.

The current commercial demand for the fruits of Jessenia bataua and Myrciaria dubia is less pronounced. Oil from J. bataua has dropped has ceased to be a commercial
product while the market for *M. dubia* fruits, on the other hand, has exhibited a slow but steady increase over the past 15 years. Preliminary analyses of local harvesting regimes suggest that approximately 50 to 100 tons of this fruit are collected and sold in the Iquitos market each year.


In addition to examining the social organisation of production in the Amazon, this review also summarises research on the production of a number of extractive products including açai juice and palm hearts (both mainly from *Euterpe oleracea*), aguaje (*Mauritia flexuosa*) and camu camu (*Myrciaria dubia*). *Euterpe oleracea* occurs in extensive natural stands on the flood plains of the Lower Amazon in Brazil, as well as in the Guyanas and Venezuela. The commercial importance of açai juice is recent, but by 1987 it had become easily the most important (by value) extractive product in the Brazilian economy. The main marketing constraint is the high perishability of açai fruits, which must reach the market place within 24 hours. This therefore limits it, as a cash crop, to areas near market centres. However the short distances, ease of processing and absence of complex wholesale and export market structures result in a high proportion of the sale value accruing to the producers. Most of the produce is brought by the producers themselves to the processing plants. Açai palms have the advantage that they can be easily managed for both the juice and palm hearts on a sustainable basis, due to their multi-stemmed self-regenerative habit. They are increasingly planted, and respond well to low intensive management. Açai juice is regarded in Para as a staple food forming a major and basic part of the diet with a daily consumption of up to 2 litres per person per day, with 50,000 litres of unprocessed fruit normally sold daily in Belem alone (up to the cholera epidemic). It is therefore not an ephemeral "boom-bust" extractive product. The fruit is also equally popular at all socio-economic levels, meaning that it does not suffer that the normal demand problem associated with staples - a negative income elasticity of demand. Another advantage is that due to regionally different seasons of maturity, an all year round supply can be maintained. The palm heart canning industry moved to Para and Amapa states after depleting the natural stands of *Euterpe edulis* stands in southern Brazil during the sixties. Production has declined from mid 1980s levels, when açai stands were exploited at a rate of over 90,000 tons per annum, due to the destructive harvesting methods used, with gangs of contracted labourers cutting the tops off entire *Euterpe oleracea* stands, and lower export prices. The palm hearts are processed and canned in factories on the banks of the Amazon, before being taken to Belem, from where they are distributed to the large domestic market or exported, if the fibre level is sufficiently low, principally to France and the US. It is reported that poor quality control by numerous small firms in the canning business has led to the rejection of much of the export material, and that the product is very variable due to the subjective decision of which outer fibrous leaves to eliminate. Palm hearts could be harvested on a sustainable basis by leaving some of the stems and cutting from the base, but labourers are paid on a piece rate basis and have no incentive to practice slower sustainable practices. It is suggested that this is a clear case where land reform would result in sustainable management practices: the combination of extractive reserves and co-operative marketing in Amapa was under investigation in 1990. In the absence of
rationalised harvesting techniques, future demand could be met from plantations of *Bactris gasipaes*, which can produce palm hearts at six times the rate of *E. oleracea* in experimental plantations. Researchers have looked at the impacts of rapid market expansion on extractive groups on Combu Island in the Amazon estuary near Belém. Many extractors were share-cropping tenants to the major (absentee) landlord of the island, whose main interest was the profitability of açaí extraction. Thus access to land became more dependent on willingness to specialise in this increasingly profitable activity. This was resisted by many share-croppers who preferred a broader livelihood basis. The result was increased social conflict, and marginality of those denied access to land. The recent collapse of the açaí juice market due to cholera will have vindicated the actions of the more conservative extractors.

Information on agauje is taken from Padoch (1988) and Vasquez and Gentry (1989), abstracts of which are also given here.

Camu camu (*Myrciaria dubia*) is a lake margin plant found throughout Amazonia in nutrient-poor black water forests, and is of particular commercial importance in Peru. The fruit matures as river levels rise, making it easy to harvest by canoe. The fruit, which has the highest known vitamin C content of any fruit, some 30 times that of citrus, is sold in Iquitos markets for processing into fruit drinks and ice cream. One study has calculated a sustainable annual gross income of $6,000 per hectare, presumably within easy reach of the Iquitos market. Another study has suggested that the local market is limited.


Of 163 fruit species observed to be regularly consumed in the region surrounding Iquitos, Peru, 120 species are exclusively wild-harvested and 19 more originate from both wild and cultivated sources. The wild-harvested fruits of 57 species belonging to 24 different plant families are sold in the Iquitos market and are very important in the economy and diets of the area. Nearly half of the Iquitos fruit vendors sell wild-harvested fruits (if fruits used as vegetables or starch sources are excluded), and over half of the fruit species sold are wild-harvested. Many fruit species consumed at Iquitos differ from those consumed in other parts of Amazonia. Although some native fruit species are beginning to be grown as crops, the wild populations of these high-potential species are being rapidly depleted by destructive harvesting techniques as market pressure begins to build. In the last few years, the availability of several of the most popular fruit species has decreased markedly. If non-destructive sustained-yield harvesting of resources such as wild-harvested fruits is to play its suggested role in tropical forest conservation, much stronger efforts will be needed to prevent destructive over-harvesting of these potentially significant resources.


Presents the results of an assessment of the environmental consequences of an African Development Bank loan to a logging company. It was found that primate abundance was extremely low in logged forest. This is not believed to be a direct consequence of
the reduction in canopy, but results from the extremely intensive market hunting that coincides with timber surveying and extraction. Weapons and hunting camps were common, and logging company vehicles transported primates, duikers, and other game daily. Wildlife laws of Congo are openly violated and they are rarely enforced. While market hunting is clearly facilitated and intensified by the presence of logging concessions, it is the Congo's highly urbanised population that provides the ever growing demand for meat, a demand not being met through animal husbandry. Thus, although selective logging in the absence of hunting may have only limited adverse effects on wildlife, when the two are combined the consequences are grave for the Sangha region's wildlife. The authors recommend that loans to logging companies from the Africa Development Bank should incorporate conditions for ensuring wildlife conservation.
6. BASKETS AND HANDICRAFTS

6.1 Introduction

Basketry and handicraft enterprises are grouped together here in recognition of the fact that the products of a proportion of basket-making, mat-making and cane-working enterprises are intended for non-utilitarian purposes. The dichotomy between utilitarian products and "craft" products for decorative, ceremonial or other purposes, and the relevance this has for their growth prospects, is examined in more detail below.

6.2 Employment and contributions to income

Basketry and handicraft enterprises appear to be very important in terms of numbers of people employed but, nevertheless, this category of enterprises remains poorly studied. Mead et al. (6) found that mat-making accounted for half of all non-farm activity in rural areas of Dosso in Niger and suggested that it may attain similar magnitudes in neighbouring Tahoua and Madoua. In Rufiji district, Tanzania, Havnevik found that almost 15,000 people, mostly women, of a total population of 131,000 (active population 65,000) were engaged in basketry or mat-making (Havnevik, 1980). Although in Ghana it was more usual for fewer people to be involved in basketry and only on a part-time basis, Falconer (4) found it to be the major economic activity in some study villages. Most of the other studies, in the Philippines, Java and Botswana are of areas chosen specifically because there was a high concentration of producers. Data from GEMINI studies in countries of southern and eastern Africa underlines the importance in terms of employment of the "grass/cane/bamboo" manufacturing subsector while highlighting the considerable variation between countries (Arnold et al., 1994). In Botswana, Kenya and Lesotho grass/cane/bamboo enterprises accounted for only 0.5% to 2.9% of all small- and medium-scale enterprises (the figure for the Dominican Republic is also low at 0.3%). In Malawi, Zimbabwe and Swaziland the respective percentages are 7.1%, 13.8% and 31.5%. In these latter countries the numbers of people employed are quite substantial - 52,217 (Malawi), 151,671 (Zimbabwe) and 29,113 (Swaziland), representing approximately 0.6%, 1.5% and 3.8% of the populations of those countries respectively.

In terms of income contributions, the evidence from these few studies indicates that these activities provide only minimal returns to producers. Havnevik found returns to labour for basketry or mat-making to be Shs. 0.48 per hour and the potential monthly income about Shs. 100, only about 30% of the official rural minimum wage. Two of the studies (9, 11) point to the positive effect that links with export and tourist markets can have on wages. Returns to basket making for the producers in Botswana exceeded those possible from the principal alternative occupation of beer brewing (11). In the Philippines the daily wage rate of home workers and workshop labourers producing goods for the export market at least approximated the local agricultural wage rate, whereas the independent producers manufacturing for the domestic market were earning only half the agricultural wage (9). The higher wages paid to wage labourers was also found in Regino's study (8) of the larger, more formal firms involved
in the woven crafts industry in the Philippines where workers were receiving wages equal or slightly above the legislated minimum wage rate.

Despite the evidence of low returns to the basketry producers, the data gathered by GEMINI surveys demonstrates the importance of these activities in terms of contribution to overall income. In all the countries for which data is available (Zimbabwe, Malawi, Lesotho and Swaziland), over half of the business proprietors stated that the enterprise accounted for 50% or more of their household's income. The continued participation of producers in the industry despite the low returns available is in most cases indicative of the lack of (10, 11), or poor remuneration available from (9, 4), alternative employment opportunities. This case study evidence is confirmed by GEMINI data, with over half of the proprietors interviewed stating that they were previously unemployed before they started the present activity. In most cases, therefore, wages from basketry and craft production represent either a supplementary source of income or the only source of income for individuals who would otherwise have no alternative. This is not to say that earnings from these activities are not important, but the evidence seems to indicate that it is only in exceptional cases that these earnings can form the basis for accumulation (9).

6.3 Organisation and structure of production

Units producing for the domestic market are generally located in rural areas and home-based (4, 6, 7, 9, 10). Workshop or factory production is rare (4, 5, 7) and usually associated with production for more lucrative urban or export markets. Systems of production such as batch production have evolved in some cases (10). However, most production is still organised in parallel, with co-operative production (specialised craftspersons undertaking different steps in the manufacturing process) only being reported in the wood-carving industry in Indonesia (5). In the production systems for the urban and tourist markets in both the Philippines and Indonesia, systems of subcontracting (putting out production to other producers) have developed (9, 10). These have largely been developed by exporters, and local traders and entrepreneurs. In the example from Botswana, where marketing is controlled by a state-owned organisation, no similar arrangements are found in the industry structure (11).

The studies also demonstrate the differences between countries in the degree to which this is an activity undertaken only by one sex or by both. In situations where both men and women are involved in the industry, such as Smyth's example from West Java (10), more than one person per household may be involved in the industry. In Niger (6), Botswana (11) and the Philippines (9) where the industry is dominated by women, and in Ghana (4) where men predominate, one-person operations are the norm. In most countries where GEMINI surveys have been conducted the grass/cane/bamboo subsector is a female-dominated activity, both at the level of workers and proprietors. However, Malawi is an exception to this general trend, with men representing over 70% of both the workers and the proprietors. Such gender divisions of labour that exist appear to be maintained when production is organised on a wage-labour or factory basis.
While some barriers to entry may exist, in the form of capital requirements (10), skill requirements (10) or knowledge of marketing contacts (10), these are generally not significant. The simple tools used in production are often used for other purposes in the household or are very simple and low cost (4, 11). Systems whereby traders or entrepreneurs advance capital to producers are rare (9).

Where people are able to, they collect their own supplies of raw materials (4, 8, 10, 11). The plant species from which the raw materials are obtained are usually relatively common and display high growth rates, factors which tend to reduce the risk of over-exploitation (1, 3). However problems may occur when utilisation is increased rapidly. Falconer (4) suggests that in Ghana there is a need to assess the resource base of the cane-working industry before the government sponsored export promotion begins to have an impact. This caution appears to be justified, as the expansion of the basket making industry in Botswana has resulted in problems of depletion of the natural sources of inputs (11). A number of possible interventions are suggested in this case, including the cultivation of palms by smallholders - this has already occurred in the examples from the Philippines studied by Rutten (9). The examples from Niger (6), the Philippines (7) and Indonesia (5) indicate that people will obtain supplies from elsewhere if they are not available locally.

The effect of government on the industry, beyond the support programmes discussed below, is minimal. The only significant example found in the studies examined here was in Ghana (4), where the controls on gathering exercised by local government and the forestry department were partly blamed for the decline in cane collecting.

6.4 Sources of demand

The main source of demand is the low-income domestic market. The output for this market includes a variety of products, but primarily consists of containers for foods and other items. Sales of baskets to traders, farmers and fishermen are also important in Ghana, where they are used for carrying produce. The peaks in demand associated with seasonal increases in activity (4) or yearly festivals (10) encourage the development of production to order and subcontracting relationships. Generally these domestic markets tend to show a lack of dynamism (10), and in some cases are shrinking or stagnant (5, 6, 7). In some cases substitution by modern alternatives has taken place (4, 5).

Export and some urban markets offer more hope to producers in terms of expanding demand and better prices (4, 5, 9, 10, 11). The strength of such markets is greatly dependent on urban growth, increases in urban incomes, government export promotion activities and marketing arrangements.

6.5 Marketing structures

Marketing systems vary greatly in sophistication, from the direct sale to consumers preferred by the wood-carvers of Java (5), through wholesale and retail arrangements in the basket trade.
in Ghana (4), to more complicated credit-based putting out arrangements and production to order found in the examples from Southeast Asia (9, 10). Evidence from the GEMINI surveys indicates that individuals are by far the most important customers for these enterprises.

In Ghana, producers in the main production area sell to wholesalers or at local markets - sales direct to urban markets only occur in Ashante region. Wholesalers are mostly women and combine their trade in baskets with other trading and non-trading activities. Returns from the basket trade are lower than those obtained from other non-timber forest product based trading activities. The retail trade in Ghana is also dominated by women and is restricted to urban areas where it is combined with other trading activities. In West Java local producer/traders (usually the larger producers in the village) and urban-based intermediaries (mostly men) provide the outlets for most of the village's production. Although the traders from the city offer higher prices, producers tend to prefer to deal with local traders who are more reliable with payments and to whom the producers often have obligations. Both of these systems appear to be disadvantageous for smaller producers as they have little opportunity to be innovative, with little access to market information on latest designs and a reluctance on the part of intermediaries to take a risk in dealing with new products (10).

The study by Rutten in the Philippines (9) provides an opportunity to compare the effects of two different marketing systems on producers. The expansion of markets for the plaited hats and sleeping mats produced in Aklan to areas outside the province, has resulted in a small increase in the degree of security of producers due to the steady, large demand for products, and to the willingness of traders (half of whom were women) to extend credit to weavers. Weavers have remained independent, however, and can still sell on the open markets. In contrast, the expansion of the export craft in Malilipot has given rise to a highly differentiated industry based on wage labour and an unequal access to the means of production. The workers are highly dependent on entrepreneurs (mostly female) and are not organised to defend their interests collectively. Although this subcontracting putting-out arrangement is, in theory, the most disadvantageous for artisans, several characteristics of export production (high demand for labour, sharp deadlines and severe competition among exporters and suppliers) have given them some leverage, reflected in their relatively high wages. On the strength of advances forwarded by exporters several of the craftworkers have managed to enter the realm of capital and become suppliers themselves.

The work of Botswanacraft (11) gives an example where the formation of co-operatives and the assistance of government has enabled small producers to produce new designs and access a lucrative tourist market.

6.6 Patterns of change

A number of the studies (5, 6, 7, 10) point to a declining demand for utilitarian products as incomes increase or substitutes become available. Declining availability of raw materials (2, 6, 7) and increased numbers of competitors (10) are also squeezing returns to producers. Producers who have access to alternative employment are leaving the industry, while those with no alternative are forced to accept lower and lower returns.
Production for the urban, and particularly, the export market offers rather better prospects for producers. In Botswana (11), where marketing is undertaken by a government organisation, there appears to have been little change in the structure or organisation of production. In other countries, where such arrangements are absent, larger producers, and in particular factories (4, 7), are expanding in response to growing urban consumer and tourist demand for their higher quality and more sophisticated products. An alternative to this development is the evolution of an industry structure which involves increased use of subcontracting arrangements in which small firms still play a major role, as observed in Indonesia and the Philippines (9, 10). While Rutten (9) suggests that in the Philippines example she studied some of the subcontracted artisans benefit from this system, Smyth (10) reports that producers in West Java are reducing quality and removing high cost inputs in an attempt to maintain margins. While this enables survival in the short term, she predicts that in the long term it will make producers more vulnerable by reducing their skill base and forcing them to overly specialise.

6.7 Appropriate interventions

Opportunities for government intervention to assist smaller producers are limited. Organisation of producers into co-operatives and the provision of marketing and technical assistance are two possible options (10) which seem to have been particularly successful in Botswana (2, 11). Rutten (9) also recommends that working for a higher, more stable demand for handicraft products may be the most appropriate support activity. However, marketing contacts made through government or charitable agencies have been monopolised by larger producers in West Java (10). Mead et al. (6) and Terry (11) both suggest that the most appropriate approach in the long run is to promote alternative income-generating activities, at least for the less-skilled producers (11).

In addition to the annotated items that follow see also the following studies on this subject listed in the bibliography:-

7. BASKETS AND HANDICRAFTS - SELECTED ABSTRACTS


Production and sale of handicrafts made from indigenous plant materials has dramatically increased in southern Africa since the 1970's. Despite this, few data are available on the amount of plant material utilised. The quantity of indigenous plant species used annually by a craftwork project in the Ingwavuma district, Natal, South Africa from 1978 to 1983 was determined from sales records. Resource management is facilitated by the use of species that have high biomass production and/or abundance (Hyphaene coriacea, Digitaria eriantha and Juncus kraussii) and by control of species use through selective buying. Alternatives need to be provided for plant resources that are vulnerable to over-exploitation, particularly those used for natural dyes.


The basket-weaving industry on the edge of the Okavango Swamps in north-western Botswana is dependent on natural populations of the palm Hyphaene petersiana. After the initial organisation of the collection and sale of woven palm baskets from this complex of villages by the manager of the Etsha co-operative, basket-making as a cottage industry expanded rapidly when two Peace Corps volunteers developed markets for the baskets in Europe and the USA. Botswanacraft Marketing Company (Pty.) Ltd was then established to buy baskets from the villagers, to encourage innovative basketry and maintain a high standard of craftwork, and to provide a sales outlet for the finished product. As sales, particularly exports, increased the industry expanded rapidly. By 1984 over 50% of the female population of Etsha (ca. 1 500) were making baskets to supplement their incomes; in that year Botswanacraft purchased baskets worth 25,000 pula (1 pula = $1 U.S., 1984).

Commercialisation of the basket industry has led to changes in the population structure of the palms. The mean size of palm leaves has decreased and the resource has been depleted in the vicinity of swamp villages. Plants used to dye the palm fibres for basketry are becoming scarce. Through use of alternative raw materials and development of new crafts both natural resources and the incomes of the village craftspeople could be sustained.


The objective of this study was to assess Hyphaene coriacea leaf production in order to provide management guidelines for palm leaf harvesting. If palm leaves suitable for basketry were harvested on a sustainable basis current levels of leaf production would provide an estimated 140 leaves/hectare/year or approximately 2.5 million leaves/year
in the study area. This is far in excess of the current level of domestic or commercial use and there appears to be a high potential for increased harvesting of this resource.


This document reports on the findings of a major study of the use of non-timber forest products in Ghana. Information for the study of the cane and cane product trade was collected in a number of ways including interviews with small-scale cane processing enterprises in Kumasi and cane gatherers and basket weavers in Western region, surveys and censuses of traders, consumer surveys and an inventory of cane resources.

Canes are an important resource in Ghana, being used in housebuilding, basket-making and the production of cane furniture. The cane-utilising industries are divided geographically. Most baskets used commercially and on the farm are made in rural areas. The largest concentration of basket-making enterprises are found in the southwestern corner of the country, this is also where the forests with the largest populations of canes are found. Cane and cane baskets have an important commercial as well as subsistence value in rural areas.

The urban weavers concentrate on "urban" goods such as furniture, baby's cots, shelving, and shopping baskets which fetch far higher prices than baskets. Important centres of furniture production (and other urban cane goods) are Accra, Asamankese and Kumasi.

The cane most commonly used is known as *mfia* (*Erythmospatha* spp.) although *eye* (*Laccosperma opacum*) and *demmere* (*Calamus deeraus*) are also used. Canes collected on a commercial basis, both by rural people and urban-based collector groups, are mostly destined for urban-based processors (sometimes through intermediaries). Most people interviewed claimed that cane collection was more common in the past, giving a number of reasons for the decline, including reduced cane population, transportation problems and interventions by the local government or forestry department. In Western region the reason given was that basket-making was considered a more rewarding activity. Rural gatherers (and also gatherer/traders) are usually involved on a part-time basis and can make substantial economic returns from this activity. The wholesale traders in cane, most of whom are urban-based, also make good returns. All gatherers and most of the traders of cane are male.

Cane basket production is also a traditionally male preserve, engaged in on a part-time basis by men who are often also farmers. Many of the producers only operate on a small-scale for their own use or local demand. However in some villages studied, basket-making is the major economic activity, providing more income than farming for some of its participants. Usually this is a solitary occupation although children may also be employed to produce bases to be finished off by the adult. Children sometimes may also produce their own finished articles, particularly during school holidays. Most basket-makers collect their own canes from the forest or farm-bush. The produce is sold either to local consumers and traders or to traders from urban areas, or direct to
consumers by producers in Ashante region. Generally there will be a mixture of weavers who are producing to order and those who are not. Production to order is especially common during periods of peak demand, when dealers want to ensure supplies. Such peak periods occur, for example, during the cocoa harvest and for fish baskets during the fishing season. Basket weaving generally compares favourably with other rural wage earning activities, although if prices fall then this dramatically affects profitability.

From the few centres of commercial production much of the produce is traded through a variety of channels depending on local demand and particularly transport networks. In the Western region few producers take their produce to urban markets to sell as there are many alternative local marketing including sales to visiting wholesalers and at regional markets. In Ashante more of the producers go to urban markets, as fewer wholesale traders visit the rural areas. Of those who are involved in the basket trade the majority are women. Wholesalers are found in all areas, whereas retail traders are rare except in large markets. The wholesale basket trade involves transporting baskets to urban centres, coastal fishing centres as well as northern cities. Many traders combine this trade with other products, or other activities (especially farming). Rural wholesale traders, who have the advantage that they can ensure a steady supply but who also experience difficulties with transport, mainly supply urban retail traders. Urban traders don't have the same advantage of contacts with suppliers but have better contacts in markets and access to storage facilities in the towns. Returns to the wholesale cane basket trade, whilst substantial, appear to be lower than those of other NTFP trades examined (especially bushmeat, chewsticks and raw canes).

The only major retail trade occurs in the urban areas, and is mostly the preserve of women. It is often combined with other income earning activities, perhaps due to the marked seasonal fluctuations in basket sales. In Kumasi the supply is mainly provided by basket makers bringing their wares to the market, demand mainly comes from other traders.

The results of the consumer survey found that baskets are used by the majority of rural and urban people. Even in rural areas (and even in those areas where most basket weavers are concentrated) most people bought their baskets rather than made them themselves. Traders who were questioned said that they preferred baskets to other types of container. The survey also confirmed the existence of considerable fluctuations in supply and demand (supply being squeezed during periods of peak labour demand).

In urban centres there are a growing number of cane processing enterprises producing a range of goods for the urban household and tourist market. These artisans make sets of furniture, shelving, many types of baskets and containers, lamp shades, waste baskets, baby's cots and other household items. 39 enterprises were studied: all of them were small, ranging from 1 to 10 weavers per enterprise. Many enterprises employ apprentices. All cane processors are men. Within the last five years business has expanded. In Accra 67% of those interviewed had been producing cane goods for less than 5 years. Considerable differences were found between enterprises in Accra and Kumasi in monthly production, quantities of cane used and types items produced. Returns per enterprise are considerable, although returns per person are difficult to calculate due to the presumably lower pay of apprentices. Estimates of returns based
on actual sales and on production can differ considerably. Supply of canes in Kumasi is usually by regular suppliers, while in Accra many people get their canes from the railway station rather than having it brought to them. Few processors have regular buyers, most rely on road-side sales. Baskets, shelves and trays sell most readily, while the greatest profits are earned from furniture sets. In Kumasi, most processors produce furniture on order, other products are produced regularly. In Accra, furniture production appears to be more common. Many producers make furniture for road-side sale rather than on order. In Accra, for many producers cane supply dictates what they produce and when. The higher prices paid for cane in Accra as well as the fact that production is dictated by supply suggest that the growing number of enterprises are putting pressure on cane supplies getting to Accra. In Accra, some producers claim that peddling wares is difficult because they are restricted by the city authorities. Of those enterprises studied few rely on the tourist trade, and few had worked with the Export Promotion Council. Few producers had had contact with this Council, but it is suggested that once the programme begins to have an effect, it is most likely that the demand for canes will increase at an even faster rate. There is a great and urgent need, therefore, to assess the resource base, and the potential user-conflicts which may ensue with even higher extraction rates.

Management of the cane resources of forest reserves is based on a permitting system. This system is largely ineffective as it is ignored by most local gatherers. Although some gatherers complained of a decline in the availability of canes, there is little information on actual stocks of canes in reserves. It is suggested that any management system should first concentrate on obtaining data on stocks before attempting to control exploitation. Canes are also obtained outside reserve forests in stool forest and secondary re-growth of clearings. Little information on the quantities produced from these sources exists. It is suggested that canes could be grown in the bush fallow areas. Canes could also potentially be incorporated into a number of Forestry Department activities including rural forestry programmes, plantation development, buffer zone management as well as management planning for the reserves.


*Case study three: Forest-based handicrafts in Indonesia.* A combination of government policies that favour the small-scale household-based manufacturing sector while limiting the export of unprocessed forest products (e.g. logs and rattan) has helped to spur the growth and development of forest-based small-scale enterprises (FBSSEs) in Indonesia in the last decade. Among the most prominent and successful FBSSEs to have developed are wood carving and the manufacture of rattan furniture and household goods (not included in this abstract). Not all FBSSEs have continued to prosper however. The traditional umbrella and clog making crafts represent two industries which boomed at the start but are now declining because of heavy competition from plastics and other synthetic materials and a drastic change in market demands.
Jepara in central Java was chosen for the study of the wood-carving industry. It is one of the major centres of the wood carving industry. Forest-based handicrafts account for a large proportion of the total industrial employment in the area. They also offer higher incomes to labourers than other small industries and handicraft industries. The traditional craft of wood carving experienced a boom in the 1970's with the provision of technological guidance and market information from the Department of Industry. The number of units increased from around 500 in 1966/67 to about 1,560 units (employing around 16,000 skilled workers) in 1984. Jepara County is a poor wood-producing area so most logs are imported from neighbouring counties. Most manufacturers prefer to buy on credit from wholesalers and retailers because Perhutani (the state-owned Indonesian Forest Corporation) demands cash payments. The conversion of logs into sawn wood is carried out using traditional manual or mechanised bandsaws. The technological level employed in wood carving is still traditional. Although machinery is available in the market, few craftpersons can afford to buy it. The study gives little information on the organisation of production or the earnings of entrepreneurs and labourers. Of the four industries studied product markets are largest for the wood carving enterprises. Most production is for the domestic market - either in the county or large cities outside. Although direct sale (particularly on order) to the customer is the preferred business, there are several marketing arrangements in practice including peddling the products themselves, sale to a broker and asking a showroom to display their goods. The major constraint on the industry is the saturation of the market with carved handicrafts. This is reducing the sale price of items while raw material prices are increasing. Entrepreneur's profit margins are being reduced, forcing them to lower worker's wages. Poor quality and the lack of organisation and co-operation between producers to meet orders constrain any expansion into export production. The author suggests that further expansion of the industry will be dependent on increases in the purchasing power of the domestic market. The wood carving and rattan enterprises were noted to share a number of characteristics: they are both very labour-intensive, with specialised craftpersons undertaking different steps in the manufacturing process; they offer a wide range of products and can respond fairly easily to new product demands; they have both received support and technical assistance from government institutions; they are both dependent on raw materials imported from other parts of the island of Java or from other islands within Indonesia.

