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Ministry of Agriculture
Comprehensive Assessment of the Agriculture Sector
Volume 2.1 - Sub-Sector Reports



MINISTRY OF AGRICULTURE

COMPREHENSIVE ASSESSMENT OF THE AGRICULTURE SECTOR IN LIBERIA (CAAS-Lib)

Volume 2.1 - Sub-Sector Reports

Liberia 2007

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**I. FOOD CROP PRODUCTION, POST-HARVEST HANDLING,
PROCESSING, MARKETING AND CONSUMPTION WITH A FOCUS
ON SMALL HOLDERS AND TRADITIONAL FARMING AND FOOD
SECURITY**

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Liberia 2007

ACRONYMS

AGOA	African Growth and Opportunity Act
ASR	Agricultural Sector Review (World Bank term for CAAS-LIB)
CAAS-LIB	Comprehensive Assessment of the Agricultural Sector-Liberia
CARI	Central Agricultural Research Institute
CBO	Community Based Organisation
CDA	Cooperation Development Authority (of the GoL)
CFSAM	Comprehensive Food Security Assessment Mission
CFSNS	Comprehensive Food Security and Nutrition Survey
DFID	Department for International Development
DRC	Domestic Resource Cost
ECHO	European Commission Humanitarian Office
EU	European Union
GAA	German Agro Action
GDP	Gross Domestic Product
GoL	Government of Liberia
Ha	Hectare
IDPs	Internally Displaced Persons
IITA	International Institute of Tropical Agriculture
IFC	International Finance Corporation (of the World Bank)
IMF	International Monetary Fund
LD or L\$	Liberian Dollar
LEAP	Liberian Employment Action Programme
LEEP	Liberian Emergency Employment Programme
LWS	Lutheran World Service
JICA	Japanese International Cooperation Agency
MFI	Micro-Finance Institution
MoA	Ministry of Agriculture
MPP	Micro-Projects Programme
NIC	National Investment Commission
NGO	Non-Governmental Organisation
NPFL	National Patriotic Front of Liberia
NSAs	Non-State Actors
NTGL	National Transition Government of Liberia
MFI	Micro-Finance Institution
MT	Metric Tonne
PAM	Policy Analysis Matrix (World Bank tool for showing comparative advantage and competitive advantage status of a sub-sector or industry)
SARA	Southeastern Agricultural Relief Agency
SWOT	Strengths Weaknesses Opportunities and Threats
TOR	Terms of Reference
UNMIL	United Nations Mission in Liberia
USAID	United States Agency for International Development
US\$	United States Dollar
WARDA	Africa Rice Centre

WB	World Bank
WFP	World Food Programme
WVI	World Vision International (NGO)

I. FOOD CROP PRODUCTION, POST-HARVEST HANDLING, PROCESSING, MARKETING AND CONSUMPTION, WITH A FOCUS ON SMALL-HOLDERS AND TRADITIONAL FARMING AND FOOD SECURITY

1. INTRODUCTION

This document forms a contribution chapter to the Comprehensive Assessment of the Agricultural Sector (CAAS-LIB) in Liberia and is designed to assist in indicating and specifying the potential role of specified agricultural commodity value chains in achieving the priority objectives of the government by focusing on small holders, traditional farming and food security and forms an input for the preparation of a strategic orientation framework to achieve sustainable food security, nutrition and agricultural development. It presents a number of short, medium and long-term investments proposals for the sector and discusses targeted policy options that could be considered.

The basis for this chapter was a mission¹ undertaken in September 2006 by the international consultant to gather and analyse information regarding the food crop sub-sector of Liberia through existing documentation (Annex 1), interviews, field observation and a survey involving work of a national consultant and enumerators. Meetings were held with a wide range of interested parties including Government and Non-State Actors (NSAs) (see Annex 2 for a list of people met).

Hard data in the form of documentation or survey results are limited both inside and outside of Liberia². A number of NGOs have however, conducted rapid appraisal and assessment surveys of the agricultural sub-sectors but these are few and far between. Even national statistics are approximates providing little concrete evidence of income, production, productivity and imports and exports. FAO statistics whilst available online and generated through crop assessment studies began only recently, although remain as broad estimates.

Following the initial mission, which involved work in Monrovia as well as visiting two counties, Bong and Nimba, a survey was organised and commissioned in six identified counties to gather information on selected food crops as well as input suppliers and marketing agents. The enumerators interviewed just under 300³ farmers, traders and input supply sellers of. The core findings of this survey are presented in Annex 3 and two examples of the questionnaires used are presented in Annex 4. A number of case studies have also been developed and are included in this Chapter as Annex 5.

¹ Mission conducted in September 2006 by Paul Schoen, Agricultural Economist – Food Crops. Field Survey managed by Franklin Henries.

² Commonly articulated in the literature reviewed and from interviews in Monrovia, is the issue of sourcing reliable data and up to date information. See also Prof. F. K. Fianu, February 2006 “Liberia: Short-Medium Term Action Plan for Crop-Livestock Rehabilitation”. He states that, “There is a huge void for basic data for planning in Liberia. No detailed weather data, soil map, data on soil types and their properties, on vegetation and details of floristics, etc. could be found. This vacuum makes planning difficult and will hold back agricultural development if it remains unaddressed. Some demographic data have been assembled and mapped by the UN Agencies, however, and are available at the Offices of Humanitarian Information Centre (HIC), UNDP, Monrovia” page 27.

³ Although 300 interviews were conducted only 152 interview sets were uncorrupted. This 152 formed the core for the database.

Following the data collected during the field visit a number of farm budgets were developed covering rice, cassava and vegetable production. These were analyzed and some crude domestic resource cost ratios were generated indicating comparative advantage of each sector and the use of scarce domestic resources. Six models are provided in Annex 6.

2. REVIEW OF PAST EXPERIENCE IN THE SUB-SECTOR⁴

Liberia continues to be in transition from a 14-year national civil war to peace, consolidation and economic recovery. A new Government, elected into office at the start of 2006, has been trying to establish a series of measures through which it will address urgent problems and priorities of the country and lay the foundations for sustainable consolidated peace and security leading to recovery and development. The agriculture sector is central to this strategy and is looked upon as meeting access to nutritious food, employment, and income and of course foreign exchange reserves. With a population of just over three million people, the vast majority are involved in agricultural production for subsistence purposes, producing little surplus either for the home market or for export. Commercial cash crops on the other hand, such as rubber and oil palm, attract different players and are operated at a different level. The agricultural sector is estimated to employ over 70% of the entire labour force although its contribution to GDP is only around 20%⁵.

In 1980, GDP per capita in Liberia exceeded US\$1,200 (in 2005 prices) or about US\$ 3.2 per day. After 25 years of political instability, poor governance and economic underperformance, culminating in the 15 years of intermittent conflict to 2003, it had fallen to \$163⁶ (or about US\$ 0.50 per day) making it one of the poorest countries in the region. Poverty is estimated at 76%⁷ with 80% of the poor located in rural areas and over half the population living in extreme poverty⁸. Many households are food insecure, with it being estimated that 49% of the population are malnourished and 40% of children are stunted. Over 1.7 million people (half the total population) are identified as vulnerable and eligible for humanitarian assistance and food aid.⁹

The Government of Liberia (GoL) identified the following overarching objectives for agricultural recovery and natural resource development including:

- Sustainable resettlement of all vulnerable groups (Internally Displaced Persons (IDPs), returnees and conflict affected host communities); creation of employment for youth.
- Enhancing food security and achieving self-reliance in the main staple crops particularly increased and stable supply and availability of food products.

⁴ Drawn from "Liberia Agriculture Sector Review in a Post Conflict Country, World Bank, Concept Note, pag 1.

⁵ GoL, Ministry of Economics and Planning, Liberia Medium Term Reconstruction and Development Plan, 2001-2006, page 55.

⁶ The beginnings of the civil war in Liberia are typically traced to the cross-border incursions of National Patriotic Front of Liberia (NPFL) from neighbouring Cote d'Ivoire, of which Charles Taylor became leader on December 24th 1989. However, some observers point to the army coup of 1980, which overthrew the one-party regime of the True Whig Party. Others argue that it is merely the latest episode of the struggle, begun in the Nineteenth Century, between the settlers from America and the indigenous communities of the interior.

⁷ This is the proportion of the population living on less than one US\$ per day. IMF, (2006).

⁸ NTGL (2004:7)

⁹ FAO Food Security Statistics, March 2006. The extent of vulnerability is difficult to discern because of conflicting assessments reported for the same township.

- Improvement of access to food for the most vulnerable social groups and enhancement of the nutritional absorption capacity of the population.
- Increasing income of small holders through improved production, marketing and value addition with emphasis on gender issues in agriculture.
- Rejuvenating the commercial and plantation sector.
- Restocking of livestock and rehabilitation of the fisheries sector.
- Institutional and policy reforms directed at addressing the main pillars of governance including decentralisation, economic management, and food security.
- Increasing investment, both private and public, to jump-start the sectors' contribution to overall economic development.

In order to assess the performance and potential of the agricultural sector, and subsequently develop an effective strategy for agricultural development that contributes to achieving national priority objectives, particularly food security, employment and investment, the value chain of important agricultural commodities have been examined. What is shown confirms that the food crop sector is weak, primary based and almost exclusively oriented towards subsistence production, which explains the low contribution to GDP. The vast majority of Liberians depend on food imports, which substitute for local production. It is also held back by a combination of factors including poor infrastructure and input use, limited support services either privately available or from government and limited access to credit at attractive rates¹⁰.

Given the fact that Liberia had been in a severe state of conflict for long over a decade until only recently, agricultural production not surprisingly continues to operate at very low levels of productivity as well as output. GoL has not been able to provide farmers, input suppliers or marketing agents with advisory services, inputs or marketing support. Government offices and facilities set up in Monrovia have had poor out reach facilities. Although an “enabling” policy environment is absent which acts as a break to development it is nevertheless a market oriented policy, even if more passive than actually active¹¹.

3. ANALYSIS OF THE CURRENT SITUATION

This section presents a general overview of the agricultural sector, provides a number of simply maps of land use patterns and discusses some of the key characteristics of Liberian agriculture.

3.1 Liberian Agriculture

General situation. Liberia's economy was traditionally based on agriculture. Subsistence agriculture was and remains predominate amongst 60% of the population. Of the remaining 40%, who are employed in the “formal” sector, 43% of these people have strong connections

¹⁰ See Chet Aeschliman's Chapter on “Rural Finance and Agricultural Marketing Sub-Sectors” prepared for the CAAS-LIB initiative. November 2006.

¹¹ There was some agricultural research conducted in centres such as CARI in the central counties, but these were suspended until only recently when some very small-scale work has commenced (CARI has a number of commercial crop production fields for cassava and rice but this remains very much embryonic in nature). There is some research starting up again but this appears to be limited to exploration of cassava for industrial use in the main. Agricultural development has not been a vehicle for poverty alleviation although it has the potential to do so.

to the agricultural sector, typically in the plantation industry¹². Agriculture has always been the backbone of the Liberian economy with subsistence production, rubber and timber accounting for significant shares of GDP, export earnings and employment. Subsistence agriculture, which has focused on rain-fed food crop production, has however, been characterised by its low productivity. Commercial tree crop production for export has been undertaken by large-scale plantation also includes smallholder and outgrower production systems. Table 1 shows the broad division of the economy over the 1972 to 2005 period.

Table 1: Structure of GDP

	1972-74	1979-81	2003-05
Agriculture	10%	11%	50%
Rubber	6%	5%	18%
Forestry and other	3%	9%	32%
Mining/Manufacturing	36%	n/a	10%
Other Formal	45%	n/a	40%
Traditional Economy/Subsistence agriculture	15%	20%	n/a

Source: 1972 – 74 data from World Bank (1978). 1979 – 81 values estimated based on data from World Bank (1984). 2003 – 2005 data from IMF (2006).

General character of Liberian agriculture. Four production systems have been identified that characterise Liberian agriculture. These are:

- **Foreign commercial plantations** producing perennial export crops (rubber, palm oil).
- **State owned plantations** run by the Liberian Palm Products Corporation and the Liberian Cocoa and Coffee Corporation.
- **Domestically owned, medium-sized commercial farms** producing industrial crops for export and livestock for the local market (although these are extremely small in number).
- **Small traditional household farms** using primitive production techniques with extremely limited use of modern inputs, which make up the majority of all farming and therefore the livelihoods of the rural population.

Maps

A number of maps shown overleaf and produced by FAO further help illustrate the general farming areas. These maps illustrate land cover, land use and the farming systems that are practiced. They demonstrate a heavy concentration of agriculture (tree crops and vegetable in the main) in the central belt region and root crops in the northern quadrant¹³.

There are a few areas where commercial production has been explored such as in cassava and rice production (upland) but this is still in its infancy when compared to other parts of West Africa including Ghana for example or Cote d'Ivoire. The Liberian agricultural sector is broadly characterised by many farmers producing close to subsistence levels with little surplus for sale in the market place or for further processing and then sale (See also Annex 3 of this chapter for some summary findings from the survey conducted, which illustrates some core characteristics of farming practices in Liberia, lack of processing that takes place before commodities reach the consumer and the level of subsistence based activities that are evident for rice, root crop and vegetable producers).

¹² "Liberia Agriculture Sector Review - In A Post Conflict Country – Concept Note", September 2006, World Bank, pages 1-2.

¹³ The consultant identified no other detailed agricultural production maps and felt that these should be presented despite their clear limitations.

In terms of real GDP growth for Liberia, Table 2 shows that this has dramatically declined between 2000 and 2005 although suggestions are that it will pick up in the next few years. The contribution of agriculture however is shown to have been small, and even in decline. Forestry is equally a poor contributor to GDP although it had been a substantial player in 2000. Mining clearly had made a large contribution although this too has fluctuated grossly in this five-year period.