Tasikmalaya County in West Java was the area chosen for studying umbrella and clog production. The umbrella industry, which had been in existence since the 19th century, experienced a boom in the 1950's with over 600 households and firms engaged in the business. But in 1964, many firms went out of business because of competition from imported plastic umbrellas. As a result only two units were engaged in the umbrella-making industry in 1980 and four were reported in 1984. The commercial clog-making industry is of more recent origins. In their early development, clogs were very simple and used lower quality woods. This industry boomed during the Japanese occupation in the 1940's because shoes and raw materials for their manufacture were not available. Since that period the quality of clogs began to improve. The heels and the sides were carved artistically. It was at this time that the industry gained its popularity in the country. From 1962 to 1966, the demand for clogs increased dramatically. As substitute materials like rubber and plastic began to take over the domestic market, the industry had a brief export boom from 1975-1980, when Australia provided the major
market for Indonesian clogs. However, problems with quality control resulted in a dramatic drop in local production. At the time of the study, only two firms were engaged in clog making, principally because of their determination to preserve the tradition.

The author concludes that in order to survive as viable concerns in today's dynamic market, traditional FBSEs must be able to continuously diversify products to meet demand. Improved production rates and the use of new technology may need to be adopted. This is easier in crafts such as wood carved furniture and rattan handicrafts where new designs can be followed using the same materials, and where a range of products has always been the rule. In very specific activities like umbrella or clog making, it is not as easy to be resilient and innovative. Finally, the government's efforts in giving guidance and technical training to further the skills of both entrepreneurs and craftspersons in the wood carving and rattan industries have helped stimulate these industries.


This paper reports on the findings of a study undertaken by Michigan State University, concerning micro and small enterprises and their role in the development of Niger. Four subsectors were examined in more detail, including mats. The team found that the weaving of mats provides minimal levels of income to large numbers of women, particularly in rural Dosso. Future prospects for this activity are bleak. Increasing prices of raw materials have combined with downward pressures on finished product prices to squeeze returns to the producer. It is recommended that the primary focus should be on developing alternative income-earning opportunities to enable participants to leave this activity. In the meantime, there is a strong case for reducing or removing the highly regressive tax paid by those selling mats in the market.


The Philippines chapter of this volume examines a number of local handicrafts including weaving, rattan furniture and mat-making. The mat-making industry is a traditional pass-time, which provides goods for home and farm use and supplements agricultural incomes. The industry continues to provide full and part-time employment, since there remains an effective demand from those at low income levels who cannot afford more expensive alternatives. The industry has also expanded into novelty items for export, further stimulating production and employment. Secondary data show a rapid increase during the 1960s in the number of mat-making firms, from 247 in 1964 to 2,392 in 1972. Virtually all are small-scale: only six firms employ more than 20 people. At the same time, the labour force experienced an eight-fold increase, from 1,200 in 1964 to 9,941 in 1972, outpacing the expansion rate of employment in the other four craft industries studied.
The study then examines the mat-industry of Bohol and Samar provinces in more detail. Here the industry is organised mainly as household units and produces goods primarily for the low-income domestic market (53% for domestic, 38% exported, 9% to tourists). Bohol's industry has been relatively stagnant since the 1960s whereas Samar finns have flourished with the growing popularity of embroidered mats, particularly those made in the more accessible and commercially active town of Basey.

The industries in Bohol and Samar rely on grass leaves from palm trees such as *ticug*, which is brought from Leyte Province. There are problems in *ticug* supply, because the fields where they grow are also used for intensive rice cultivation. The mat-making process is manual, tedious and inefficient. Except for the factories in Basey and Inabanga, quality of the finished products is low.

There is a noticeable absence of women under 40 in the craft, due to low salaries and heavy out-migration of local residents. Earnings vary considerably because of differences in working hours and wage rates. Factory employees in Samar net a much higher PHP 366 per month than Bohol's factory workers at PHP 219 per month; home-based weavers earn an average of PHP 132.70 per month in Samar and PHP 97.73 per month in Bohol. The industry is an important source of employment and income for home-based workers, in view of the households minimal earnings from agriculture. Earnings from this activity represent a significant one half (Samar) to two-thirds (Bohol) of all household income.

Entrepreneurs identify the following market problems: insufficient information; transport and travel difficulties; and the low demand for and low price of their products. On the supply side, product development, financing, supplies, and quality control are dominant problems. However, entrepreneurs generally view the industry as having a bright future. Domestic demand for novelty products has been steadily growing, although traders who deal in utilitarian goods see demand trends less positively.

In considering the policy implications of these findings the study recommends firstly that policy makers should recognise the importance of the sector. Secondly it recommends greater effort on the part of development agencies in delivering assistance to household production units, combined with greater organisation by producers. Thirdly, measures for minimising the role of middlemen except in distributing to more remote areas are recommended. Financial and technical assistance to take advantage of new opportunities are also recommended. Finally the study recommends a more concerted effort to preserve and develop an indigenous raw material base.


The results of a survey of registered cottage industries producing a variety of woven goods are presented. Most firms were established in the early 1980s. 88% are small scale. Raw materials are obtained from wild stocks of herbs and grasses growing in natural forest. Firms rely on suppliers to provide them with raw materials - obtaining raw materials is a greater problem for small firms. Except for one large firm which was a direct exporter, all producers sold to local traders who cater to both domestic
and international markets which are generally characterised by a single proprietorship type of ownership. Firms paid better wages to full-time workers than piece-workers (P71 per day cf. P62.50 per day respectively; legislated minimum wage rate was P64 per day). High capital requirement is the major barrier to entry for potential new firms. The increase in the number of firms from 1970 suggests, however, that barriers to entry are not significant.


The central figures in this study are the artisans and traders of Nabas, a coastal municipality ofrice and coconut growers in the province of Aklan, located on the island of Panay. In the municipality are some three thousand women and girls who - at home, on a part-time basis - make plaited hats and sleeping mats for the domestic markets, about sixty village middlemen, and several large traders. The area chosen for a brief comparative research study is the municipality of Malilipot in the province of Albay. Although similar in topography, crops, and pattern of landownership, here the artisans are wage-dependent home workers or workshop labourers who produce Western-style placemats for exporters and their sub-contractors. In both regions the raw material sources are planted palms, *bariw* (from *Pandanus copelandii*) and *abaca* (from *Musa textilis*) respectively. The author makes the point that it is difficult to say to what extent the two cases can be generalised.

It is the poverty of a large part of the population that accounts for the survival and growth of many of these handicraft industries. Labour remuneration for handicraft producers is, in general, extremely low, and hardly reaches the level of the local agricultural wage. This is true for craft producers in both research locations. Agrarian developments (increased landlessness and labour-saving changes in rice cultivation and harvesting) exacerbate this situation. Poor producers are willing to accept very low pay in crafts because they also have other, often marginal sources of income. Thus, they form a large supply of cheap labour which is readily recruited by handicraft entrepreneurs.

Despite these negative aspects, the two commercialised crafts also have some advantages for artisans which stem precisely from the commercial orientation of the industries. In Buenavista (Nabas), the expansion of markets to areas outside the province has resulted in a (small) increase in the degree of security of producers due to the steady, large demand for products, and to the willingness of traders to extend credit to weavers.

Even in Malilipot, a number of workers have been able to accumulate an investible surplus on the basis of the craft and have developed into small entrepreneurs. The workers in this craft are home workers and workshop labourers, recruited by exporters through a network of suppliers in towns and villages. The industry is based on the subcontracting putting-out arrangement. This system is, in theory, the most disadvantageous for artisans as the craftworkers are wage dependent, perform only one step in the production process, have no control over the final product nor over its proceeds, and can be laid off whenever demand for the product declines. The whole
arrangement is based on advances provided by exporters: the advances are channelled through a chain of suppliers and sub-suppliers in towns and villages. These advances, however, enable some workers without capital of their own to recruit fellow home workers to fill orders and become sub-suppliers and, if circumstances are favourable, eventually become established suppliers. In the town of Malilipot and in the village of Santa Teresa where part of the research was done, at least thirty percent of the suppliers were originally craftworkers, apparently many of them landless or near-landless.

Regarding the relations between artisans and entrepreneurs, the experiences of the artisans in Nabas suggest that growing importance of entrepreneurs in the process of commercialisation is not necessarily accompanied by a loss in the bargaining power of artisans. In Nabas artisans gained somewhat in bargaining power as their craft expanded, and trade relations have become more personalised with a more pronounced credit-supplying element which enhanced the subsistence security of artisans. This development contrasts sharply with that in local rice cultivation. The main factors responsible for the evolution of relations in the weaving craft are increased market demand and free competition among entrepreneurs. As demand for Nabas-made sleeping mats and hats expanded in the last thirty years, traders proliferated, competition increased, and traders had to make more efforts to meet increased demand. In the course of these developments, weavers have remained independent producers because raw materials and implements are cheap and locally available, and weavers have still the possibility to sell on the open markets besides selling to credit-supplying traders. Moreover, they continue to depend on their own labour and that of their husband and children, and seldom employ wage labour. In short, the commercialisation of the weaving craft, in the village of Buenavista at least, involved little differentiation in access to the means of production.

In contrast, the expansion of the abaca export craft in Malilipot has given rise to a highly differentiated industry based on wage labour and an unequal access to the means of production. Exporters and their subcontractors developed a system of putting-out production and manufacture in small workshops which responds to the requirements of the handicraft export market. They need to react fast to changing foreign tastes and keep strict control over quality and timing of production. Therefore, they supply raw materials to craftworkers, specify designs, and pay piece wages. The workers are highly dependent on entrepreneurs and are not organised to defend their interests collectively. Nevertheless, production for the world market may give some leverage. The high demand for labour, sharp deadlines of export orders, severe competition among exporters and suppliers, and the personalised ties between workers and suppliers fostered by the risks involved in export production, result in some bargaining power of workers. Their bargaining position is a tenuous one, since a drop in market demand decreases their leverage. But even in the present period of slack demand, the daily wage income of home workers and workshop labourers at least approximates the local agricultural wage rate, a condition that is quite exceptional for home workers in crafts (in Nabas independent producers earn only half the agricultural wage).

In Nabas about half of the hat and mat traders are women; in Malilipot, women appear to predominate among the subcontracting entrepreneurs. Women are also prominent
among handicraft exporters: the largest exporter in Aklan is a woman, and in Albay many women have either an export business of their own or run one together with their husband. Their economic background is varied, and they include married women, single women and widows. Concerning the prominence of women in the crafts sector the author argues that the cultural role of Philippine lowland women encourages both self-exploitation (working for an income that is lower than a subsistence income) and entrepreneurial accumulation. Women's responsibilities for household welfare, their role as financial managers in the household and their freedom of movement are all important cultural factors encouraging them into craft production and also to take up an entrepreneurial role whenever some capital is available.

The author makes two conclusions regarding the importance of crafts in rural development. First, the income from crafts is vital to the rural poor who work at crafts, in particular to landless workers and marginal cultivators. It cushions the effects of seasonal underemployment, may save households from destitution, provide some income security, and cover the schooling costs of a child. It may also give poor people opportunities for socio-economic mobility, as in the subcontracting craft in Albay. Artisans in both areas repeatedly point out how important the craft is in their scramble for a living. But on the other hand the income from crafts is extremely low and, in the case of the export craft, irregular and insecure. Handicraft may alleviate conditions of poverty but does not, on the whole, solve problems of poverty and need. The causes of the low earnings of artisans - low market prices because of sharp competition, and (not excessive) profit-taking by entrepreneurs - have no easy solution. Working conditions of the wage dependent craftworkers who work at home or in small shops are hardly affected by protective labour laws. These laws are difficult to enforce and may, if applied, unintentionally undermine the competitive position of the products. Given the reality of a competitive handicraft market, striving for a higher, more stable demand for handicraft products is the most feasible way to improve the artisans' bargaining power and hence their labour income.

A second aspect relevant to rural development is that handicraft provides a broad range of rural entrepreneurs with a surplus for local reinvestment. In this respect, handicraft compares favourably with large-scale, capital-intensive industry whose profits are monopolised by large urban corporations. The state has played a role of some importance in this process of local accumulation. Traders in Nabas largely accumulated and expanded on their own account, but a number has recently benefited from low-cost government credit. The subcontractors in Malilipot owe part of their rise and expansion to the government's export promotion policy: government-sponsored trade missions helped raise foreign demand for Philippine crafts, and government credit enabled handicraft exporters to develop a wide network of subcontractors by means of advance payments. As the subcontractors of Malilipot accumulated some capital of their own, they, too, began to avail themselves of government credit. By investing their profits in other rural ventures the entrepreneurs in Nabas and Malilipot undoubtedly contributed to a further linking of the local economy to wider markets and to a further commercialisation of the local economy.

The author questions, however, whether rural craft production can be regarded as a dynamic force in rural development, contributing to self-sustained industrialisation. This depends greatly on the investment policy of handicraft entrepreneurs. The
entrepreneurs of this study use their profits not only to expand their enterprise but also
to invest in land, transportation, and various types of upward and downward trade.
Practically no entrepreneur has invested in manufacturing ventures other than crafts. It
appears that the orientation of the entrepreneurs remains one of traders and "rent­
seekers", interested in the circulation of goods and in activities that yield quick returns.
This may be quite obvious for the craft traders of Nadas, who are traders by
profession. But it also applies to the subcontracting manufacturers of Malilipot. This
investment policy is perfectly sensible and understandable from the viewpoint of their
own family interests and the limited range of, and risks involved with, alternative
investment opportunities. But, the author states, this does suggest that one should not
exaggerate the "dynamic" contribution of crafts to economic development. Nor should
one hail too easily the accumulation taking place in crafts as an alternative route
toward industrialisation.

activities in a Sundanese village (West Java, Indonesia). PhD thesis. Anthropology
Department, University College London.

This thesis questions the prominent representation of Javanese women as enjoying a
high degree of personal and social power as a direct consequence of their participation
in production. The first part of research is an investigation of the factors which
influence the gender division of labour. In the second part it is shown that, despite the
importance of agriculture, most households in the research area (Rankulan, a village in
the Tasikmalaya region) carry out a number of productive tasks in different sectors of
the economy: from subsistence farming, to petty commodity production and to wage
work. The author considers that such combinations are a consequence of strategies
adopted by households as units to ensure their own survival and reproduction and that
such strategies are made possible by the dominant gender division of labour.

Among the activities in which women are involved the case of anyaman (bamboo
weaving) is taken for closer scrutiny. This study offered the opportunity of
investigating more closely an area of work in which superficially there is no strict
gender division of labour.

Anyaman is of recent origin in the study area, but with the considerable reduction in
the amount of work available after agricultural modernisation in the 1960s it
represented one of the few employment alternatives to emerge. Weaving is undertaken
by household-based units using family labour. Among the 77 households interviewed,
30% were involved in bamboo weaving to some extent. In 2/3 of the households more
than one person was involved, there was a roughly 50:50 division between those
households involved in bamboo weaving as a primary occupation and those for whom
it was a secondary activity. Households were of similar size to the village average, but
examination of land distribution shows that 80% own less than 0.05 hectares.

All skills have been passed on from family, neighbours or friends, with transfer of
skills from mother to children particularly important now. The simple tools and raw
materials involved in production are easily available to most producers. Bamboo is
found in the surrounding hills, with several people owning bamboo producing land and
selling rights to cut on it. In other cases bamboo is cut and sold at slightly higher prices
to women and older people (who cannot collect their own due to social or physical restrictions on their mobility). Initial sawing and cutting of the bamboo is performed by both men and women. Weaving is by hand, frequently in batch production with bases, bodies and then final touches of the baskets completed. The final product is plain in appearance and quality is mediocre. Labour times varied between 4-7 hours every working day for those involved full-time to a few hours a day or week when the activity was a secondary occupation. Women would devote more time than men when the involvement was only on a part-time basis. Individuals would change the degree of involvement in weaving over the course of time. The amount of time devoted to anyaman was dependent on a number of factors including the seasonal variation in demand (with some working up to 12 or 14 hours per day in the period leading up to the festival of Lebaran when demand was high), loss of marketing channels (due to illness, bankruptcy or other problems for traders) and the availability of alternative employment opportunities.

Similar to other small-scale marketing in Java, the trade in bamboo products is characterised by a high degree of complexity. Producers rarely sell to the final consumer, rather they take orders and deliver to local producer/traders (tengkulak) or to urban-based traders (bandar). The bandar are mostly men, and are purely involved with trade (with no associated provision of credit or raw materials). Producers tend to prefer marketing contacts with local tengkulak as they are often more reliable with payments than bandar (even though the latter pay higher prices). The author sees the existence of the tengkulaks as a process of differentiation of producers leading to the eventual emergence of a class of capitalist enterprises.

In the same way as refined bamboo work (and in contrast to the more utilitarian rough bamboo work) the final outlets for semi-refined baskets and other items are the market stalls and souvenir shops of the cities and smaller urban centres. A small number of the larger and wealthier producer/traders have links through a local charitable organisation to western charities such as Oxfam and Novib and the more lucrative markets they represent.

Anyaman represents a poorly remunerative occupation for most producers. Although figures for hourly or daily returns are not presented the author states that anyaman's principle importance is in offering a separate, supplementary source of income which can be relied upon in times of need.

The author's principle interest is in the position of women in the productive process and how this is related to their position in society. She concludes that women should correctly be classified as dependent workers (as opposed to petty commodity producers) as a result of their lack of opportunities to seek other employment (thus tying them to home-based production) and their poor control over the productive process (e.g. their dependence on men for raw material supplies and, at the other end, their reduced access to markets).

The increasing numbers of people seeking work and turning to anyaman has lead to a "reproductive squeeze" on producers. They have been forced to lower the costs of production in order to maintain the same levels of sales from anyaman. This has been achieved by product debasement with lower quality work and the reduction of use of
high quality materials such as rattan. Anyaman brings lower returns to labour than most other occupations hence producers are unlikely to invest time and energy in upgrading skills, but reduced quality, skills and level of technology means producers are more vulnerable. This trend to involutionary development - producing more and more for a limited and specialised market - could be altered drastically by a new government project to encourage co-operation between producers and make credit available.


This report examines the effect of a major marketing operation by the Botswanacraft Marketing Company on the women of the Hambukushu tribe in Etsha, their traditional craft of woven palm baskets, and the main natural resources used to make the craft (*Hyphaene petersiana* palm and two dye materials). Botswanacraft has been in operation since the early 1970's. This company purchases crafts from all over Botswana and markets them throughout the world. Its primary product is the woven palm basket from the Ngamiland District in north-western Botswana. Hambukushu women, who are refugees from Angola and now reside in Etsha, are the major producers of this particular craft.

Craft making is very much sex-specific, with the women working primarily with natural plant fibres from trees and reeds, while the men work mainly in wood and metal. From the *mbare* palm (*Hyphaene petersiana*), the women make several varieties of baskets and bracelets. These palms are found in the surrounding environment of the Okavango delta. Natural dyes are obtained from two species of tree. The tools used in basketmaking (a short, sharpened piece of wire and a razor blade) are few and simple.

Botswanacraft Marketing Company is a parastatal company of the Republic of Botswana under the investment firm Botswana Development Corporation. It is devoted to the development and marketing of Botswana handicrafts. Botswanacraft buys traditional and contemporary crafts throughout Botswana and sells them in retail shops in Gaborone and Shashe, and to wholesalers and retailers abroad. Commercial buying started in early 1970 in Ngamiland District, the northwesternmost district. Purchasing was made by a combination of a single travelling buyer who visited villages and local buyers ("agents") working on a commission basis. Transportation of the goods is a critical part of the buying system. Botswanacraft has a contract with a transport company, with most of the production being transported by its trucks. Although the operation has received grants from donor agencies, it has almost been self-supporting from the sales of crafts.

Basket weavers in Etsha make an average of 19.4 open baskets and 9.4 closed baskets per year. One medium-sized open basket will take one woman about 60 hours of continuous weaving. Even though basketmaking is sandwiched in between other demands around the home, 44% of the weavers claim to spend all day making baskets. The amount of time devoted to basket making varies depending on the agricultural season and seasonal cash needs. Most weavers worked within their *diyumbo* (gathering
of homesteads), often transforming it into a social event by working with other female family members or friends. As individuals, basketweavers are not deriving a great deal of positive social benefits from basketry such as high status or true appreciation of their creative abilities, but they are also not being criticised for their skills or the time invested in weaving.

Approximately 70% of the goods purchased by Botswanacraft are sold in Botswana, with baskets accounting for 40% of total sales. Export sales have expanded over the years, baskets account for a much greater proportion (90%) of these sales. Sales of exports by Botswanacraft are made to a number of organisations including nine alternative marketing organisations, nine wholesalers, eleven retailers, and seven combined wholesalers/retailers. Botswanacraft also hired experts and volunteers to work on the development side of the handicraft industry. Their activities have included attempts to improve the quality of existing products, introduce new craft items, develop solutions to the increasing problems of raw material depletion, and improve the organisation of the handicraft industry at the village level through training of and supervision of craft leaders, teachers, and local counterparts.

The activities of Botswanacraft have provided a significant amount of cash income over the years to the households of Etsha and, therefore, few people have needed to migrate to larger towns in other districts or countries to seek employment opportunities. As a source of income basket sales have been critically important to Etsha households during years of drought. The purchase of baskets has also meant that this aspect of the Hambukushu culture has been maintained and even flourished. Other aspects of the producers' culture (e.g. traditional clothing) have, however, suffered as a direct result of the purchasing and marketing operations.

The mass purchasing of Etsha baskets by Botswanacraft has had an effect on the baskets in three areas: type, design and quality. Certain types of baskets have flourished because Botswanacraft encouraged people to make these types. Overall design and quality have improved through Botswanacraft's encouragement.

The increased utilisation of the palm and dye materials due to Botswanacraft's expansive purchasing program has had an obvious negative impact on the natural resources in basketmaking. The potential problem of over-utilisation and possible depletion was not recognised in the early years of expanded basketmaking. Education of basket weavers in non-destructive harvesting techniques, encouragement of palm planting, and trials on palm propagation are now being undertaken.

The author concludes that although the Botswanacraft operation has provided a much needed service to the rural poor a number of improvements could be made. In particular she suggests that the organisation should concentrate on the more competent producers, through training and an increase in the premium for the highest quality baskets, to assist them to become full-time "professional" basketmakers. More effort also needs to be placed upon looking for, and developing, alternative and better sources of income, especially for the less-than-competent weaver. Botswanacraft should also attempt to operate more as a business, reducing its inefficiencies whilst trying to obtain higher prices from dealers. Efforts to conserve the natural resource base of the industry should also be continued and expanded.
8. EXTRACTIVE PRODUCTS

8.1 Introduction

Extractive products are defined here as any product derived from a natural forest which enters into a large-scale industrial process as a raw material or is exported in an unprocessed or semi-processed form. Although historically important in the high forest zones of West Africa (Townson, 1992) and Southeast Asia (de Beer and McDermott, 1989; Peluso, 1992d), many extractive industries in these two regions have declined or disappeared altogether (the gathering and trade of rattan in Southeast Asia is an important exception, having increased dramatically in recent years, and is considered separately below). Most of this discussion is therefore based on examples from Latin America, especially from the Amazon region where the majority of studies of extractive systems have been conducted.

8.2 Employment

As a result of the number of studies conducted in the Amazon, this area is the one for which there is the most reliable data concerning employment. However, estimates of the current number of "extractivists" vary. 1985 Census figures (quoted in 16) give a figure of 340,000 rubber tappers, while Schwartzmann and Allegretti (1987) suggest that half a million people depended on rubber and other latex products as their main source of income. Browder (1992a) suggests that the number of people deriving a significant proportion of their livelihoods from the extraction of natural forest products may be as high as 1,500,000, or 20% of the economically active population of Brazil's Amazon region. Figures for other areas are less common. May (9) quotes surveys from the early 1980s which show that products from the babassu palm (Orbignya phalerata) contributed 22% of income from all sources to as many as 420,000 rural families in north-east Brazil. Case study material from other areas (4, 11) suggests that extractive industries can be locally important sources of employment.

8.3 Income

Although many analysts state that extractivism is a poorly remunerated activity for those engaged in it (7), a number of the studies examined here suggest that returns compare favourably with the alternatives available. Rubber tappers working under the more remunerative autonomous system (see later) earned approximately $1,000 p.a. from sales of rubber and Brazil nuts, placing their earnings above those of half of the economically active population of the region (16). A number of authors also note that the sale of extractive products is only one of a number of market and subsistence activities engaged in by rubber tappers (3, 7, 16). Some studies point to a recent decline in the importance of extractive products in the economies of some communities - for example, the contribution of rubber to the total earnings from forest-derived products on Combú Island has fallen to $75.06 p.a. out of an average total of $3,171.56 p.a.. In a study of copal and rattan collecting in the Philippines, Connelly (4) found copal collectors to be earning an average of P18 per man day.
compared to the P10 to be earned in agricultural work. The surveys quoted by May (9) show that sale of babassu kernels alone provided an average of between 27 and 30 percent of cash household income. In the Guatemalan Petén (11), cutters of the decorative fern xate were found to be earning an average, over a year, of $8 per day - considerably more than the $2-3 per day available for work on ranches or in agriculture.

8.4 Structure and organisation of production

There is no single pattern for the organisation of production. Although in some situations collectors work autonomously (2, 4 and 16), they may also be employed in harvesting teams as wage-labourers (11 and, historically, 5). The system of aviamento has had a very strong influence on the development of extractive industries in the Brazilian Amazon (as described below). Some of the collection activities are engaged in year round (4), perhaps with some seasonal peaks (11), whereas others are undertaken for only a few months of the year because of conflicting labour demands (16 and 2) or natural seasonality of production (10, 11 and 16). The priority given to labouring in rice cultivation is one of the reasons given for the inelastic supply of babassu kernels in Brazil - this problem had a number of negative consequences for the industry and producers (16). While extraction is a major source of cash income to women in the babassu system of Brazil (6), in most other cases the majority of labour involved in collecting activities is provided by men (4, 11 and 16). Some products, such as copal and rubber, undergo only minimal processing before sale (4 and 16). The processing of other products, for example Brazil nuts and babassu kernels (16), involves considerable labour input which is traditionally provided mainly by women.

8.5 Raw material supplies

Many of the studies reviewed have a conservation bias and concentrate on aspects of resource availability and management. Rubber tappers living on traditional holdings and with rights to a number of rubber trails and Brazil nut groves, are only one example of resource use and rights (16). On Combu Island rubber is also tapped, though economically it is of minor importance and tenure systems and management do not centre around it. In the babassu areas of Brazil, the palm is actively managed as part of an agroforestry system combining crops and cattle (9). A system of usufruct rights to palms close to holdings has developed, and collectors also have access to babassu stands on private holdings (providing that sale of kernels is only made through the landowner). May (9 and 16) stresses the importance of these tenure rights in determining management for sustained production, and details the way in which dilution of these rights has contributed to a decline in the babassu industry and the clearing of babassu stands for other uses. The Uaxactún-Carmelita multiple-use reserve in the Guatemalan Maya Biosphere reserve allows harvesting of forest products, with workers being brought in on trucks by contractors (11). In the Philippines, copal is collected from trees in the forest up to 5 hours walk away from the village (4). In both these latter examples there appears to be little active management of the resource.
A number of cases point to destructive harvesting practices. Overexploitation is given as one of the reasons for the depletion of copal supplies, although agricultural expansion and, in particular, mining and logging operations have also played a part (4). The excessive increase in collection is due to an increase in population and also an increased desire to participate in the market economy. Although collection of the three major products of the Uaxactún-Carmelita reserve should be sustainable, overexploitation of resources has become a major problem (11), especially for chicle gum where inexperienced harvesters are using destructive tapping methods. Historical studies in the Amazon (16) and in West Africa (Harms, 1975) (5) also point to cases where harvesting has resulted in destruction of the resource base. Nations (11) suggests that training and licensing of harvesters is one solution to the problems in the multiple-use reserves in Guatemala (11). Connelly (4) criticises similar efforts by the government in the Philippines for ignoring the greater destruction caused by mining and logging operations.

In addition to the possible negative effects of harvesting, raw material supplies are under threat from a number of other directions. Forest clearance for agriculture or cattle ranching is occurring in a number of areas. As Homma (8) points out, "the expansion of the agricultural frontier often reduces the area of forest available for extraction independently of its [extraction's] profitability". Destruction of forest in Mexico is resulting in an increased share of the xate export market for Guatemala (11). Hecht (6) points out the negative effects of current rural development programmes on the babassu industry, which are "undermining access to resources and often imply their destruction". Some studies have discovered that the resource base upon which the Brazil nut industry of Acre depends may be dwindling - a lack of regeneration and juvenile trees has been noted, and the trees are being illegally felled for timber (16).

A major factor contributing to the decline of extractive industries in some areas is competition from domesticated sources of the product (8). Rubber production in the Brazilian Amazon almost disappeared as a result of cheaper production in South East Asian plantations, and only survived as a result of government subsidisation of production (16). In West Africa, where production was not subsidised, natural rubber production rapidly declined and eventually ceased altogether (Harms, 1975). Brazil nut plantations have recently been established in the Amazon and, although their future productivity is still debatable, they represent a potentially major threat to production from wild sources (10 and 16).

- extractive reserves

In Brazil, a system of "extractive reserves" has developed as a response by the National Council of Rubber Tappers (CNS) to forest clearance and expulsion of rubber tappers. These areas are reserves for the extraction of potentially renewable commercial forest products by traditional resident populations (3). The state retains ownership of the land and grants usufruct rights to rubber tappers for an initial minimum period of 30 years (Schwartzmann, 1992b). Property rights follow traditional patterns of land use and the areas are administered on a local level by locally elected groups (16). Although 16 reserves covering a total of 3 million hectares had been decreed by 1991, demarcation and implementation is progressing slowly due to continuing land rights conflicts (16).
The extractive reserves movement has been promoted by some researchers as a means of reconciling development and conservation (Allegretti, 1990). However, recent discussions have tended to downplay the potential of extractivism as an approach to promote forest conservation (3). As detailed elsewhere in this review, extractive activities suffer from a number of problems related to sustainable production and marketing. Browder (3) also questions whether the interests of extractive communities necessarily coincide with the objectives of protecting biological diversity. Recently a consensus has emerged that, although extractive reserves should be supported on the grounds of social justice, they represent only one (and a relatively minor one) of a much larger collection of approaches necessary to protect significant areas of the Amazon's tropical forests (3, 16). In addition there are doubts about the transferability of the extractive reserves approach to other areas with significantly different ecological, socio-economic and political environments (Peluso, 1992d) (18). The example of the Uaxactún-Carmelita multiple-use reserve in the Petén demonstrates that locally applicable models can, however, be designed (11).

8.6 Marketing systems

- aviamento (16)

Throughout the Amazon Basin this is an historically important, and still widespread, system of credit and marketing. Although existing in many forms it usually involves the supply of market goods on credit at inflated prices, to be paid for in extractive products, mainly rubber and Brazil nuts. It was thus highly regressive, frequently resulting in rubber tappers being maintained in a state of debt peonage to the rubber merchants or patraos (owners of the rubber trails). The system was manipulated in such a way as to keep the tappers engaged in extractive activities with little time for agriculture and therefore dependent on the patrao for food supplies. Although the system had few advantages for its participants (including the patrao and rubber merchants, who were frequently in debt themselves), it did manage to allow communities in remote rural areas to participate in the market economy. The support of the rubber industry by the Brazilian government can also be explained by the involvement of a number of powerful interests in the industry. Recently there has been a shift away from aviamento to more autonomous systems in areas that have become more accessible and rubber tappers have become less dependent on the merchants for supplies of foods and other goods.

- other systems

Few details are given of other systems of marketing extractive products. In Guatemala xate passes from contractors to processing warehouses where the stems are sorted before being shipped or air-freighted to Europe and America (11). In West Africa the gum arabic trade became dominated by one lineage who became economically and socially powerful as a result of their numerous trading activities (5). In spite of the lack of detailed studies, May (9) states that the terms under which extractive products are traded in the market is one of the factors that determines, in large measure, whether such resources may be managed for sustained production. Poor market infrastructure, perishable products, and isolation from information on
prices or market trends make forest dwellers vulnerable to buyers' manipulations and limit the scope for increased output. The volatility of markets, their limited size and scope for expansion and the possibility that rapid expansion in markets may lead to resource overexploitation are other problems facing NTFP trade expansion. May (9) illustrates this with examples from the babassu industry. Here the structure of market intermediation was partly attributable for the failure to fully realise the potential of babassu. Despite increased demand and prices, merchants and landowners failed to pass on benefits to producers. This resulted in declining terms of trade for extractors and a failure of production to increase (16). Ribbans (15) also details some of the problems, including access to markets and access to product and market information, facing those wishing to expand the market for extractive products in developed countries.

8.7 Demand

The poor future prospects for demand for many extractive products is another weak point for these industries. Many of the authors note the falling demand for products, either as a result of substitution by synthetics (5, 8, 9, 11, 16) or natural products (9, 11, 16) or as a result of declining popularity (11, 16). Homma (8) states that the process of substitution is triggered by two different conditions. First, the price of the natural resource begins to climb because of depletion of the product in the forest and increase in demand. Second, technological improvement of the substitute reduces its price and increases its competitiveness. In the case of Brazil nuts, falling demand was related to problems with quality (16). Ribbans (15) notes that there are a number of uncertainties over the demand for "rain-forest products" in developed countries which indicate that they may have difficulty in transcending the "novelty" market.

8.8 Rattan gathering and trade in Kalimantan, Indonesia

While the majority of extractive products obtained from the forests of Southeast Asia have now become economically insignificant, especially when compared to the timber exports from the region, rattan exports have expanded rapidly. The majority of production came from Kalimantan and Sumatra in Indonesia. The raw rattan industry there has steadily increased, bringing in US$ 335 million (or 6.5% of total forestry earnings) in 1988 and employing perhaps 100,000 people (13). Recently the government has introduced a ban restricting the export of rattan to only finished goods such as furniture, mats and trinkets (17) (see below). Much of the information reviewed here pre-dates this ban, and it is not clear how well it reflects the present situation in Kalimantan.

Rattan cane is obtained from one of a number of species of climbing palms. In Kalimantan, both natural and cultivated sources are utilised (little information is available on the balance between the two sources). Although cultivation of rattan has been practised for over a century, cultivation is still rare in some areas, especially in West Kalimantan (17). Rattan cultivation ranges from being a secondary occupation to being a major source of income for
some farmers. Under pressure from a number of directions, local controls on rattan harvesting have broken down in many areas. Over-harvesting is now widespread (13).

Rattan collection is generally a part-time activity among the peasant and off-farm labouring households involved (13). Recently new migrants have swollen the numbers of rattan gatherers, placing further pressure on the resource. The act of gathering rattan, which is performed in groups or individually, requires no specialised tools (only a machete). Ethnic differences exist in the degree to which women are involved in collection. Collectors usually perform some limited first-stage processing on the rattan before selling it to traders.

Studies of the rattan trade conducted before the ban was introduced indentified two types of traders - "long-term" traders to whom collectors were bound by credit-based obligations and "short-term" traders who became involved in trade when market prices were high and had fewer direct ties to collectors. Trader-boats (employing 4-5 semi-permanent labourers) delivered rattan canes downstream to first-stage processing centres. Here the canes were air-dried, sorted and treated to preserve them and enhance their colour. Canes were sorted once again before being dispatched to wholesalers and retailers. Much of the production was eventually exported, to be used in the rattan furniture industries of Hong Kong, Singapore and other Southeast Asian nations. The market for these goods had been expanding rapidly in recent years. Demand for rattan by these industries has thus been increasing also, and together with the shrinking supplies from the forest, had resulted in the real price of unprocessed rattan in the world increasing by 9% per year since 1981 (17).

The rationale behind the ban on all but finished rattan goods was to encourage domestic processing of rattan, leading to an increase in local employment and of the value added from manufactured exports. The government proposed that the ban on rattan could create 75,000 to 160,000 new jobs in manufacturing (17). It is too early to comment on the outcome of this ban, although initial studies suggest that it has had a strongly negative effect on rattan-growers and collectors by reducing prices and incomes. Many former growers have slowed or stopped cultivation, and farmers switched to and/or intensified other productive activities (17). To have the desired effect of increasing manufacturing activity, furniture manufacturers must also overcome a number of constraints relating to technology, training and finance (13). Significant smuggling may also be allowing foreign producers access to low-cost supplies of rattan (14), although world prices of rattan have increased (maybe by as much as 100% (17)). These high world prices have also prompted marginal producer nations to expand exports and to establish plantations of rattan or rattan substitutes (17). Manufacturers have also been encouraged to develop synthetic and natural substitutes for rattan in the furniture industry (17).

8.9 Patterns of change

Historically, the fortunes of extractive activities have followed a boom-bust pattern, with rapid expansion of production being followed by a more-or-less rapid decline in production from the forest. The causal factors in this typical trajectory have been raw material supplies and demand. The source of a product has often either suffered destruction due to unsustainable harvesting practices or as a result of forest clearance for alternative land uses. Commercial
pressures to domesticate wild sources of valuable products have often also resulted in the production from natural sources becoming uncompetitive. Demand problems relate to the general decline in popularity of some products, coupled with a tendency towards the substitution of the extractive product in favour of cheaper and better quality synthetic or natural alternatives. It can be expected that without considerable effort to formalise and enforce rights to sources, improve management and seek out and develop alternative products and markets, the future of many extractive activities is bleak. Even in those areas where such efforts are being made, it may be more appropriate to view extractive activities as providing a breathing space in the short-term until more robust and viable alternatives can be developed.

In addition to the annotated items that follow see also the following studies on this subject listed in the bibliography:-

This paper considers the value of native forests dominated by palms, examining in detail two forest-dominant palms: "lontar" (*Borassus sundaicus*), a sap-producing palm that forms pure stands on highly degraded sites in eastern Indonesia, and "babassu" (*Orbignya phalerata*), an oil-producing palm that occurs on secondary forest sites in central and northern Brazil. Lontar and the people who use it represent a highly successful example of integration between palm forests and rural communities. The palm is tapped throughout the dry season but with peak periods at the start and end of the season. At the beginning of the season syrup from the sap is either sold directly or used for making gin, which is exported to regional population centres. The output from the second, more intensive tapping period is principally used for the subsistence needs of the population, being particularly important when harvests are poor. Lontar also supports a number of other economic activities (pig-raising, honey collection, etc.), and the stands of lontar provide the basis for permanent garden plots.

Forests of babassu originate and are maintained by human activities, in turn providing subsistence and traded products to inhabitants of the areas in which they are found. Manual extraction of kernels from the extremely hard fruits of babassu constitutes a cottage industry involving over 500,000 families in Brazil. One study found that, during the 3-month peak of the babassu harvest (October-December), selling of kernels contributed an average 40% of total monetary income for households in three rural districts of Maranhao. In contrast to the situation in eastern Indonesia, babassu stands are being eradicated over widespread areas due to conversion of formerly cultivated lands to cattle ranches.

The viability of palm forests as a resource seems to depend on whether they occur on sites where competitive and potentially disruptive land uses are practised. The two examples suggest that use and management of these forests are viable enterprises on climatically and/or edaphically marginal sites. Based on the scant evidence that currently exists, this paper proposes that palm forests possess a potentially unique pattern of nutrient cycling, which enables them to support relatively productive and stable forms of agriculture as well as to contribute to recovery of disturbed sites.
reduced this species' relative contribution to revenue, and other products such as shrimp have assumed greater importance. Although not consciously favoured by management practices, the greater abundance of rubber trees on sites subjected to management suggests that it appears to benefit indirectly from such practices. Rubber is a nonperishable product that can be stored for sale when prices are higher or when alternative sources of income are minimal: in the household studied, rubber was sold in March and August. Data on the sale of forest products by five producers from 1984 through 1988 show that rubber contributed only $75.06 p.a. on average out of an average total of $3,171.56.


In this article, the author examines the claims regarding the potential for extractive reserves to combine conservation and development as they apply to the Brazilian Amazon. The article also challenges the growing view among conservation groups and donor organisations that extractive reserves will help save tropical forests on a meaningful scale.

The proposal that extractive reserves will protect tropical forest biodiversity is questioned. Extractive reserves are not intended to preserve biodiversity in the tropics and are more likely to be successful in (relatively) biologically poor oligarchic forests which constitute only a small fraction of the Amazon's total forest area. Extractor populations also have no direct interest in conservation of forest biodiversity other than to protect their economic opportunities. Many of them engage in activities (such as ranching and small-scale agriculture) which require the forest to be cleared. Numerous examples point to destructive harvesting by extractor populations.

The study also criticises some financial analyses for over-exaggerating the returns to extractive activities. Several other comparative financial analyses of alternative land-use strategies indicate that forest product extraction is among the least remunerative uses of Amazon forestlands. The social organisation of extractive activities also often involves exploitative labour and trading relationships.

The author also points out that the future prospects for many extractive products are poor, the use of land and labour inputs in extractive reserves may be inefficient, and extractive systems do not capitalise on the diverse array of products naturally provided by tropical forests.

Evidence from three case studies points to some of the problems commonly found in extractive communities. These include declining incomes as rubber prices fall, household debt, exploitative trade relations, low literacy rates and high child mortality rates. These findings suggest that it would be wise to take a closer look at how extractive reserves work, who actually benefits from them, and how well they serve the goal of forest conservation. This task will not only require more detailed research of
life in extractive reserves, and in some cases on adjoining indigenous areas, but also a careful examination of the new global structure of environmental politics, especially the emerging role of environmental non-governmental organisations and networks in elevating and transforming local social movements into global environmental causes célèbres.

The author concludes that although extractive reserves may play a useful role in natural forest conservation for a small proportion of the Amazon's forest area and human population, much greater emphasis must be given to strategies that go beyond the limits of extractivism, to stabilise the precarious economic and ecological situations of small- and medium-scale farmers and ranchers, the principal agents of forest destruction in the Amazon.


This paper examines the economic and environmental significance of the collection of forest products for the market by the Tagbanua, an indigenous ethnic minority group living on Palawan Island in the Philippines. The paper begins by looking at the history of forest collecting in Palawan. It then discusses the profitability and economic importance for the island's indigenous collectors of the trade in rattan and Manila copal - a resin, used in the manufacture of paint varnish and other industrial products, that is produced by the tree Agathis dammara. Though other forest subsistence activities (gathering edible wild plants and hunting wild pig) have declined in importance in recent decades, Tagbanua exploitation of copal and rattan for sale on the market has intensified. Market-oriented forest collecting now takes up a large percentage of labour time for Tagbanua men and is a vital source of cash income for many families.

Agathis trees are found only on well-drained slopes at higher elevations in the mountains above Napsaan, or farther in the interior of the island. Walking time to copal sites is usually between 2 and 5 hours from the village. The collectors use machetes to make incisions in the sides of trees from which resin slowly leaks out into sacks. The sacks are then carried in rattan backpacks to pickup points along the road or back to the village. Both the copal and rattan are delivered to lowland Filipino agents, some of them local settlers, who work on a commission basis for the owners of the forest concessions in the area.

Contrary to the impression received from accounts written earlier in the century, today both copal and rattan collecting appear to be reasonably profitable endeavours. At Napsaan, the returns from collecting copal averaged about P18.00 per man day, with a range from 0 (caught in heavy rains) to about P40.00/day. These returns are considerably higher than the agricultural wage rate (P10.00/day) at the time. Data from two earlier studies also confirm the higher returns to copal collecting in Palawan.

Although Napsaan forest collectors are currently able to achieve relatively high cash returns for their labour, their livelihood may be threatened in the near future by the growing scarcity of both copal and rattan on the west coast of Palawan. The depletion of rattan and copal resources in the area appears to be the result of 3 factors: 1) the resource-extraction practices of large-scale mining and logging companies, 2) the
farming activities of the local population, and 3) the increasing intensity of exploitation by local forest collectors. This increased intensity of exploitation has resulted in the collection of forest products, which was once primarily a dry-season activity, now being undertaken year-round. During 1981, for example, adult Tagbanua men in Napsaan spent on average more than 10% of their daylight hours collecting copal and rattan in the forest. Over a year this represents approximately 35-40 days of forest labour for each Tagbanua male. Some of this increase in labour time devoted to forest collecting may be explained by the longer distances collectors must now walk to find copal and rattan. Much of the increase, however, is the result of the recent growth of the Tagbanua population living in the area and the higher frequency of exploitation by individual collectors who are motivated by a growing desire to obtain the cash necessary to participate in the regional market economy.

The minor forest products of Palawan can be preserved only if further destruction of Agathis and rattan by agricultural expansion and logging can be minimised and the current intensity of exploitation can be reduced. These goals, easily stated, will be difficult to achieve, however, because of the problems of enforcement and the powerful interests of the various participants involved in the trade. Two recent government measures to control the loss of forest resources - extension and enforcement of improved tapping techniques and prohibition of swidden-clearing on forest land - are criticised by the author. Both ignore the damage caused by mining and logging operations and ignore alternative approaches such as reducing the quota of minor forest products that concession holders may purchase from indigenous collectors and establishing programs to raise levels of agricultural production.


This study concerns the history of gum arabic in the nineteenth century, when intensive harvesting for the world market occurred. It argues that commercial expansion unleashed pressures which contributed to increased social oppression and environmental degradation in the gum-producing areas of the region. Control over the extractive economy in gum arabic came to be exercised by zawaya lineages, who had become an "emergent class" in the southern Sahara through their trading and other economic activities. During the nineteenth century gum boom, zawaya lineages increasingly turned to slave labour to harvest gum from the acacia forests. In addition, the economic incentives of the gum trade encouraged extractors to inflict so many wounds to the trees that entire groves died prematurely, allowing the desert to encroach further to the south. Eventually, as a result of declining yields, competition from domesticated sources and a decline in demand due to substitution by synthetics, the trade in gum arabic fell dramatically in the early twentieth century. Relating this evidence to the present-day Amazon, the author recommends that expanded commercialisation of forest products be confined to local markets.
This paper outlines the role played by successional palm forests of babassu palm (*Orbignya phalerata*) in the livelihoods of rural communities in the Brazilian state of Maranhao. Extractive activities are important as inputs to household reproduction, and are critical as a source of cash income. In the case study the authors analyse, small-scale extraction was roughly equivalent to wage labour and to agriculture in its contribution to household income. Of particular importance is the sale of the oil-rich kernels of the babassu palm, which has steadily increased over the past 60 years now accounting for 89% of all vegetable oilseed production from non-domesticated sources in Brazil. Rural inhabitants (mostly women) manually extract the oil-rich kernels for sale to local industries for production of lauric vegetable oil, used in soap manufacture, other industrial uses and feedcake. Land distribution in the babassu area is extremely regressive with many landless households. For these landless households the income from the sale of babassu products is particularly important, especially during the period between crop harvests. A number of changes in land use and social relations of production have occurred recently which have resulted in a large reduction in the labour/subsistence opportunities in the area. These changes include: increases in extensive land uses, especially livestock; increases in intensive land uses such as mechanised rice cultivation; and the increased industrialisation of babassu fruits. All three have resulted in a decline in tenant relations, and an erosion of access to both farming land and babassu stands. By far the most significant factor has been ranching expansion.

It is suggested that in rural development analysis, a significant source of both use and exchange values has been overlooked. This issue is of particular concern due to the important contribution extractive activities make to the incomes of the landless generally and women in particular. Also, current rural development programs are actively undermining access to the resources and often imply their destruction. Through this detailed social and ecological analysis of the babassu palm/shifting cultitical system in Northeast Brazil, the authors show the interdependence of regional biological and human agricultural systems. Changes in social relations and technology can undermine the bases for the sustainability of the stable interactions between shifting cultivators and palms.


This exercise of comparing the economics of the three main land uses in Amazonia is based on a considerable amount of regional western Amazonia field data and uses household income generation as the point of departure. It is also unusual in that it incorporates the costs of land degradation. Although the results are not consistent, good and average extraction tends to give higher household income and returns per hectare than average livestock or average colonist agriculture but is behind good livestock and colonist agriculture. If an indicator is used to value the loss of forest, land uses other than petty extraction are not sustainable and go out of production. If
they are to enter into another cycle of production, they require either a long fallow or fertilisation plus fallow.

The author concludes that extraction is a land use that is not very lucrative for its inhabitants, but its returns from productive activities based on actual use of land resources is better than the alternatives. The problem, however, is that if land markets are such that land as a commodity is of greater interest than land as an input to production, there is little incentive to work for sustained activities. In this light, extractive reserves, which effectively remove forest lands from land markets, provide the tenurial basis through which sustainable livelihoods for people and forests can be maintained. The consensus view, however, is that extraction as it is currently elaborated is a land use of great economic hardship and one of exploitation through rents, through markets, and, in many cases, through continued debt and debt peonage. Any strategy for improving the lot of extractors must take account of the large array of activities they undertake to assure subsistence and cash.


The main objective of this paper is to examine the economic dynamics of forest product extraction in Amazonia. Although based on a renewable resource, the extraction of forest products typically undergoes three distinct developmental phases: expansion, stagnation, and decline. Four main factors contribute to the decline of forest product extraction: (1) the inelastic supply of forest products, (2) harvest rates that exceed regeneration rates, (3) the domestication of the forest product, and (4) the development of industrial substitutes for the product. Other variables that affect extraction include expansion of the agricultural frontier and population increase which reduce the area of forest cover available for extraction, independently of its profitability. The economic dynamics of forest product expansion must be understood to successfully carry out conservationist and preservationist measures, and to secure equity for future generations.


"An adequate market assessment of the potential of non-timber forest products (NTFPs) is important prior to investment in product development. The terms under which such products are traded in the market, and the tenure rights over the resources from which they are derived determine, in large measure, whether such resources may be managed for sustained production. Prospects for trade expansion in NTFPs suffer from the following restrictions: 1) poor market infrastructure, perishable products, and isolation from information on prices or market trends, which make forest dwellers vulnerable to buyers' manipulations and limit the scope for increased output; 2) markets may be highly specialised, fickle, and limited in size or scope for expansion, and if output expands, the bottom may drop out of the market, leading to abandonment of production; 3) if markets expand, the rush to exploit new opportunities may exhaust fragile and poorly understood resources that previously supplied low volumes of useful products in a sustainable fashion."
The author illustrates these points with examples from the industries based on the babassu palm in Brazil. Although this species forms dense stands in oligarchic forests throughout Amazonia, it is in Maranhao and Piaui that babassu palm forests are most impressive in area and economic importance. According to surveys carried out in the early 1980s, babassu kernel sales alone provide an average of between 27 percent and 30 percent of cash household income; and babassu products in general contributed 22 percent of income from all sources to as many as 420,000 rural families in Brazil.

Unfortunately, however, a great deal of babassu's potential has not been and may never be realised. This assessment is primarily due to the secularly low value of the palm's principal products in relation to forest productivity and fruit bulk. It is also attributable to the character of the forest products industries that have arisen based on babassu, the structure of market intermediation, and the property rights over the palms themselves. The traditional markets for babassu oil have constricted sharply due to falling demand and substitution by synthetics or other natural oils. The result of these problems has been a decline in the babassu industry, low remuneration to producers, and consequent deforestation of high-density stands to make way for more remunerative land uses. Only development measures that address these problems in concert can be expected to ensure that babassu products may become more viable components of rural enterprises.


The edible seeds of the Brazil nut tree (*Bertholletia excelsa*), along with rubber, are often cited as the most important products of extractive reserves in Amazonia. Brazil nuts are collected mostly during the wet season and rubber is tapped mostly during the dry season. The combination of these two forest products provides year-round income for those living by extractivism. This article reviews the natural history, the value of the Brazil nut harvest, the possibilities for plantation cultivation, and the future of the Brazil nut industry.

Brazil nuts are harvested almost entirely from wild trees during a five to six month period in the rainy season. Collection of Brazil nuts has a major impact on local Amazonian economies. Available figures, however, only provide approximations of total production because of the difficulty in obtaining accurate data from the Amazon. Brazilian production has ranged from 3,557 tons in 1944 to 104,487 tons in 1970. Since 1980, annual production has been around 40,000 tons. In 1986, the total value of shelled and unshelled Brazil nut seeds exported from Manaus alone was $5,773,228. Most of the seeds are sent to England, France, the United States, and Germany. The primary value (money paid to collectors) of Brazil nut stands has been calculated to be $97 per hectare. Over a ten year period, utilisation of a forest for Brazil nut production appears to be more profitable than extracting timber or cutting the forest for pasture.

Recently, plantations of Brazil nut have been established in Amazonia. Although commercial production has not commenced, the owners have high expectations. The authors warns, however, that the future success of Brazil nut plantations is still open to debate. If plantations are viable, then conservationists will have to be prepared to
assess the impact that plantations will have on the maintenance of extractive reserves. It is also important that not too much hope is placed on Brazil nut extraction as an economically viable way to support an ever increasing population in Amazonia. In the first place, world markets may not be able to handle much of an increase in Brazil nut production, and, in the second place, such low intensity use of land is not capable of supporting human populations at the level needed to increase the standard of living demanded by more and more people.

Those interested in the preservation of tropical nature should be careful not to equate the establishment of extractive reserves with the maintenance of Amazonian biodiversity. Because Brazil nut gatherers and rubber tappers do more than just gather Brazil nuts, they often have a negative impact on plant and animal diversity. Indeed, extractive reserves may become little more than secondary vegetation with economic plants such as Brazil nut and rubber trees scattered here and there. Therefore, the establishment of extractive reserves does not negate the need for well planned biological reserves.


This paper details the production of extractive forest products from the Maya Biosphere Reserve. The Petén multiple-use reserve, or extractive reserve, focuses on three natural forest products: chicle gum from the tree *Manilkara zapota*, allspice from the *pimienta gorda* tree (*Pimenta dioica*), and *xate* palm from several species of *Chamadorea*. All three of these products are renewable forest resources. Combined, the three produce between US $4 million and US $7 million per year in export revenues for Guatemala.

*Xate* palm stems are exported to the United States, Switzerland, Germany, and the Netherlands for use in the floral industry. More than 100 million stems are exported per year. The *Chamadorea* palms occur naturally in the lowland tropical forests of the Guatemalan Petén, as well as in neighbouring Tabasco and Chiapas, Mexico, and in Belize. Guatemala is the second major producer of *xate* in the world, just after Mexico. But Guatemala may soon be the primary exporter because lowland tropical forests will not last much longer in Mexico. Mexico's small remaining areas of *xate*-producing tropical forest are fast being replaced by farmland and cattle pasture at a rate far surpassing that in Guatemala. The appeal of *xate* as a forest resource and as the basis for the Petén extractive reserve is the fact that the palms can be harvested every three months without damage.

*Xate* harvesters, called *xateros*, are organised into harvesting teams by contractors based in the town of Santa Elena, Petén. The contractors provide the *xateros* with rice, corn flour, sugar, coffee, powdered milk, and soups, then take them by truck to a tropical forest region where *xate* is known to grow. The *xateros* set up a camp and begin to work the forest. Every other day the contractor returns to the camp, bringing in more food and taking out the *xate* the workers have cut. The contractor then rushes the *xate* to processing warehouses in Santa Elena, or takes it to the Petén airport for shipment to processors in Guatemala City.
Xate harvesters are paid by the number of leaves they cut during their stays within the forest. During 1988, xateros were receiving $0.20 per fifty leaves of jade or one hundred leaves of hembra (the two main species). Over the year, a xatero makes an average of about $8 a day. This is considerably more than the $2 or $3 a day that labourers in the Petén make working on cattle ranches or harvesting corn.

After the xate is delivered to processing warehouses, workers grade it, sort it, and discard unusable leaves - those that are discoloured, poorly formed, or too small for export. Combined sales of the two main species of xate reach almost $4 million per year. Xate production also creates jobs in a country plagued by underemployment. At least six thousand professional xateros live in the Guatemalan Petén today, and another two hundred professional sorters work year round in processing warehouses in the Petén and Guatemala City. In addition several thousand Petén farmers gather xate during a few months each year to earn additional income.

A second important product from the Petén forest is allspice, the dried, unripe berries of the tropical forest tree known in Guatemala as pimiento gorda (Pimenta dioica or Pimenta officinalis). Allspice is gathered each year during June, July, and August by coppicing seed-bearing trees and boiling and drying the harvested seeds. This practice is not destructive - allspice trees soon sprout new branches, and the tree can be harvested again after six years of regrowth. Enough trees exist within the Petén forest to support the export of almost one million pounds of allspice per year. Guatemala currently has about 30 per cent of the international allspice market, trailing Jamaica, which benefits from plantation production. The allspice season coincides with the lowest seasonal demand for xate.

Many Petén xate harvesters also work February to June collecting chicle gum, a latex harvested by cutting cross-sections in the outer bark of the chicle tree. Although this should not be destructive if performed properly, inexperienced harvesters may damage the trees. Increased demand for "natural chewing gum" has reduced the effects of substitution by sorva gum from Brazil, but recent figures indicate a decline in exports.

Recent cashflow analyses for three alternative land uses (using a planning horizon of twelve years and a discount rate of 5%) produced more favourable results for extraction than either cattle ranching or colonist agriculture. Extractive activities also leave the forest intact, which has considerable advantages, particularly for the growing tourism industry in the region.

A number of problems with extractive reserves and extractive industries are identified by the author. The problem of changing markets is reduced by the fact that extractive reserves do not have to depend on only one or two products. Over-exploitation of the resources has become a major problem. This is mainly caused by inexperienced harvesters entering the industry, and one proposed solution is the training and licensing of harvesters. Other problems include the lack of organisation of harvesters and difficulties in guaranteeing continued access to resources. Conflict with other pressure groups, particularly cattle ranchers, contributes greatly to this latter problem. Although demonstrations of the economic superiority of extractive reserves are needed they are
rarely enough on their own. Conservationists should also support extractive alternatives scientifically, politically, and financially.