Table 2: Real GDP growth estimates between 2000-2005 (% change)^a

Item	2000	2001	2002	2003	2004	2005
Real GDP	25.7	2.9	3.7	-31.3	2.6	5.3
Agriculture and Fisheries	6.2	6.4	-4.3	-38.2	11.5	2.7
Forestry	70.6	5.0	22.4	-36.8	-34.4	4.9
Mining and Panning	49.8	-74.9	-12.8	56.7	49.5	-14.9
Manufacturing	127.5	-22.0	-17.4	-11.8	97.7	7.9
Services	15.0	3.2	7.0	-8.3	4.5	9.5

Source: International Monetary Fund, Liberia: Statistical Appendix, April 2006. ^a IMF estimates

According to the multilateral and GoL's "Comprehensive Food Security and Nutrition Survey" (CFSNS) conducted between February and June 2006 a summary of the situation suggests that the:

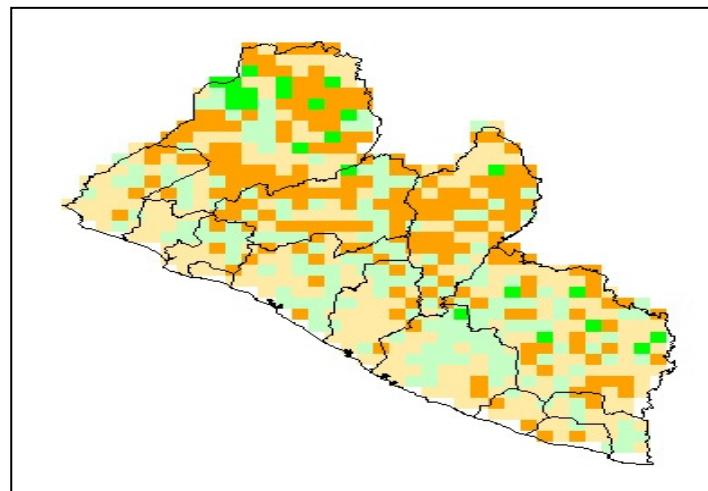
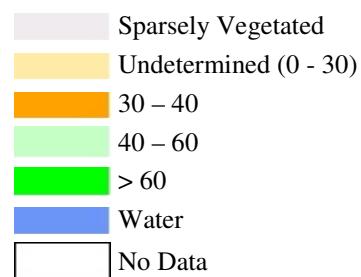
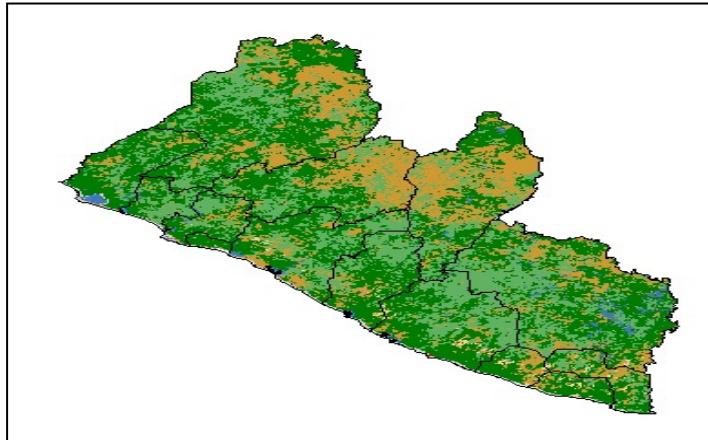
"...majority of Liberians rely heavily on agriculture production, both on a subsistence and commercial basis. Thus, the agriculture sector consists of both small farmers and [a few] larger commercial producers. Small farmers tend to rely more heavily on food crop production, while commercial farmers rely on cash crops such as palm nuts and rubber trees. The largest and most well known commercial farms include Firestone, Guthrie and Cavalla. While these are large-scale commercial farmers, some commercial farmers tend to be smaller. For instance, cocoa and coffee are produced on a very small scale. Liberians in the rural areas tend to work on plantations or farms. Before the war, the northern and central areas of Liberia were effective food crop producers. These areas (including Lofa, Bong and Nimba Counties) were able to produce enough excess food to supply other parts of the country. However, since the end of the civil war, many farms have not returned to pre-war productivity levels¹⁴. Furthermore according to the survey the average size of landholding for the survey was [only] 3.3 acres (ca.1.3 hectares)¹⁵.

Although many rural people have access to land it appears that the size of holding has changed somewhat from before the war until now. Whilst land tenure has not been a critical problem in the past it is becoming more important in the context of access to land at the moment¹⁶. Limited access to land will undoubtedly contribute to community tension and be a course of conflict in the years to come.

¹⁴ WFP and FAO CFSAM 2006, page 22.

¹⁵ WFP and FAO CFSAM 2006, page 40.

¹⁶ In general, land tenure arrangements are based on tribal tradition. These traditional arrangements are well adapted to the bush fallow cropping system. WFP & FAO CFSAM 2006, page 40.

Map 1: Permanent Crops and Arable Land (Percentage Intensity) for Liberia***Map 2: Land Cover for Liberia***

*Source: FAO – Country Profiles and Mapping Information Services (website: <http://www.fao.org/countryprofiles/maps.asp?iso3=LBR&lang=en>), 2006

Map 3: Broad Farming Systems for Liberia***Farming Systems**

- █ Tree crop including vegetable production and some upland rice
- █ Root crop (principally cassava and some upland rice)
- █ Coastal artisanal fishing and some swamp rice



Source: FAO – Country Profiles and Mapping Information Services (website: <http://www.fao.org/countryprofiles/maps.asp?iso3=LBR&lang=en>), 2006

Core crops. Table 3 shows the level of Liberia's dependency, low production levels and fluctuating import and export levels experienced in the agricultural sector particularly for the major items of natural rubber and paddy rice. Cassava productivity, on the other hand, appears to have grown substantially from a low of 300,000 MT in the 1979 to 1981 period to a high of 490,000 MT in 2003. The value of agricultural exports has however gone down from a high of US\$135 million to a low of US\$34 million. Agricultural imports on the other hand have also declined but more slowly.

Table 3: Basic Statistics of Agricultural Trade, Production and Fertilizer Use

Land Use	UNIT	1979-81	1989-91	2000	2001	2002	2003
Total Land	1000 HA	9,632	9,632	9,632	9,632	9,632	--
Arable Land + Permanents Crops	1000 HA	576	612	595	600	600	
Arable Land	1000 HA	371	397	380	380	380	-
Irrigated Land	1000 HA	2	3	3	3	3	-
Agricultural Production Major Items							
Natural rubber	1000 MT	81	55	105	107	109	110
Cassava	1000 MT	300	33	441	480	480	490
Rice, paddy	1000 MT	254	191	183	145	110	100
Foreign Trade – Exports							
Total	MLN US\$	555.4	376.7	500.0	500.0	500.0	500.0
Agricultural	MLN US\$	135.6	61.6	65.5	69.3	77.5	34.0
Major Exports (share in Agriculture)							
Rubber, natural (dry)	percent	68.0	86.4	91.5	94.5	98.1	85.2
Cocoa beans	percent	8.7	4.9	5.2	1.2	1.3	11.6
Coffee, green	percent	19.5	5.0	0.3	0.4	0.2	1.0
Foreign Trade - Imports							
Total	MLN US\$	505.9	267.3	400.0	400.0	400.0	400.0
Agricultural	MLN US\$	97.3	83.0	87.6	66.0	71.8	77.4
Major Imports (share in Agriculture)							
Rice, milled	percent	34.9	53.8	17.4	24.7	27.9	25.8
Breakfast cereals	percent	0.3	0.0	3.4	2.0	4.0	8.7
Maize	percent	0.5	0.0	6.9	9.1	9.1	8.4
Agriculture trade balance							
Exports-Imports	MLN US\$	38.3 -	21.4	22.0	3.4	5.7	- 43.4
Lands & Inputs							
Total Population/ Arable Land	Inhab/HA	5	5	8	8	9	-
Fertilizer Use/Arable Land	kg nutrs./HA	12	3	-	-	-	-
Tractors/Arable Land	No/1000 HA	0.8	0.8	0.9	0.9	0.9	-

Source: Various sections taken from FAOSTAT: World Bank - World Development Indicators, 2005

²⁰ It is unclear from the statistics whether these refer to industrial cassava production or simply home grown subsistence. If the latter this would be understandable at a time of civil war given its food insecurity and the ability to leave cassava in the ground until needed. Such increases may not continue in the future-correspondence with AGSF, FAO January 2007.

3.2 Status of food crops

Tables 4 and 5 illustrate the rapid decline in area harvested for rice paddy and cassava production over the war period from 1990 to 2004. Rice area farmed has averaged around 114,000 hectares with an average yield of 1 tonne/ha over this period. National production swung in this period erratically from 180,000 tonnes in 1990 to a low of 50,000 tonnes in 1994 averaging over the longer period to 2004 to around 125,000 tonnes. Cereal imports have correspondingly filled the short fall.

Table 4: Core Statistics for Rice – Paddy Production and Imports

Year	Area harvested (1000 Ha)	Average National Yield per hectare in Tonnes	National Production (1000 tonnes)	Rice Imports – Qty Mt	Imports – Value \$'000 US\$
1990	175.00	1.03	180.00	70,328	25,145
1991	110.00	0.91	100.00	171,945	64,200
1992	120.00	0.92	110.00	141,392	51,715
1993	60.00	1.08	65.00	178,473	48,650
1994	45.00	1.11	50.00	120,895	44,130
1995	50.00	1.12	56.20	155,169	35,100
1996	75.60	1.25	94.450	195,443	46,900
1997	135.20	1.25	168.40	147,657	24,800
1998	161.90	1.29	209.40	170,571	25,700
1999	153.70	1.28	196.30	136,091	20,800
2000	143.50	1.28	183.40	221,420*	37,000
2001	130.00	1.12	145.00	100,000	20,000
2002	120.00	0.92	110.00	100,000	20,000
2003	120.00	0.83	100.00	100,000	20,000
2004	120.01	0.92	110.00	100,000	22,000
Average	114.66	1.08	125.21	125,864	33,742

Source: FAOSTAT *Note: Combined milled paddy rice, wheat, flour maize and maize. FAO Estimate.

In terms of cassava and vegetable production (non-disaggregated by type) FAO estimates show that a steady increase in the area devoted to cassava²⁰ took place whilst the area set aside for vegetable production has been rather static. Production in both cases has also hardly changed in the 14-year period over which these statistics are available.

Rice and Cassava²¹. Rice is the staple food of Liberia with an estimated annual consumption of 300,000 tons yet Liberia only produces about one third of this. This means there is local market potential. Although the world market price is currently depressed it sells at a fairly high price in Liberia, so making rice production for the local market profitable.

Swamp rice is more profitable than upland rice production, as long as it is reasonably well managed. Poor management though, results in yields of 15 bags per acre, and a lower gross margin than upland rice. Although upland rice is low yielding there are benefits from the inter-crops grown with it.

Cassava is second in importance to rice as a staple food, and important for food security with returns to cassava production quite good. A critical factor, when it comes to marketing, is the distance of the plot from the farmstead and the road, as cassava is a bulky low value and

²¹ Based on material in David Parker's report on "Farm Management Survey of Liberian Smallholder Tree and Food Crops", June 2001, page 6-7.

perishable crop. Developing the markets for various products that can be made on the farm from cassava could improve its prospects as a cash crop.

Table 5: Core Statistics for Cassava and Vegetable Production

Year	Cassava (fresh and dried)			Vegetables		
	Area Harvested (1000 Ha)	Quantity produced (1000 tonnes)	Yield per has (tonnes/h as)	Area Harvested (1000 Ha)	Quantity produced (1000 t)	Yield per hectare (tonnes/Ha)
1990	55.00	380.00	6.91	17.00	70.00	4.12
1991	42.00	270.00	6.43	17.00	70.00	4.12
1992	40.00	280.00	6.67	17.00	70.00	4.12
1993	40.00	245.00	6.13	17.00	70.00	4.12
1994	29.00	250.00	6.25	17.00	75.00	4.41
1995	32.81	175.00	6.03	17.00	75.00	4.41
1996	43.30	213.26	6.50	17.00	75.00	4.41
1997	47.00	282.20	6.52	17.00	75.00	4.41
1998	55.50	307.00	6.53	17.00	75.00	4.41
1999	67.00	361.30	6.51	17.00	75.00	4.41
2000	72.50	440.50	6.57	17.00	75.00	4.41
2001	72.50	480.00	6.62	17.00	75.00	4.41
2002	75.00	480.00	6.62	17.00	75.00	4.41
2003	75.00	490.00	6.53	17.00	75.00	4.41
2004	75.00	490.00	6.53	17.00	75.00	4.41
Average	54.77	342.95	6.49	17.00	73.66	4.33

Source: FAOSTAT, 2006

Markets²³. The Liberian market is very small although it does have the advantage of being concentrated in Monrovia, yet its effective demand is weak due to the poverty level of most Liberians.

There is a need to look to develop products that require a minimum of capital but also allow produce to be processed on the farm, extending their shelf life and enhancing their value. Examples would include dried fruit, pureed fruit and fruit leathers. These products would first be developed for the local market and as quality improves and a critical mass obtained, eventually for export.

Production systems. The FAO/WFP Crop and Food Security Assessment For Liberia conducted in February 2006 indicated the very weak production systems in the country. It stated that:

“Although rice and cassava is largely consumed by most Liberians, it is not grown on a large scale by any individual or entity. Subsistence farmers who use rudimentary tools and traditional methods of cultivation mostly carry out production of these crops. Moreover, there are no current available statistics describing the performance of these two crops. The only available statistics are those produced by the Bureau of Statistics of the Ministry of Agriculture in November 2001. According to this baseline survey, average rice farm size per farmer is 1.18 ha compared to 0.48 ha for cassava. The report also shows that estimated average rice and cassava yields are 1.3MT/ha for rice and 7.8MT/ha for cassava²⁴.

²³ Ibid.

²⁴ This is close to the general FAO statistics found in Table 1 and 2 of this chapter.

Relative to the baseline²⁵ estimates yields of cassava and rice [the FAO/WFP assessment] mission observed a gloomy picture of the current situation. Yields of rice and cassava are extremely low. The mission estimated that less than 30% of the baseline figure is produced in 2005 season for rice and 76% for cassava”²⁶.

According to another FAO report also in 2006, “Most food crops in the country (probably about 90 %) are produced by means of an age-old subsistence system whereby the land is cropped by slash-and-burn with bush fallowing. Rudimentary implements like hoes, machetes and axes are used and the farmer and his or her household can only till about half to one hectare”²⁷.

The three or four targeted areas identified for the purposes of this report (cereals principally rice, root crops (including cassava and yam) and vegetables) are at early stages of development with none showing huge potential in the short term for change and none having really reached a level of potential sophistication attractive for external commercial investment based on the evidence identified²⁸.

Value Chains and Value Adding. Figures 1 to 3 in the adjacent pages present a schematic overview of some of the value added processing within the food crop sub-sectors for vegetables, rice and cassava based on fieldwork conducted and interviews with farmers and market traders. Very little value adding in the chain appears to take place with the chains being limited, very short and often confined to only two or, at best, three rings along the chain. There is little value being added²⁹ in most cases whilst at best a simple trading relationship seems to take place. Some conversion of cassava into fufu or gari takes place (to permit marketing over distances or time without deterioration) but the value increase is marginal – purchases appear more for convenience than anything else.

There is very little difference between small-scale farming and subsistence-based farming with little surplus in both cases available for sale. Figures 1 to 3 show that differences between trading, production and selling are small and prices between the farm gate and the point of sale to the end consumer in most cases is also low³⁰. Given that most rice produced is for subsistence purposes it is not surprising that very little domestic production finds itself on the open market. Of the amount of produce that gets onto the market a substantial amount of this is lost through wastage.

This does not mean that these commodities cannot become more important commercially but the investment in training, in infrastructure, in setting up factories which convert the products into a higher value commodity, in food quality assurance and food handling, storage and transport and packaging would need to be made. With much of the farming remaining at

²⁵ Sub-reference to the Baseline Survey of the Ministry of Agriculture carried out in 2001.

²⁶ FAO/WFP Crop And Food Security Assessment For Liberia February 2006, Section 8, page 18.

²⁷ “Liberia: Short-Medium Term Action Plan For Crop-Livestock Rehabilitation”, Prof. F. K. Fianu, February 2006, page 36.

²⁸ There is a conspicuous absence of medium to large-scale agro-processing plants in the country. (See FAO-RAF Multidisciplinary Mission to Liberia. March 2005. Page 28).

²⁹ The survey results for this chapter show that 80% of all farmers interviewed do not undertake processing of any sort. The remaining 20% of farmers interviewed indicated they might conduct some gari preparation, grinding of pepper and okra, milling and par-boiling. There is also little value being added at the smallholder level in the tree crop sector of rubber and the dwindling production of coffee and cocoa production systems as observed by David Parker in 2001 (See David Parker’s report of 2001) Pages 17, 22 and 23.

³⁰ This is also confirmed by the food crops survey undertaken in October-November 2006 for this chapter.

subsistence level, increasing production and productivity will be difficult. Limited amounts of excess produce were seen in the vegetable and cassava production sub-sectors but where this takes place wastage and spoilage could be as high as 50%³¹ which impacts negatively on availability and incentive to over produce.

Value chains are extremely short with very little value actually being added to the product. It might be safer to view these as marketing chains rather than value adding chains for now.

Identifying areas in the food crops sub-sector showing comparative advantage or the potential for economic return, without heavy investment in the supporting physical as well as economic environment, were few if any at this stage.

Household consumption pattern. Household farms are based on family labour with an estimated average size of 1.5 ha³² according to the 2001 Bureau of Statistics Baseline Survey. Output is largely consumed by household members and consists of food crops (rice, roots, tubers, legumes), small livestock (chickens, goats) and small plots of cash crops (coffee, cocoa).