This article draws the following conclusions based on the evidence presented at the 1989 symposium "Extractive economics in tropical forests: A course of action", papers from which are presented elsewhere in the same volume. 1) NTFP extraction is an extremely diverse forest use. 2) The portion of remaining tropical forest suitable for NTFP extraction is significant but depends greatly on the organisation of producers, the emergence of new markets for NTFPs and, the success of current efforts at forest management. 3) NTFP extraction is ecologically benign relative to the principal alternative land-uses - cattle ranching and selective timber extraction. 4) In its current form, non-market values of NTFP extraction in Amazonia appear more important than market values. 5) In the medium- to long-term, the income generated by NTFP extraction could increase greatly. This would depend on forest management to increase production of NTFPs, emergence of new NTFPs, increases in on-site processing and profit-sharing agreements and, certification and promotion in "green" consumer markets. 6) NTFP extraction from managed tropical forests can proceed for decades or centuries without yielding to alternative land-uses that require deforestation. 7) The potential of NTFP extraction to reconcile the seemingly conflicting goals of forest conservation and economic development will be realised only if populations of extractors organise themselves to (a) defend their natural resources, (b) improve their educational systems, health care, diet and income, (c) build their capacity to manage natural resources, and (d) build their capacity to process and sell their products. 8) Governments have often acted to undermine NTFP extraction by ignoring it or undervaluing it in regional planning programmes, by providing economic incentives to competing land uses, or by attempting to control it in ways that neglect the biological, social, and economic complexity of extraction.

The author recommends that a more widespread, effective network of extractor organisations is needed to realise the potential of NTFP extraction. These groups will require assistance from researchers and extension agents to improve production systems and livelihoods. Other non-governmental groups can also help with the reform of laws that discriminate against extractive activities, assistance with structuring the new organisations' campaigns for human rights and the provision of information about markets, laws, natural resource management and potential sources of funding. Governments, the private sector, the international finance community and bilateral aid agencies also have a role to play in supporting NTFP extraction.

Case study one: *Rattan industries in East Kalimantan, Indonesia*. Of all the non-timber forest products, rattan is by far the most important economically, accounting for 6.56% of Indonesia's total average annual export earnings from forest products in 1988, and nearly half of the earnings from non-timber products in the early 1980's. Supplying 90% of the raw rattan traded on world markets, Indonesia earned US$335 million in 1984, with some 83,000 to 100,000 people employed in collection, trade, and processing activities. The value of NTFP exports has increased greatly in recent years, a result not only of the higher world prices for raw materials, but also of the increasing percentage of rattan exports which are semi- or fully processed. Although Sumatra is considered by some analysts to be potentially the biggest supplier of rattan in Indonesia, an estimated 50% of current exports originate from Kalimantan. Of the four provinces in the island East Kalimantan boasts the largest production areas for wild varieties of rattan.

The rattan industry in East Kalimantan has three main components: a) cultivation and collection; b) trade; and c) processing. Rattan collection is relatively simple operation requiring only a machete for cutting the rattan and removing the sheath and the strength to pull it down from the treetops. Two to four labourers might work in a household of part-time collectors. More men than women are employed in the rattan collection industries. Until it reaches a first-stage processing centre, the only treatment given cut rattan by collectors is bundling (i.e. folding 4-6 metre lengths in half) in packs approximately 28 kilograms each, air-drying, and for some varieties in some locales, removal of the outer coating on the stems. The bundled rattan is then sold to a trader who takes it down river by boat to a first stage processing centre. Collection is somewhat seasonal, being influenced by agriculture cycles and cash needs among other factors. It is generally a part-time activity combined with other farm and non-farm activities. The contribution of rattan collection to total income depends on the location of villages, being lower in downriver villages (close to cities and alternative employment) and greater in upriver villages, especially areas where rattan is grown in plantations. Some rattan growers receive one-third to one-half the selling price of the rattan in their gardens, the other portion going to cutting labourers working independently or with a trader. In spite of its part-time or seasonal nature, particularly for collectors and labourers, the rattan related industry remains a crucial portion of their livelihood, especially as it is flexible enough to be engaged in as and when circumstances demand.

The property status of rattan within a village forest territory has shifted from "open access" to common use by a harvest group depending on village. Some villages have attempted to control rattan collection through local regulations such as restricting clump cutting to 10-20 percent per year. Plantations belong to the planter who originally claimed the land by clearing the forest for cultivation or by inheriting the
land from the clearer. Conflicts between timber concessions and villagers have occurred.

There are two types of traders - long-term and short-term. Long-term traders may be village shopkeepers or river middlemen, trade boat operators, or the agents of shopkeepers or river traders. Long-term traders have greater knowledge of the rattan trade and develop, often debt-based, relations with collectors. Short-term traders are usually attracted to the activity when market prices are high and have fewer bonds with collectors. Trading skills vary according to ethnic affiliations with Bugis, banjar, and Chinese rattan traders having a long history of trading experience and displaying well-developed skills in managing trade operations.

Processors sort the rattan, air-dry it, then pass it through either a diesel or sulphur treatment to preserve and enhance the rattan. In some cases more specialised processing takes place to separate the rattan into peel and pith for local handicraft production, or to make rattan carpets and mats. Processing plants are also somewhat subject to seasonal constraints due to agricultural activities where workers come from agricultural villages. Seasonality, in terms of drought or rain, also affects the capability of trade boats to travel upriver to buy rattan in bulk, and of collectors or middlemen to transport rattan from shallow tributaries by raft or canoe. A large scale first stage processing centre employs 20 to 80 workers at a time, the number depending on the agricultural season and the availability of rattan. The author states that the employment potential of manufacturing operations such as furniture making and rattan mat or carpet production is formidable. Wages are paid on a daily or piecework basis, depending on the task. These plants are mostly owned by Chinese.

Indonesia provides a majority of raw materials to the international rattan furniture industry, with most of it sent to Hong Kong (approx. 60%) and Singapore (approx. 20%). There, the canes are either manufactured directly into furniture or simply cleaned and re-sorted to meet international trade standards, and re-exported to Europe, the USA, or Japan. The rest is manufactured and sold locally as furniture or other household items such as baskets, mats, and other decorative articles.

The author considers a number of issues and constraints relevant to the industry. The exploitation of raw materials is particularly important as over-harvesting is widespread. Local controls on collection have been seriously eroded by government laws, improved access (with motors on canoes), and increased numbers of migrants.

The processing industries also suffer from several problems related to technology. Production for a very competitive and quality-conscious market requires very expensive machinery (for splitting and shaping the rattan), imports of which attract a high government-imposed tax. There are also difficulties in finding trainers from Hong Kong and Taiwan to teach furniture-making skills to local people.

Collectors and processors experience greater financial constraints than traders or middlemen. Collectors are often trapped in a cycle of indebtedness and exploitation by traders. However collectors with long-term arrangements with shopkeepers enjoy patronage benefits not obvious in the rattan agreement itself. Downstream indebtedness and patron-client relationships are currently being replaced by cash transactions,
resulting in new advantages and disadvantages to both collectors and traders. Processors problems with financing stem from the large amounts of capital required to establish an operation, particularly if they wish to buy splitting machines or the machines for bending large canes into standard shapes for furniture.

Labour is also relatively costly in East Kalimantan compared to Java. The world market for rattan goods is highly competitive, and Indonesia must compete with producers in Hong Kong and Singapore where shipping costs are much lower. Finally, a lack of data on these industries makes analysis difficult for policy makers and slows down the development of all important extension efforts to share information with producers.

A number of recommendations for possible directions to ameliorate some of the major problems of the industry are presented. These include encouraging the establishment of rattan plantations, whether by individuals or by villages. To retain a higher percentage of the value close to the source of collection, first stage processing centres should be established upriver, both at major bulking villages and at small ones nearby. The activities of timber companies should be regulated and the forest service should uphold the rights of indigenous people to non-timber forest products on concession lands. If property rights to forest rattan are to be officially allocated, villagers should be allowed priority to the forest territories they once controlled.

The author concludes that future expansion of furniture manufacture in the province would not only increase rattan's important contribution to local people's incomes and provincial revenues, but might also serve as a check on over-exploitation. If increased support for rural processing centres were to be combined with the implementation of the recommendations above, processing rattan in rural areas has the potential to support men and women in rural East Kalimantan for generations to come.


In this paper the author uses a political ecology framework to analyse the sociological and environmental factors emerging over the past two and a half decades and influencing contemporary rattan production and trade in East Kalimantan.

Rattan is managed in various ways throughout the province. Rattan gardens, where rattan is planted alongside other economic and useful species, are common in the southern parts of the province (Pasir district) and along the Mahakam river. In some of the same areas, or elsewhere, management systems are based on limited harvest regulations, in which a certain percentage of the harvestable stems are taken in one year and the rest left for subsequent years. Collection is sometimes done by the owners... dried in the sun and sold to village shopkeepers, village middlemen, or tradeboat operators, who sell the rattan downriver. Rattan collection is generally a part-time activity, engaged in by various members of peasant or labouring households, who work individually or in groups. Collection is but one of a variety of economic activities. The level of involvement fluctuates with the agricultural cycle, the market and the weather. Property rights, availability of land for shifting cultivation, access and
relationships with rattan buyers, other members for group working and knowledge of rattan ecology also influence rattan collection.

Traditional systems of trade involved the sale of rattan by collectors to riverboat or village-based middlemen who then transported the rattan to an exporter or a processing factory. The system was based on the provision of credit by middlemen, who expected collectors to purchase subsistence and trade goods from them. Debt tied collectors to particular middlemen, and middlemen to higher order traders. Co-operation (largely intended to protect traders from delinquent collectors not selling their produce to the traders to whom they were indebted) and price setting between traders was common. Recently the number of traders operating outside this system and, therefore without a long term interest in sustaining trading activities has increased. This has opened new opportunities for collectors to sell their products for cash (cash transactions have become increasingly common, particularly in the most accessible villages) but the increased collection has had negative impacts on forest sources of rattan (although it may also have created incentives for planting more rattan in home or forest gardens). The difficulties of trader collusion as cash transactions have become more common has resulted in traders (or trader's agents) accompanying their collectors (usually in groups) into the forest where they collect for a week or more at a time. Provisions are provided by the traders for the duration of the collecting expedition and, at the end of it, the trader takes possession and pays for the rattan in cash or goods based on his valuation of the wet rattan minus the cost of provisions consumed in the forest.

The author considers some of the influences on the collection and trade in rattan since the 1960s. The ban on manual logging in the early seventies resulted in many timber traders looking for alternative activities, which included rattan and damar (resin) production and trade. New migrants were forced into non-timber forest product extraction after they lost their employment as manual woodcutters. Local people also became more dependent on non-timber forest products when access to timber and timber-management rights were taken from them. Improved transport (after the timber boom) and the rapid expansion of credit along the trading networks (improving the collector's bargaining power by leading to increased competition between creditors and an increased use of cash in transactions) both lead to increased extraction of non-timber forest products. World demand for rattan increased greatly at a time when other sources for the world market were being depleted or restricted (especially the Philippines ban on the export of unprocessed rattan). The increase of foreign investment, particularly by the Japanese, in rattan carpeting and matting factories in South Kalimantan province also had a major effect on rattan supplies. Rattan cutters from other regions would take, sometimes by force, the supplies of rattan from gardens. Factory scale, capitalist production of rattan carpeting has eliminated the home production of carpets, with some people now working as wage labourers in the factories.

In the 1980s the forest fires of 1982-3 destroyed or temporarily eliminated many prime sources of rattan. Forest collection activities remained dramatically reduced as late as six years after the fire, especially those which were not for direct subsistence. The bans on the export of raw rattan (1979) and then semi-processed rattan (1988) also had major impacts on participation in commercial collection and trade in areas not directly affected by the fires. Both laws, particularly the most recent, were meant to increase
value-added from rattan and to stimulate both rattan-based industries and commercial (plantation) production of rattan. By July 1989 rattan manufacturing capacities had increased more than 600 percent since the passing of the law, and the number of rattan manufacturing enterprises had increased by more than 250 percent. Most of these manufacturing enterprises are not providing new opportunities for the people of East Kalimantan, for they are located either in South Kalimantan or in Java where labour in Indonesia is most abundant and least expensive. However, the smuggling of large quantities of raw rattan has been reported, while the legal trade is reportedly suffering. Large-scale forest conversion projects and forest clearance by transmigrants have put more pressure on rattan resources. "East Kalimantan today provides a classic case of widespread and difficult to control forest extraction. Moreover, while the transition to capitalist relations of production in extraction and processing of rattan has benefited collectors in some ways, it has simultaneously deprived them of rights and the means of enforcing their rights to NTFPs, and thus exposing the sources of rattan to more real threats of depletion. Considering the extensive destruction of rattan habitats (by fire, logging, conversion to plantations, and migrant populations), and the overwhelming increase in rattan extraction, it seems safe to say the current rate of extraction is anything but sustainable."

The author concludes that the specific political-economic and environmental circumstances of Indonesia and interior Kalimantan preclude the application of the Amazonian model of extractive reserves. The politics of forest management, at both the national and local levels, are more conducive to village level extractive reserves than to regional, labour-based organisations.


This thesis examines the recent efforts to promote the sale of natural forest products in developed country markets. The history of trade in seven NTFPs (rubber, piassava fibre, sarsaparilla, brazil nuts, babassu oil, vegetable ivory and balata) is analysed. It is concluded that the typical scenario has been over-exploitation and resource depletion to meet rising demand, before the product is turned over to cultivation, replaced by chemical cloning, superseded by scientific discovery or substituted by a more convenient alternative.

A number of economic, ethical and local problems in supplying international markets are identified. These include: insecurity of commodity prices; world recession; competition from overseas and the development of synthetic substitutes; loss of "intellectual property"; access to land; heterogeneity of forest; heterogeneity of forest peoples; access to markets and; access to product and market information.

The task ahead of extractivists is formidable. Beyond the inherent problems of engaging in international trade, Brazilian producers are further disadvantaged by infrastructural constraints and a lack of governmental or other official institutional support. Furthermore, a question mark still hangs over demand. Recession in the industrialised countries has made potential consumers more introspective and there is a dearth of information concerning the specifications of forest resources and, equally important, the potential for new markets. Meanwhile, importers and retailers are split
over the perception of their role in providing opportunities for forest products which indicates that Amazonia's produce may have difficulty in transcending the "novelty" market.

If the uncertainties of supply and demand could be conquered, there would still be no guarantee that commercialisation of NTFPs would be self-sustaining. Indigenous peoples have proved as capable as any other of destroying the resource base to meet their own financial needs or the demands of the market. Increased demand is also apt to lead to over-specialisation - making communities even more vulnerable to market shifts.

The author concludes that the shortcomings of commercial extractivism as a means of defending the rainforest and providing a decent standard of living for its inhabitants, derive from the fact that essentially, it is a model which addresses the symptoms and not the causes of deforestation and rural-worker exploitation. Although extractivism may offer a short-term fix in a small number of cases it is in danger of diverting international attention away from the real problems - land distribution, poverty and inadequate welfare and legal provision - that confront the region.


This study examines the impacts of the development of the principal extractive products of the Amazon. The production of rubber, Brazil nuts and babaçu products is considered in detail. Rubber became an important commodity following the discovery of vulcanisation in 1839, and exports from Amazonia expanded rapidly, especially after 1870. Workers were recruited from the drought-prone north-east of Brazil and from local indigenous groups. A highly regressive system of credit and marketing called aviamento developed in which market goods were supplied on credit at inflated prices, to be paid for in extractive products, mainly rubber and Brazil nuts. The system resulted in rubber tappers constantly being in a state of debt peonage to the petty rubber merchants and patraos (owners of the rubber trails). The aviamento system is still widespread and exists in many forms throughout the Amazon Basin. It is very difficult to replace as it does offer a means by which groups in remote areas can have access to outside markets. The participation of many powerful interests in the aviamento system also helps to explain the support and protection given to Amazonian rubber by the Brazilian government. This support includes the payment of subsidies that have, at times, kept the price of Brazilian rubber at three times the international market price. Recently there has been a shift from aviamento to autonomous systems in more accessible areas. According to one study this system offers a better quality of life to producers. The average holding was 372 hectares and an average family exploited 1100 rubber trees. From an annual production of 750 kg of rubber and 4500 kg of Brazil nuts, annual incomes of almost $1000 were earned, with some earning over $1500 plus subsistence benefits. This gave them an income that put them above half the economically active population of the region. Increasing conflicts between land speculators and ranchers occurred between 1960 and 1980. In 1985 the National Council of Rubber Tappers (CNS) was established and called for the formation of extractive reserves. This allows for the legal recognition of property rights based on traditional patterns of land use. Each landholding allows for a mix of activities, as in
the autonomous rubber tapper system, with generally three rubber trails of 120 trees per trail in some 100-150 ha. The land is retained by the State and is leased to the rubber tappers for an initial minimum period of 30 years: this avoids the normal process of land concentration and deforestation which has followed privatisation in the Amazon region. The extractive reserves are under the joint control of CNS and the Brazilian Environmental Institute (IBAMA), but at the local level are administered by locally elected groups.

Despite these developments, natural rubber faces a bleak future as a result of successful domestication in non-Amazonian Brazil. These plantations, which are estimated to supply 60% of Brazil's market, will soon be able to supply all Brazil's domestic rubber needs at a reduced cost, thereby removing the rationale for subsidising wild rubber extraction. Liberalisation policies in the Brazilian economy are also likely to increase pressures for reduction or removal of this subsidy.

Brazil nut trees (*Bertholletia excelsa*) are found in groves of 50-100 trees in the unflooded forest throughout Amazonia. The seasonal complementarity with rubber production - it is harvested in the rainy season while rubber is extracted in the dry season - contributes to its importance in the extractive economies of Brazil, Peru and Bolivia. Women have an important role in the extraction activity, as they crack the fruits collected by the men, separate out the nuts, and prepare them for home consumption. Although Brazil nut extraction became important following the rubber price crash of the early 1900s, the share of the edible nut market has declined now to less than five per cent, due mainly to the growth in consumption of almonds and hazel nuts. The quality and quantity of Brazil nut production varies widely between trees, regions and years. Recent problems with quality have reduced demand and prices. Although production has shifted to Acre and Colombia and Peru, the future of Brazil nut extraction may be under threat due to a dwindling resource base. A lack of regeneration and juvenile trees has been reported in Acre, for which a number of explanations have been proposed. Unless technical or disease problems intervene, production from domesticated sources may also increasingly compete with supplies from natural sources. The author suggests that co-operative processing and marketing (such as that established by Cultural Survival) will be important if Brazil nut gatherers are to be sufficiently remunerated to continue.

Babaçu (*Orbignya phalerata*), a palm used for its oil, charcoal, food and shelter, grows in successional palm forest over large areas of Brazil and Bolivia, but especially in the transition zone between the semi-arid north-east and humid tropics of northern Brazil. It has a particularly high potential because it is a pioneer species in cleared forest, growing in almost pure stands on degraded sites. Babaçu products are particularly important for the subsistence economy as they are obtained in the period between peak labour demands in annual crop production, and are produced primarily by women and children. The main cash products are oil (used for cooking, soap and chemical applications), feedcake and charcoal. The babaçu oil industry was at one time the largest oilseed industry in the world based solely on the harvest of a wild plant: in 1984 it contributed an estimated $150 million value-added to the Brazilian economy. However, there was a dramatic decline in its export value from $4.26 million in 1985 to $109,000 in 1989, due to substitution by synthetic detergents and less fatty edible oils, but domestic usage in Brazil remains substantial.
A system of usufruct rights to babaçu stands on common lands and private estates (where rights are dependent on sale of the kernels to the landowner) have become established. However, recent major changes in land use throughout the region resulted in babaçu clearance, widespread eviction, and a reduced area for subsistence agriculture, further increasing peasant dependence on the depleted babaçu stands. Since the 1970s processing activities have been located within the production zone. Despite increased demand and prices (fuelled by fast economic growth and population growth) production failed to increase. This was firstly because merchants and landowners did not pass on the price increases, resulting in declining terms of trade for the extractors. Babaçu also proved to have an inelastic supply as extraction took second place behind rice cultivation in households' labour priorities. Because of problems in obtaining supplies, babaçu processing plants attempted to reduce costs by shifting to whole fruit marketing and centralised processing. This is less labour intensive than manual extraction and was dominated by men, in contrast to herne-based processing which was traditionally women's work. The combination of land use changes and processing changes have caused drastic alterations in rural employment and income distribution, and resulted in large-scale outmigration. Possible interventions include the establishment of community-owned processing units on extractive reserves and also the normalisation and protection of usufruct rights of extractors on private land.

The study identifies the main factors affecting sustainable welfare benefits for extractive groups as including tenure stability, policies favouring alternative land uses, aviamiento, commercialisation systems, commercial pressures resulting in resource depletion where the extraction method is destructive, and the boom-bust nature of export markets that inevitably lead to substitution by a synthetic or planted product. The author concludes that the future of extractivism depends on better remuneration for extractors, whether through the market or not, tenure and institutional reforms (i.e. extractive reserves), and successful diversification through integrated natural forest management. The cultivation of formerly wild plants in agroforestry systems should also be given high priority. Extractivism on its own, and under present market conditions, has major limitations as a response to deforestation pressures, but there are important strategic and humanitarian reasons for its support while longer term solutions are being developed.


Based on interviews in two rattan-growing regions in Kalimantan, this article examines the effect on smallholders of the Indonesian government's ban on the export of raw and semi-processed rattan in 1988. The study sites represented two different styles and intensities of cultivation of the thin-caned sega (Calamus caesius): high-intensity in Sampit (Central Kalimantan), where rattan is a well-established tradition, and low-intensity in Ketapang (West Kalimantan), where few farmers cultivate rattan and investments in rattan are minimal. Although villagers in West and Central Kalimantan derive about 28% of their income from rattan, Sampit farmers make about 50% more per year from rattan than farmers in Ketapang. This is because Sampit is more accessible and so farmgate prices are higher in Sampit than in Ketapang.
Indonesia is not the only country to have restricted the exports of unprocessed rattan. Over the past 15 years, the Philippines and Thailand and most recently Malaysia banned the exports of raw rattan. The rationale for the ban is that it will encourage the domestic processing of rattan, increasing local employment and value added from manufactured exports. Additionally the government was lobbied by Indonesian furniture manufacturers. The bans were progressively more restrictive, and at present allow only the export of finished rattan goods - furniture, mats and trinkets.

The effect of the ban has been to lower domestic demand for unprocessed rattan and depress farm-gate prices by about 40%. Small and large traders alike have abandoned the rattan trade. It was also found that most of the farmers interviewed had stopped collecting and cultivating rattan since the imposition of the ban. In Sampit the farmers have intensified rubber and jelutung (gutta percha) tapping, logging and horticulture. Average household incomes have fallen by 38% in Sampit and by 31% in Ketapang (although Sampit has also suffered from failed rice harvests). The number of farmers earning less than what was considered to be enough for a family of five (Rp 25,000/week) had increased by fourfold in both the studies sites. Outside the study areas, unemployment has probably resulted in areas where farmers depend more heavily on rattan. Trading firms in Sampit have also reduced their workforces considerably.

The authors conclude that, although the ban may allow Indonesia to acquire the technical and marketing skills to compete successfully in the world market for finished rattan goods, it has had negative short-term consequences on local economies. In addition the sharp increase in world prices for rattan caused by the ban has prompted marginal producer countries (Papua New Guinea, Vietnam, Burma, Laos, Cambodia) to increase exports and to establish plantations of rattan or rattan substitutes. Manufacturers have been encouraged to develop synthetic substitutes and to search for woody products that can substitute for rattan in the furniture industry. The ban may therefore erode the market for Indonesia's finished rattan exports.


This paper compares existing non-timber forest production systems in Petén, Guatemala, and West Kalimantan, Indonesia, to identify key ecological, socio-economic, and political factors in the design and implementation of extractive reserves. In the Petén, chicle, xate and allspice are the primary products of the export-oriented extractive economy. In Indonesia a range of products are extracted from the natural forests including gaharu (resin from Aquilaria spp. used as a perfume), medang (bark of Litsea spp. used in aromatic mosquito repellent coils), ililipe nuts (from Shorea spp. and from which edible oil is extracted), ironwood (a termite and rot resistant wood), damar (resin from Dipterocarpus spp. used as a caulk for ship construction), wild fruits and, most importantly, rattan. The paper compares and contrasts NTFP extraction in the two regions, examining a number of ecological parameters including the spatial and temporal availability of harvested products and the sustainability of
harvesting practices from both a population and an ecosystem perspective. Whilst the commercially important products in West Kalimantan generally occur at a low density in the species rich forests, the forests of the Petén display a much lower species diversity with unusually high densities of some of the commercially important species. Harvesting seasons for the products extracted in Guatemala complement each other, providing year round employment. In West Kalimantan most products are extracted continuously, though the natural production of illipe nuts and some fruits is concentrated into masting years which occur every 3-7 years. Sustainable harvesting appears to occur in Guatemala, but in West Kalimantan some products may be being harvested in a non-sustainable manner (although there is little available evidence on this subject).

Socio-economic and political factors of importance to the functioning and sustainability of the extractive systems include the presence or absence of well-defined resource tenure rights, physical and social infrastructure, markets, and alternative land uses. Again, the circumstances in the Petén are more favourable with informal rules governing the harvesting of products, durable and easily transported products, well established marketing systems and infrastructure, a relatively consistent and stable demand, and less pressure to convert the land for other uses. In West Kalimantan conditions are much less favourable, with little evidence of tenure or use rules for extracted products in the area studied, poorly developed marketing systems and infrastructure, a low level of demand for many products, and considerable pressures for alternative land uses, with those involved in the extractive industries have little political leverage.

The authors conclude that although extractive reserves can play a significant role in preserving tropical forests as part of a broader land-use spectrum, their effectiveness is highly dependent on prevailing local ecological, socio-economic, and political conditions. Ultimately, extractive reserves should be regarded as one component of an overall approach to the problem of tropical deforestation.
10. FURNITURE AND CARPENTRY

10.1 Introduction

Furniture manufacturing, together with other woodworking activities, is a major source of employment in both rural and urban areas. Woodworking enterprises are predominantly small-scale, male owned and employ predominantly men. As economies grow and change the small-scale sector experiences considerable competitive pressures from both large-scale enterprises and small-scale enterprises located outside the area. The success with which small-scale producers can respond to the structural transformation occurring in an economy depends not only on the nature of these transformations and the accompanying changes in the demand and input situations, but also on the ability of producers to re-organise their production and marketing operations to compete for new market opportunities.

10.2 General industry characteristics

The case study material examined here indicates that the furniture and carpentry industry is comprised of predominantly small establishments (2, 4, 5, 6, 7, 8). In Guayas province, Ecuador, McKean (4) found that smaller firms, those with less than 10 employees, constituted 99% of the population, while accounting for the bulk of production, 84% of the total, and 90% of the employment. In Thailand, government survey data also reveals the numerical importance of smaller firms, with 89% having fewer than 25 workers, although Boomgard (1) points out that this data set only includes a fraction of all furniture manufacturers. This case study evidence is supported by the results of surveys of small enterprises (establishments with fewer than 50 workers) conducted in southern and eastern Africa by the GEMINI project. The majority of enterprises enumerated fell into the 1-5 worker size range, with between 95% (Zimbabwe and Kenya) to 99% (Malawi) of enterprises employing less than 10 workers (Arnold et al., 1994).

Boomgard's study (1) is the only one of the studies examined here to present data on the comparative profitability and competitiveness of small-scale versus large-scale furniture making. Although only limited data was available, it points to large-scale, modern Bangkok firms being substantially more efficient with respect to the use of both labour and capital than the firms at the provincial level. The comparative economic performance of firms at the changwat level is examined in more detail by Boomgard (1). Budget breakdowns and production function analyses suggest that advantages are not the result of firm size, although a clear pattern emerges of higher technical efficiency associated with larger size. The conclusion reached by the author, that the primary determinants of performance are, therefore, attributed to batch size and the ability to organise production for the appropriate market niche, is considered later in the section dealing with the organisation of production. Drawing on data gathered during a number of small enterprise surveys, Liedholm and Mead (1987) examine the issues of economic efficiency and profitability in more detail. In Sierra Leone, Honduras and Jamaica, social benefit-cost ratios for small-scale furniture enterprises (employing less than 50 persons) were considerably higher than for the large-scale enterprises (employing more than
50 persons). In Sierra Leone, these findings held whether domestic prices or world prices were used in the calculations. Examination of the economic profit (obtained by subtracting from net family return the imputed value of the family labour inputs, valued at their "shadow" price) of small-scale furniture makers in Jamaica, Honduras, Egypt, Sierra Leone and Bangladesh, where the economic profit was consistently found to be zero or above, also suggests that these enterprises are economically efficient.