The predominant character of the traditional small farm is one of low productivity of land and labour. Shifting cultivation on the uplands is still the main technique and the family constitutes a large part of labour on farms with little hired hand permanently or even on a causal basis³³.

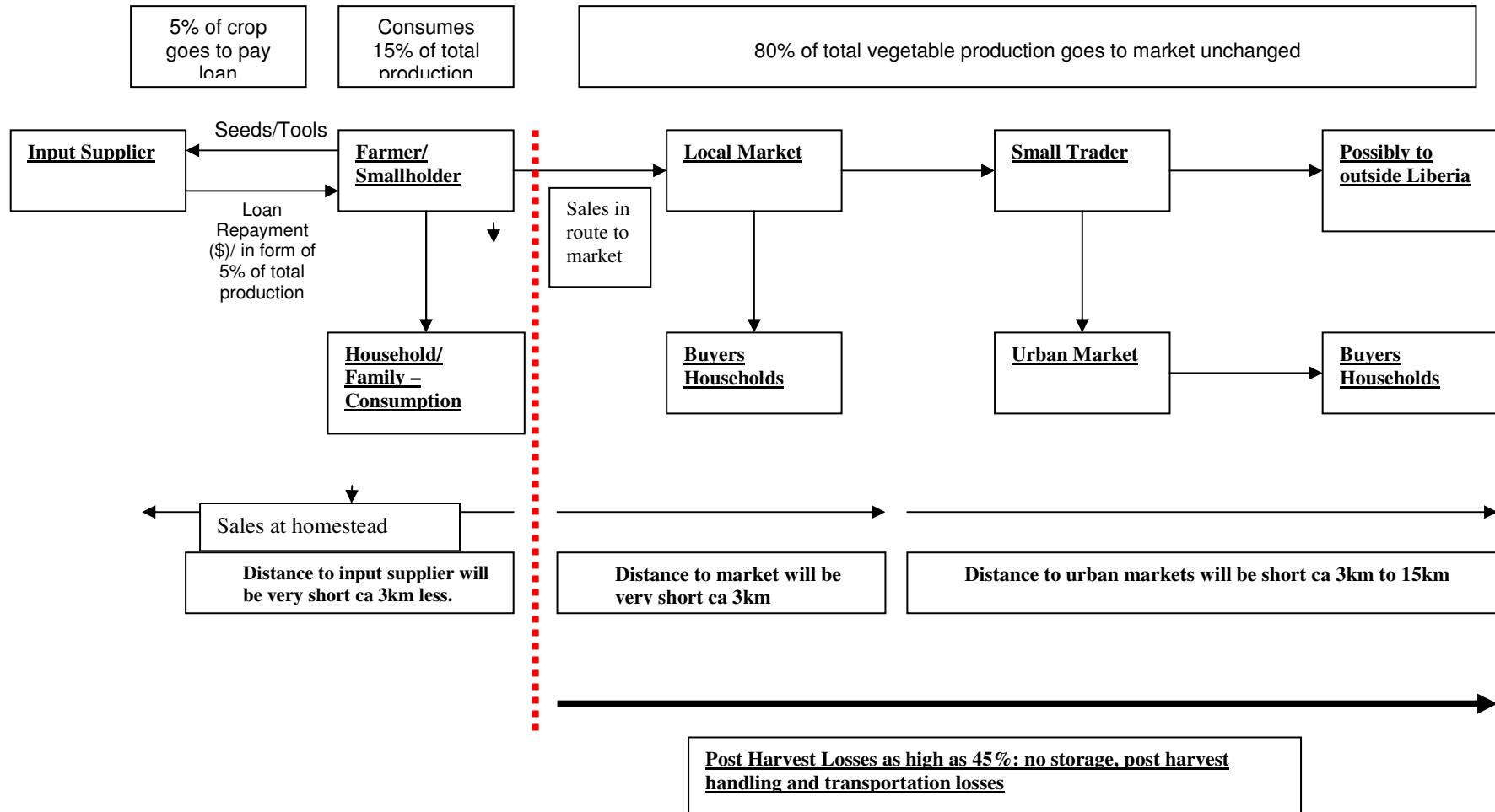
Agricultural Input Suppliers. Input suppliers are those who supply items to farmers such as seeds and tools. Many will also be smallholders themselves. In practice though, the scale of these operations are extremely small and limited in scope, range of product and services provided. Some do provide credit to farmers although the majority do not³⁴. They deal directly with both farmers and other buyers and employ one or two staff to help run their business. Located in small villages and towns their shops are often small and under-stocked. Important also to note is the low or even zero use of fertilizer over a 20-year period as shown previously in Table 3.

³¹ Based on mission interviews with farmers and traders.

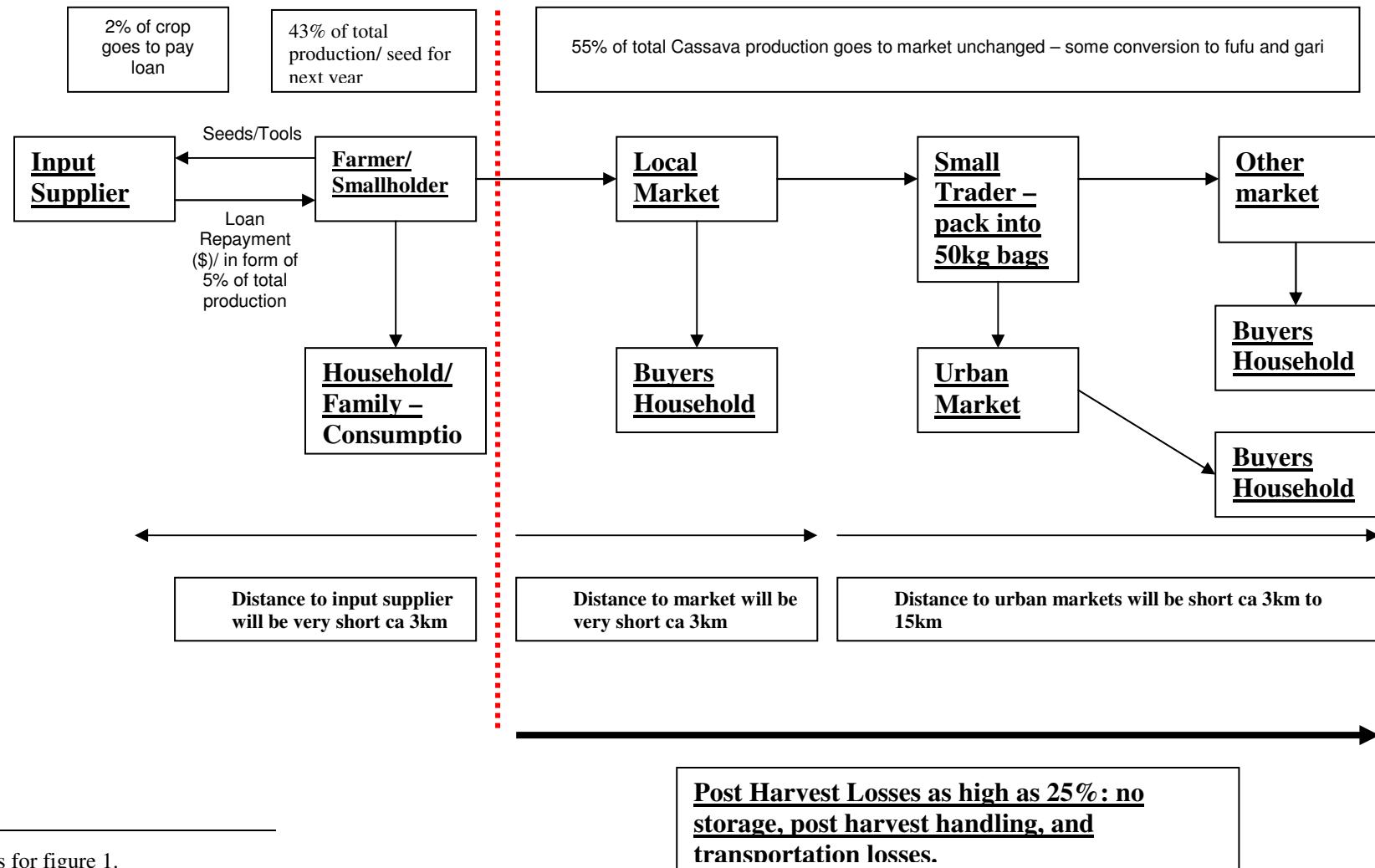
³² The food crops survey conducted for this review showed that the over 90% of those farmers interviewed farmed land that was 2 hectares or less.

³³ Again drawing on the food crop survey 92% of all farmers interviewed indicated that labour came from within the family.

³⁴ The survey conducted for this review showed that two thirds of all input suppliers interviewed (admittedly the group was small to begin with at only 9 interviews), no advisory services were provided. Thirty per cent however did extend some form of credit to the buyer.

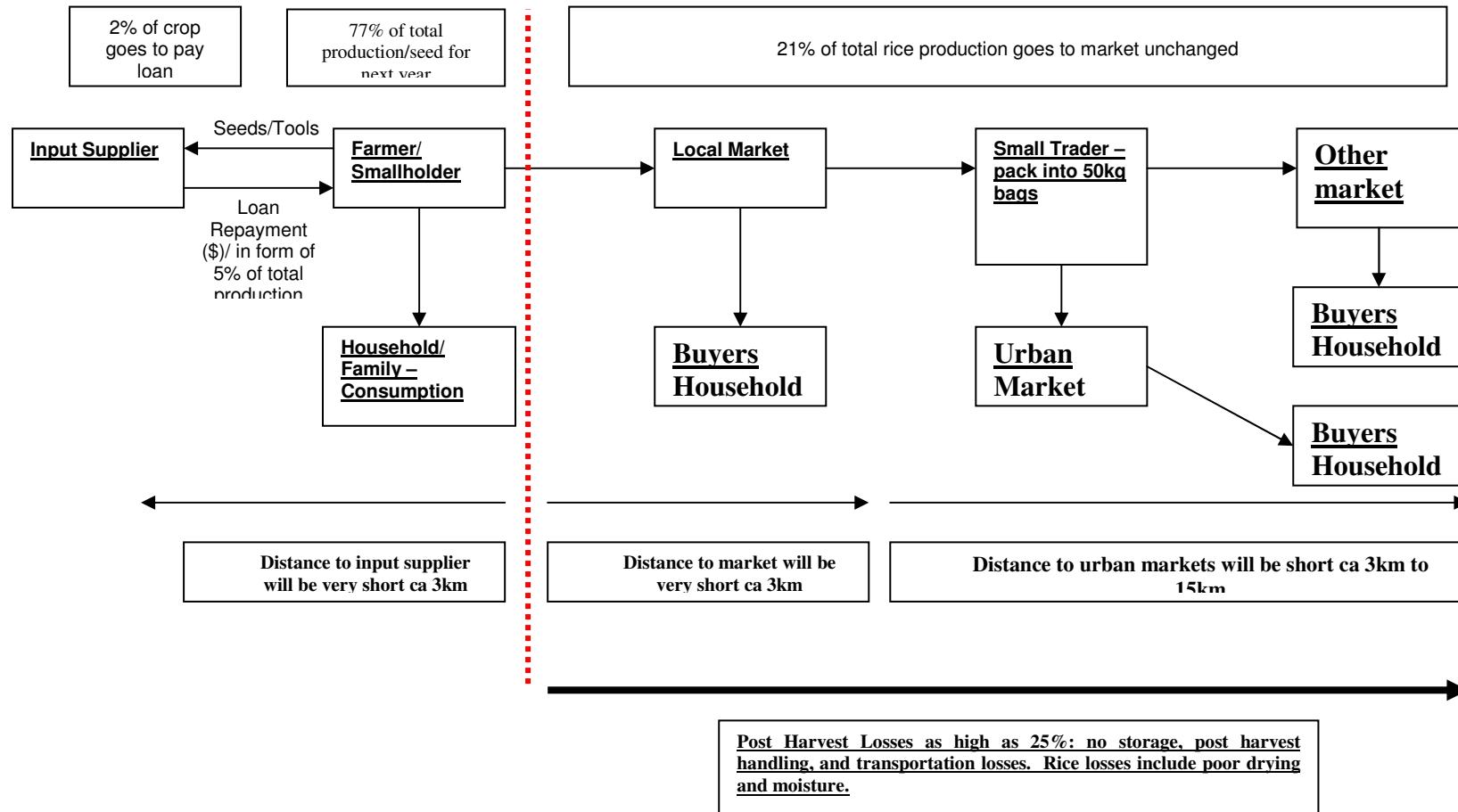
Figure 1: Vegetable Value Chain³⁵

³⁵ Compiled from data in: October 2006 Survey for this chapter and from Compendium of Food Security and Nutrition Survey, Liberia, June 2006, and from James Tefft, "Agricultural Policy and Food Security in Liberia", ESA Working Paper, March 2005, FAO.

Figure 2: Cassava Value Chain³⁶

³⁶ As for figure 1.

Figure 3: Rice Value Chain³⁷ (mainly upland)



³⁷ As for figure 1.

Markets. Most county capitals and some secondary urban centres have daily markets. The exceptions are Barclayville in Grand Kru and Fishtown in River Gee that hold markets weekly. Markets in the southeast generally offer a rather limited, homogeneous and costly set of food and non-food commodities, with the exception of those closely located to the border with Cote d'Ivoire.

Women are mainly responsible for marketing. Difficult access to markets, particularly in the rainy season, has a negative influence on production and income, as well as on the availability of foodstuffs. For commercial crops such as rubber, cacao and coffee the existing poor transportation network also affects them. Producers have to pay for transport to buyers' substations or sell to middlemen at lower prices at the farm gate. Poor infrastructure dampens production, limits the marketing network, and constrains people's access to goods and cash or credit³⁸.

There is less trade between the south-eastern counties and Monrovia than between the central region and the capital. This is because there is no direct, main road along the coast from Harper to Monrovia. Heavy trucks and buses have to travel from the south-east to Monrovia via Zwedru taking two days in total and adding to the cost³⁹.

People living in communities close to Guinea, Sierra Leone, and Cote d'Ivoire cross the borders to trade in food and dry goods. The traders bring goods such as rice, soft drinks, beer, salt, soap, kerosene, laundry soap, onions, cloth etc, and some farm implements. This trade is profitable because the price of the above items is much higher in Liberia based on the fact there is limited manufacturing locally.⁴⁰

Crop Losses and Wastage. On the whole whilst rice, either upland or swamp, is grown almost exclusively for home consumption it is often supplemented by purchased long grain variety, itself imported from China or the USA, about 50% the vegetable crop production leaves the homestead for the market. Many farmers mill their own rice using pestle and mortar resulting in many broken grains and a poor milling out-turn of some 50%⁴¹. However, in the case of vegetables almost 50% of these go to waste due to poor handling, damage in transport, rot or other loss. This was also recorded in the recently completed FAO/WFP Food Security Assessment Survey in February 2006 and verified by field observation⁴².

³⁸Prof. F. K. Fianu, states that, "Foodstuff marketing in Liberia, as elsewhere in the sub-region, is fraught with high wastage and high risk of food contamination. Women are the ones who trade in foodstuffs but the marketplace environment is not friendly to nursing women and those with frisky toddlers. Places of convenience are often not provided and the market sheds and stalls are not enough to go round so when it rains much foodstuff damage occurs beneath the sheets used to cover the wares. Sellers are frequently forced to stand in quagmire to sell". February 2006 Liberia: Short-Medium Term Action Plan For Crop-Livestock Rehabilitation.

³⁹ For example, from Barclayville in Grand Kru, the cost of transport to Monrovia in the dry season is LD2,500 and more than LD 4,000 (between US\$ 40 to US\$ 66) during the peak (rainy) season.

⁴⁰ For example, one kg of rice costs LD30 in a community close to Cote d'Ivoire compared to LD 20 for a very small cup (approximately 250 grams) in Barclayville market (Grand Kru). Source: FAO food and Security Assessment for Liberia February 2006.

⁴¹ See David Parker EU study of 2001. Page 36.

⁴² According to the Food Assessment survey conducted in early 2006, "Across all counties [surveyed] the rice harvest for 2005 was mainly household produced and consumed. Only 7% was sold nationally, however reaching peaks of 17% in Nimba, 14% in Grand Cape Mount and 11% in Montserrado. Overall the second main use was preservation as rice seeds with 13%. Cassava is also mainly consumed (57%), however was overall more marketed than rice (35%). 70% or more of cassava was consumed in River Cess, Grand Kru, Grand Bassa and Sinoe. It was mainly sold in Grand Cape Mount, Monserrado and River Gee (50% or more). The selling or consumption of vegetables varies greatly between counties while overall it is more common to sell vegetables than to consume them". Page 42.

Cereal Dependency and Food Aid. Liberia's cereal import requirement, mostly rice in 2006 was estimated at 204,000 MT. Of this, 90,000 MT was estimated to be imported commercially, 74,000 MT was nationally produced and the balance (some 40,000 MT) made up from food aid by donors but managed by the World Food Programme (WFP).

Table 6 shows the weakness of Liberian food crop production over the period 2000-2002, and significant dependence on imported food, which continues to be the case.

Table 6: Food Balance for Liberia (2000-2002 in '000 tonnes)

Food Crops	Production (+ve)	Exports (-)	Imports (+)	Seed, Feed, other (-)	Consumption (-)
Cereals	97	1	212	52	256
Vegetable Oils	47	4	9	4	48
Sugar	4	-	12	0	16
Roots and Tubers	529	-	2	6	525
Meat	21	-	5	0	26
Milk	1	-	6	0	7

Source: FAO Country Profiles 2002, Liberia.

3.3 Vulnerabilities

There are a number of vulnerabilities, which are faced by small farmers. These are briefly listed in the section below:

Markets. Market access is not always easy or close by and distances needed to travel can be enormous especially if the only means is by foot. Many county markets are open, exposed to the elements and *ad hoc* in management. Access to water, electricity and even functional stalls are also limited.

Infrastructure. Related to marketing but also the purchase of inputs and supplies is the absence of infrastructure which can facilitate movement of goods in and out of production areas. There is also limited storage for commodities and poor food handling appears to contribute to large food wastage and loss⁴³. In some cases, such as vegetables, this can be as high as 50%.

Knowledge Sharing and Research. The absence of any technical support for farmers from extension agents or private sector non-cash crop buyers is also limited. Knowledge sharing is informal, local and indigenous which may contribute to improved production levels but is, again, limited in nature. In addition, knowledge of input use is poor at the local level and sources of information to supplement this are weak.

Enabling Policy. The position of GoL in terms of providing and supporting an enabling agricultural environment is benevolent but passive in practice. Although there are no policies that subsidize farm inputs or encourage improved performance in the food crop sector, there are none equally that act against it.

Credit. The availability of credit and access to finance remains problematic. The accompanying chapter on finance and marketing reports that, “the infancy of rural

⁴³ Supported by statements made by Prof. F. K. Fianu, February 2006 “Liberia: Short-Medium Term Action Plan For Crop-Livestock Rehabilitation” although he did not attempt quantification. Page 37.

microfinance in Liberia, the rarity of bank branches outside Monrovia and the conservative approach of commercial banks mean that for the foreseeable future, *at least for the next 5 to 10 years, rural financial services will not be available to the vast majority of creditworthy farmers, at least through currently-available channels.* Even when the MFIs [Micro-Finance Institutions] finally arrive in a majority of villages, most will be reluctant to invest large sums of money in agriculture because of the perceived high risk of doing so”⁴⁴.

Natural environment. Farming in Liberia is also under threat from the problems of flooding, water control, pests and other natural elements although this is not countrywide. Irrigation and water management potential exists but this would require huge investment in infrastructure and training in operation and maintenance.

3.4 Food Crop Sector Assessment Survey

A survey was undertaken between September and November 2006 to identify value chains that were perceived to be important. Just over 150 significant interviews were conducted over a six-week period with farmers, traders and farm input suppliers. The data derived from this was sufficient to profile the production system and also lead to the identification of a number of areas of intervention that could be attractive for future investment. Five questionnaires were developed and used in the process of data collection (three food crop specific and two dealing with input supply and trading). These are described below:

- **Commodity Survey:** The core agricultural sub-sector surveys included rice, root crops and vegetables (e.g. bitter ball and pepper). Additional information generated included data on farm production, financial returns of farming, what farmers were selling and what they were producing for home consumption.
- **Input Supplier Survey:** A small number of input suppliers were interviewed to determine what is sold and their prices and what inputs are available on the market as well as ease of access marketers have to farmers selling produce.
- **Trader Survey:** Traders were also interviewed to determine if there was any value adding taking place between the farm gate and end consumer. It was also intended to elicit costs of transportation, processing and marketing.

A number of Gross Margin Analysis were planned to be undertaken on selected focal food crops such as rice, cassava, cowpea, maize and vegetables (e.g. cabbage and chilli peppers) based on existing enterprises in agricultural group projects such as Nimbabian Bangladeshi Friendship Agricultural Project (NIBAFAP) and the Dokodan Farmers Cooperative in Nimba County but it was agreed that this would be conducted by the consultancy on agricultural extension.

3.5 Findings of the Survey and SWOT of Areas visited

Based on the survey results the following SWOT Analysis in Table 7 provides a summary of all areas visited. Flooding interestingly appears to restrict production in the counties of Grand Kru and Maryland only whilst poor road infrastructure and limited transport is a major weakness in nearly all areas with the Southeast the worst hit generally and Grand Kru the hardest hit in particular. The findings reinforce the issue of vulnerability, isolation and

⁴⁴ Draft Report for CAAS-LIB - “Liberia’s Rural Finance and Marketing Sub-Sectors”, FAO- Ghana. Chet Aeschliman et al, November 2006.

remoteness of producers accessing markets. The incentive to produce for a local market is, significantly reduced with farmers preferring to concentrate on subsistence practice rather than food crops for sale.

Table 7: Summary SWOT of Areas Visited

Strengths	Weaknesses	Opportunities	Threats
Food Security	Lack of technical support	Abundant arable land	Pest infestation
Family Labour	Drudgery in post harvest work	Good Market potential	Some Flooding
Self sustainability	Health hazards	Relative peace	
Source of income	Lack of trapping materials	High market demand	
Good sales profit	Lack of farm inputs	Self employment	
Good health	Lack of road infrastructure		
	Lack of transport		

3.6 Field Data Analysis of Core Commodities

The following section draws on the data results of the survey and is made with reference to the three tables shown overleaf. Farm sizes across the three-food crop sub-sectors were recorded as low with an average in each case of 1.5 ha for rice, 0.8 ha for cassava and 0.7 ha for vegetables.

Table 8 shows low agricultural rice production yields in Bong and Grand Kru Counties. On average 64% of rice harvest is consumed at home whilst 36% is sold. In Grand Kru, food is mainly exchanged for other foodstuff under a system of barter due to limited cash, high poverty and lack of commercial trade opportunities. Some farmers paid for inputs either in-kind or in-cash. For comparative reasons the in-kind payment has been converted into cash and the value expressed in the Table 8. Limited fertilizer use was seen in lowland areas, mainly in and around Cape Mount and Nimba Counties.

Table 9 indicates data for root crop producers cultivated on average as little as 1 ha and consumed about 42% of the harvest. The major cassava consumption areas include Grand Kru, Maryland and Nimba Counties. Cassava consumption is consumed mainly in raw form, but is on occasion eaten boiled or in pounded form. In both Bong and Grand Cape Mount Counties, the highest income from the sale of cassava was recorded. 59% of root crop farmers hired labour to assist in the cultivation, which suggests that labour costs are lower than elsewhere.

Table 10 confirms that vegetable producers are the most profitable in the farming sector. In Bong and Nimba Counties, vegetable production is carried out commercially and represents the largest number of producers and the highest return from sales. Profit from vegetable production was nearly three times that of rice production. Fertilizer use is also highest in this group. Subsequent analysis of the database confirms the profitability of vegetable production.

Table 8: Production Data for Rice⁴⁵

	Average Farm Size in Hectares per county	% of farmers from sample who used home grown seed	Rice seed cost per kg (US\$)	% of farmers from sample who bought fertilizer	% of farmers who rented land and average price at which they rented land per county	% of farmers who employed labour and average rate paid per county for a piece of work	Average Output Kg/ha per county	% of produce consumed at home	% of produce sold	Sale Price US\$/Kg	% of farmers who reached Profit level per farm (US\$)
Bong	1.4	50%	0.2	None	28% paid \$16	50% paid \$37.45	588	79%	21%	0.2	39% @ \$166
Grand Cape Mount	1.5	5%	0.3	11%	None	76% paid \$33	1,122	55%	45%	0.26	33% @ \$129
Grand Kru	1.9	100%	0	None	None	Family labour	2,46	48%	52%	0.6	Barter Sales
Maryland	1.5	100%	0	None	None	Family labour	1,042	78%	22%	0.36	95% @ \$82
Nimba	1.4	39%	0.32	6%	17% paid \$21	6% paid \$45.64	1,033	59%	41%	0.28	77% @ \$136
Average	1.5	59%	0.27	8%	23% paid \$18.50	44% paid \$39.00	806	64%	36%	0.34	61% @ \$103

⁴⁵ Tables 8, 9 and 10 have been complied on data collected during the field survey conducted in October 2006.

Table 9: Production Data for Root Crops

County	Average Farm Size in Hectares per county	% of farmers from sample who used home grown seed	Cuttings Purchased per bundle	% of farmers from sample who bought fertilizer	% of farmers who rented land and average price at which they rented land per county	% of farmers who employed labour and average rate paid per county for a piece of work	Average Output Kg/ha per county	% of produce consumed at home	% of produce sold	Sale Price US\$/Kg	% of farmers who reached Profit level per farm (US\$)
Bong	0.6	77%	\$0.55	None	None	94% paid \$11	7,369	31%	69%	0.08kg	\$263
Grand Cape Mount	1.4	None	\$1.00	None	22% paid \$6.00	94% paid \$95.00	6,365	32%	74%	0.15kg	\$203
Grand Kru	0.8		\$2.13	None	None	12% paid \$16.00	1,836	56%	44%	0.15kg	\$26
Maryland	0.5		\$2.34	None	None	29% paid \$19.00	3,857	47%	53%	0.17kg	\$48
Nimba	0.6	38%	\$3.19	None	38% paid \$29.00	67% paid \$29.00	7,188	45%	55%	0.06/kg	\$76
Average	0.8	58%	\$1.84	None	30% paid \$18.00	59% paid \$34.00	5,323	42%	59%	0.12/kg	\$123

Table 10: Production Data for Vegetables

County	Average Farm Size in Hectares per county	% of farmers from sample who used home grown seed	Cuttings Purchase d per bundle	% of farmers from sample who bought fertilizer	% of farmers who rented land and average price at which they rented land per county	% of farmers who employed labour and average rate paid per county for a piece of work	Average Output Kg/ha per county	% of produce consumed at home	% of produce sold	Sale Price US\$/Kg	Average Profit per farm per county (US\$)
Bong	0.8	33%	\$7.00	61% paid \$37.05	16% paid \$22.00	77% paid \$27.00	2,704	12%	88%	0.96	\$678
Grand Cape Mount	0.8	11%	\$9.11	67% paid \$13.46	5% paid \$26.00	95% paid \$23.00	1,418	20%	80%	0.72	\$162
Grand Kru	0.4	13%	\$2.93	None	None	25% paid \$6.00	344	47%	53%	0.67	\$17
Maryland	0.3	None	\$3.36	None	5% paid \$3.45	14% paid \$17.00	1,200	41%	59%	0.78	\$28
Nimba	1	None	\$7.00	56% paid \$34.80	28% paid \$46.00	100% paid \$26.00	2,145	17%	83%	0.84	\$602
Average	0.7	19%	\$5.88	61% @ \$28.43	14% paid \$24.00	62% paid \$20.00	1,562	27%	73%	0.79	\$297

3.7 DRC Calculations and SWOT Analysis

Initial Domestic Resource Calculations (DRCs⁴⁶) of domestic production are presented in Table 11 covering the three food crop sub-sectors these being rice, cassava and vegetables. Six models have been developed. This Table also includes a set of data on the size of farm examined showing that they are all very small in scale and practice mixed subsistence and commercial farming as a norm.

Table 11: DRC Comparisons for Rice, Root Crop and Vegetable Production

Production System	Size of smallholding and percentage used for commercial production	Private Profit (in US\$)	Social Profit (Shadow Prices – US\$)	DRC (ratio)	Comparative Advantage
Model 1: Upland Rice (Bong)	1.4 has (of which 21% produce is sold)	7.27	-16.63	1.43	Some
Model 2: Lowland Rice (Nimba)	1.6 has (of which 89% produce is sold)	17.29	340.89	0.30	High ⁴⁷
Model 3: Root Crop – Cassava (Nimba)	0.6 has (of which 55% produce is sold)	99.90	168.36	0.16	Very High
Model 4: Vegetable Production (Grand Cape Mount)	0.8 has (of which 80% produce is sold)	465.48	1,160.40	0.04	Very High
Model 5: Bitterball-Plantain-Other Vegetable (Maryland)	0.8 has (of which 40% produce is sold)	25.79	43.93	0.19	Very High
Model 6: Bitterball-Plantain (Maryland)	0.4 has (of which 50% produce is sold)	3.43	10.07	0.47	High

⁴⁶ **Definition of DRC:** ‘The Domestic Resource Cost ratio, or DRC, measures the ratio of domestic factors used to produce one unit of rice (e.g. labour and capital invested in the production) to the added value generated by this unit of rice (i.e. the value of the production minus all the investment costs, e.g. seed, fertilizer, energy). The DRC is estimated using social prices—that is, prices that would prevail in the absence of government intervention on input and output markets (e.g. subsidies on fertilizer sales price, duty on rice imports) or market failure (monopoly). If the ratio is greater than one, more domestic resources are invested in producing the commodity than the added value generated by the production activity—there is no comparative advantage in producing the commodity and the domestic resources would be more efficiently utilized if allocated to another productive activity. Conversely, if the ratio is below one, the commodity is produced using less domestic resources than the added value generated—rice producers do have a comparative advantage. Source of definition: WARDA’s “Annual Report 2001-2”.

⁴⁷ The results of the DRC analysis and comparison between lowland and upland (or swamp) rice are important. Lowland rice production shows higher potential with good management than upland rice production offering higher yields and returns to labour, capital investment and general efficiency. David Parker even goes as far saying that, “The development of the swamp is the key to producing a marketable surplus”. (See David Parker, EU Study 2001, page 37-38 and 42).

Table 11 also shows calculations that indicate upland rice production has little comparative advantage as it stands at present and has a suggested DRC ratio of about 1.43. Its use of domestic resources is too high and better use could be made of finances to grow other commodities for the market. However, since private profit is just positive, producers have an incentive to produce domestic rice for home consumption. Lowland rice production also shows a good DRC ratio at 0.30, which suggests that further research into its comparative advantage, needs to be undertaken. Lowland rice production is very much more labour intensive and could provide employment for men and women whilst at the same time responding to the staple food insecurity needs of the country.

Vegetable growing is by far the most profitable, with cassava the root crop representation being relatively profitable. As is perhaps to be expected, Liberia has high comparative advantage in producing cassava and vegetables for its urban markets whose reliance on fresh produce is currently only met by domestic production.

The full calculations are shown in Annex 6 for each of the sub-sector crop models developed using data collected from the survey.