The studies disagree on the extent to which furniture making can be seen as a "multi-person business operation" (6) as opposed to a self employment activity. In Kibera, Kenya (6) and in the western districts of Kenya (Bilëtoft, 1989), only 5% and 6% (respectively) of the businesses relied solely on the proprietor's labour (6), while in Anloga, Ghana (2), furniture-making displayed a much greater degree of individualism than the other sectors studied (vehicle repair and metal-working), with 29% of furniture enterprises consisting solely of the entrepreneur. Complete census surveys of three changwats (provinces) in Thailand, reported by Boomgard (1), found that firms generally range in size from one to thirty workers with the largest concentration in the 5-15 worker range. Analysis of the GEMINI data sets from southern and eastern Africa gives the average number of workers for all woodworking enterprises (including carpentry, furniture and other woodworking enterprises) as ranging from 1.4 in Lesotho to 3.8 in Kenya. The average for the Dominican Republic was slightly higher at 4.7. Many of the enterprises enumerated in Africa were single person operations (ranging from 14% of the total in Botswana to 67% in Swaziland and Zimbabwe). In the Dominican Republic only 18% of enterprises were single-person operations. There is also conflicting evidence on the extent to which the range of enterprises found can be seen in terms of a continuum, progressing from small (in terms of capital, workforce, output), relatively unmechanised concerns to larger-scale, almost fully mechanised enterprises. This issue will be developed further in the sections relating to technology choice, finances, organisation of production, and markets. Without exception, the studies point to furniture making as being a male-dominated industry both at the level of the proprietor and the workforce. The GEMINI data also supports this conclusion, with from 82% (Lesotho) to 97% (Zimbabwe) of enterprises being male-owned and men making up from 85% (Botswana) to 100% (Zimbabwe) of the workforce.

Several of the case studies provide information on the age of establishments. McKean (4) found that most enterprises in Guayas province, Ecuador, had been established for five or more years, with only 18% having been in operation for less than five years. In contrast, 43% of the enterprises studied in Anloga, Ghana, had been founded in the five years before the study was conducted (2). In Thailand the average of firms in changwat Khon Kaen ranged from 4.0 years for the retailers to 10.2 years for the producer-retailers, highlighting the recent growth in the numbers of retailers operating in the changwat furniture distribution system (1). The average age of all woodworking enterprises enumerated in the GEMINI surveys ranged from 1.7 in Botswana to 13.5 in Malawi and Zimbabwe (where woodworking enterprises were considerably (five to six years) older than the average for all non forest-based manufacturing). The evidence on the age distribution of the enterprises is inconclusive, however, with the data from some countries (Dominican Republic and Malawi) displaying an even spread across the age groups examined, others showing an aggregation in the 1-2 years age groups (Botswana).
and Zimbabwe and Swaziland showing a concentration of enterprises in the 4-10 years age group.

None of the case studies specifically examines the rural-urban location of the enterprises, and therefore there is some doubt over how representative the picture presented, which is of a predominantly urban-based industry, is. The evidence from the GEMINI surveys indicates that the vast majority of woodworking enterprises are located in rural areas (roughly defined as areas with a population below 20,000) (Arnold et. al., op. cit). In Ecuador (4) half of the enterprises rented their premises rather than owned, while among the enterprises included in Sverrisson's non-random sample in Kenya, three-quarters of the enterprises rented their premises (8). In both Zimbabwe and Kenya, Sverrisson (7,8) found that appropriate premises were less of a problem than expected, with a major part of the production activity being performed outside under a shed. Parker (6), also in Kenya, found that lack of display space was much more of a problem than lack of production space.

- employment

The GEMINI surveys provide the most detailed information regarding employment in the small-scale woodworking industries. The data shows these enterprises to be major providers of employment, with employment in all woodworking enterprises representing between 0.66% (Swaziland) and 5.12% (Kenya) of employment in medium- and small-scale enterprises. In the three largest countries surveyed - Malawi, Kenya and Zimbabwe - the numbers of people employed in the small-scale carpentry and furniture subsector are 27,325, 107,252 and 73,045 respectively (roughly 0.3%, 0.4% and 0.75% of the populations of those countries respectively). In the Dominican Republic over 22,000 people are employed in the small-scale woodworking sector. Evidence from case studies is less comprehensive. House (3) quotes a survey that found that 1.5% of the families engaged in some type of rural non-farm enterprise were engaged in the furniture industry in some way. Mead (5), for Egypt, states that furniture and carpentry is one of the largest subsectors among small enterprises. In Rufiji district, Tanzania, Havnevik (1980) found that over 2,300 men, representing approximately 4% of the economically active population, were involved in carpentry, saw milling or the manufacture of wooden beds.

- income

Sverrisson (8) found that the average monthly earnings of sole proprietors of firms in the lowest technical sophistication group were significantly higher than those of all categories of workers except skilled workers in intermediate technology enterprises. Also in Kenya, House (3) found that the net average annual earnings of the business heads of £707, compared very favourably with what these same persons would earn as employees in wage employment in the formal sector. In contrast the average monthly earnings of Z$223 of a proprietor of a low technological sophistication firm in Zimbabwe were relatively low compared to the Z$250-700 per month earned by an experienced carpenter in an established firm (7). Sverrisson concludes that such entrepreneurs would obviously be financially better off working in a factory. In the market places and smaller towns in three western districts of Kenya surveyed by Billetoft (op. cit.), the enterprise owners in carpentry (and metal working) were found to be earning only
moderately higher average incomes than owners in the other trades studied (tailoring, shoe-making, bicycle repair, auto-repair). The survey found that 27% of owners were earning between Ksh 500-1,000 per month, 23% were earning between Ksh 1,000-1,500 per month, while 44% were earning Ksh 1,500 or over. Due to problems of measurement error and the exclusion of data on resales (compared with sales of own production), Boomgard (1) expresses little confidence in his analysis of changwat-level furniture firm budgets. However he states that the bottom line is "not a pretty picture" and may reflect the "major dynamic structural evolution" underway in the provincial Thai furniture industry, with firms having to adjust to a new competitive environment. Liedholm and Mead (op. cit.) present data gathered from surveys conducted in five countries (Jamaica, Honduras, Egypt, Sierra Leone and Bangladesh), on net returns per hour of family labour in a range of small industries. In Egypt and Jamaica the returns in the furniture industry were well above the average for all small industry (slightly above double and slightly below double, respectively), while in the other countries returns were similar to the all small industry average. In all but one (Bangladesh) of the countries studied, and especially so in Egypt and Jamaica, the returns were well above the prevailing hourly wage rate for small scale industry workers.

In Egypt, where wage rates were noted to be unusually high (5), the average daily wage rate for all workers (excluding apprentices) in the Egyptian small-scale furniture industry was 3.72 Egyptian Pounds (LE) which compares with the LE30 per month earned by a newly started graduate in the civil service. In Rufiji district (Havnevik, op. cit.), workers in the carpentry industry had average hourly returns of approximately Shs. 2.45 an hour, giving a monthly potential income of Shs 510/-, or nearly double the rural minimum wage of the time. In Western Kenya (Billetoft, op. cit.) the skilled fundis (artisans) were found to typically earn KSh 6-800 per month with fundis in carpentry and metal working tending to earn slightly above this and those in tailoring and shoe-making slightly below this average. By way of comparison, the basic average wage under the collective wage agreements was KSh 1,363 per month (excluding a housing allowance of KSh 233). In the three provinces surveyed in Thailand (1) the average wages per day were 72.9 Baht, with administrative, sales and skilled production staff earning slightly above this amount, unskilled production staff roughly two-thirds and apprentices one-half. The average wage rate is considerably above that in other industries such as the cement industry or the garment industry and roughly 25 Baht above the government established minimum wages.

10.3 Internal firm characteristics

- entrepreneurs

Entrepreneurs appear to be recruited mainly from within the industry. The majority are previously employed in either large firms or as an employee in another small firm before they set themselves up as an independent artisan or a proprietor of a larger firm. Data from the GEMINI studies also points to a fairly substantial proportion of entrepreneurs being unemployed, although this was much less likely with woodworking enterprises than with all other (non forest-based) manufacturing enterprises (Anold et. al., op. cit.). Although in Zimbabwe and Kenya a significant proportion of the proprietors of smaller firms (and some
larger firms) also engaged in agricultural activities (7, 8), involvement in agriculture was, predictably, not mentioned in either of the studies conducted in urban areas of Ghana and Kenya (2, 6). GEMINI data again points to involvement in agriculture as being fairly common among entrepreneurs located in rural areas.

A number of authors (4, 8) point out that proprietors, and especially those of smaller firms, are often motivated to establish an enterprise to achieve greater independence and obtain a decent income. Consolidation and improvement of the business (8) became a motivating factor in Kenya only when the problem of earning a living had been solved, and therefore tended to be restricted to larger and more technologically advanced firms.

Proprietors of smaller businesses typically possess less experience, which has been gained at a lower level in the production process, for example through apprenticeships (6, 7, 8). Entrepreneurs in charge of larger enterprises brought greater experience, and especially management experience and training, to their current business (4, 6, 7, 8). Owners of woodworking enterprises enumerated by the GEMINI project were on average older than those of other manufacturing enterprises and possessed more experience in the particular activity. Some of the studies also point to the higher educational achievement of proprietors of larger firms (2, 8). Sverrisson (8) states that information on levels of general education of entrepreneurs suggests that it is of little consequence in the graduation of firms from hand tool operation into partial mechanisation. Its principal influence is in determining at which level, in terms of technological sophistication, entrepreneurs choose to start their operations or take over old ones. In a similar vein, Dawson (2) states that the lower educational level of proprietors of woodworking firms, as compared to those of firms in other sectors, is a consequence of the lack of potential for growth in this sector rather than its cause.

Management specialisation, in the sense that the proprietor or leader of the enterprise is only concerned with management, is only considered by Sverrisson for Zimbabwe and Kenya (7, 8). He found it to be restricted to only those firms in the higher technological sophistication groups. Bookkeeping and financial management tends to be more advanced among those firms showing higher levels of technological sophistication (1, 7, 8) and among those firms that are more fully integrated (6) (for example, combining production and retailing 1). However, among the group of firms in the lowest technological sophistication group, Sverrisson (8) found no particular pattern, leading him to suggest that accounting is not a critical factor in determining whether these firms graduate to a higher level of sophistication. His assertion that "expansion comes before management development, and expansion calls for such development" is supported by Dawson's findings (2) that a more serious approach to management tends to be a consequence of a firm's expansion rather than its cause. Boomgard states that it is not clear whether the fact of keeping records is a cause or effect of good performance, but his comments that "it is a necessity for accurate pricing" and "it is difficult ... to insure that accurate account is taken of capital and overhead expenses" support the idea that record-keeping becomes necessary after firm growth.
Information on the capital entry thresholds for small furniture enterprises is lacking. In Ecuador McKean (4) suggests that capital requirements are low, while in Ghana, Dawson (2) found them to be significantly lower than for the two other sectors (vehicle-repair and metalworking) that he studied in detail. In both these countries the effect of these low capital barriers to entry, when combined with the widespread possession of the necessary technical skills, results in the sector being characterised by acute competition between firms at the lower end of the size and technical sophistication spectrum. Boomgard (1) also identifies acute competition as a problem area in the furniture industry. He identifies three actual or potential deleterious effects which such a highly competitive environment can produce. These are excessively low returns to producers (creating an extremely hostile environment for progressive innovation and development), the consequences of limited market size per firm (i.e. limited possibilities for specialisation and the encouragement of diversified production) and problems related to the quality of the products produced by the industry. In contrast, Billetoft (3) found carpentry, together with metal working, to be one of the most capital demanding of the examined activities (other industries included tailoring and shoe-making), although he states that no unequivocal conclusions can be reached on whether this results in relatively fewer entrants and, in turn, less competition and higher profitability. The issue of acute competition and its consequences will be returned to later in the consideration of patterns of change. Initial investment capital was usually obtained from savings and personal assets in Ecuador (4) and in the lower technological sophistication groups in Zimbabwe and Kenya (7, 8). This conclusion is supported by the GEMINI data where 79% (Malawi) to 100% (Botswana) of the enterprises had never received loans, and the principal source for those that had received loans was family and friends. In the Dominican Republic, where 35% of enterprises had received loans, family and friends were again a major source of funds but commercial banks and non-governmental organisations were equally important. In Thailand (1) too, loans were an important source of start-up capital, providing over half of the total, with personal and family savings providing the remainder. Investment of funds from other enterprises was the only source of investment for firms in the highest technical sophistication group in Kenya and Zimbabwe (7, 8). In Zimbabwe, recurrent investment was financed out of savings from carpentry activities, but in most cases on a microscopic scale (7). The situation in Thailand followed the results for initial capital, with about half of expansion funds coming from savings or firm profits and the other half from loans. The evidence on the importance of finance as a constraint on firm growth is conflicting. Lack of capital was one of the reasons why entrepreneurs were unable to buy machines or purchase timber in bulk in Kibera, Kenya (6). However, in Thailand (1), although over 50 percent of the firms surveyed reported that they would have problems financing the additional fixed assets required to increase their peak production by 25 percent, none of the firms which were not actually planning to expand mentioned finance as a problem. Hence, it is concluded that the availability of finance does not appear to be a major problem which will have much effect on the development of the changwat level furniture industry.

Working capital had to be financed directly from earnings for most of the low and medium technological sophistication enterprises in Kenya and Zimbabwe (7, 8). In Ecuador (4) and also for the more mechanised firms in Kenya (8) and Zimbabwe (7), credit played a much
more significant role in financing working capital, with bank overdraft facilities playing an important part in the finances of enterprises in both the latter countries. Among the furniture producers examined in Thailand, credit needs for fixed assets and working capital were drawn from a variety of sources including bank loans, overdraft accounts, loans from friends or relatives, credit from input suppliers, rotating credit associations, Small Industry Finance Organisation (SIFO) loans, advance payments from buyers, firm profits and personal savings (1).

Working capital is of particular importance for a number of reasons. The primary reason is the high working capital costs involved in furniture making, resulting from the high cost of materials (1, 6). Working capital is also important in allowing firms to produce for stock - often a requirement if firms want to access higher quality markets (2) or sell to larger retailers (6). For many firms working capital problems cannot be overcome and their production is effectively constrained. In some cases (7) entrepreneurs have developed a number of solutions, such as demanding deposits (i.e. borrowing from customers) or insisting that the customers provide the timber, which reduce but do not solve the problems caused by lack of working capital. In Thailand, working capital shortages were reported by 58 percent of firms, with 82 percent of these firms considering the problem among their most serious. Boomgard suggests that, while working capital shortages may be a real problem for managers, they may be symptomatic of other more fundamental problems such as a high level of uncertainty in output markets or input markets, or problems in the management of cash flow. "Providing more funds to meet cash needs may solve nothing and may contribute to making the other problems of the firm more severe".

- raw materials

The primary raw material for furniture making in the examples considered here is wood. Although Boomgard's study of provincial furniture manufacturers in Thailand contains a comprehensive examination of the role wood supplies play in the dynamic evolution of the industry, few of the other studies address the issue of raw material supplies specifically. In most cases producers utilise low value structural woods, for example pine in Zimbabwe (7), pine and cypress in Kenya (6) or a number of lesser known timbers such as tabek (Lagerstroemis calyculata) and yang (Dipterocarpus alatus) in Thailand (1). Plywood is also used extensively in Thailand. Low value structural woods and plywood are used mainly in the manufacture of furniture at the lower quality end of the market. The use of higher value structural woods such as teak and rosewood in Thailand or various native hardwood species in Zimbabwe and Kenya is relatively rare, and usually restricted to higher value furniture. Only in Ghana are the higher value hardwoods used routinely by small-scale furniture making enterprises (2).

The distribution networks for wood show considerable variation both between countries and the type of wood traded. In Thailand the production of plywood is centralised in Bangkok and provincial level producers of furniture most commonly place orders and receive deliveries from Bangkok based merchants (1). In contrast to the situation with plywood, structural woods are produced, processed and distributed regionally, with local sawmills being by far the most commonly used suppliers (1). The distribution system for structural woods does not
appear to be meeting the needs of provincial level furniture makers, with three quarters of the sample firms in Chiang Mai (where the historical dependence on teak is great and regulation is the most stringent) complaining of problems in getting the quantity of wood needed, getting it at the right time, very high rising and unpredictable prices and government regulation. However, as explained below, many of these problems can be attributed to aggregate shortage of timber in Thailand rather than deficiencies in the supply distribution system itself. Although the scale of the forestry operations in the two areas in Kenya and Zimbabwe studied by Sverrisson differed greatly, in both cases firms obtained their supplies either direct from sawmills or from timber merchants. One difference between the two countries was the existence in Kenya of small-scale timber merchants located in the same areas as the small and intermediate carpenters, supplying both furniture makers and builders, and selling firewood as well. Also, in Kenya the vertical integration of saw-milling and production of doors and furniture was a common occurrence whereas in Zimbabwe the two huge lumber companies rather concentrated on veneers, laminates, and similar products. In Kibera, Kenya (6), the larger, more vertically integrated furniture makers purchased their timber direct from wholesalers, which were located at the upcountry sawmills or in greater Nairobi. This is advantageous in that the producers have more control over the quality of wood they purchase and they also avoid paying the retailers' mark-up on wood. Other enterprises would purchase their timber either from the large-scale retailers who dealt mainly in low quality pine and cypress, or from the smaller retailers selling higher quality hardwood timber. One problem identified in the study was that furniture manufacturers were often unaware of these smaller less visible retailers and travelled outside Kibera to purchase high quality timber.

The extent to which supplies of timber were seen as a constraint to the development of the small-scale furniture industry varies between the cases studied. In Zimbabwe (7) and Kenya (8) the two sites studied by Sverrisson were chosen partly because forestry was a significant activity, thus allowing the studies to ignore raw material supply bottlenecks. Although in both these case studies problems with the supply of hardwoods were identified, it appears that this had little deleterious effect on furniture producers, the majority of whom tended to rely on lower value structural woods. In Thailand the poor supply situation for structural woods was identified by Boomgard to be a major factor in the future evolution of the industry (1). Further deterioration in this situation was also predicted to result in problems with the supply of plywood, which at the time of the study presented few problems. The main problems resulting from the shortage of wood is not straightforward inability to purchase wood, but appears to be added search costs, forced substitution to less desirable wood species or having to buy relatively lower quality wood of the preferred species. The most important aspect of the wood supply situation is that it is likely to have a differential impact on Bangkok-based producers as opposed to those in the provinces. All producers will be confronted with the problem of rising prices, but up-country markets will experience progressively more serious supply interruptions, while these will be less severe for the Bangkok producers because of the dominance of this market area. Boomgard emphasises the important role government could play in improving the distribution of usable timber between Bangkok and up-country areas and between up-country areas of differential timber endowment. In Ghana, Dawson (2) noted that the drive to increase timber exports as part of the structural adjustment programme had resulted in it becoming increasingly difficult and more expensive for small producers to obtain timber of the right quality. This, in turn, restricted the ability of firms to upgrade the quality of
their products. Larger producers were able to obtain supplies as they either owned plantations or had shares in sawmills. In Kenya, Sverrisson (8) found that producers experienced greater difficulties in obtaining hardwoods in comparison with the plantation grown pine and cypress. Private individuals experienced fewer problems and as a result firms frequently required customers to supply the timber for a product, a solution which also reduced the working capital problems of firms.

- technology choice

Relative to other subsectors, furniture making is a labour-intensive activity (1, 4, 5). Among the small-scale manufacturers the majority of production activities such as carpentry, carving, staining, upholstering and finishing, are still completely manual processes. This is reflected in the levels of mechanisation, which are generally low although there are considerable differences between firms (1, 2, 4, 5, 6, 7, 8). The importance of mechanisation lies in freeing firms from dependence on others for mechanised services (5, 6), reducing the need for skilled labour (1, 5) and improving quality to enable firms to produce for more lucrative markets (2, 8). The high degree to which labour and machinery can be employed interchangeably is an important factor in allowing incremental change within a firm as it evolves (either expanding or contracting). Boomgard's analysis (1) of the elasticities of substitution revealed that skilled labour and capital are strong substitutes while unskilled labour and capital are complements, a finding which will be returned to in the section dealing with labour. This characteristic of furniture production also helps to explain the continuum from small unmechanised to larger virtually completely mechanised firms that is found. However, there does appear to be a size threshold to mechanisation, with the smallest firms rarely possessing machinery, primarily as a result of capital constraints but also presumably because of insufficient value and volume of turnover. Rapid mechanisation was observed both in Ghana (2) and Ecuador (4) as markets expanded. It is interesting to note, however, that even in the relatively advanced provincial furniture industry in Thailand the manufacturing process is still a relatively labour-intensive one when compared to the developed countries (1).

Larger and more vertically integrated firms tend to display a higher level of mechanisation (6, 7, 8) although there is not necessarily a direct correlation between the number of workers and capital intensity (1). In a number of cases difficulties in attaining or increasing mechanisation of the production process is a constraint on the firm's growth (6, 7). Financial problems (often caused by difficulties in obtaining credit) and, occasionally, unavailability of machines were the main factors preventing firms from purchasing more machinery (4, 6, 7). Machines were obtained from a number of sources, including import, purchase whilst overseas, and domestic producers (2, 4, 6). In Kibera, Kenya, most machines were supplied by informal sector firms, at prices significantly lower than equivalent machines produced by the formal sector (6). This indigenous capability, also encountered in Ghana (2) and Zimbabwe (7), has the effect that firms that wish to purchase machinery are less affected by import and foreign exchange controls. Difficulty in obtaining hand tools, although being addressed by alternative technology agencies, was found to be an insignificant problem in urban Zimbabwe. Problems related to mechanisation were much more important and the use of a number of hand tools was relegated to the past (7).
The greatest effect of increased mechanisation is related to its effect on the division of labour. This relationship is dealt with below in the "Labour and the organisation of production" section. Effects of mechanisation on industry structure are usually presented in terms of the effect of the lack of machines. In most cases, those firms with machines have provided machining services to other firms (2, 6, 7, 8). In Egypt (5) and Kenya (6) a number of firms were found that specialised exclusively in providing machining services. The effect of increasing levels of mechanisation on these subcontracting relationships is not considered in any of the studies, although Parker (6) suggests that if all the firms that planned to mechanise actually succeeded, excess capacity would result as the supply of machining services outstripped demand. The problems that this could cause highlights the fact that even small machines require a sizeable through-put of production to make the initial investment in purchasing them worthwhile. Parker has also identified the major role that electricity supply plays in mechanisation. Firms that were located in districts where electricity was not yet available faced the choice of either continuing to be reliant on outside machining services or relocating to a district with electricity.

- labour and the organisation of production

The relatively labour-intensive nature of the industry has been noted previously in the section on mechanisation. The studies provide no clear message on the use of family labour, with McKean stating that it is common among artisan producers in Ecuador (4), whilst Sverrisson found it to be rare in Kenya and Zimbabwe (7, 8). In Thailand family labour accounted for 15 percent of the total man-hours worked (1). GEMINI data also reveals considerable cross-country differences in the importance of family labour, with family members (excluding the proprietor) representing between 0 and 6% of the workforce in Kenya, Lesotho, Botswana and the Dominican Republic, but 16% and 22% respectively in Zimbabwe and Malawi. Examination of the trends across the rural-urban spectrum appears to show a decline in the importance of family workers, at the expense of paid workers, as the location of the enterprise becomes more urban. However, this appears to be correlated with the larger average size of urban enterprises. The use of casual labour and payment on a piecework basis appears to be widespread from the evidence of the case studies (4, 6, 7, 8), although in Thailand temporary workers only provided 12 percent of total man-hours and most factories in the sample paid by daily wages (1). The tendency to employ workers on a casual basis is in large part a response to the fluctuating demand which is a characteristic of the industry (8), and may be reinforced by labour legislation (4, 7).

Trainees and apprentices may represent a significant proportion of the workforce (2, 5, 7, 8) although considerable differences are apparent in the importance of the apprenticeship system in the various countries examined - a finding confirmed by the GEMINI data. Apprenticeships appear to be one of the major ways in which new workers are trained in some countries (2, 5), although formal vocational training may also play a role in supplying workers to more technologically advanced enterprises (7, 8). In Egypt, Mead (5) documents a decline in the number of apprentices as young people sought higher status employment (despite significantly increased real wages for apprentices). The decline in the apprenticeship system in Thailand is attributed to the combined effects of a relatively high turnover rate for unskilled workers, the relatively low wages of apprentices and the fact that many skilled workers prefer to start their
own business (1). In contrast Dawson (2) notes that the large number of apprentices in the woodworking industry in Ghana has resulted in an over-supply of trained labour. Often a trained apprentice will stay on in the same workshop but as a separate operator producing in competition with his former employer (2).

Mead (5) found that the non-trainee workforce in the small-scale woodworking industry was primarily made up of skilled workers. This contrasted sharply with the large-scale factories where semi-skilled and unskilled workers made up the majority of the workforce (excluding apprentices). In Thailand the ratio of skilled labour hours to unskilled labour hours recorded for the sample provincial level firms was 1.90 (1). Again this contrasts with the Bangkok producers, who were relatively less skilled-labour intensive and, interestingly, with the village level producers of low priced furniture who employed mainly low-skilled labour. The reduction in the supply of skilled labour in both Egypt and Thailand (due to the reduced number of apprentices mentioned above and also the large number of workers leaving the country for better-paid work overseas and/or to the capital) thus tended to favour the large-scale enterprises over the small-scale ones. These were the only cases where the lack of skilled labour was considered to be a constraint on development of small-scale industry, although it is unclear to what extent this indicates that in most situations there are sufficient people available with the necessary skills. In the GEMINI studies very few woodworking firms identified labour as being their major current problem. The issue of whether mechanisation results in a "deskilling" of the labour force is investigated further by Sverrisson (7, 8). He found that there is no apparent relation between the state of skills and the degree of mechanisation, with subcontracting and the use of machinery by independent artisans calling for broad skills. Decrease of skills occurred much more as a result of the introduction of standardised production with hand tools and simple machinery than mechanisation per se.

Mechanisation can also play a role in determining the organisation of production. Although there was a clear relationship between technical sophistication and division of labour among the woodworking firms of Mutare, Zimbabwe, the relationship was not so clear for firms showing a lower level of sophistication (7). Among these latter firms the situation was frequently encountered where an entrepreneur had managed to obtain one or a few machines without being able to organise work accordingly (i.e. beyond the level common in non-mechanised enterprises). In Kenya, the intermediate firms using simple machines to make standardised products used semiskilled labour and apprentices to a larger extent than either the more flexible low sophistication enterprises, or the equally flexible high sophistication group (8). Co-operative work arrangements (in which several workers contribute to the production of one item) had only arisen in the medium and high technological sophistication groups. The small number of enterprises in the lowest technological sophistication group that were producing standardised products for display continued working in parallel mode, with one worker taking an item from beginning to end.

McKean (4) examines the strategy of specialisation by product type as a means to establish long-term relationships with buyers in growth industries. This strategy permitted greater leverage with buyers and greater use of assembly line, mass production, as the firm was insulated from the acute competition characteristic of the residential furniture industry. These firms' profitable survival became linked to the evolution of particular industries, such as
housing and consumer goods, which are in turn affected by government policies. Elsewhere (1, 2, 5, 7, 8) specialisation is adopted as an approach by relatively few enterprises. In Egypt (5) specialisation was encouraged by the low incomes of consumers, with some businesses selling furniture with the wood unfinished. Whether to finish the wood and how to do so (e.g. the customer performing the work himself or hiring a fellow villager to do the work) is then left to the customer. Both Sverrisson (7) and Boomgard (1) note that one possible explanation for specialisation being uncommon may be the limited markets available to producers. This means that firms must be able to offer a range of products to potential buyers to be sure of maintaining output at a sufficient level. The most marked examples of specialisation noted in Thailand were found among the batch contractors producing desks for government customers. These firms were found to be among the most profitable of those examined in the budget analysis, a result attributed mainly to the gains from specialisation and batch production (see below). As considered later, the producer-retailers were also found to display a degree of specialisation (1). The only examples of specialisation referred to by Sverrisson were those that involved firms supplying middle and higher income markets, for example a carpenter who specialised in kitchen fittings for well-off customers in Mutare.