In contrast, Table 12, developed by WARDA in 2002, illustrates the DRCs for a number of West African and shows the changes between 1973 and 1996 that can be achieved in comparative advantage. In all cases DRC for rice improved between 1978 and 1996 where they were calculated showing that production systems can change if there is a concerted effort and policy support to realise this shift.

Table 12: West African DRC Comparisons for Rice

Country	1978	1993	1995	1996
Cote D'Ivoire	1.68	1.02	0.73	Nc
Mali	0.69	Nc	Nc	0.40
Senegal	1.66	Nc	Nc	1.12
Sierra Leone	0.89	Nc	0.55	Nc

Sources: CERDI Université d'Auvergne; Stanford University; WARDA. Annual Report, 2001-2002. Calculations produced by a Stanford University Study of selected West African countries.

An analysis of the strengths and weaknesses of the value chains of the selected commodities and assessment of the comparative advantage is presented in Table 12 generated during the initial mission. This Table also covers fruit production, a fourth sub-sector, which theoretically should have high market value although this mission has not investigated its potential. Original thoughts on the state of play of the food sector have been confirmed by the survey results.

Table 13 presents a SWOT of the sectors reviewed and shows that there are a number of opportunities to commercialise sub-sector activities although investment will be needed in terms of education, agricultural research and pilot testing on farms to narrow down support in the identified sub-sectors. High wastage and loss of produce through poor handling, rot or storage are areas of concern. As all sub-sectors suffer equally from this, some are likely to suffer more from their perishable characteristics than others.

Table 13: Strengths, Weaknesses and Comparative Advantage of Selected Crops

<i>Value Chain for:</i>	<i>Strengths</i>	<i>Weaknesses</i>	<i>Demonstration of Comparative Advantage to meet domestic household food security, nutrition, incomes as well as for regional and international exports</i>
<i>Cereals (especially rice – upland)</i>	There are two types – upland and lowland. Most farmers cultivate upland. There is a strong farming awareness of rice and some potential for growth in this area. Demand is high as rice is a staple crop of Liberia.	Processing is by hand, production mainly for home consumption and little opportunity for surplus as imports (from China and USA) are readily available (even if expensive). The number of harvests achieved per year is few - currently it is estimated that only one crop per year is achieved when in fact this should be at least twice that. Productivity per hectare is also too low at about 25% that achieved outside Liberia. Currently about 1 tonnes per hectare. (Based on several interviews with rice/paddy farmers and verified by the national consultant in food crops).	Production of local rice is not seen as a boost to income but rather to contribute to food security as a staple food source. Currently there is no comparative advantage seen either regionally or internationally for upland rice. The production is to satisfy subsistence needs rather than market needs, and supplemented by rice imports. No government policies are in place yet to provide an incentive to reverse this. A possible area is organic rice production in the future but this would need substantial investment in infrastructure, food handling and packaging to reach certification stage (very little fertilizer and pesticide application takes place currently). Calculations shown by this mission suggest that upland rice has a relatively low DRC suggesting that use of limited domestic resources should be channelled to other efforts.
<i>Root crops</i> (the main crop considered is cassava)	As with rice production, cassava growing is popular and meets some food security needs and some cash needs production. Value adding potential exists converting the commodity possibly into bio-fuel or other product such as starch. Low technology would be a possibility meeting local market demand.	Industrialisation of cassava production and post-harvest value adding is limited and would require investment in hardware, training and promotion. Production losses are high from pests and plant diseases.	The current production of root crops shows some comparative advantage and the potential exists to industrialise the sub-sector. Further research would need to be conducted into the sub-sector to explore local and industrial demand and undertake feasibility studies to examine viability. Calculations by the mission suggest good DRC ratios.
<i>Vegetables</i> (the main crops possibly are items such as bitter ball and peppers but it	A market exists for a number of vegetables although items such as tomatoes and cucumber for example were not seen at points of sale. Half of	Almost no value adding was observed. Some vegetable leaves were cut for the consumer at the point of sale. Generally poor handling, storage and packaging incurring large post-harvest loss.	There would seem to be scope for expansion of the vegetable sector through both reducing post harvest loss and increasing production and productivity. Improved transportation and other infrastructure, as

Value Chain for:	Strengths	Weaknesses	Demonstration of Comparative Advantage to meet domestic household food security, nutrition, incomes as well as for regional and international exports
is difficult to be sure because of the limited variety in markets.	<p>the vegetable production is for sale in markets, whilst the other half is for home consumption. The markets are more likely to be urban centres.</p> <p>There is the potential to focus on female-headed vegetable garden and production systems.</p>		<p>well as training and increased access to competitive lines of credit could provide an incentive for an increase in vegetable production, handling and marketing. The production system would need to substantially changed and some specialization would have to take place. Currently large volumes of vegetables are coming into Liberia from across the borders with Guinea and Cote d'Ivoire or, as seen in Monrovia, as frozen produce from Europe, USA or the Middle East. DRC calculations show that vegetable production has reasonable comparative advantage with a DRC ratio approaching 1. With greater effort and investment it may be possible to bring the DRC even further down.</p>
<i>Other Observations – the fruit sector (this was not examined in this mission but seems to present itself as a potential area for economic growth in the agrarian sector)</i>	Liberia has the potential as with other warm climate regions to grow high value fruit crops which could if sufficient investment took place, be exported or converted into higher value products such as juices and tinned fruit.	<p>As with many places fresh fruit availability is limited and under-developed. The investment needed to bring the sub-sector to an industrial and therefore economically interesting stage would be enormous. The Liberian palate seems to dictate against development of this sector.</p>	<p>The potential for setting up juicing plants and fruit conversion into dried products or into another value added item seems to be large and could offer early gains.</p> <p>Current data on fruits is scanty although this would be an area that could be investigated further. Even the FAOSTAT has very little information on this and a more detailed fruit study would need to be conducted.⁴⁸</p>

⁴⁸ A study conducted by David Parker for the EU in 2002 suggests that, "Banana and citrus look to have the highest returns per hectare and good potential returns. Both products are for the domestic market though and demand is therefore limited." Page 16.

4. THE WAY FORWARD

4.1 Supporting Structures to Establish Comparative Advantage

In order for the food crop sector to establish itself and become a supplier of food as well as generate paid employment and increase its contribution to the local and national economy a number of supporting structures need to be put in place. These will also contribute to establishing comparative advantage and will contribute to creating competitiveness. Turning a suitably agro-ecological region into a higher economic driver is not easy although when coupled with a population that has good indigenous knowledge may make the transition easier.

These initiatives should be driven by GoL in the first instance and supported by donors such as UNDP and the EU as well as bilateral agents of change where they operate in the country such as DFID, USAID and JICA for example. Technical support can be met by FAO and other technical agencies.

Production Systems. Production systems need to receive legitimate focus from both technical and managerial agents of change. Improved farming techniques and practices, such as better seeds, better land husbandry management and pest management should be the focus of MoA in particular. The measures that will contribute to achieving this include policy focus from MoA, collaboration efforts and joint activities with research and extension services.

Markets. Market places should be identified and improved including the supply of stalls, water and electricity and management systems for their operation. This could also assist in generating new employment and alternative income activities. A number of the urban areas could be selected as pilot programmes of support to markets in centres such as Monrovia, Harper and selected centres inland.

Credit. Micro-finance credit schemes need to be encouraged through the creation of products held with existing banks and the generation of appropriate attitudes towards farming as a viable business proposition. Access to credit is important for smaller farmers or cooperatives that are beginning to face the challenges of future growth⁴⁹.

Infrastructure. Necessary infrastructure such as roads and communication systems need to be considered in the long term. Immediate infrastructure could include market places⁵⁰, feeder roads and water points.

Knowledge Sharing and Research. Local, as well as international, knowledge on sectoral changes need to be made available to enable improvements to take place in terms of production, productivity, efficiency gains, marketing, food processing and handling and where possible value adding without pricing the commodities beyond the reach of most people. Agricultural research should recommence allowing an incremental increase in output

⁴⁹ See chapter on Draft Report for CAAS-LIB - ‘Liberia’s Rural Finance and Marketing Sub-Sectors’, FAO-Ghana. Chet Aeschliman et al, November 2006. Page 33.

⁵⁰ See the examples of micro-project programmes where market construction is an important element of economic generation, employment generation and where women have the opportunity to become market sellers and market masters e.g. Micro-Project Programmes of the EU, in Nigeria, Ghana and Malawi.

if it can be taken up by farmers' organizations, NGOs and other civil based organizations (CBOs) whose role would be to act as centres of information and exchange of knowledge.

Enabling Policy. From a policy point of view GoL needs to be more proactive in terms of its support to agricultural change. This includes GoL support to MoA and increased budgetary allocation for extension, and service provision to farmers. There needs to be an emphasis on production, productivity and a general move towards establishing food security, which includes access including purchase or production of food.

4.2 Government Policy

The Government of Liberia has two policy position papers these being, "Statement of Policy Intent" and "Strategy for the Agricultural Sector" but neither provides sufficient detail on what government will actually be doing or supporting in the short term let alone the medium and long term. The Ministry of Agriculture (MoA) is small, understaffed and lacking skills needed to develop and support agricultural change. It is assumed therefore that MoA's role will come in the form of legal statute and in providing the legal boundaries of commercial activity rather than undertaking agricultural research, direct extension and training. Government's role will be in developing an enabling environment for economic stability and growth⁵¹.

Public and private partnerships might provide an initial opportunity for investment. Government will also need to consider a programme of incentives that allow small or even micro agro-industrial business to be established employing people and generating income. Forms of contract farming and off-farm work and even non-farm work should also be examined (e.g. in the transportation sector or packaging sectors).

Given a policy vacuum however, the entrepreneurial sector cannot be relied upon to substitute for Government nor *visa versa* but as a provider of services, which can be delivered in a way, which generates economic return efficiently and effectively.

The MoA has no policy on market information gathering, pricing (from input through to last point of sale) or on ways and means of monitoring agricultural sector behaviour. A continuous process of reviewing, analysing and fine tuning the understanding of the agricultural sector needs to take place and tools such as the Policy Analysis Matrix (PAM) need to be adopted internally so that the impact of public support and private sector activities can be monitored and adjustments made. Given the limited resources available such quick and relatively reliable indicators of return to investment and economic support could be adopted. They are not at present.

Overall the government's economic policy centres on the principle of the "Free Enterprise System" with the market as the principal determinant and which translates into a minimum involvement in the economy. Where the Government is involved, this is limited to joint ventures to achieve national goals and to stimulate the private sector. The Government's

⁵¹ David Parker report in 2002 showed this even then when he stated that, "The government has a very limited revenue base and little source of borrowing. It therefore has no operational agricultural research or support services. The government appears to have a "hands-free policy" of entrusting as much agricultural development to the private sector or the NGO sector. For smallholder farms, agricultural support is being given piecemeal through a battery of NGOs with short term funding horizons, often supported by multi-lateral donors, with similar short-term funding. There does not appear to be any coherent guiding policy." Page 10.

policy places major reliance on individual and private initiatives⁵². The National Investment Commission (NIC), which spearheads the investment drive focuses on medium and large businesses, and has little interest in micro-business or small agro-industrial concerns. It therefore misses the opportunity to contribute to agricultural change. It would be important that NIC therefore reconsider its focus to include small-scale farming and activities upstream and down stream of production in its portfolio as a special area of interest requiring smaller amounts of capital investment and shorter realisation periods.

Liberia's liberal business climate is designed to attract foreign investment and support economic growth and development. Through a liberal Investment Incentive Code, Liberia offers several physical benefits, including exemption from custom duties, income tax, stamp fees and other benefits, to new and expanding business enterprises for approved investments projects including agriculture, forestry, fishing, and mining. Other potential areas for investment incentives include building, construction, transport and communication and approved investment projects may also be eligible for support in securing loans and guaranteeing credit by the Central Bank.

4.2.1 Policy on food imports

There are no statutory foreign exchange controls in Liberia, and funds generally are freely remitted in and out of the country.⁵³

Liberian governments have consistently maintained a liberal policy towards food imports and exports and the current situation remains the same. Unfortunately Liberia also remains rather dependent on food aid, which has come under the directive of the World Food Programme (WFP). Whilst Government remains concerned with the importation of rice coming freely into the country and views the commodity strategically it maintains a zero monetary and fiscal policy towards it. Late in 2006 there was a concern that importers had been holding off on a large consignment of rice in order to speculate for higher prices. Government intervened charging the importer with "economic piracy" and placing him under arrest. Although this charge was subsequently dropped it demonstrates the importance the current Government places on rice as a staple food for consumers. It did not however, lead to the introduction of any law or policy to protect the country from this happening again but rather, demonstrated the vulnerability of Liberia to forces of commercial interest and possible speculation. Importantly engaging in dialogue with importers would be a good step in the right direction to develop an enabling environment and improving productivity and production for more access to food.

4.2.2 Policy on Tariffs on Imported Goods (machinery, other inputs)

Imports of machinery and other goods are subject to tariff duties, ranging between 2.5% and 25%, which constitute a major source of government income. Import duties are specific (based on weight for example) for some commodities and *ad valorem* (based on cost, insurance, and freight value) for others. Specific duties apply to foodstuffs (rice though is a special case and exempt from this), beverages, petroleum products, and certain rubber and textile products. All exports and some imports require licenses. Customs duties are 25% on luxury items such as alcoholic beverages, apparel, cosmetics, electronics and jewellery.

⁵² National Investment Commission, www.libnic.com

⁵³ Source: <http://www.lowtax.net/lowtax/html/liberia/jlacfir.html>

Although the Free Port of Monrovia was closed in 1999, goods up until that time could be landed, stored, sorted, manufactured, repacked, re-forwarded, or transhipped without payment of customs duties.

4.2.3 Current Policy on Agro-Industry

GoL has no current policy on agro-industry beyond an awareness of the main cash crop sectors of rubber and oil palm. These industries do not receive particular assistance or incentive other than that they are free to conduct their business in a close to tax free environment.

4.3 On-going and Planned Activities and Interventions of Other Partners

NGOs. The NGO sector is extremely active in Liberia. They range from large, international and reasonably well-funded organisations to small, local and limited funded actors and civil based type organisations. Many NGOs and others classified as Non-State Actors (NSAs), have agricultural programmes related to training and some input supply support (including the supply of starter packs covering seeds and basic tools). Mercy Corps and German Agro-Action (GAA), for example, have community based organisation programmes to support peace building, youth activities and agricultural recovery improving both the business and agricultural management skills of farmers, small businesses and entrepreneurs. MercyCorps is supported with USAID funding, whilst Agro-Action receives funding from the EC's Humanitarian Office (ECHO).

Multilateral Agencies. UNDP is also involved in agrarian support. Its current effort is geared towards promoting the "Establishment of a Songhai-Liberia Initiative for the Promotion of Rural Growth within the Liberian Government Programmes LEEP and LEAP". This programme is based on the Benin model of clustering enterprises (SMEs) that can be linked together for higher efficiency and the promotion of rural growth and employment generation. The programme is targeted at all 15 Liberian counties and each having an identified agricultural commodity at its core. Funding comes from UNDP, USAID and ILO and is supported by FAO⁵⁴.

The World Bank has focused on agro-forestry and the forestry sector in general as its intervention policy and this is set to continue for a number of years to come. Prime support is given however, to infrastructure and road construction and this too is likely to continue. This is an invaluable contribution, as it will provide channels along which trade can take place.

Donors, such as DFID, are only just beginning to venture into Liberia but this is limited for the moment. Their Liberian development programme is managed from Freetown, Sierra Leone.

4.4 Policy Options, Interventions and Investment

This paper presents below a number of policy options, interventions and investment scenarios, which GoL could consider for implementation with support from the international community. These would go someway to improving food security and an improvement in

⁵⁴ This programme is due to commence in early 2007.

nutritional status, provide income and employment. These also target the food crop sub-sectors identified earlier.