Another consequence of limited markets is small production runs of manufacturers (7). Production to order appears to be the norm (2, 5, 6, 7, 8). Boomgard found that although modern firms and traditional firms both produced an array of goods, the former specialise to the extent of producing several relatively large batches of identical products, while the latter typically produce very few pieces which could be considered identical. He found that firms which manufactured on a job-order basis were far less efficient and profitable than firms which were able to produce and market in batches. Production for stock was seen in only a few of the case studies (4, 5, 8) and typically among the larger enterprises. In Kenya the availability of items in stock ("cash and carry"), and in particular standardised furniture, was seen by producers to be a necessity to ensure custom and, hence, the survival of the firm.

In Ecuador (4) the constraints imposed on firms by government labour and credit policies (see later section on the influence of policy) contributed to the adoption of a centralised-decentralisation strategy by many firms. This involved the division of a firm's activities between small semi-autonomous operations under tight central control, thus avoiding the high costs associated with labour legislation. The associated firms still had access to subsidised credit available to small industry and artisans, as well as to those benefits available to artisans (exemption from insurance requirements and tax on profits, lower sales tax, etc.). This was also seen as being a more effective strategy than subcontracting as firms could assure themselves of a high quality product and in sufficient volume as it was under their effective control. As with subcontracting, this approach was critically dependent on the firm first being integrated forward into retailing.
10.4 Commodity networks

- markets

There is a high degree of market differentiation in the furniture sector, principally based on the quality of the product and the size of the firm. The lower cost and lower quality furniture is consumed primarily by the rural and urban poor (1, 2, 3, 5, 6, 7, 8). This market is supplied by smaller firms with little or no machinery (5, 6, 7, 8). Firm size and the degree of mechanisation increases as the quality and cost of the final product increases (5, 6). However, there are important exceptions to this trend. In Egypt the highest cost, highest quality furniture was produced primarily by medium-sized firms, with several machines but still employing a significant number of skilled workers (5). The market for intermediate-priced furniture is supplied by a range of firms from small, unmechanised workshops to large mechanised factories. In Thailand the medium quality market was also the one in which there was most competition between large- and small-scale firms and between Bangkok-based and provincial producers (1). Similar findings are reported in Kenya and Zimbabwe where it was found that small firms were competing with shops selling the product of large factories (7, 8). It might also be mentioned here that Zimbabwe is a rather special case, where an established formal sector combined with a well-developed infrastructural system increases the exposure of small producers to competition from the production of large-scale businesses. In Thailand, improvements in infrastructure and communications have proceeded in line with the general structural transformation in the economy (1). This has resulted in firms at the provincial level being increasingly brought into competition with producers from around the country, especially the specialised "furniture villages" in Northern Thailand, producers from other changwats and, most importantly from modern, large-scale producers from Bangkok. In addition to differences in product quality, firms also differed in the type of product they produced. In Kibera, Kenya, the small firms producing for the low-income market sold mainly basic items such as chairs, tables and beds (6). The higher income consumers purchased more non-basic items, often from outside Kibera. McKean (4) also found this on in Ecuador, with small firms with relatively small assets selling unfinished furniture or finished individual pieces and firms with larger assets producing finished sets of furniture, sold as units. In Thailand the small, village based producers in the North restricted their output to sets of tables and chairs, which were marketed throughout the kingdom (1).

Two other possible outlets for producers - institutional buyers and export markets - deserve attention. Purchases by government institutions and private businesses can be important niche markets for small producers (1, 2, 6, 7), especially as they allow a degree of specialisation and batch production unlikely to be supported by other markets. In Thailand the survey of town-based provincial manufacturers found that approximately 20 percent of all production was on government contracts, although the author suggests this may not be representative of the country as a whole (1). However access to these markets is not straightforward, being dependent mainly upon personal contacts, as the informal nature of many smaller firms means they are seldom listed in business directories or the like (6). In Ghana markets for small firms to supply school furniture only opened up as large-scale industry constricted from the mid-1970s on (2). In Kenya (7) the firms supplying district councils and other firms were found to be those in the highest technical sophistication group. Personal contacts and an ability to
muster the working capital necessary to produce in bulk were the prime reasons for this. Production for export is rare (1), being a significant activity only in Ghana, where producers in neighbouring countries had higher production costs and/or raw material costs.

There are a number of reasons why firms of different sizes and technological sophistication supply different markets. A principal reason is access to marketing systems - these are examined in more detail below. A number of the studies point to the problems smaller firms have in accessing markets for higher cost furniture as a result of difficulties in producing for stock (often resulting from a lack of working capital), lack of display space or suitable location for display space, lack of marketing contacts, etc. (2, 6, 7, 8). Although Dawson (2) reports that difficulties in obtaining quality seasoned timber were causing difficulties in upgrading the quality of finished products, input problems are not mentioned in any of the other studies as a constraint on producers ability to access higher cost markets. Among the producers studied by Boomgard (1) the problems with wood supplies mainly related to the difficulties in securing supplies of the lower value structural timbers, although the situation for firms located in the northern teak producing areas may well have been different. Although Parker (6) found that larger furniture retailers were unwilling to deal with informal sector manufacturers partly because of poor quality control, it is not clear from the other studies whether an inability to produce higher quality products is restricting smaller producers to the low income and low quality markets. Sverrisson (8) states that the low quality production of small firms should instead be seen as representing "appropriate quality", meeting the demand of a market which is more conscious of price than quality. "Quality improvement is, therefore, not a pertinent issue for many proprietors" (8).

- demand

The strength of demand for furniture is greatly determined by the incomes of consumers and the growth in population. Liedholm and Mead (1987) found income elasticities for furniture produced by small enterprises of 2.00 and 1.61 in Bangladesh and Sierra Leone respectively. Mead (5) estimates that the income elasticity for furniture in Egypt was probably over two in the aggregate. Wiboonchutikula (1992) quotes income elasticities for furniture in provincial Thailand of 0.88 between 1975 and 1986 (although in Greater Bangkok the figure was -0.07). Using data from village surveys conducted in three provinces in Thailand, Boomgard (1) estimated income elasticities for the total value of furniture owned and for purchases made in 1980 of 0.52 and 0.74 respectively. While these high income elasticities obviously help furniture manufacturers during periods of prosperity, it also makes them vulnerable to a collapse in demand during recessions, as evidenced by the "nose-dive" in furniture sales in Ecuador during the 1982-3 recession (4). The high degree of market differentiation also means that the distribution of any income increases is also of great importance (5). House (3) suggests that, due to the propensity of the lower income sections of Kenya to purchase furniture mainly from low income producers, a policy of redistribution by growth will further expansion of employment in this sector of the industry (Mead (5) warns, however, that promises of redistribution may not necessarily be followed by action). Similarly, Boomgard (1) calculates that 76 percent of the total annual increase in expenditures on furniture between 1980 and 1990 will be accounted for outside municipal areas. This is partly a result of increasing incomes and populations in the rural areas, but more importantly is a result of the
sheer weight of numbers in the rural areas. Finally, the possibility that tastes may not remain static must be considered, particularly where firms of different sizes manufacture products of different styles (5). Although smaller firms can react to these changes, they may also find that they have to adapt their production organisation (for example increasing mechanisation) to stay competitive against larger, more mechanised firms (5).

For those enterprises producing goods for the public sector, the level of public spending obviously affects the size of their market (2, 6). Structural adjustment programmes such as that in Ghana, where strict controls on public spending (including that by schools, an important market for some furniture-makers) were imposed, can depress markets significantly (2). Prior to the introduction of this programme large-scale firms had been in decline and their contraction had resulted in a number of markets, such as supplying beer crates, school furniture and construction items, becoming open to small producers. The structural adjustment programme revived the large-scale enterprises, and they rapidly retook these markets.

The demand for furniture is also very uneven within the year or the month. Seasonal variation in demand may result from pressures on household spending due, for example, to requirements to pay school fees (6) or due to purchases made before festivals such as the purchasing of domestic furniture and kitchens before Christmas observed by Sverrisson in Zimbabwe (7). In rural economies the cyclical nature of agriculture-based incomes has a large influence on demand. The seasonality in demand in rural Thailand is closely linked to the wet season rice harvest which occurs in October, November and December, although the observed fluctuations in employment in furniture factories are also attributed to the effect of agricultural labour demands on urban labour markets (1). In urban areas, demand may also be cyclical within a month as a result of the times when salaries and advances are received (6). Dawson (2) comments that the unevenness of demand particularly affects the ability of firms to mechanise and increases the costs of maintaining a sizeable inventory. The considerable skills in money management required by entrepreneurs to combine seasonality in demand with the high working capital costs of furniture production were noted by Parker (6). Producers have a number of passive and active strategies in response to this seasonality. One of the most common passive responses is seen in the extensive use of casual labour, which gives entrepreneurs the flexibility to adjust costs and production to the market needs (4, 7). Boomgard found, however, that there was a poor correspondence between production declines and cutbacks in labour, suggesting that managers are experiencing difficulties in accurately anticipating seasonal output variations. More active responses are observed in Kibera where many producers seek out outside markets with less fluctuation in demand (6). Sverrisson (7) found that firms in the medium and high technical sophistication brackets anticipated seasonal peaks in demand by producing for stock.

- marketing

The most common method of retailing is direct sale to the consumer from the workshop (1, 2, 6, 7, 8). The data from the GEMINI studies also supports this conclusion with the vast majority of enterprises recording individuals as their main customer. Sale to a retailer is very rarely found, with a number of the studies (1, 6, 7, 8) reporting on the problems small producers have in establishing trading relationships with retailers. Boomgard (1) suggests that
the main reason why provincial retailers purchase so little of their stock from local producers is the fact that these producers, unlike the Bangkok based wholesalers, do not offer credit. Furniture makers in Kibera, Kenya (6), were able to sell only to the smaller retailers, as the larger ones believed that they have poor quality control, inadequate working capital to accept terms of contracts and cannot meet short deadlines. Retailers in Nakuru, Kenya were also reluctant to deal with informal sector producers (obtaining their supplies instead from large factories), giving reasons of low quality and unreliable deliveries (8). Producers were, however, also reluctant to supply retailers as they claimed that the price received from retailers was too low, making it more profitable for them to sell their own output. The large factories can compensate for the low price paid by the shops, and the transport costs incurred, through economies of scale as well as better capacity utilisation maintained by regular deliveries to the furniture shops. In Ecuador (4) a recent development has been the entry of large numbers of firms, discount houses, department stores and retail stores in shopping centres specialising in the sale of the products of very small manufacturers. These retailers benefited from a relatively rapid turnover of capital, making them more attractive to loan officers than small manufacturing firms which displayed a much slower capital turnover. Some of the retailers actually directed the production of the firms supplying them, thus moving closer to a subcontracting relationship with the manufacturing firms. This system and the system of producer/retailers, where subcontracting relationships are also much in evidence, relates very much to the question of industry structure and therefore is considered separately below. Producer-retailers were also found to be an important component of the distribution system in Thailand, where the dramatic increase in furniture reselling was identified as one of the major changes affecting the development of the provincial level furniture industry (1). Boomgard states that "the importance of retailing ... is that it introduces new competitive forces from outside the changwat level industry and also that it allows manufacturers to reach more consumers, thereby facilitating gains from specialisation". The distribution system is not only important in understanding the potential of provincial level producers in the markets which they presently serve, but it will also determine to a large extent their ability to access the expanding rural market. Producers will have little hope of reaching the largest segments of the rural markets unless they develop linkages with itinerant merchants and fixed location retailers who operate in these areas.

10.5 Industry structure.

The furniture industry in both developed and developing economies is typically a "fragmented industry" (4), characterised by a low level of seller concentration with a large share of production being supplied by relatively smaller establishments. However, despite this fragmentation, firms do not always operate individually, and in a number of the cases studied relationships such as the provision of machine servicing, subcontracting arrangements, and production/retailing were found.

- services, specialisation and subcontracting

Firms performing specialised tasks for another firm, particularly some form of machine work, were found in several countries (2, 4, 5, 6, 7, 8). These were relatively casual arrangements
with the work being carried out on demand by the purchaser of the service. A common reason why firms required these services was that they lacked the necessary machinery, and the task was relatively labour-demanding if carried out by hand (2, 5, 6, 8). Such arrangements could be beneficial for the supplier because they allowed capacity utilisation to be kept high, thus reducing the costs of production (6). Some of the suppliers of these services specialised solely in this activity (5, 6).

A further development of this is seen in the specialisation of producers in carrying out certain stages of a production process. This was found in Egypt where there was an active market for parts or products at any of a variety of stages of completion (5). A similar situation was noted by Dawson in Ghana (2) where furniture pieces manufactured in Anloga were assembled by woodworkers in another town 75 miles north. This type of specialisation appears, however, to be relatively rare. The same is also true for subcontracting relationships, which were only of significance in Ecuador (4). Relatively larger establishments would subcontract small producers for particular production lines and then centralise the final assembly, finishing and retailing. These arrangements had advantages for the subcontracting firms because they were able to respond to sales fluctuations and to avoid labour difficulties associated with increasing the size of the workforce. However, subcontracting was less viable as a long-term strategy than the centralised decentralisation approach mentioned above. Problems with subcontracting included inadequate quality control and insufficient volumes of production. McKean also states that for the subcontracted firm it merely represents a means of survival with little chance for accumulation (4). In contrast to this, Parker in Kibera, Kenya (6) found that among the more established enterprises there was a trend to bring more production activities in-house, with the purchase of machines allowing the firm to avoid the delays and difficulties in buying machine time.

- producer retailing

A development found in Ecuador (4) and Thailand (1) but rare elsewhere is for producers to begin retailing the produce of other firms. This is to some extent simply a development of the subcontracting arrangements seen in Kibera (6) and Egypt (5). However, it is much more highly developed in Ecuador and Thailand where it was one part of a strategy for survival by small firms. In Ecuador manufacturers with a retail capacity were in a better position to overcome competition from artisans and to benefit from such innovations as instalment-based credit. They were in a position to subcontract other firms, and to achieve a relatively high volume of sales. Those small firms without a retail capacity tended to be subcontracted by another enterprise. However, this strategy was not sufficient on its own to allow producers to survive profitably in the industry and needed to be combined either with the development of subcontracting arrangements with small producers or the adoption of a centralised-decentralisation approach. In Thailand (1) the development of producer-retailing also resulted from competitive pressures. In this case the advantages of this type of firm organisation related mainly to the ability of the firm to specialise in production while offering a greater variety of products for sale than they produce. Although the producer-retailers had not specialised to the extent of producing only a narrow range of products, when compared to a producer-seller, the typical producer-retailer produces a much larger batch of product for every product class he chooses and this is where the gains from specialisation come from.
Additional advantages from producer-retailing resulted from the ability to spread out capital costs of buildings and land and the provision of design information through the procurement process.

- flexible specialisation

The thesis of flexible specialisation has emerged from recent debates on the transformation of production systems in the industrially advanced countries, and the part such transformations play in determining the relative competitive position of such countries. Its relevance to development theory and practice has resulted in it being introduced into discussions about industrialisation in the less developed countries (Schmitz, 1989). Flexible specialisation is proposed as an alternative to the mass production paradigm, and recognises the strengths and viability of craft production, based on flexible use of general purpose machinery by skilled workers, capable of manufacturing a wide range of products for constantly changing markets. The key elements of the concept are: multi-purpose equipment and innovation; clusters of enterprises or small-firm communities; interaction/networking between smaller enterprises and between smaller and larger ones and; collective efficiency (the result of the physical presence nearby of innovative producers). The relevance of this conceptual approach to the small-scale furniture industry in developing countries is developed further by Sverrisson (8). The firms studied in Nakuru, Kenya displayed many of the attributes implied in the flexible specialisation thesis (a relatively diversified and changeable product range; a flexible technological configuration; an adjustable form of labour organisation: batch production) and can be seen as existing within a collective of enterprises (coexisting within a geographical region, with similar production characteristics and co-operation, competition control and social cohesion all in evidence). However it is difficult to see evidence in this example, or indeed in the other studies examined, of the horizontal and vertical links between firms and the strong inter-firm division of labour which are central to the flexible specialisation concept. In contrast, successful strategies for small firms in the furniture sector involve bringing production in-house (6), increasing the degree of vertical integration (1, 6) and expanding into producer-retailing (1, 4, 8). The necessity to shield the firm from the effects of the intensely volatile and competitive situation that prevails in the industry plays an important part in determining these strategies, as confirmed by McKean (4) and Sverrisson (8).

10.6 The influence of policy and support measures

The preceding discussion has already touched upon the ways in which government policy can facilitate or present obstacles to the operation of small furniture-making enterprises. In the majority of cases these policy effects are unintentional or, at least, not directed specifically at this particular subsector. The indirect effects of a policy such as the Economic Recovery Programme in Ghana on consumer spending is a case in point (2). More direct effects on demand may be achieved by policies of income redistribution such as those considered by House (3) and Mead (5) for Kenya and Egypt respectively. However, as Mead points out, such policies are rarely implemented. A more direct effect of government on the demand for the products of small-scale furniture makers is the extent to which institutions (from government departments to schools) purchase from these firms. As noted earlier, institutional
buyers were an important market for at least some of the enterprises studied in Ghana (2), Kenya (6, 8), Zimbabwe (7), and Thailand (1). Sverrisson (8) proposes that preferential purchasing from small and intermediate local enterprises by government institutions could be the single most effective support measure that governments could apply.

The import of machinery is another area where government policies have had a significant impact on the development of the subsector. McKean (4) found that the relatively liberal import policy of the government of Ecuador had allowed furniture makers, and especially the larger-scale producers, to expand their production during the 1974-82 boom. In Zimbabwe (7) government foreign exchange allocation policies also selectively favoured larger firms in obtaining machinery. These examples contrast with the situation in Ghana (2) during the economic decline from the mid-1970s onwards, when foreign exchange shortages and currency controls favoured the small producers who were still able to obtain machinery through informal networks.

In both Ecuador (4) and Zimbabwe (7) labour legislation has influenced the structure of the furniture industry. In Ecuador the legislation has included provisions to promote artisan development by exempting them from the small industry regulations concerning wage and benefit entitlements (especially wage rates and union rights) and other areas (e.g. sales tax and tax on profits). In Zimbabwe labour legislation creates problems for entrepreneurs who wish to terminate the contract of an employee. These laws create particular problems for those entrepreneurs who are in the process of graduating from artisan production to more advanced production methods as they involve either increased costs or reduced flexibility in employment practices or both. In both countries the effect has been to encourage co-operation between entrepreneurs (e.g. purchasing mechanised services from each other), the development of subcontracting arrangements, short-term, casual hiring of workers and, in Ecuador, the adoption of centralised-decentralization strategies.

In Thailand the regulations most frequently referred to by entrepreneurs as causing problems were those of the Forestry Department (1). The "strict, but frequently corrupt, and inconsistent" regulation of the use of teak created significant problems for those firms which continued to use teak in quantities beyond what they could legally purchase. A number of owners reported having to bribe officials to stay in business. Another problem related to the "Wood Using Industry Quota System", with district forestry officials claiming that the quota had been filled, though Boomgard reports that this was not the case for any district in the North-eastern region. In Ghana (2) the difficulties in obtaining quality timber resulting from the government's export-drive also adversely affected the production capabilities of small producers.

A number of other examples where policy has affected the development of the industry exist, however these tend to be quite specific in their nature. They include the favouring of retailers over manufacturers (due to the higher turnover of working capital of the former) by the government's credit policies in Ecuador (4), and the protection of the furniture industry in Ecuador by restrictions on the import of cheaper products from Colombia (4).
As regards governmental and non-governmental support programmes, what is most apparent from these studies is the very limited role they have played in the development of the small-scale furniture industry. Only in Nakuru, Kenya (8) were they found to have been active to any degree, and even there the number of enterprises involved was a small proportion of the total sample. Although entrepreneurs were aware of the loans offered by the Kenya Industrial Estates (KIE), many felt that the organisation was corrupt and inaccessible and, in addition, that the amortisation and interest terms were too tough. Comparing the size of a typical monthly instalment with information on sales, surplus and fixed costs, and given the difficulty in predicting the dynamic effect of a loan in an extremely volatile market, Sverrisson (8) suggests that repayment may present difficulties for entrepreneurs. Parker (6) also suggests that the seasonal nature of demand for furniture presents special problems in designing lending programmes for enterprises in the subsector. Other criticisms of the KIE activities related to its dualism, offering either small loans to boost the working capital of small and intermediate enterprises or large investment loans to sophisticated enterprises. Dynamic entrepreneurs in the intermediate group therefore found it difficult to obtain investment finance. Delays in processing applications were also a problem, with capital boosts becoming available long after the opportunities for production expansion which motivated the application had passed.

The various agencies and departments in Thailand responsible for encouraging small enterprises are also criticised for lack of relevance to the needs of provincial level producers (1). In particular the technical training available at local institutes was found to be almost completely irrelevant to the needs of the local furniture industry, a conclusion shared by a number of local businessmen.

10.7 Patterns of change

The case studies examined for this review represent a wide spectrum of experiences, as is reflected in the way that small industries have developed in each of the study countries. This analysis of the patterns of change in the small-scale furniture sector will attempt to draw together the insights from these individual studies as well as highlighting the diversity found between them.

It is useful from the point of view of analysis to greatly simplify the case studies examined here and to distinguish between two types of environments in which small-scale woodworking enterprises may be operating. The first is the relatively undeveloped urban or rural situation, characterised by a market consisting of predominantly low income consumers and with a relatively poor communications and distribution infrastructure. In contrast to this is the environment where the economy has begun to experience a degree of structural transformation with increased incomes, improved infrastructure and greater urbanisation. It should be clear that a number of the case studies do not fit conveniently into either of these ideal types.

In the first case the low income market is served by a large number of very small enterprises producing goods of a relatively low quality. There is little competition from large-scale producers or from other producers outside the area. However, low capital requirements make entry into the industry relatively easy and the result is intense competition between small
producers for what is essentially the same limited market. In turn this results in a great deal of importance being attached to marketing as evident from the amount of time devoted by entrepreneurs to this activity as opposed to production management. Beyond the straightforward strategies of cultivating contacts, entertaining customers and being competitive on price and quality, firms succeed in marketing principally by possessing display space in prominent locations. The need to maintain sales also requires a range of products to be on offer to potential customers. This extended scope of production limits the degree of specialisation a firm can achieve. There are also few other advances made in production organisation. Gradual mechanisation does occur but for many firms the availability of finance to make such investments is a problem. Working capital is financed mainly from firm profits, customer advances/deposits or personal savings. Working capital is a major problem for small firms, not only in their day-to-day operations, but also for firms wishing to gradually transform their production process, for example, through the production of items for stock or the introduction of batch production. Government influence on producers is generally negative, particularly regarding raw material allocation and machinery imports. The influence of governmental or non-governmental support programmes is negligible.

Producers operating in the more "advanced" environment experience a different set of potentials, constraints and competitive pressures to those in the model above. Increased incomes have changed the demand situation, with not only a greatly increased level of demand but also a greater demand for medium quality products (perhaps with new styles) and an increased market in the rural areas. The improved distribution system results in producers being brought into competition with large-scale and/or modern factory producers in the medium quality product ranges and with small-scale producers outside the area in the lower quality ranges. Although this means that the relative importance of competition between local small-scale producers may be reduced, it is still very much a characteristic of the industry. The considerable development in the marketing system includes an increase in furniture reselling activities, with producers trading in the products of other firms and separate retailers establishing themselves. Although labour-intensive in comparison to "modern" firms, the majority of small-scale traditional firms will now display a high level of mechanisation. Financial problems are still an issue but overcoming them is more a matter of managerial capabilities. Input problems, and especially the availability of skilled labour, is now a much more important problem area for the firms. The majority of firms still organise production on a parallel basis with little in the way of standardised designs and batch production. However, such organisation becomes increasingly less profitable as competition from those firms that have made such shifts in production organisation increases. Firms operating in this environment still experience the same problems relating to government as those above, but in addition government labour legislation increasingly affects their operations. Again, support programmes have little effect on these firms.

The extent to which any particular situation might be judged to resemble either of the two scenarios above will obviously vary greatly, and it must be stressed that no "typical" pattern of development exists. It is possible, however, to pick out a number of important factors which greatly influence the success of individual enterprises and/or small-scale enterprises in general.
Demand, and so the level of production, is greatly influenced by consumer income due to the high income elasticities of demand for furniture products. Increases in demand from lower income groups often favour small producers, as their position as suppliers of this market is generally assured. Above this level, however, competition from larger firms and shifts in customer preferences make predictions of the effects of income increases much more difficult.

The availability of skilled labour is of particular importance for small firms, where standardised production is less common. In both Thailand and Egypt the lack of such workers is identified as an important factor influencing the development of the furniture industry and, in particular, the small-scale sector. Raw material availability is also found to have been a serious obstacle to the sector's development in Thailand as well as in Ghana. In both these cases the differential impact of shortages on firms of different sizes adversely affected the small-scale sector. In the area of finance, investment capital constraints can seriously affect a firm's ability to mechanise. As with working capital this must usually be financed directly from earnings and savings. Working capital appears to be a problem for most small firms and particularly restricts their ability to accumulate raw material stocks and also to produce for stock.

Internal firm characteristics also play a role in the development of the industry. At the level of the entrepreneur, the most obvious influence comes from the entrepreneur's motivation for establishing the business. Owners of smaller firms (from the limited evidence offered in these studies) tend to be seeking independence and a decent income, whereas it is only once the firm is established that the owner becomes growth-oriented. Although entrepreneurial skill is obviously required for a firm to be successful, the impression is that formal management skills are not requirements for such success, at least while the firm's size is still relatively small. In relation to production organisation a major issue is mechanisation. Access to machines such as saws, lathes, drills, etc., is vital to keep down labour demands and meet quality requirements. Mechanisation can spread quickly, but it is generally slowed by the extensive trade in machining services between mechanised and non-mechanised firms. As firms become larger and more vertically integrated they rely less on these outside services as they move towards almost complete mechanisation. Government import and exchange rate policies, by making purchase of foreign machines more difficult, can have a significant effect on the ability of firms to mechanise, although this may be off-set to some extent by the development of a capacity to manufacture machines among domestic firms in both the formal and informal sectors. The organisation of production, such as the division of labour, the degree of standardisation of production, and the arrangement of work in parallel or co-operative modes obviously changes as firms grow. It is difficult to tell to what extent such changes are, like management skills, made necessary by business growth and to what extent they determine growth. Specialisation by product type was a successful strategy for profitable survival among the small furniture manufacturing firms of Ecuador.

Developments in the marketing and distribution system can have a great influence in shaping the structure of the industry, as noted above. While one way that firms can respond to such changes is through their own marketing initiatives, such as developing linkages with retailers in expanding markets, another possibility is to insulate the firm from the effects of the intense competition which can accompany increased marketing activities by exploiting niche markets, for example through developing a decorating service or seeking out government contracts.
At the level of industry structure, marketing is also seen to be an important area. Producer retailing in Ecuador was seen to be an important way for producers to overcome competition from smaller artisan producers and benefit from retailing innovations such as instalment-based credit. In Thailand the adoption of the producer retailing strategy was important in allowing firms to specialise. Aside from this, industry structure is not seen to have been an important determinant of the dynamics of the industry, with subcontracting (beyond the relatively simple provisioning of services) being rare. Co-operation between firms appears to become less common as average firms size increases and they become more vertically integrated.

One of the most interesting points to emerge from this analysis of the forces influencing firm and industry success is extent to which it can be seen that individual success and the success of the small-scale sector in general can be in conflict. In particular, those activities which may help the individual firm, such as provision of credit or assistance with equipment purchases, may well lead to ever more intense competition between producers. This may have the unintended consequence of reducing the ability of those that are already making progress to make further advances in their operations and meet the challenge from more modern and larger-scale producers. Such conflicts make the task of designing policies and programmes to support the small-scale sector much more of a challenge, and highlight the importance of understanding the dynamics of the furniture industry on a subsector as well as an individual level.

In addition to the annotated items that follow see also the following studies on this subject listed in the bibliography:-

This study examines the economic viability of small-scale furniture manufacturers in rural Northeast Thailand. It adopts a subsector or "systems" perspective in which the small, rural firms are viewed as participants in a changwat (provincial) level production-distribution system, rather than in just one industry.

Furniture manufacturers in Thailand may be located in Bangkok, changwat capitals, amphoe (district) towns and villages. Bangkok producers generally produce for the Bangkok and export markets, although increasingly their output is being sold throughout the country. Producers in amphoe towns and changwat capitals tend to sell to local markets, while village level production is sold throughout the country. However in recent years the correspondence between production and consumption location in the Thai furniture industry has begun to break down. The finns within each changwat are being brought into competition with producers from other parts of the country, namely certain specialised "furniture villages" in Northern Thailand, producers from other changwats which have extended the reach of their market, and, perhaps most importantly, from modern, large-scale producers from Bangkok.

At the changwat level, furniture manufacturers can be differentiated in many ways. The vast majority of producers located in the changwat level system manufacture wooden furniture. With few exceptions, finns tend not to specialise in a particular line of products, but instead produce a wide range of types of items. The quality of products is a firm-specific characteristic. Normally, a producer's output will fall into one or two adjacent quality classes. The technology of production is best classified as machine-assisted hand production. There is variation across manufacturers primarily in terms of the amount and sophistication of the machinery employed. In no case, however, is the production process fully mechanised. All finns are clearly labour intensive although there are a wide range of capital-labour ratios. There is also variation in the ratio of skilled labour to unskilled labour. Changwat level producers also differ by the size of the firm measured by the number of workers. Firms generally range in size from one to 30 workers with the largest concentration in the 5-15 worker range. One of the most interesting differences among producer-sellers is the way in which they have organised the marketing of their output. The majority of these finns sell their output directly to final consumers. Of these finns, the most common production and selling arrangement is to produce in response to orders from consumers ("job-order" production). Normally, in this situation, products are produced individually or in very small batches. A second group of producer-sellers are involved in the production of various sized batches of products on a contract basis. There are usually orders for desks or cupboards for government offices and schools. This is termed "batch contracting". Some finns will combine job-order and batch contract production to some degree and others will specialise entirely in batch contracts. It is usually possible to clearly classify a firm as being in one or the other category. A third type of selling arrangement is also based on contract sales, but the contract involves the production of a small number of a wide range of products. These finns are usually involved in the interior decoration or construction business. Their work largely involves building furniture, but it also involves the provision of a "decoration" or "design" service and a certain portion of...
the work is done on site. Examples of this type of contracting include building-in counters, cupboards and seats in hotels, restaurants and theatres and finishing the interiors of homes. These producer-sellers are "single-order contractors" or decorators. Only a small portion of the changwat level producer-sellers sell furniture to retailers and producer-retailers for resale. One of each of the two upholstery firms located in Khon Kaen and Chiang Mai sell exclusively to town based retailers. The other types of producer-sellers in this group specialise in the manufacturing of lower quality products for the geographically dispersed lower income markets. One group is located in the changwat capitals and sells to retailers located in amphoe towns or itinerant merchants. The other group, found only in Khon Kaen, is composed of producers who come from other areas of the country, primarily from Northern Thailand, who set up temporary factories during the post-rice harvest season. Their output is largely sold through itinerant merchants in rural areas. Regarding the seasonality in production levels the author states that in the furniture industry the most probable demand side factors relate to the annual timing of consumer income receipts. Given the importance of agricultural income in Thailand, this type of seasonality would be closely linked to the wet season rice harvest which occurs in October, November and December. Therefore, given this rough analysis, it appears that there is some seasonal fluctuation resulting from the cycle of agricultural production. On the supply side, it is possible that the seasonal labour demands in agriculture could pinch urban labour markets during the periods of peak agricultural labour demands. During the period of slack labour demand in agriculture, on the other hand, there is likely an excess supply of workers in urban areas, especially unskilled labour. The evidence presented supports the hypothesis that a range of technologies do exist even in the changwat level furniture industry. These techniques are consistent with the production of a wide variety of products for roughly similar markets.

The producer-retailer is really nothing more than a single firm which combines manufacturing, selling these goods and reselling other manufacturers' goods. In both the production and retailing enterprise these firms are essentially no different from the fixed location producer-sellers and retailers. The important difference between these firms and producer-sellers is that they offer consumers an assortment of products purchased from various outside suppliers in addition to the products they produce in their own factory. The mix of own production and resales varies substantially across firms. Most of the producer-retailers began as producers-sellers and then diversified into retailing, although some retailers have gradually expanded their finishing enterprise into a full-scale unit. The combination of production and retailing results in a number of important advantages for both portions of the business including permitting some specialisation in production, spreading out the capital costs of the building and land, providing important information on product designs through the procurement process and, allowing the producer to substantially diversify the range of items offered for sale in his showroom.

Two main classes of furniture retailers operate at the changwat level - the fixed location retailer and the itinerant trader. The fixed location retailers are simply a retail store, buying furniture from various sources and selling from their store to the public. They generally will deal in a range of furniture products including wooden furniture, upholstery products and some metal products. In smaller towns, retailers will often be diversified, selling a number of different types of goods in addition to furniture. In many cases, retailers will employ a small staff of painters or carpenters to finish products which are purchased in a semi-finished form. A common practice on the part of producers who sell to retailers over a long distance is to sell the goods in a semi-finished state. Normally, the items are fully assembled and sanded, but require a final painting, staining and lacquering or varnishing. The second type of retailer is the
itinerant merchant. There are two rather distinct types of these itinerant sellers. One group represents producers from specialised furniture production villages in the North and will be discussed below. The other group is indigenous to the changwat level system. These itinerant merchants deal exclusively in the relatively low quality, inexpensive products of certain town-based manufacturers. Typically, these sellers operate on a relatively small scale, carrying their products to villages and small towns in pick-up trucks. These merchants are only active in the post-harvest season as a consequence of the strong relationship between the agricultural cycle and the cash incomes of their potential consumers. There may be more than 300 of these merchants operating in Changwat Khon Kaen alone.

In order to precisely examine the structure and organisation of the various changwat level production-distribution system, a complete census enumeration of all furniture enterprises, that is, producer-sellers, producer-retailers and retailers, was carried out in all amphoe towns in Changwat Khon Kaen. It was not possible to enumerate the itinerant retailers. This research was supplemented by further census enumerations in selected amphoe towns in Roi-et, Chiang Mai and Amphoe Muang, Lampang. A brief interview was conducted with the firm manager or other knowledgeable person in each firm covering sales, production, employment, sources of products resold and the age of the firm. According to the survey, there are a total of 84 establishments in the Khon Kaen furniture industry. This represents one firm per 16,000 persons in the changwat or one firm per 3.6 thousand urban residents. Total annual sales are approximately 31.4 million Baht. Of the total sales figures, approximately 53 percent represents disposition of own products and the remaining 47 percent represents resales. Total employment in production and retailing is 504 persons, or approximately one person per year per 62 thousand Baht of sales. Producer-retailers are, on average, larger in terms of production (565,000 B p.a.), resales (273,000 B p.a.), total sales (839,000 B p.a.) and employment (11.4 per firm) than either producer-sellers or retailers (average employment 7.2 and 3.3 respectively). They are also the least common type of firm. The average number of firms per town in the changwat are 1.3 producer-sellers, 9 producer-retailers and 2.2 retailer. When arranged by the size of the town it can be seen that the relative numbers of each type of firm drops off sharply with declining town size. Most of the furniture purchased for resale is produced in Bangkok, over 68 percent. The producer-retailers are by far the oldest firms in all town sizes (average age 10.2 years), and retailers are the most recent entrants into the industry (average age 4.0 years). Retailers, including itinerant merchants, are the youngest firms indicating the increasing separation of production and consumption and opening up opportunities for increased competition from products manufactured outside of the changwat. Geographically, producers-sellers and producer-retailers are more likely to be found in changwat capitals, with retailers dominating sales in smaller towns. Itinerant merchants appear to serve even smaller towns and dispersed rural consumers. Additional information on the changwat level production and distribution system was obtained in Changwats Chiang Mai and Roi-et. In each case the types of participants and the patterns of organisation were similar. In Chiang Mai, the most developed changwat in the study area, the industry is much more concentrated in the capital city than in Khon Kaen or Roi-et where a more dispersed pattern is found.

The regional medium-scale producers and Northern Thai village producers are mainly competing for market share at the lower end of the product quality range, whereas Bangkok producers are competing for the higher quality ranges. The importance of these different sources of imports into the changwat differs in each of the study areas, apparently as a
consequence of the income levels of the changwats and the resultant size of the market for different qualities of products.

One of the most important factors affecting the rate and structure of growth in the Thai furniture industry is the pattern and growth of furniture consumption. A major consideration is that furniture is a relatively new product for the majority of Thai consumers. In major urban centres and among higher income groups the use of furniture has increased rapidly in the past 25 years, and more recently, consumption has begun to spread throughout the population. The observed pattern of furniture ownership in Thailand in 1970 shows that, in all product categories, urban consumers clearly dominate rural consumers. The average urban household owned 22.4 pieces of furniture in 1970, while the average rural household owned 7.4 pieces. Comparable data for villages in 1981, gives the average number of pieces of furniture owned as 0.56, one-thirteenth of the figure for village and amphoe towns in the earlier survey. This serves to underline the remarkably low level of per household furniture ownership in villages in Thailand. The 1970 data reveals the apparently strong relationship between income levels and furniture owned - the poorest 33 percent of the population own only 15 percent of the furniture, while the richest 6 percent own 11 percent of the furniture stock. In spite of the low levels of per capita furniture expenditures in villages, the sheer numbers of rural residents results in total expenditures for this group considerably larger than would have been anticipated. For three regions studied in detail, nearly 57 percent of total expenditure on furniture are made by villagers, compared to 19 percent for residents of municipal areas and 23 percent for sanitary districts. The results of the 1981 village survey show that higher income households purchase more expensive furniture and more of it than lower income households. An econometric analysis of furniture ownership and consumption patterns reveals that the village of the respondent has the greatest power in explaining the probability of ownership and purchase. However, once the decision to purchase has been made, income becomes a much greater determinant of the amount spent on furniture. For the total value or furniture owned the mean income elasticity is .52. The mean income elasticity for purchases made in 1980 is .74. For furniture consumers the income elasticities are extremely high and declining through income classes. The author concludes that, with increased urbanisation, incomes and population, the demand for furniture will undergo substantial increases in the future. In the absence of rapid penetration of outlying areas by Bangkok based manufacturers, the greatest portion of demand increases will be for the products produced in Amphoe Muang (district capitals) and other Amphoe towns throughout the kingdom. This is likely to have favourable employment and income impacts throughout the "urban", rural areas.

The author presents an analysis of the ways in which products are distributed from manufacturers to consumers. Up-country resellers can procure their supplies of products for resale in an number of ways from a variety of sources. Information on the geographic origin of products purchased by resellers shows the relative importance of Bangkok produced furniture in up-country resales and, at the same time, the variation in source of supply by location and firm type. The pattern revealed by the data suggests that the size of the local market, the income of the area and, therefore, quality preferences each play an important role in determining the supplies used. Producer-retailers are found to have a clear preference for purchasing higher quality goods produced in Bangkok. The reseller will base his decision on whom to purchase from based almost entirely on whether the seller is willing to offer trade credit and, is so, at what terms. Among the Bangkok based wholesalers, credit was common if there was a long-standing relationship between the buyer and seller. Trade credit is less readily available from changwat level producers. Cash payment is the primary medium of exchange,
although some firms require advance payments and others provide credit to certain types of buyers.

The primary input for furniture manufacturing in Thailand is wood. Virtually all producers use plywood and low value structural wood. Many firms also occasionally use some high value woods such as teak and rosewood for finishing, and some firms, primarily those in Northern Thailand, depend almost exclusively on higher value structural woods. Overall, plywood currently presents few problems for the changwat level furniture industry with it being widely available at a reasonable price and quality. In recent years deforestation has had important supply and price effects for most of the types of woods commonly used in furniture production. Three of the seven most important problems identified by producers related to wood supplies.

The author states that this is a potential significant area in the dynamic evolution of the industry. The trends and potential implications are summarised as follows: 1. continued rising prices of both plywoods and structural woods for all manufacturers; 2. progressively more serious supply interruptions in up-country markets, but less so for Bangkok because of the dominance of this market area; 3. gradual, but noticeable shifts to increasing the plywood intensity of furniture manufacturing in all areas; and 4. progressively increasing costs advantages to non-wooden furniture manufacturers.

Labour is the most important factor of production used in the manufacturing of furniture. All but one of the sample firms is owned and operated as a family business. Permanent workers make up about 72 percent of the workforce with the remainder consisting of family or temporary workers. Wage rates vary by skill by location, by type of employment arrangement and by firm type. There is also some variation in the manner by which workers are compensated. Most of the factories in the sample pay by daily wages. Average wages per day were 72.9 Baht with administrative, sales and skilled production staff earning slightly above this, unskilled production staff earning roughly two thirds and apprentices one half of the average. For comparative purposes, the average daily wages in cement product firms in the same areas are 48 Baht per day for skilled workers and 35 Baht per day for unskilled workers. In the ready made garment industry, the figures are 25 to 55 Baht per day for skilled workers and 16 Baht per day for unskilled workers. The relative scarcity of skilled labour is a potentially important constraint for the changwat level furniture industry. Rising wage rates for skilled workers will probably result from the labour shortages and may be relatively more serious for up-country firms compared to Bangkok firms. Migration to Bangkok and overseas (to the Middle East) and a decline in the apprentice system are two important factors affecting the supply situation for skilled labour. The latter problem appears to arise because the structure of incentives encourages underinvestment in skill development, and therefore some form of subsidy to reduce the costs of training might be justified. In Bangkok, the producers interviewed expressed no concern with the unavailability of skilled workers, but did commonly complain of the high wages which must be paid. Village produced products require relatively low skill levels, and no worker-related problems were reported by the producers interviewed.

The average initial investment valued at the original cost is approximately 204 thousand Baht ($10,000). Twenty-seven percent is for purchased or leased buildings and land, while 73 percent is for purchased machinery and equipment. As to the source of capital, the funds for both initial investments and expansion funds come almost equally from personal or family savings and loans. The availability of finance for fixed assets and working capital needs is perhaps the most commonly mentioned problem facing small industries. However the author
suggests that the availability of finance does not appear to be a major problem which will have much effect on the development of the changwat level furniture industry.

Analysis of the financial performance of changwat level furniture firms reveals that returns turn negative as soon as the imputed return to buildings, land and vehicles is deducted, and the rate of economic profit is -17.2 percent. There are several factors which can be noted to help explain the results - measurement error, buying and selling of products (in addition to manufacturing activities), major dynamic structural evolution underway in the Thai furniture industry. The firms that are performing badly, in general, are also less technically efficient. This implies that technical assistance in production can be an important component of any overall assistance package. The most interesting and significant finding of the study of the economics of furniture manufacturing is the consistent relationship found between economic performance and firm organisation. The most profitable firms, as seen in the budget analysis, are those firms which have chosen to market their output through contractual relations, whether with batch government contracts or single order decoration contracts. It is noted that the results of the budget breakdowns by firm size, technology and location show less variation than by firm organisation, suggesting the dominant importance of organisation. Furthermore, the finding of constant returns to scale in production function analysis suggests that advantages are not the result of firm size. The primary determinants of performance are, therefore, attributed to batch size and the ability to organise production for the appropriate market niche.

Theoretically, competition is generally regarded as a healthy, desirable economic state. This largely ignores the fact, however, that competition can also have undesirable consequences for producers and consumers. There are at least three actual and/or potential deleterious effects which a highly competitive environment can produce. These are excessively low returns to firms, the consequences of limited market size per firm and problems related to the quality of the products produced by the industry. The implications of the degree of competition in the industry are great.

Generally direct government intervention has little effect on changwat level furniture producers. There is little direct contact between the government institutes whose role is to assist industry and the changwat level furniture industry. It does not appear that government policy has geared itself well to the needs of the changwat level furniture industry. There is no technical support consistent with the needs of small-scale, rural producers and product distributors. Furthermore, there would seem to be much more that the government could do to supplement the fixed and working capital financial needs of small firms, producers and distributors alike.

The paper identifies four major types of changes which have been taking place in the Thai furniture industry which carry considerable importance in understanding the development potential of the changwat level production-distribution system. These are - 1. the steady growth in the demand for furniture in municipal areas, amphoe towns and villages; 2. the dramatic increase in furniture reselling; 3. the development of modern, large-scale furniture manufacturing for the domestic Thai market in Bangkok; and 4. the increasing difficulty associated with acquiring necessary supplies of critical inputs for furniture manufacturing, namely, structural woods and skilled labour. Although the more rural markets are served to some extent by the changwat level producers, to have any hope of reaching the largest segments of these markets producers must actively develop linkages with itinerant merchants and fixed location retailers in the villages and smaller amphoe towns. The importance of retailing from the standpoint of the changwat level industry is that it introduces new competitive forces from
outside the changwat and also that it allows manufacturers to reach more consumers, thereby facilitating gains from specialisation. Therefore another option available to the changwat level manufacturer is to augment his production enterprises with a reselling enterprise. In the medium to medium-high quality range competition from large, modern manufacturers is being felt up-country. These firms are significantly more efficient than the various types of producers found in the changwat level industry. Local producers will be forced to adjust to the competition from Bangkok. The increasing difficulty of acquiring needed supplies of structural wood and skilled labour may tend to further disadvantage changwat level furniture manufacturers.

Several policy recommendations are proposed on the basis of this research. These relate to technical assistance, financial assistance, materials policy and institutional reorganisation. The development of the changwat level furniture industry can be facilitated through the design and implementation of a program of technical assistance aimed at improving the ability of participants in the industry to adapt to its evolving structure and organisation, in particular training managers in marketing, design and the use of alternative materials and in training skilled labour. The evidence on the need for financial assistance presented in this study is not as conclusive and it is recommended that further research be carried out concerning the private sector's ability to finance the types of adaptations which are expected to be made by participants in the changwat level furniture industry. The study also makes recommendations regarding the activities of relevant departments and agencies concerned with forestry policy and regulation and industrial promotion. It suggests that the Department of Industrial should be reorganised with "industry desks" and a redefined role as a point of collection and dissemination of information and that the forestry agencies and departments should be encouraged to proceed with all due haste to implement a program of long-term, sustainable yield commercial forestry while in the short- and medium-term making efforts to improve the distribution of usable timber between Bangkok and up-country areas and between up-country areas of differential timber endowment.


This study examines the development of small-scale industry (SSI) in Kumasi, Ghana over the fifteen years from 1973 to the present. During this period, small firms have played an increasingly important role in the local economy and, in certain areas, have penetrated markets previously dominated by large domestic industry and exports. The first objective of the study is to trace the factors behind the explosion of small-scale industry activity from the mid-1970s and to describe the quantitative and qualitative advances made by SSIs. The central focus of the study, however, is to assess the sustainability of these advances and to gauge the potential for self-sustaining growth in the SSI sector. Particular attention is paid to the effects of the Economic recovery programme (ERP), a structural adjustment programme launched in 1983 with support and participation of the IMF and World Bank. The study adopts a branch-specific approach, with one of these branches being furniture and related industries. Empirical research was restricted to the two Kumasi suburbs of Suame and Anloga, areas where small-scale workshops have been concentrated.
Results from a questionnaire survey showed that furniture enterprises accounted for 26% of the total in the two suburbs. No women workers were identified in any of the enterprises. The majority of firms had been established relatively recently (since 1975). Furniture enterprise proprietors tended to have lower educational levels than other proprietors. Most proprietors had previously been employed in either a large firm or corporation or as an employee in another small firm. The vast majority (91%) had received their training in a small firm. The greatest degree of individualism was found in the furniture industry with a disproportionately large number of firms consisting solely of the proprietor. Salaried employment (as opposed to work as an apprentice) is also much less common in the furniture industry than other industries. The majority of furniture enterprises sell to individuals, but with a sizeable proportion selling to retailers.

For the branch-by-branch analysis the study team focused on three sectors - vehicle repair, metal-work/manufacturing and furniture. Unlike the diversity found with metal-work/manufacturing, it was found that there was a much greater coincidence in the experiences and current situation of vehicle repair and furniture-making firms. Interviews with long-established proprietors revealed that from the mid-1970s there was an explosion in the number of carpenters working in Anloga. This is consistent with the evidence that points to the opening or growth of markets around that time. The constriction of large-scale industry resulted in increased markets for small firms in supplying beer crates, school furniture and to small construction firms. Sales to foreign traders also increased because of the absence of timber supplies and/or a low-priced furniture industry in neighbouring countries. In parallel to this there was an increased mechanisation - saw benches and wood-turning lathes (more than half made in Kumasi) and a smaller number of more-sophisticated wood-working machines appeared. The mechanisation of Anloga (where most of the furniture enterprises were located) has affected almost all the firms, since those who own power machines hire them out to those who do not.

Since 1985 there has been a drop in demand with breweries purchasing plastic crates which are cheaper and of better quality. The control on public spending resulting from the ERP has meant that schools have had no money to purchase furniture. Foreign demand has also dropped - this may be partly due to increased prices. It has become increasingly difficult and more expensive to obtain timber of the right quality as the drive to increase timber exports has proceeded. The sector also suffers greatly from unrestricted competition. Capital barriers to entry are low and the large numbers of apprentices ensure an over-supply of trained labour. Often a trained apprentice will stay on in the same workshop and set up in competition with his former employer.

There has been a limited degree of product enhancement and diversification. This partly results from the continued use of green wood (due to ease of working) and the limited number of uses for wood. Difficulties in upgrading the quality of finished products are caused by the problems in obtaining quality seasoned timber and the need for capital necessary to produce for stock.

The author states that a more serious approach to management tends to be a consequence of a firm's expansion rather than, initially at least, its cause. He also argues that the significantly higher than average number of furniture-making
proprietors who have no education at all as well as the lower level of investment in machines by those returning from overseas are a consequence of the lack of potential for growth rather than its cause.

It is concluded that the potential for the development and endogenous growth of the small-scale woodworking sector appears to be rather limited. With declining markets, rising raw material costs and a greater atomisation of firms than in any other branch of small scale manufacturing, even the more imaginative entrepreneurs have found little scope for moving into new markets or product lines. However it is also concluded that the future of Anloga as a supplier of low-quality furniture seems assured. The rural and urban poor will provide a solid bedrock of demand. Beyond that, however, small firms have little control over their market. They were sucked into the vacuum left by the retreat of large- and medium-scale factories in the mid-1970s. With limited ability to improve the quality of their produce, however, and with no control over their supply of materials, they have just as quickly been marginalised again.


This paper, which examines the secondary employment and income effects of an income redistribution, is addressed at the level of the furniture subsector. Surveys have shown that over half of rural families engaged in at least one non-farm activity, and, of these, 1.5% were engaged in furniture. The smallest firms, which were found in rural areas and in the urban informal sector, produce the lowest quality of furniture. The major constraint of this part of the industry appears to be the low incomes of the majority of the population.

The whole industry was found to be very labour-intensive compared with other manufacturing industries. The use of machines is rare. Data derived from an informal sector survey show that labour productivity is only a third of the average for formal sector firms, while average wages are significantly lower. Fuel and electricity used per worker is negligible in the informal sector. Informal sector firms had much lower capital:labour and capital:output ratios than formal sector firms. These data are reflective of the lower quality output and skills employed in the informal sector. Yet the net average annual earnings of the business heads of K£707 compare very favourably with what these same persons would earn as employees in wage employment in the formal sector.

From the results of a demand survey it is evident that low income households have a greater propensity to buy from urban informal sector producers. Consequently, a policy of income redistribution through growth will further the expansion of employment in the low income sector of the industry. The author concludes that such increases will create quite respectable income opportunities for the newly employed and will go a long way towards alleviating existing deficiencies in the stocks of basic furniture of the poorest Kenyan households.
This thesis examines forces external to small manufacturing firms - the macroeconomic context, industry structure and growth trends, and government policy - and discusses whether government policy towards industry represents a critical constraint to the development of small firms. It also investigates whether subcontracting represents a viable strategy for coping profitably in a fragmented industry. The study draws on a "subsector" or "industry analysis" approach and is based on data gathered from structured interviews with key informants and a survey of a sample of small sawmilling and furniture producers in the provinces of Guayas and Pichincha.

In the furniture subsector of Ecuador, smaller firms, those with less than 10 employees, constitute 99% of the population, while accounting for the bulk of production, 84% of the total, and 90% of employment. The province of Guayas accounts for 30% of furniture establishments nation-wide. Guayaquil, the most populous city by a significant margin, represents a sizeable market.

Wooden furniture manufacturing in Guayas is a highly fragmented industry with a very low level of seller concentration. This is a reflection of features of this industry in its incipient stages. These factors range from low entry barriers, limited capacity for economies of scale, high inventory and storage costs, diverse product lines and high exit barriers. The seasonal demand characteristic of the subsector particularly affects the ability of firms to mechanise and increases the costs of maintaining a sizeable inventory.

The small furniture manufacturers interviewed in Guayas employed an average of seven permanent workers supplemented by five occasional workers (contracted intermittently on a piecework basis). The large number of subcontracting relationships and high proportion of workers employed on an unsalaried piecework basis meant that managers had the flexibility to reduce the total number of workers at will.

The motivation of most small manufacturers interviewed establishing their firm was independence and a decent income, not growth. Sixty percent of the small manufacturers interviewed had been in existence for over ten years. Most started out as independent artisans, and then expanded their operation modestly over time. The large majority of managers interviewed already had significant experience in the carpentry or furniture industry prior to establishing their own firm. Savings and personal assets were the primary financial basis for establishing firms.

The majority of production activities such as carpentry, carving, staining, upholstering and finishing, are still completely manual processes. The extensive use of labour for furniture manufacturing, along with the diversity of production activities, has traditionally discouraged mass production and encouraged specialisation.

Small furniture manufacturers accumulated on average 2 million sucres in woodworking machinery, approximately US$ 16,000, by 1985. There are considerable
differences in the asset levels of small firms. Half of the interviewed manufacturers rented, rather than owned, their workshop space. Most small manufacturers interviewed built up their asset base over five years ago, and had purchased new imported machinery at that time. Price rises in imported machinery as well as the higher cost of credit, have served to shrink the market for new woodworking machinery.

The increasing importance of credit for working capital can be seen in small manufacturers' explanation for their low level of use of installed capacity. Small manufacturers interviewed used an average of 50 percent of their installed capacity, principally due to a lack of working capital, lack of space, and contraction of markets.

The type of product manufactured reflects the variability by firm size. Smaller firms visited tended to manufacture unfinished furniture or finished individual pieces, such as tables, chairs, beds. Small manufacturers interviewed with proportionately larger assets produced finished sets of furniture, sold as units; kitchen cabinets, modular shelving or other plywood-based products. the sales levels of small manufacturers also suggests a wide spectrum of production potential. the average monthly sales level for small furniture manufacturers in Guayas was 900,000 sucres or US$ 7,200. However, half of the small manufacturers had sales of 200,000 or less sucres, equivalent to US$ 1,600, while another group, 14 percent of the total, had over two million sucres, or US$ 16,000 in monthly sales on average.

A review of the forces in industry affecting the development of small manufacturers in Guayas points to several critical constraints and a number of strategies for surviving profitably in a fragmented industry. Two related constraints have had the most serious effect on the evolution of these small firms. On one hand, the massive entry of artisans has encouraged severe price-based competition for small manufacturers. Artisans have a lower cost structure given the extensive use of family labour, their survival-oriented motivation, and freedom from the expense and regulation of labour legislation. On the other, retailers of artisans have the critical strategic advantage of a retail capacity without the costs associated with production. In the post 1982 recessionary period working capital financing was still available to retailers, largely because their rapid turnover of capital made them an attractive credit risk. The government's labour and credit policies have effectively discouraged the emergence of small industry, encouraged the entry of artisans and favoured retailers over small manufacturers. The result is the continued fragmentation in the industry.

One effective strategy for surviving profitably as a small furniture manufacturer was forward integration into retailing. Manufacturers with a retail capacity were in a better position to overcome competition from artisans and to benefit from such innovations as instalment-based credit. They were in a position to subcontract other firms, and to achieve a relatively high volume of sales. Those small firms without a retail capacity tended to be subcontracted by another enterprise. Entering into this subcontracting relationship provided these smaller firms both with access to working capital and to markets. For these very small firms, subcontracting arrangements represented a basis for survival, not a secure basis for capital accumulation.
However, achieving this strategic advantage of a retail capacity was not sufficient for profitable survival by small manufacturers. Rather, they had to develop strategies to overcome competition from retailers of artisans and to cope with restrictive labour legislation. Several firms coping profitably in a highly fragmented industry adopted a production structure which capitalised on this fragmentation. They divided up their firm into small semi-autonomous specialised operations under tight central control. They made extensive use of occasional workers. As a result, they were able to protect themselves from the high costs associated labour legislation, e.g. strikes, small industry salaries and benefits. they could use labour practices more characteristic of artisan workshops, gain access to subsidised credit available to small industry, and sustain a volume of production which permits lower production costs.

Subcontracting smaller firms was another means to accomplish the same end. They would subcontract small producers for particular production lines and then centralise the final assembly, finishing and retailing. However, subcontracting was less viable as a long-term strategy than the centralised decentralisation approach. Problems with subcontracting included inadequate quality control and insufficient volumes of production.

A third approach was specialisation by product type as a means to establish long-term relationships with buyers in growth industries. This strategy permitted greater leverage with buyers and greater use of assembly line, mass production, as the firm was insulated from the acute competition characteristic of the residential furniture industry. These firms' profitable survival became linked to the evolution of particular industries, such as housing and consumer goods, which are in turn affected by government policies.