It is clear that investment other than in general terms, needs to be made in infrastructure (e.g. roads, storage, processing and pack-houses), training, market research and market information gathering and form an important programme of change in the rural economy. These have been well articulated by the 2005 FAO agricultural policy and food security mission, which emphasised that:

“Reducing the real cost of food to the rural and urban consumer is an important objective for the Liberian government in the medium term as it works to rekindle the production potential of its agricultural sector. Achieving this objective depends on inputs in several areas, notably productivity-driven increases in production, better roads for reduced transport costs, market information, greater participation and competition in import and domestic marketing systems (traders, cooperatives), transparent and favourable import policy (food, fuel and spare parts), application and enforcement of regional trade regulations and reinforced economic governance to reduce transaction costs and enforce contracts. Each of these factors contributes to establishing a reliable, lower cost supply of food at less variable prices. Competition and proper incentives for traders, farmer organizations, cooperatives and other private actors to become involved in agricultural marketing are particularly important issues to address to reduce the cost of food. Lebanese and Mandingo importers, wholesalers and transporters have historically played important roles in Liberia’s mercantilist system of trade and economic control, in agricultural marketing as well as in financing farmers’ crop production. Liberia needs to find a delicate balance between establishing a level playing field and competitive environment for all participants (with safeguards against monopoly power) with a supportive policy and regulatory framework that provides incentives for the private sector to make productive investments that are critical to the long-term development of Liberia’s agricultural sector”⁵⁵.

4.5 Proposals for Institutional Reforms, Policy Options

A general strategy across commodities to develop value-addition can effectively be applied in traditional farming systems, leading to real income generation, employment and food security for small holders by concentrating on small changes at the point of post harvest and prior to onward transportation. Currently farmers/sellers make little if any changes to the produce they make available on the market. Essentially produce is sold in a raw state, often unwashed and poorly presented. The opportunity to alter this seems obvious and training and awareness rising of the potential to increase margins and the sales price is therefore high. The following policy and investment options are designed to assist in this process.

4.5.1 Policy Options

It is suggested that GoL consider identifying areas where there is high opportunity focusing on improved productivity in high potential areas (such as small, middle and large farmers although it is recognised most farmers fall under the small category) and addressing food security concerns in vulnerable areas where production will still take place for self sufficiency reasons and local markets (as identified in existing data and from the food crops survey). This would cover both food staple production and horticulture crops. Identification

⁵⁵ James Tefft, “Agricultural Policy and Food Security”, FAO/ESA Working Paper 05-11, March 2005, page 10.

of areas could be based on historically important productive areas and those with favourable agro-climatic advantages.

4.5.2 Investment Options (Programmes and Projects)

The investment options outlined below are designed to narrow the gap between domestic food requirement and production over the next 10 years, improving incomes and support seed distribution, agricultural inputs, micro-finance credit systems and investments in marketing infrastructure, road networks, irrigation, research and extension.

Furthermore it is recommended that some basic services for farmers such as soil testing, pesticide and fertiliser quality control and management including certification for food quality could be considered. Investment by Government in regulatory issues and facilitating public and private partnership in provision of services to farmers at least in the medium to long term is necessary and encouraging the National Investment Commission (NIC) to include in its focus small agricultural business would be a way forward.

There is a clear need to strengthen the agricultural information systems of MoA and the statistical wing of the agriculture ministry for regular crop assessment, monitoring and record keeping.

In terms of food crop exports it is known that Liberia will have received African Growth and Opportunity Act (AGOA) status on 1st January 2007 and is in discussion with EUROCOP. However for Liberia this is not enough for a successful future. International markets for Liberia's food crops will demand quality, reliable supply and high food safety standard at prices that are competitive. The field visits undertaken indicate that the state of play of Liberia's food crop production is a long way from ensuring any of these criteria if investment is not made in the areas of basic education, good agricultural practices, market awareness for the quality of crops being sought, transport, storage and post harvest handling to name a few.

The following sections detail a number of proposal options covering the priority areas. An estimate of the cost of these is presented alongside the brief proposal although these will have to undergo significant review. The discussion is briefly presented in three sections: a) immediate term, b) short term and c) medium to long-term (5-10 years) periods.

a) Immediate Term: Investment in Studies, Sector Analysis and Monitoring

Short term or immediate investment (over the next one to two years) includes discrete sub-sector studies and setting up monitoring systems capturing such items as market data, players in the sector, input and output prices regularly. In particular it is important to consider undertaking the following sub-sector studies:

- The impact of the WFP programme in Liberia on the local economies.
- A study on transport and haulage of agricultural produce and commodities.
- A study on infrastructure including markets, communication, input supply.
- A detailed study on the impact of Government's agricultural policy with respect to imports (in particular Rice from overseas).
- A number of PAM Studies could be undertaken of various sub-sector operators in the food crops sector e.g. juicing or processing.
- The study of micro-businesses and SMEs in Liberia.
- A number of detailed sub-sector studies e.g. for rice and vegetables.

- A number of case studies need to be undertaken for illustrative purposes (some will have been undertaken in the follow-up section below) including cooperative arrangements, or following the transport of certain food crops from producer to final market and end consumer.
- A review of the seed sector should be undertaken.
- Putting in place a monitoring system for market information (e.g. prices, quantities, production).

Immediate Term: Investment in Studies, Sector Analysis and Monitoring cost: ca. US\$ 1,000,000

b) Short Term: Two-to-Five Year Investment Proposals

Education and Targeted Training⁵⁶. In terms of the next investment level there is a real need for education and specific training including literacy and numerical proficiency before moving into business training and marketing, and encouraging entrepreneurial activity. These are important because they carry producers to the next level of business activity⁵⁷.

Appropriate Technology for Increased Productivity and Production. Investment could include training in improved farming techniques to increase productivity and output as well as in simple technologies to allow small processing houses or factories to be established using appropriate and affordable machinery. Limits to this however include good quality seed stocks, fertilizer (whether organic or chemical), guaranteed power supply, inputs for the processing activity and relatively reliable transport from the farm gate to the market trader and end consumer as well supply of produce.

Basic Services. As discussed above some basic services for farmers need to be considered including soil testing, pesticide and fertilizer quality control and management including certification for food quality could be considered once the supply side has been fully studied and examined.

Data Collection and Statistical Services. Agricultural information systems of MoA are very weak and support for data collection, and in particular the statistical wing of MoA for regular crop assessment, monitoring and record keeping is a priority. Although very difficult to achieve even in the intermediate term, developing a marketing information service is nevertheless very important to alert farmers to market opportunities. It might be possible as a starting point to encourage NGOs to disseminate market information with technical support from FAO's AGS office but this would need further development⁵⁸.

⁵⁶ See World Bank commissioned study: The Evolution of Agricultural Education and Training: Global Insights of Relevance for Africa, Carl Eicher, Michigan State University, August 2006 in which the author states that over the next 15 years at least US\$1 billion will need to be invested in agricultural education and training alone.

⁵⁷ It is noted that FAO-AGSF has a range of training materials that could be used to develop training programmes. Information on these can be found by the consultant at: <http://www.fao.org/ag/ags/subjects/en/agmarket/agmarket.html>; <http://www.fao.org/ag/ags/subjects/en/ruralfinance/index.html>; www.ruralfinance.org; and soon to come on-line: <http://www.fao.org/ag/ags/subjects/en/farmMgmt/index.html>.

⁵⁸ Comments by Andrew Shepherd, FAO, AGS on an earlier version of this report suggest an interesting initiative of encouraging NGOs to act as conduits for market information in collaboration with radio stations and mobile phone service providers (see <http://www.nextbillion.net/node/1694>). Further comments from him suggest that the experience of FAO in Africa and elsewhere, that NGOs trying to work in agricultural marketing have an inadequate appreciation of what needs to be done and that FAO could organise a training programme for NGOs (and Ministry extension staff).

***Short-Term: Two-to-Five Year Investment
Proposals cost: ca. US\$ 5,000,000***

c) Five-to-Ten Year Investment Proposals

Processing and Packaging. In the five to ten year time frame investment should take place to improve both processing and packaging of commodities on offer. Concentration could take place on the vegetable sector in particular leading to improvement in handling, storage and sale of the more perishable items. It is also anticipated that the fruit sector may attract attention and be a focus of investment given the potential for such value adding activities such as juicing and further processing. Small scale juicing plants and cleaning houses are envisaged which would allow local juices to substitute for expensive imports.

Infrastructure. There is a clear need in the next five to ten years for public and private investment in supporting infrastructure. Initially this could be in the form of, for example, small-scale markets with water services included. If individuals/communities can appoint market “masters” to manage the markets as an enterprise this may lead to sustainable continuation of the project. There is strong linkage with the Micro-Projects investment option described below.

In addition the World Bank and possibly African Development Bank could be approached to support road and market project construction incorporating market development and upgrading in those locations benefiting from the improved road system.

Micro-Projects Programme (MPP) and Micro-Credit System. The micro-projects programme (MPP) can be used as a means to support numerous small-scale projects where the need is highest. In some cases these can be community driven or if credit related, privately targeted. However, setting up such programmes is not easy although the target population in Liberia is rather small and therefore this option seems feasible.

The establishment of a Micro-Credit Fund to support local initiative and fill temporarily an absence of reliable banking lines of credit for small and micro-enterprises could be opened up and information shared more widely and transparently while commercial banks take on board the possibility of developing micro-credit as part of their every day portfolio of products on offer.

Five-to-Ten Year Investment Proposal cost: ca. US\$ 25,000,000 (probably 50% of this will be for infrastructure and 50% for MPP type activities)

4.5.3 Indicative Costs, Returns and Risks

A summary of indicative costs is presented in Table 14 together with identified risks. Returns to investment will need to be calculated although at this stage they have been qualitatively assessed. Full feasibility cost-benefit analysis will need to be undertaken to develop and review the individual proposals.

Table 14: Summary Investment Table

Proposal	Cost (US\$)	Return	Risk or Assumption
a) Immediate Term (1 to 2 years)			
Studies	1 000 000	High return in terms of information gap filling	Low risk
Sub-total:	1 000 000		
b) Short Term (2 to 5 years)			
Education and Targeted Training	2 500 000	High return in terms of information gap filling	Overall Low risk
Appropriate technology	1 000 000	High return potential	Overall Low risk
Basic Services	1 000 000	High return potential	Overall Low risk
Data Collection and Statistical Services	1 000 000	High return potential	Risk of limited skills in country to carry through the work and sustain the services
Sub-total:	5 000 000		
c) Medium to Long Term (5 to 10 years)			
Processing and Packaging	6 000 000	Good return in the long run	Risk of limited production without some form of guarantee such as contract farming
Infrastructure	10 000 000	Good return in the long run	Clearly a public investment with private sector benefits
Micro-Projects Programme (MPP) and Micro-Credit System	8 000 000	Good return in the medium run	Payback of loans, investments are made in projects supported
Sub-total:	24 000 000		
Overall total:	30 000 000		

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Liberian agricultural production is weak and undeveloped. The vast majority of Liberians rely on agriculture for their livelihoods or as the prime source for their food. Having emerged from a 14 year long civil war the Liberian agrarian economy is very much hindered by an absence of sustained investment either by Government or the private sector and entrepreneurial activity is at an infant stage.

5.2 Recommendations

Analysis of the current food crop sector and a review of the potential gains from investment suggest that investment is needed in a number of core areas these being education, market information and support to improving productivity of a number of core food crop sub-sectors. Whilst rice and root crops including the staple cassava crop are favoured the vegetable sector shows highest profit potential although lowland rice production has promise as well.

It is recommended that three investment phases be considered covering the immediate, short term and medium to long-term periods. Investment is estimated at around US\$ 30 million in total over the next five to ten years.

- Immediate investment is required to undertake detailed research in a variety of areas, which are both private sector (e.g. market studies) and public sector oriented (e.g. Policy Analysis Matrix (PAM) review and study).
- Short Term investment is considered important to build local education in numeric management and literacy whilst also moving into farm and business planning, budgeting, and gross margin analysis. Basic field-testing kits and other rapid impact activities are also considered in the short term, as is the improvement in data collection, data management and analysis.
- Medium to long-term investment will be required in infrastructure, micro-projects programming and micro-credit support including support for micro-businesses and SMEs in the agro-sector.

The investment options are summarised in tables 15, 16 and 17, please see next pages.

Table 15: Immediate Term Investment (1 to 2 years)

Name of Activity	<i>Studies, Sector Analysis and Monitoring</i>
Institutional Responsibility	Development agencies allocated on the basis of strength to conduct the work – MoA, FAO, possibly IFC for SME work.
Aim(s) of Activity	The aims of these activities will fill in gaps in knowledge of key areas and act as inputs to decision-making and resource allocation.
Description of Main Activities	<p>Suggested studies and reviews:</p> <ul style="list-style-type: none"> • The impact of the WFP programme in Liberia on the local economies; • A study on transport and haulage of agricultural produce and commodities. • A study on infrastructure including markets, communication, input supply. • A detailed study on the impact of Government's agricultural policy with respect to imports (in particular Rice from overseas). • The study of micro-businesses and SMEs in Liberia. • A number of PAM Studies could be undertaken of various sub-sector operators in the food crops sector e.g. juicing or processing. • A number of sub-sector studies e.g. for rice and vegetables. • A number of case studies need to be undertaken for illustrative purposes (some will have been undertaken in the follow-up section below) including cooperative arrangements, or following the transport of certain food crops from producer to final market and end consumer. • A review of the seed sector should be undertaken. • Putting in a place a monitoring system for market information (e.g. prices, quantities, production and output and input usage) – could be undertaken by FAO marketing section).
Expected Result(s)	It is expected that the results of these activities will dramatically increase the knowledge base of decision-makers in Government and its development partners, guiding them as to which areas of investment are needed and identifying and fine tuning agricultural policy.
Impact on Food Security, Poverty Reduction and Economic Development	Greater information as to economic activity will assist in allocating limited physical and financial resources to where the needs are greatest.
Period of Execution	Immediate Term (1 to 2 years)
Estimated Cost	US\$ 1 000 000

Table 16: Short Term Investment (2 to 5 years)

Name of Activity	Short Term: Two-to-Five Year Investment Proposals
Institutional Responsibility	Development agencies allocated on the basis of strength to conduct the work – MoA, FAO
Aim(s) of Activity	The aim of the two-to-five year investment proposal is to raise the level of understanding of agriculturalists, increasing production, productivity and output.
Description of Main Activities	<ul style="list-style-type: none"> • Education and Targeted Training • Appropriate technology • Basic Services • Data Collection and Statistical Services
Expected Result(s)	<p><i>Training:</i> It is expected that through training and education productivity, production and quality increases will be seen in the agricultural sector and that output will reach a level that can compete successfully on the open market and food security will also become more certain.</p> <p>Basic services will eventually develop and to a point where farmers and other agriculturalists are able to practice land husbandry more effectively, reducing wastage and other inputs.</p> <p><i>Local technology:</i> Examination and promotion of appropriate local and regional technology will increase production but using simple machinery, which can be easily constructed, implemented and maintained.</p> <p><i>Data and Statistics:</i> Data collection and statistical services will be developed to a point whereby information is reliable and forms a basis for sound decision-making and policy formulation by Government but also by the private sector on which to make investment decisions.</p>
Impact on Food Security, Poverty Reduction and Economic Development	Greater information as to economic activity will assist in allocating limited physical and financial resources to where the needs are greatest.
Period of Execution	Short Term (2 to 5 years)
Estimated Cost	US\$ 5 000 000

Table 17: Intermediate Term Investment (5 to 10 years)

Name of Activity	Medium-Term: Five-to-Ten Year Investment Proposal
Institutional Responsibility	Development agencies allocated on the basis of strength to conduct the work – MoA to lead, FAO, World Bank, EC (based on their experience of Micro-Project Programming)
Aim(s) of Activity	The aim of the five-to-ten year investment proposal is to dramatically improve the handling, processing and value adding of commodities grown in Liberia. This will increase the worth of the commodity and start to industrialize production, leading to employment, skill enhancement, and general sophistication of the sector.
Description of Main Activities	<p>Processing and Packaging: Concentration on the vegetable sector, which would lead to improvement in handling, storage and sale of the more perishable items. Value adding activities such as juicing and further processing. Small scale juicing plants and cleaning houses are envisaged which would allow local juices to substitute for expensive imports.</p> <p>Infrastructure: Initially this could be in the form of small-scale markets with water services included. If individuals/communities can appoint market “masters” to manage the markets as an enterprise this may lead to sustainable continuation of the project.</p> <p>Micro-Projects Programme (MPP) and Micro-Credit System. A micro-projects programme (MPP) can be used as a means to support numerous small-scale projects where the need is highest. In some cases these can be community driven or if credit related, privately targeted.</p> <p>The establishment of a managed Micro-Credit Fund to support local initiative and fill <u>temporarily</u> an absence of reliable banking lines of credit for small and micro-enterprises could be opened up and information shared more widely and transparently.</p>
Expected Result(s)	It is expected that with substantial investment some of the basic industrial activities associated with agriculture can kick-start a higher economic turnover much needed to act as a point of interest for entrepreneurs, investors and start to reduce poverty, food insecurity and unemployment.
Impact on Food Security, Poverty Reduction and Economic Development	Building processing factories, infrastructure and making funding small projects in communities will employ people, increase the amount of money available in the local economies and generally lead to a feeling of hope for a better future.
Period of Execution	Medium Term (5 to 10 years)
Estimated Cost	US\$ 24 000 000

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ANNEX 2**PEOPLE MET**

Name	Organisation	Position
<i>Government</i>		
Dr Christopher Toe	Ministry of Agriculture	Minister for Agriculture
James Logan	Ministry of Agriculture	Deputy Minister
L. Kandakai	Ministry of Agriculture	Deputy Minister, Regional Development, Research and Extension
Alfred F. Kotio	Forestry Development Authority	National Authorising Officer, Commissions
James Zayzay	National Investment Centre (NIC)	Acting Head
William Q. Menyen	MoA, Nimba County	District Agricultural Officer,
Gertre Soluntea,	MoA, Cuttington, Bong County	County Agricultural Coordinator,
Daniel S. Gbigbi	CARI-Seed Multiplication Project	Officer in Charge,
John Woods	Forestry Development Authority	Managing Director
Jangar S. Kamara	Forestry Development Authority	Technical Manager Designate for Commercial Forestry
Garmai Wolokollie	Forestry Development Authority	Acting Head
Haris Wennie	Cooperation Development Authority (CDA)	Deputy Registrar
<i>CAAS-LIB Team Members</i>		
Dr Othello Brandy	CAAS-LIB	National Coordinator
Dr Dunstan Spencer	CAAS-LIB	Team Leader
Franklin Henries	CAAS-LIB	Counterpart - Food Crops
Jallah Kennedy	CAAS-LIB	Counterpart - Institutional Development
Paul Jallah	CAAS-LIB	Counterpart - Institutional Development
<i>NGOs, Farmers and Cooperatives</i>		
Lucia Bass	Independent Farmer on WFP Food-for-Work Programme	Farmer, Bong County
MacArthur M. Pay-Bayee	International Institute of Tropical Agriculture (IITA)	Project Manager – Sustainable Tree Crop Program
Arthur Flomo	Dokodan Cooperative	President
Thomas Gbuabaye,	Africare Liberia	Agricultural Production
Offerce N. Kpokolo	NGO - Nimbaian Bangladeshi Agricultural Project, Kapain District	Project Manager
James Jiazoli	World Vision	Agricultural Manager – Food Security
Tom Ewert	MercyCorps	Country Director

<i>Donor Staff and Donor Funded Projects</i>		
Joseph Boiwu	FAO – Liberia	Assistant Resident Representative (Officer In Charge) – Operations
Thomas Palmer	FAO – Regional Office Ghana	Senior Policy and Programme Officer
Chris Jackson	World Bank	Consultant – Policy Analysis
Chet Aeschliman,	FAO Regional Officer for Africa, Accra, Ghana	Rural Finance and Marketing Officer
Kay Schwendinger	UNDP – Liberia	Strategic Partnerships Officer – Liberia
Mohamed Khaled	FAO – Liberia	Emergency Coordinator
Robert Krech	World Bank	Consultant
Emmet Watson	UNDP – Liberia	Assistant Resident Representative
Indu Bhushan Gautam	UNDP Programme	Reintegration and Participatory Development Manager – Community Based Reintegration Recovery Programme
Robert Krech	World Bank – Liberia	Consultant
Liam McGuire	EU – Community Development Programme	Team Leader
Paul Woods	EU – Community Development Programme	Contracts, Finances and Administration

ANNEX 3**METHODOLOGY AND KEY FINDINGS****Methodology**

Two teams of six enumerators and one supervisor conducted the survey. The survey was designed before hand.

Given poor road conditions at the time of this survey it made impossible to visit all counties. The survey instead covered a number of significant agricultural producing counties to derive a balanced view of production from low to high producers within each county.

Bong and Nimba counties were chosen to represent high production areas. Grand Cape Mount County represented one of the counties with intermediate food production whilst Grand Kru, Grand Gedeh and Maryland counties displayed low productivity and whose foodstuff comes mainly from Côte d'Ivoire and Guinea.

The six enumerators were divided into two teams of three as shown in Table 1 and 2 below:

- Team One consisted of Sam Guwor (Vegetables), Toe Williams (Root Crops) and David Vienn (Rice). They visited 36 towns in Bong, Grand Cape Mount and Nimba Counties. The Table below shows the towns visited.
- Team Two consisted of James Newman (Root Crops), Alex Mulbah (Vegetables) and Henry Bundor (Rice). They visited the southeast region and covered 19 towns. Due to poor roads, many towns were reached only by walking.

Table 1 - Counties and Towns Visited by Team One

County	Town
Bong	Balayeamah, Dulimue, Duta, Gbonota, Gbonoyea, Gowhua, Kpalainta, Lehleh, Naama, Suakoko, Warta, Yatala
Grand Cape Mount	Dowula, Gohnzodua, Kpeneji, Madina, Njagbacca, Sinje, Torsor, Vonzuuanla
Nimba	Duowine, Gbedin, Karnplay, Kpaituo, Kpankatuo, Karnplay, Layee, Manbor Gbe, Nengbehn, Sanniquellie, Suazua, Voley, Yarsonnoh, Zaanpea, Zogowee, Zontuo

Table 2 – Counties and Towns Visited by Team Two

County	Towns Visited
Grand Gedeh	Pouh Town, Zai Town, Zwedru
Grand Kru	Barclayville, Chanakalle, Filoken, Kayken, Picnic Cess Setor, Topoe
Maryland	Barraken, Bishop Hill, Easy Town, Fish Town, Gbolobo Harper East, High Wood, Philadelphia, Plebo, Sawonken, Seldeken

The enumerators were not able to reach Grand Gedeh County because of transportation difficulties. The Supervisor supplemented the above survey with interviews with traders and input suppliers and met with farmer groups in three towns in Grand Gedeh County.

Findings

The following tables present key findings generated by the survey for each commodity and in each county visited.

Out of the total number of farmers interviewed, 64% were engaged in upland rice farming while 28% cultivated in the lowlands. 8% of farmers cultivated both upland and lowlands (a practice usually employed to safeguard against adverse weather conditions and by farmers who had a late start in the season). Farmers in the South Eastern region were also seen to carry out parboiling of rice after harvest to reduce the percentage of broken grains when milling. Table 3 (a) below shows distribution per county for rice production.

Table 3 (a) – Rice Production

County	Lowland	Upland	Lowland/ Upland	Parboiling	Trader
Bong	44%	56%	0	22%	0
Grand Cape Mount	35%	65%	0	17%	0
Grand Gedeh*	0	0	0	0	2
Grand Kru	12%	59%	29%	76%	0
Maryland	22%	67%	11%	71%	2
Nimba	28%	72%	0	39%	2
Total	141%	319%	40%	225%	6
Mean	28%	64%	8%	45%	

Table 3 (b) shows that 80% of root crops farmers grew cassava (the second staple crop after rice), while 16% were engaged in the production of plantain, and 4 in cocoyam cultivation. Some value addition in the form of cassava flour processing, fufu and gari was seen, with the production of gari being the major product produced by 35% of farmers, followed by fufu at 19% and only 1% of farmers in Nimba County producing cassava flour.

Table 3 (b) - Root Crop Production

County	Cassava	Cocoyan	Plantain	Flour	Fufu	Gari	Trader
Bong	72%	6%	22%	0	5%	17%	0
Grand Cape Mount	100%	0	0	0	0	73%	1
Grand Gedeh*	0	0	0	0	0	0	0
Grand Kru	94%	6%	0	0	38%	44%	0
Maryland	90%	10%	0	0	50%	40%	1
Nimba	44%	0	56%	5%	0	0	0
Total	400%	22%	78%	5%	93%	174%	2
Mean	80%	4%	16%	1%	19%	35%	

As shown in Table 4 below, 54% of the vegetable farmers interviewed grew bitter balls and pepper in mixed stand with upland rice during the rainy season, followed by 37% of pepper and 9% bitter balls grown in pure stands. The Table also shows Nimba and Bong Counties as the highest producers of these commodities – 72% and 67% respectively. Bitterballs are grown by 61% of farmers in Maryland county.

Table 4 – Vegetable Production

County	Bitterballs	Pepper/ Bitterballs	Pepper	Trader
Bong	33%	67%	0	0
Grand Cape Mount	0	39%	61%	1
Grand Gedeh*	0	0	0	3
Grand Kru	0	31%	69%	0
Maryland	10%	61%	29%	2
Nimba	0%	72%	28%	0
Total	43%	270%	187%	6
Mean	9%	54%	37%	

Summary of Survey**a) Number of Interviews by County and Sector**

<i>a) Farmers</i>	Number Interviewed	%
Bong	31	23%
Maryland	24	18%
Grand Cape Mount	25	19%
Grand Kru	16	12%
Nimba	39	29%
Total	135	
<i>b) Input Suppliers</i>	Number Interviewed	%
Maryland	6	67%
Nimba	1	11%
Grand Gedeh	2	22%
Total	9	
<i>c) Traders</i>	Number Interviewed	%
Maryland	3	38%
Grand Gedeh	4	50%
Cape Mount	1	12%
Total	8	
Overall Total Number of Interviews	152	

Note: Numbers have been rounded.

b) Size of farms of Commodity Producers (135 farmer respondents)

Farm size in Has	Number	%
Up to 2 has	120	88.9%
2 to 3 has	12	8.9%
3 to 4 has	2	1.5%
> 4 has	1	0.7%
Total	135	100%

c) A few key Characteristics of Farmers Interviewed (135 farmer respondents)

Commodities being farmed		
	Number	%
Upland Rice	35	26%
Bitterball/Plantain	28	21%
Plantain	21	16%
Lowland Rice	19	14%
Cassava	15	11%
Bitterball	8	6%
Bitterball/Plantain/Other Veg.	7	5%
Other Vegetable/Plantain	1	1%
Other Vegetable	1	1%
Total	135	

Labour Source		
	Number	%
Family	124	92%
Casual	8	6%
Hire	1	1%
None	1	1%
Family/Hire	1	1%
Total	135	100%

Processing		
	Number	%
Gari Preparation	9	7%
Ground pepper	5	4%
Ground okra	1	1%
2 and 3	0	0%
Milling	7	5%
Parboiling	4	3%
Cassava dough	0	0%
Cassava flour	0	0%
None	109	81%
Total	135	

Does the farmer do any processing?		
	Number	%
Yes	27	20%
No	108	80%
Total	135	100%

Where do you sell?		
	Number	%
Farm gate	28	21%
Market	22	16%
Direct Trader	0	0%
Farm gate/Market	2	1%
Market/Direct Trader	10	7%
Direct Trader/Farm Gate	45	33%
None	28	21%
Total	135	

Who do you sell to?		
	Number	%
Another farmer	63	47%
Trader	35	26%
Another farmer/Trader	8	6%
None	29	21%
Total	135	

Do you take to market?		
	Number	%
Yes	75	56%
No	58	43%
N/A	2	1%
Total	135	100%

Transportation Means		
	Number	%
Walk	40	30%
None	62	46%
Other	33	24%
Total	135	

Future Plan		
	Number	%
Continue Farming	40	30%
Expand Farm	66	49%
Uncertain	1	1%
Plant Cassava & rice	1	1%
Plant Cassava	2	1%
Tree crops	4	3%
Education	14	10%
Improve production	2	1%
Support Family	2	1%
Build home	2	1%
Marketing	1	1%
Total	135	

Summary Table of Sales/Home Consumption		
	% of commodity for Home	% of commodity for Sale
Lowland Rice	62%	38%
Plantain	58%	42%
B - P - OV*	56%	44%
Upland Rice	46%	53%
Bitterball/Plantain	43%	55%
Cassava	37%	63%
Bitterball	32%	68%
Total (average of total)	48%	52%

*Bitterball/Plantain/Other Vegetables.

d) Input Supplier Questions and Findings (9 respondents)

Who do you deal with when selling items?		
	Number	%
Farmer directly	2	22%
Other	1	11%
Both farmer and other	6	67%
Total	9	

Do you provide any other services?		
	Number	%
Credit	3	33%
Advice	0	0%
Other	0	0%
No	6	67%
Total	9	

Other competition?		
	Number	%
Other local traders	3	33%
National travelling sales	0	0%
Foreign traders	1	11%
None	5	56%
Total	9	

How many employees do you have?		
	Number	%
0	3	33%
1	1	11%
2	4	44%
3	1	11%
Total	9	

e) Trader Questions and Responses (8 respondents)

How many employees do you have?		
	Number	%
0	5	62.5%
1	2	25.0%
2	1	12.5%
Total	8	

Do you buy in bulk?		
	Number	%
Yes	7	87.5%
No	1	12.5%
Total	8	

What do you buy?		
	Number	%
Processed*	2	25%
Fresh vegetables**	4	50%
Rice	2	25%
Total	8	

* fufu or gari

** e.g. okra

Do you do any form of processing?		
	Number	%
Yes*	1	13%
No	7	88%
Total	8	

*packaging.

Plans for the Future One Year Hence		
	Number	%
Expand	4	50%
Expand Volume and range	3	38%
Continue business	1	13%
Total	8	

ANNEX 4**VALUE CHAIN SURVEY – QUESTIONNAIRE EXAMPLES****VEGETABLE SURVEY****SECTION 1: PRODUCTION ENTERPRISE**

Vegetable Type:				
Date:				
Name of Farmer:				
Location (Village, County):				
Size of farm:				Hectares
Production				
Inputs:				
Seed price:		(Lib \$)/kg		Qty bought (kg)
Other inputs and cost:				
Fertilizer		Lib \$/kg		Units bought
Pesticide		Lib \$/kg		Units bought
Other		Lib \$/kg		Units bought
		Lib \$/kg		Units bought
Other costs:				
Land rent				
Hire Labour		Lib \$/day		Number of days
Storage		Lib \$/day		Number of days
Outputs:				
Production		Total Kgs		
How much is for home consumption?		%		
How much is for sale?		%		
Sale price		Lib \$		
Profit		Lib \$		

SECTION 2: VALUE ADDITION/PROCESSING

Processing		
Is there any processing?		
What processing takes place?		
What are the costs of processing?		Lib \$ (also list item)
What inputs are required for processing?		Inputs
What price do you sell after processing?		Lib \$/kg or per item

SECTION 3: SWOT ANALYSIS OF THE ENTERPRISE

Strengths	Weaknesses	Opportunities	Threats

SECTION 4: MARKETING QUESTIONS

Where do you sell your vegetable?		e.g. farm gate, market, direct to trader
Who do you deal with?		e.g. another farmer? Trader?
How many times do you sell?		
Do you take the produce to market? What are the transportation costs		

SECTION 5: PLAN FOR THE FUTURE

What plans are there for the future?	
One year:	
Two years?	