In sum, small furniture manufacturers have had opportunities to profitably survive in this fragmented industry. A critical prerequisite was forward integration into retailing. However, to cope with the constrains imposed by government labour and credit policies, they also needed to keep the size of their firm small and to rely on a decentralised production structure or subcontracting.

Analysis of the growth trends of the furniture manufacturing industry show that it was among the fastest growing industries in Ecuador during the boom period between 1974-82. Average yearly growth rates during this period were 17%. In Ecuador, the strong growth in domestic demand in the boom period, coupled with the availability of cheap credit, was a stimulus for expansion of the furniture industry. Machinery from abroad could be imported relatively cheaply, stimulating considerable investment by large manufacturers. The prohibition on the importation of wooden furniture to Ecuador gave local industry considerable protection, particularly from the low-cost production of Colombia. Export markets constituted a minimal proportion of total furniture sales in the 1974-83 period. Growth in the furniture industry, however, took a nose dive in the 1982-83 recession, when sales fell by sixteen percent in one year. This was caused by the drop in personal consumption; the sharp rise in the cost of credit for investment; more expensive consumer credit; the rising cost of imported inputs and capital goods; escalating labour costs; and a very limited ability to benefit from government export incentives. The failure of several large scale furniture manufacturers and the sustained viability of retailers of artisans in this recessionary...
period raise several important issues. On the one hand, government policies toward industry had encouraged the overdimensioning of production; excessive external borrowing; and overextension of consumer credit by the medium and larger firms. On the other, it suggests that opportunities for profitable survival are available to small producers, particularly those able to organise production to complement the existing structure of the fragmented furniture industry. The use of subcontracting and occasional labour by small firms appears to have made them better able to respond to the severe fluctuations in demand characteristic of the furniture industry.


In Egypt, producers of furniture comprise one of the largest subsectors among small enterprises. This paper explores the patterns of production and resource use among these small furniture producers. It is based on published and unpublished written materials about the sector and interviews and discussions with 50 woodworking establishments in Cairo and Alexandria.

Machinery use in the subsector is extremely low compared to all manufacturing enterprises. Although most firms have no machines they do not rely solely on hand tools. Privately owned service centres which have modern and well-maintained machines are used to do work which is best done mechanically.

Trainees represent one-third of all workers. As the expectations of young people have risen, with most setting their sights on more formal education, it has become increasingly difficult to attract into apprenticeships despite greatly increased real wages. The rest of the labour force is primarily made up of skilled workers. This contrasts sharply with large-scale furniture factories where a large proportion of workers (excluding trainees) are semiskilled or unskilled. The average daily wage rate for all workers (excluding apprentices) was 3.72 Egyptian pounds (LE) which compares with the LE 30 per month earned by a newly started graduate in the civil service. Real wages have also risen for skilled workers. Employment in those firms which had been in business for the last five years (the majority had been) had fallen by half. The loss of skilled workers was mainly due to emigration to other Arab countries where better-paid work was available.

The author found some evidence of specialisation. One particular example of this was the production of furniture with the wood unfinished.

Different products are sold in different markets: they are also produced in different types of firms. The highest cost, highest quality furniture is produced primarily by middle-sized, skill-intensive, selectively mechanised enterprises. The lowest cost products, by contrast, which are consumed by the poorer groups in the country, are made predominantly in very small, essentially unmechanised establishments. For the intermediate-priced products purchased by middle-income consumers, the market is shared among a variety of different types of producers ranging from small workshops with one or two skilled workers and no machines to the large mechanised establishments relying heavily on semiskilled and unskilled workers.
Factor proportions differ greatly between small, where capital is mainly present in the form of skilled labour, and large firms, where capital is represented by machinery. Capital formation in the small-scale sector takes place through training.

The idea that small firms have higher costs since they are not big enough to permit specialisation within the production process is not supported by this study. On the contrary, even the smallest firms have often been able to attain a high degree of specialisation, concentrating on only one or a few steps in the production process. They may buy semi-finished inputs, selling their output after one further stage of processing; they may undertake a certain step in the production process, working for others on a contract basis; or they send out their goods-in-process to other workshops for such jobs as sawing and carving. With this tightly woven set of market interrelationships, smallness of size has not proven a barrier to a high degree of specialisation.

Incomes of producers and workers in this sector have been high and rising. In large measure this reflects the shortage of workers who either have, or are interested in obtaining, the requisite skills.

In reviewing the future prospects of small furniture producers the author first examines demand considerations. Growth in demand for furniture rises as a result of increases in population and per capita income. Income elasticity of demand for furniture is high in Egypt, probably over 2 in the aggregate. Distribution of income is of equal importance in determining future prospects, as a result of the different markets being supplied by different types of firms. Although Egyptian leaders have stressed the importance of increasing the proportion of national income captured by the lowest income groups, it is not certain that this will happen in the future. Changing patterns of taste are particularly important for medium-priced furniture producers - widely different styles are produced by widely different enterprises (in terms of firm size, factor proportions and production technology) who are in direct competition with each other. Although a shift from more traditional to modern styles has not occurred yet it may well do.

A number of problems exist on the supply side. The lack of skilled labour has forced prices up and may lead to larger-scale more highly mechanised modern producers (who rely on unskilled or semiskilled labour) expanding their output. Small producers also face difficulties in adopting new production methods and in improving their managerial, as opposed to craft, skills.

The author concludes that in the production of intermediate-priced modern products, small producers are likely to be replaced by more larger, more highly mechanised workshops. The continuing strength of the small producers lies in two other areas: the production of lowest-cost, simple furniture, where it seems likely that they will control the market for the foreseeable future; and in the intermediate price and quality range traditional furniture, which depends on considerable skilled craftsmanship in the production process. Current production patterns for this type of product among small producers are impressively efficient; as long as the consumer tastes do not shift too rapidly away from their traditional roots, the future prospects for small producers of these products are bright.
This paper provides an overview of the furniture making subsector in Kibera. The subsector study was preceded by a complete census of small enterprises in Kibera, which revealed that, as of December 1991, there were 249 small enterprises currently involved in furniture-making. Three subsequent studies - a demand survey, a rapid appraisal of furniture-making, and a detailed business survey - provided the information about furniture-making presented in this report.

Local demand for furniture comes from consumers in lower-income parts of Kibera, who demand basic items at low prices. Consumers in higher income neighbourhoods spend more on furniture, purchase more non-basic items and purchase more from outside Kibera.

The furniture subsector has six functions: (1) wood wholesaling, (2) wood transport to Kibera, (3) wood retailing in Kibera, (4) furniture part shaping and cutting, (5) furniture assembly and finishing, and (6) furniture retail.

Wood wholesaling takes place in two areas: upcountry wholesalers connected to timber mills, and wholesalers in greater Nairobi. Wood is transported to Kibera under three arrangements. 12% of Kibera furniture-makers buy wood direct from wholesalers and transport the wood themselves. Kibera retailers also buy wood at the up-country saw mills, where it is cheaper, and transport it to Kibera. Finally, wood is also transported to Kibera by wholesalers.

Large-scale retailers of wood are highly visible, and sell lower quality cypress and pine. Smaller retailers sell higher quality woods and usually store wood to protect it. They are therefore less visible, and many furniture makers in Kibera are unaware of their existence and travel outside of Kibera for supplies of high quality timbers.

The initial process in the manufacturing of furniture (part shaping and cutting) are performed either in other suburbs where wood is purchased or by firms in Kibera. The latter usually possess fewer machines (owning lathes but not saws) and either specialise in this or are involved in other furniture-related activities.

Assembly and finishing is the central activity of this subsector. 250 businesses are involved in this stage. Although within firms there may be some specialisation of workers in particular tasks, in most cases all functions of furniture-making are performed within a single business. This stage is very labour-intensive, with hand-tools used for all tasks. The vast majority of producers retail from their workshop (with the customer collecting), while a few produce under subcontract to city-based retailers.

The furniture making subsector of Kibera has two main channels, which can be distinguished according to how many of the above functions a furniture maker undertakes. The first channel is the smallest, including less than ten per cent of furniture makers in the firm-level survey. Producers in this channel have power tools, and are involved in the greatest number of tasks. They buy wood wholesale and transport the wood to Kibera. They do all the machine work, assembling and finishing
of furniture, then they retail the bulk of furniture themselves. Producers in this channel may have a cost advantage over those in the other channel: by dealing directly with wood wholesalers, they avoid paying the retailers’ mark-up on wood. They may also have an advantage in other areas: by performing all production work within the business, they retain the most control over the timing and quality of production. However, by undertaking all functions within the business, greater managerial skill is required.

The second channel includes the vast majority of all Kibera producers. These businesses are less vertically integrated than those in the first channel. None have power tools, so they subcontract cutting and shaping of wood to businesses that have machines. Nearly all (95%) of these businesses buy wood at the retail level, 95% of whom buy from their own business.

Differences appear between these channels in a number of areas. Most striking is the size difference. Fully integrated businesses have an average of 11 workers, while less integrated businesses have only four workers. Moreover, fully integrated businesses are more likely to produce higher quality furniture out of hardwoods and are much more likely to market some of their goods outside of Kibera than less integrated businesses. In part, these differences may stem from the entrepreneur’s experience in furniture-making. Indeed, entrepreneurs in fully integrated businesses brought an average of 12 years of experience to their current business, while those in less integrated businesses brought less than seven years of experience. In addition, entrepreneurs in more integrated businesses were better financial managers. They were more likely to keep track of sales and costs than those with less integrated businesses and they were more likely to keep business and personal finances separate.

The Kibera furniture market can be broken into two segments. The first is in the neighbourhoods of Makina, Line Saba, and Lindi, each of which has a well-defined marketplace. Makina is the most accessible of the three and attracts higher income customers, many of them from other areas of Nairobi. Custom orders for higher-quality furniture represent a large percentage of the work. Line Saba is less accessible and draws its customers mainly from within Kibera. Most sales are of basic items, made with low price inputs (mainly pine) and of rough workmanship. Lindi market falls between these two extremes in its characteristics.

Other furniture makers are scattered through Kibera. They generally sell to Kibera residents, with those along main roads generally producing better quality and higher priced goods.

The surveys also point to a high degree of seasonality in demand, with it being dependent on when school fees fall due. Business is also cyclical within the month with purchases being made when salaries or advances are received. Combining this seasonality (with very high and very low demand periods) with high working capital costs (materials for furniture making are expensive, producers must be good money managers to keep their businesses open year-round. As a strategy to combat seasonality, many producers seek out outside markets. For example, a very few Kibera businesses make furniture for city-centre retailers. They are able to sell only to the smaller retailers as the larger ones believe informal sector furniture-makers have poor
quality control, inadequate working capital to accept terms of contracts and cannot meet short deadlines. Large retailers appear to be expanding as their "hire-purchase" schemes become more popular, reducing the opportunities for small furniture makers. A more common market for Kibera furniture makers is with institutions or private businesses, both within and outside of Kibera. Access to these markets is greatly dependent on personal contacts.

The detailed business survey discovered that most machines used in the subsector were supplied by informal sector firms, at considerably lower costs than equivalent machines manufactured in the formal sector. Many firms plan to buy machines, which the author suggests may lead to excess capacity as the supply of machining services outstrips demand.

Less than 5% of firms relied on the proprietors labour only. More than 65% had between 2 and 4 workers. Over half of all workers in furniture-making are paid. However, paid workers are more likely to be "casual workers", paid by the piece or by the day. Separating by channel, the data reveals that fully integrated businesses rely much more on paid labour than do less integrated businesses, where 79% of workers are paid, compared to 52% of less integrated businesses' workers. The labour force is fairly stable, with an average of around two years employment typical for paid workers and apprentices.

The study found that there were vast differences in the scale of production and subsequent returns between furniture-making concerns. The following businesses were found to have the lowest profits - less vertically integrated businesses; those making lower quality furniture; businesses without records of costs or sales; and businesses outside of major markets. Average profits varied between 1,020 Kenyan shillings ($36) in bad weeks to KSh 3,592 ($126) in good weeks.

Producers face a number of problems. Most cited machine time as the binding constraint in filling large orders and producing in a timely fashion. This explains why so many firms planned to buy machines. Other problems included lack of workshop and display space, rising input prices, and demand constraints.

The author concludes that, as a whole, this information identifies that the main constraints facing furniture makers stem from increasing competition for customers, which manifests itself by producers trying harder to meet production deadlines, attract customers with interesting furniture and goods displays, and sell at a good price. However, in order to beat the competition, producers must deal with the supply-side constraints of rising input prices and increased competition for scarce machine time. Producers' solutions to both of supply-side problems require capital, either to buy machines or buy lumber in bulk. However, as the discussion of financial returns highlighted, returns to furniture making are highly seasonal, making large payments on loans difficult. This is the puzzle of designing lending programs for furniture makers.

This report presents empirical material on wood-working enterprises, which was collected in a three month visit to Zimbabwe in the fall of 1988, as well as background material, which is used to put the results of the fieldwork into perspective. The main objective was to investigate local innovation and adoption of intermediate technology in existing, small private enterprises. The study asks the questions: - does local innovation exist, which forms does it take, and which are the implications for current theoretical and policy discussions.

UNIDO figures for Zimbabwe show that the woodworking industry consist of furniture-making and other activities in roughly equal shares. The sector is relatively labour intensive and contains a high proportion of firms owned by Zimbabweans. Although recently wood-working has faced severe problems with sharp falls in output after 1981 (in contrast to the trend for all manufacturing), no explanation is offered here for the decline.

The small-scale woodworking industry in Mutare region is analysed in detail. Information was gathered by extensive interviews with 26 woodworking entrepreneurs, who made up the (non-randomly selected) core sample, and shorter interviews with business relations and larger firms. Most of the enterprises in the sample were long-term projects, providing full time employment for at least some employees and operating all year round. They were therefore somewhat exceptional from a rural small enterprise viewpoint.

Most firms were in the 2-5 employees size range (although this measure of size was variable due to the extensive use of casual labour). Sole proprietorships were mostly found among the smaller firms, other forms of ownership (e.g. partnerships, cooperatives, etc.) among the larger ones. Although some of the enterprises employed relatives, none of these workers were unpaid family labour. They ranged in age from two months to over 50 years, the average being 8.63 years. 12 of the 18 sole proprietors also engaged in agricultural side activities, mostly for home consumption. Only of the 1 of the 8 non-sole proprietors engaged in agriculture.

With the exception of the largest firms, most enterprises carried on a major part of their activity outside the building, sometimes under makeshift sheds. The main function of permanent buildings is for many small entrepreneurs to provide a place where tools, machines and work in progress can be safely kept over night. Only one of the entrepreneurs operated from home. All in all, appropriate premises were less of a problem than expected.

22 respondents had received no government assistance or project aid. Seventeen of the firms were licensed and paid a license fee. Most of the others were operating with the permission of the authorities.
14 of the firms had no machines, 8 had some, while 4 were virtually completely mechanised. A problem for many firms was that machines were difficult to get, not that they were unknown, and in several cases - by no means all - funds were lacking.

Management specialisation, in the sense that the proprietor or leader of the enterprise was only concerned with management was found only in the firms in the highest sophistication group. There was a clear relationship between technical sophistication and division of labour (divorce of working and managing, and the decline of skill and rise of semi-skilled work). However, among those with a lower level of technical sophistication the relationship is tenuous, with the reality being that many a small entrepreneur has managed to obtain one or a few machines without being able to organise work accordingly. In other words, division of labour has not yet developed beyond what was common in non-mechanised enterprises.

One consequence of limited markets is limited product specialisation, and small production runs. 16 firms did indeed produce on order only or almost exclusively. The size of orders varied, according to the size of the firm concerned (larger orders for larger firms). Seasonal fluctuations in demand, such as demand for domestic furniture and kitchens units before Christmas, and the demand for school furniture at the start of the school year, etc., were anticipated, not only in larger and more sophisticated firms, but also by those of the middle size and sophistication group. The fluctuations in activity due to these and other practices (in particular building work, which was a sizeable but variable part of the activities of most enterprises) are met by extensive use of casual labour.

Insofar as the labour laws impinge on the operations of small-scale carpentry enterprises, they reinforce the tendency towards co-operation between entrepreneurs (e.g. purchasing mechanised services from each other) and short-term, casual hiring of workers. The labour laws create problems for those entrepreneurs who are just about to take the step from artisan production to more advanced production methods. Most commonly bookkeeping practices were none-existent or very rudimentary. Bookkeeping was more advanced among those firms with greater technical sophistication and showing a higher degree of division of labour. The author concludes that the firms in the sample can be divided into roughly two groups. Several of the firms in the "lower" group do approach "graduation" according to one or another criterion. These firms show up the disjunctions in the innovation process, with it appearing that technical obstacles are minimal, but organisational obstacles considerable.

The entrepreneurs in the lowest technical sophistication group mostly received training through apprenticeships, those in the medium group were strong on formal training, whereas the leaders of the enterprises in the high complexity group were trained managers, delegating supervision to craftsmen and technicians, who in most cases had no educational advantage over the entrepreneurs in the medium group.

Few entrepreneurs reported inadequate demand, with several reporting that they had more than enough orders. In the both the lowest technical sophistication group and the medium group, the most common outlet was the workshop. The four firms in the highest technical complexity group were in a very different situation, having contacts
with wholesalers and retailers, district councils and also sending travelling salesmen around to villages. Main customer categories also contrasted greatly, although there was a wide range of customer categories in all groups. In the lowest technical sophistication group, peasants were the majority of customers, and this was true for both urban and rural carpenters. In the middle group answers were more varied. In the highest technical sophistication group, district councils and other finns were the main customers. One of these enterprises also exported, and another was considering export. Small entrepreneurs competed with shops selling the products of big factories, mostly from Harare and Bulawayo. Charging slightly lower prices, but being less effective, the smaller firms had to compromise both on quality (e.g. lower quality finish), rather drastically at times, and on earnings as well.

The average monthly earnings were Z$ 223.42, ranging from 60 to 400 (although this figure excludes 3 firms who refused to provide estimates and who were judged to be making earnings above average). This figure does not account for depreciation of machines and other investments. In established finns, experienced carpenters earn from Z$ 250-700 a month for a 40 hour week. Although some sole proprietors do better than some semi-skilled and skilled factory carpenters, it is quite clear that most of the smaller entrepreneurs would be better off in a factory, even if they worked as semiskilled carpenters. The managers (and, in most cases, the supervisory personnel) of established finns earned more than the small sole proprietors - between Z$ 500 and 3000.

Pricing criteria can be characterised as something between cost-plus pricing and market clearing pricing. Provision of credit, sometimes coupled to lay bys (payment in instalments before collection), deposits and the payment of the sum on collection, is for many entrepreneurs a prerequisite for doing any business at all, and it attracts more customers to most of them.

The basic raw material, pine, is grown in the region. Border Timbers, one of the three major estate owners and producer of sawn timbers and processed wood products, is by far the main supplier to local carpenters, either directly or through timber merchants. The choice of supplier, either sawmills or timber merchants, is determined by a combination of costs and access.

Sources of initial investment varied by technical sophistication group. In the lowest group savings from wage labour and help from family dominate, whereas investment of funds from other enterprises are the only sources for the highest group. Recurrent investment was financed in most cases out of savings from carpentry activities, but in most cases on microscopic scale. Difficulty in obtaining machines, even if funds were available, was one of the reasons for low accumulation in the most sophisticated finns. Working capital, i.e. financing of input purchases, rent, etc., has to be financed directly from earnings in most cases in the low and medium technical complexity groups, as overdraft facilities are absent. In the high sophistication group three out of four had bank overdraft facilities. The fourth enterprise did not need such facilities, as it had a captive market and access to council finance. A similar picture emerges when suppliers' credits are considered. On entrepreneur in each of the lower technical complexity groups received suppliers' credits, but all in the highest group. No
enterprise in the highest technical sophistication group reported liquidity problems, but 14 in the lower groups reported such problems.

Unemployment was the main reason why the entrepreneurs had entered the business. This was a particularly common reason in the lowest technical sophistication group, where the majority stated this as a major reason for starting their own enterprise. In the highest group, however, nobody mentioned this as their reason for embarking upon a career in woodworking. In that group two (50%) had gone into the business for an increased income. Independence was most valued in the middle group, where the increased income also had some attraction as in the lower group. The author states, however, that the reality is more complicated than this simple picture. Main start-up problems were cash and credit and obtaining tools and machines (especially for the middle technical sophistication group but not all for the highest group). Almost one quarter of enterprises reported no particular start-up problems. Main stated current business problems were cash flow and profits (but not at all for the most technically sophisticated group), tools and machines, skills (less so for the lowest group), and premises.


This report uses the same methodology as for the earlier study of Mutare, Zimbabwe, to investigate local innovation and adoption of intermediate technology in small woodworking enterprises in Nakuru, Kenya. Nakuru, the provincial capital of Rift Valley Province, is approximately 160 kilometres north west of Nairobi. It is the fourth largest town in Kenya. The Rift Valley province is Kenya's largest, generally fertile and both large-scale and smallholder agriculture thrives. Forestry is also a significant activity, allowing the study to ignore supply bottlenecks.

Official statistics show that the formal woodworking industry has been at the same level of production for the period 1985-89, whereas all manufacturing has increased by 25.6%. Data for the informal woodworking sector show that it has grown considerably in the same period, particularly in Rift Valley province (with Nakuru district displaying similar growth to the province as a whole).

For the study of woodworking in Nakuru, a (non-randomly selected) core sample of 28 woodworking entrepreneurs was selected. Again, most of the enterprises in the sample were long-term projects, providing full time employment for at least some employees and operating all year round. They were therefore somewhat exceptional from a rural small enterprise viewpoint.

11 of the 28 enterprises had 3 workers (although, again, casual labour was frequently used). All the entrepreneurs were men. Unpaid family labour played a minor role in the enterprises studied here. They ranged in age from 4 months to 23 years, the average being 6.27 years. 12 out of the 28 entrepreneurs did not engage in any farming activities, nor did any member of the immediate household. However, all but two of them reported remittances, at least occasional, to peasant relatives, mostly parents.
With the exception of the largest firms, most enterprises carried on a major part of their activity outside the building, sometimes under makeshift sheds. All in all, appropriate premises were less of a problem than expected. Seven enterprises owned their buildings, 21 rented them.

22 respondents had received no government assistance or project aid. All but one of the finns were licensed and paid a license fee.

14 of the finns had no machines (group I), 10 had some (group II), while 4 were virtually completely mechanised (group III).

Many of the finns produced on order only or almost exclusively. The size of orders varied, according to the size of the firm concerned (larger orders for larger finns).

Management specialisation, in the sense that the proprietor or leader of the enterprise was only concerned with management was found in 9 out of the 28 enterprises. In group III, no manager did any production work, in group II 50% did, and in group I 79% did. There were eight fairly established enterprises which produced mainly "for display". Although the production of these finns was very standardised, co-operative work arrangements (in which several workers contribute to the production of one piece) had only arisen in the four group II enterprises and the two group III enterprises. The two group I enterprises producing standardised products for display continued working in parallel mode, with one working taking an item from beginning to end. Average normal weekly working hours were 57.6, 48.4 and 45.2 in group I, II, and III, respectively. All but three entrepreneurs indicated that demand was very uneven. These fluctuations were again met by extensive use of casual labourers employed on a piecework basis, as is usually the case also with more permanent labourers. The author argues that this, and other aspects of labour organisation (e.g. the normal practice that craftsmen bring with them at least the most basic tools) make up what can be called a "subcontracting culture".

Unlike in Zimbabwe, the category which kept all elementary records: expenses, income, as well as debts and instalment payments, was the largest one. Again, bookkeeping was more advanced among those finns with greater technical sophistication and showing a higher degree of division of labour. The lack of any particular pattern in the lower groups lends some credence to the view expressed by most small entrepreneurs, both in theory and in practice, that accounting is not the critical factor one would expect it to be from the importance given to this by support organisations. It can be helpful, but it can also be dispensed with. Expansion comes before management development, and expansion calls for such development.

Data on levels of general education of entrepreneurs (showing an increase in number of years from group I to group III) suggest that general education is of little consequence in the graduation from hand-tool operation into partial mechanisation. However, it obviously influences at which level, in terms of technological sophistication, entrepreneurs choose to start their operations or take over old ones. Differences between the groups in terms of technical training were similar to those found in Zimbabwe.
Use of a skill indicator (calculated as the percentage share of skilled and supervisory workers of all workers), shows that there is no apparent relation between the state of skills and the degree of mechanisation. Flexible forms of organisation of production had not been superseded by mass-production arrangements, even in the highest sophistication group. Comparing between enterprise groups it is seen that both subcontracting and the use of machinery by independent artisans call for broad skills, whereas standardised production with hand tools and simple machinery opens the road to decrease of skills, rather than mechanisation per se. This is reflected in the skill distribution, as the intermediate firms using simple machines to make standardised products also use semi skilled labour and apprentices to a larger extent than either the more flexible low sophistication enterprises, or the equally flexible high sophistication group, which, in turn, implies more active supervision of workers within this group when non-standard pieces are made, something that was also indicated in the interviews.

In all but three cases the demand was reported to be fluctuating considerably. Half of each of the low and medium groups reported inadequate demand, and one in the high sophistication group. In all groups, most of the products were sold from the workshop itself or a showroom on the same premises. Main customer categories for group I were peasants, and a more varied profile for groups II and III but with an increasing middle class urban component. Small entrepreneurs competed with main-street shops selling the products of big factories. As there is a huge market for their lower quality output, they also represent what can be called "appropriate quality". Quality improvement is, therefore, not a pertinent issue for many proprietors. Indeed, increased quality beyond standardisation and mechanisation will merely move some enterprises into a more expensive market segment.

The average monthly earnings for sole proprietors were KSh 2,477, ranging from 400 to 10,000 in group I, KSh 6,233, ranging from 1,000 to 20,000 in group II, and 2,250, ranging from 1,500 to 3,000 in group III. This figure does not account for depreciation of machines and other investments. If rent, licence fees and other expenditures are deducted, the average earnings for group I workers is brought down to KSh 1,843, which is still significantly higher than all categories of workers except skilled workers in intermediate enterprises.

Pricing criteria was, as in Zimbabwe, a system of negotiated cost-plus pricing. Deposits played an important part in allowing entrepreneurs to overcome the constraints on finance caused by a minimum of working capital, lack of bank overdraft facilities, and a diffuse border between private and enterprise finances. In Kenya the production of cash and carry items (in particular standardised furniture) was far more common than in Zimbabwe in the low and intermediate groups, and generally, carpenters had more products in stock awaiting sale than in Zimbabwe. Several carpenters quoted the availability of cash and carry as a necessity of survival. One solution to the working capital problem is making the customer buy and bring the material. Rare among the other groups, it was rather common in the middle group. The reason for this is the relative difficulties of companies, as opposed to individuals, in obtaining hardwoods. The supply of softwoods, cypress, and to a smaller extent, pine, to small scale carpenters is, in contrast, generally plentiful in Nakuru and vicinity. Most of the small and intermediate carpenters in the "local" area were regular
customers of the nearest one or two timber yards. These obtained their supplies from local sources, either government or private plantations.

The main sources of funding for initial investment had been, in Kenya as in Zimbabwe, savings from wage labour and savings from other enterprises. In Kenya the picture is clearer than in Zimbabwe: only two cases had not used either of these sources, whereas in Zimbabwe 12 out of 26 had not used either of these sources. Both "traditional" sources and credit played a larger role there, testifying to the stronger dualism of Zimbabwe society, or to put it otherwise, the considerable advances made in Kenya towards a self-sustaining intermediate sector.

Regarding recurrent investment the situation was basically similar to Zimbabwe: profits precede investment, and credit played a negligible role. Bank overdrafts were common among the group III firms, two firms in group II had received loans from the Kenya Industrial estates informal sector programme, and in group I no enterprise had access to short term credit. Informal usury did not occur, instead liquidity problems, which were frequently reported, were solved by limiting the scope of cash-and-carry production, and demanding deposits - i.e. borrowing from customers.

Increased income (and stable employment) was the main reason why the entrepreneurs had entered the business. In groups II and III the main reason was independence. Insufficient earnings dominate completely among business problems in technical sophistication group I, whereas in the intermediate group, no one problem dominates. For group III the only problem mentioned by more than respondent was the scarcity of skilled workers. Main problems during start-up for firms in group II were lack of money and acquiring tools and machines. Lack of money was also a problem for group II firms but not as serious as the difficulties in finding skilled workers and attracting customers from the competitors. In the high sophistication group acquiring tools and machines was seen to have been the major problem at start-up.


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175


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189


191


193


194


198


[The ESMAP program has also produced a large number of country reports relating to more general energy sector issues, including woodfuel production and consumption]


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