INPUT SUPPLIER SURVEY

SECTION 1: PRODUCTION ENTERPRISE

Date:	
Name of Trader:	
Location (Village, County):	
Number of employees:	

SECTION 2: BUSINESS RELATED

What do you sell?		E.g. tools, seeds, fertilizers, other
List a few items and their costs:		
Tools	Lib \$ per item e.g. spades	
Seeds:	Lib \$ per kg (or 50 kg bags)	
Rice Seed	Lib \$ per kg (or 50 kg bags)	
Vegetable Seed	Lib \$ per kg (or 50 kg bags)	
Cassava cuttings	Lib \$ per kg (or 50 kg bags)	
Fertilizer	Lib \$ per kg (or 50 kg bags)	
Other inputs e.g. insecticides/pesticides?		

SECTION 3: SWOT ANALYSIS OF THE ENTERPRISE

Strengths	Weaknesses	Opportunities	Threats

SECTION 4: MARKETING QUESTIONS

Do you advertise your shop?		Posters, word of mouth etc
Who do you deal with?		e.g. direct with farmers? Other traders? Cooperatives?
Do you provide any support services to farmers?		
Do you sell commodities for farmers?		
What competition do you see in your area?		E.g. other traders in the village or town

SECTION 5: PLAN FOR THE FUTURE

What plans are there for the future?	
One year?	
Two years?	

ANNEX 5**CASE STUDIES*****Case Study 1:******Maryland County - Philadelphia Swamp Rice project - Harper***

The Philadelphia swamp rice project commenced in 1964, with assistance from the Governments of Taiwan and Liberia. Initial development work covered 100 acres out of a total of 190 acres. 31 farmers were trained in lowland rice cultivation.

Seed stocks were lost as a result of the war, but donors (such as the EU, LWS and WFP) have donated seeds to these farmers and supported by the WFP Food-for-Work-Programme. The rice variety grown here is “Suakoko 8” which is able to combat the high iron toxicity in the soil.

FAO emergency assistance implemented through the Southeastern Agricultural Relief Agency (SARA), a local NGO, had some setbacks including seeds that did not germinate, and poor quality of tools distributed to them. Current yield figures are quite low as these fields are cultivated without the application of fertilizer. Crop yield is between 1,500-2,000kg/ha as compared to the 3,000-4,000kg/ha in the pre-war years. This group of farmers provide milling services to the community as well as satellite towns and villages.

The Philadelphia farmers were equipped with one rice mill, three power tillers, four threshers and two hand-operated winnowers. Sickles were used for harvesting. Government initially provided maintenance and spare parts. Farmers provided fuel and a small fee L\$12.00/acre for two ploughing operations or \$6.00 per single operation. All equipment was stolen during the war, although recently a rice mill has been donated to the group by the Lutheran World Service (LWS) to reactivate post harvest activities.

Normal post harvest activities are beginning to take place, although little value addition (parboiling) is generated. Major problems faced by the farmers include bird damage and weed control (the dam is not functioning well and as the paddy fields cannot be flooded at some part of the season, weeds have become a problem).

Case Study 2:***Grand Gedeh County - Work and See Farmers Cooperative Society – Zwedru***

The Work and See Farmers Cooperative Society was established in 1973 primarily to produce swamp rice and vegetables. This cooperative has nine members on the Board of Directors as well as a management team. It is structured in a way that each farmer is given several plots according to their ability to utilize the land. They are assessed as their proper use. In cases where plots are not utilized, adjustments are made and excess land is given to either new members or members with spare capacity to expand their cultivation. This is done mainly to ensure vacant space is not left in the field.

Payment to the cooperative is made in the form of in-kind as opposed to cash. Proceeds accrued from the sales of the in-kind dues, are used to purchase tools and other inputs and which are then stored in a “tools bank”, which members can access on a sign-and-return basis. The cooperative also provides seeds to new members to get them started. Payment of dues was suspended during the war, but there are plans to reactivate this before the end of 2006.

In the past the cooperative had one rice mill (which provided service to the members and the general public), one mini tractor and two power tillers (donated by GoL). Farmers sold rice to the immediate community and kept some for household consumption. The civil war disrupted farming until only this year. The cooperative has a current membership of 373 farmers (comprising 230 men and 143 women).

Currently, German Agro Action (GAA) is assisting to rehabilitation of canals and floodways. Initial clearing was carried out by AGRIMECO (approximately 500 acres of lowland was cleared and 85% of which is currently under cultivation). GAA donated a new rice mill to the cooperative, which, will be supervised and monitored by a committee comprised of MOA, GAA and the cooperative. WFP has also contributed a food-for-work ration to the cooperative. Since the war no fertilizer has been applied.

If the harvest is successful, the members will consider strongly the introduction of fish farming and beekeeping.

Case Study 3:

Pouh Town: NAWOCOL

NAWOCOL is female run CBO established in 1999 to help returnees with agricultural planting materials and assistance to the vulnerable in the community with local food (cassava and vegetables). The organization has been operating on a self-help basis and charges no membership fees. Contributions made by members to the organization are used to purchase office stationery.

The organization worked well up until 2001; and has since 2001-2006 it has been dormant due to the civil conflict that engulfed the southeast. After a 6 year lag period the member resumed operation in August 2006, cultivating 5 acres of vegetables for this dry season, and base upon the success of this cropping cycle, the membership intend to engage into the cultivation of 200 acres of assorted food crops. Membership stands at 80. The organization lacks farm inputs (tools, equipment, and seeds/planting materials) and technical support but is able to pay for some technical assistance.

ANNEX 6**DRC CALCULATIONS (US\$)⁵⁹**

Model 1: Average Rice Producer (Bong)

A: Budget for Upland Rice (Bong)

Farmed area (ha) Commercial 1.4

	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season	
COSTS								
Rice inputs home grown (bucket = 10kg)	Bucket	10.00	21%	3.00	-		-	
Rice inputs purchased (bucket = 10kg)	Bucket	10.00	21%	3.00	6.30		6.30	
Fertilizer purchase (50kg bags)	Kg	44.00	21%	1.00	9.24		9.24	
Labour	Labour	40.00	21%	1.00	8.40		8.40	
Land rental	Ha	16.00	21%	1.00	3.36		3.36	
						Total Costs	27.30	
REVENUE								
Total production		Kg	0.20	588.00	1.4	Production Volume in Kg	Value	
Production of which:						823.2	164.64	
79% is for home consumption	Kg		0.20	464.52	1.4	650.328	130.07	
21% is for sale	Kg		0.20	123.48	1.4	172.872	34.57	
						Income from Sales	34.57	
						Profit	7.27	

B: Policy Analysis Matrix (PAM) for an Upland Rice Farmer for 21% of production

	Units	Quantities		Market Prices	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Rice Sales Import Parity	Kg Kg	1 1	172.87 172.87	0.20 0.40		1.00 0.40	34.57 69.15		-35
							TOTAL REVENUE	34.57	69.15
COSTS: Non-Tradable Inputs									
Labour	Labour	1.00	21%	40.00		4.50	180.00	8.40	37.80
Land rental	Ha	1.00	21%	16.00		5.00	80.00	3.36	16.80
							TOTAL NON-TRADABLE COSTS	11.76	54.60
COSTS: Tradable Inputs									
Rice inputs purchased (bucket = 10kg)	Bucket	Qty 3.00	% Used 21%	10.00		2.00	20.00	6.30	12.60
Fertilizer purchase (50kg bags)	bag of 44Kg	1.00	21%	44.00		2.00	88.00	9.24	18.48
							TOTAL TRADEABLE COSTS	15.54	31.08
							OVERALL TOTAL COSTS	27.30	85.68
								PRIVATE	SOCIAL
							Profit (REVENUE)	7.27	-16.53

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP)	7.27	PP = (Private Revenue - Overall Costs @ market prices)
Social Profits (USD/kg) (SP)	-16.53	SP = (Social Revenue - Overall Costs @ social prices)
Private Cost Ratio (PCR)	0.62	PCR = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices
Domestic Resource Cost Ratio (DRC)	1.43	DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC)		
- On tradable Outputs	50.00%	$NPC^{TO} = (\text{Private Revenue} @ \text{market prices}) / (\text{Social Revenue} @ \text{social prices})$
- On tradable Inputs	50.00%	$NPC^{TI} = (\text{Tradable Costs} @ \text{market prices}) / (\text{Tradable Costs} @ \text{social prices})$
Effective Protection Coefficient (EPC)	50.00%	$EPC = (\text{Private Revenue} - \text{Tradable Costs} @ \text{market prices}) / (\text{Soc Rev} - \text{Trad Costs} @ \text{social prices})$

⁵⁹ The data on which these matrixes have been compiled have been based are tables 8, 9 and 10 in the body of this report as well as the database of the survey undertaken.

Model 2: Average Lowland Rice Producer (Nimba)

A: Budget for Lowland Rice (Nimba)

Farmed area (ha) Commerical 1.6

	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season						
COSTS													
Rice inputs home grown	Kg	10.00	89%	50.00	-		-						
Rice inputs purchased (per bundle)	Bundle	0.28	89%	100.00	24.92		24.92						
Fertilizer use (50kg bag)	Bag	44.00	89%	1.00	39.16		39.16						
Labour	Labour	1.72	89%	6.00	9.18		9.18						
Land rental	Ha	-	89%	1.00	-		-						
Other costs - processing	Unit	16.81	89%	1.00	14.96		14.96						
Marketing (transportation)	Unit	100.00	100%	1.00	100.00		100.00						
						Total Costs for production	188.23						
REVENUE													
Total production		Kg 0.22	Per Ha 656.00	No of Ha 1.6	Production Volume in Kg 1049.6	Value 230.91							
Production of which:													
11% is for home consumption													
89% is for sale		Kg 0.22	11% 89%	72.16 583.84	1.6 1.6	115.456 934.144	Value 25.40 205.51						
						Income from Sales	205.51						
						Profit	17.29						

B: Policy Analysis Matrix (PAM) for an Upland Rice Farmer for 89% of production for sale

	Units	Quantities		Market Prices	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Rice Sales	Kg	934.14	1.00	0.22					
Import Parity	Kg	934.14	1.00	0.60					
					1.00	0.60	205.51	560.49	-354.97
						TOTAL REVENUE	205.51	560.49	-354.97
COSTS: Non-Tradable Inputs									
Labour	Labour	6.00	0.89	1.72		1.00	1.72	9.18	9.18
Land rental	Ha	0.00	1.00	-		1.00	-	0.00	0.00
Other costs - processing	Unit	1.00	0.89	16.81		2.00	33.62	14.96	-14.96
Marketing (transportation)	Unit	1.00	0.89	100.00		1.10	110.00	89.00	-8.90
						TOTAL NON-TRADEABLE COSTS	113.15	137.01	-23.86
COSTS: Tradable Inputs									
Rice inputs purchased (per bundle)	Bundle	100.00	% Used 0.89	0.28		1.10	0.31	24.92	27.41
Fertilizer use (50kg bag)	Bag	1.00		44.00		1.10	48.40	39.16	43.08
						TOTAL TRADEABLE COSTS	64.08	70.49	-6.41
						OVERALL TOTAL COSTS	177.23	207.49	-30.27
						PRIVATE	SOCIAL		
						Profit (REVENUE)	28.29	352.99	

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP) Social Profits (USD/kg) (SP) Private Cost Ratio (PCR) Domestic Resource Cost Ratio (DRC)	28.29 352.99 0.89 0.28	PP = (Private Revenue - Overall Costs @ market prices) SP = (Social Revenue - Overall Costs @ social prices) PRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC) - On tradable Outputs - On tradable Inputs	36.67% 90.91%	NPC ^{TO} = (Private Revenue @ market prices) / (Social Revenue @ social prices) NPC ^{TI} = (Tradable Costs @ market prices) / (Tradable Costs @ social prices)
Effective Protection Coefficient (EPC)	28.86%	EPC = (Private Revenue - Tradable Costs @ market prices) / (Soc Rev - Trad Costs @ social prices)

Model 3: Average Root Crop Producer (Nimba)

A: Budget for Root Crop Production (Nimba)

Farmed area (ha) 0.6

	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season
COSTS							
Root Crop seed home grown (per bucket = 10kg)	Kg	-	55%	4.00	-		-
Root Crop inputs purchased (per bucket = 10kg)	Kg	3.19	55%	6.00	10.53		10.53
Fertilizer purchase (50kg bags)	Kg	-	55%	-	-		-
Labour	Labour	29.00	55%	1.00	15.95		15.95
Land rental	Ha	29.00	55%	1.00	15.95		15.95
						Total Costs	42.43
REVENUE							
Total production Production of which: 45% is for home consumption 55% is for sale	Kg	0.06		7,188.00	No of Ha's 0.60	Production Volume in Kg	
	Kg	0.06	45%	3,234.60		4,312.80	258.77
	Kg	0.06	55%	3,953.40		1,940.76	116.45
						Income from Sales	142.32
						Profit	99.90

B: Policy Analysis Matrix (PAM) for Root Crop Production (Nimba) for 55% sale production

	Units	Quantities		Market Prices per unit	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Rice Sales Import Parity	Kg Kg	2,372.04 2,372.04	1.00 1.00	0.06 0.10	1.00	0.10	142.32	237	-95
							TOTAL REVENUE	142	237
COSTS: Non-Tradable Inputs									
Labour	Labour	0.55	1.00	29.00	1.00	29.00	15.95	15.95	0.00
Land rental	Ha	0.55	1.00	29.00	1.00	29.00	15.95	15.95	0.00
							TOTAL NON-TRADABLE COSTS	31.90	31.90
COSTS: Tradable Inputs									
Root Crop inputs purchased (per bucket = 10kg)	Kg	10.53	1.00	3.19	1.10	3.51	10.53	36.94	-26.41
Fertilizer purchase (50kg bags)	Kg	-	1.00	-	1.10	-	-	-	-
							TOTAL TRADEABLE COSTS	10.53	36.94
							OVERALL TOTAL COSTS	42.43	68.84
								PRIVATE	SOCIAL
							Profit (REVENUE)	99.90	168.36

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP) Social Profits (USD/kg) (SP) Private Cost Ratio (PCR) Domestic Resource Cost Ratio (DRC)	99.90 168.36 0.24 0.16	PP = (Private Revenue - Overall Costs @ market prices) SP = (Social Revenue - Overall Costs @ social prices) PRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC) - On tradable Outputs - On tradable Inputs	60% 28%	NPC ^{TO} = (Private Revenue @ market prices) / (Social Revenue @ social prices) NPC ^{TI} = (Tradable Costs @ market prices) / (Tradable Costs @ social prices)
Effective Protection Coefficient (EPC)	66%	EPC = (Private Revenue - Tradable Costs @ market prices) / (Soc Rev - Trad Costs @ social prices)

Model 4: Average Vegetable Producer (Grand Cape Mount)**A: Budget for Vegetable Production (Grand Cape Mount)**

Farmed area (ha)

0.8

	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season
COSTS							
Seeds home grown (per bucket = 10kg)	Kg	10.00	80%	3.00	-		-
Seeds inputs purchased (per bucket = 10kg)	Kg	9.11	80%	1.00	7.29		7.29
Fertilizer purchase (50kg bags)	Kg	13.46	80%	1.00	10.77		10.77
Labour	Labour	23.00	80%	1.00	18.40		18.40
Land rental	Ha	26.00	80%	1.00	20.80		20.80
						Total Costs	57.26
REVENUE							
Total production Production of which: 20% is for home consumption 80% is for sale	Kg	0.72		1418.00	No of Ha's 0.8	Production Volume in Kg	
	Kg	0.72	20%	283.60		1134.40	816.77
	Kg	0.72	80%	1,134.40		0.16	45.376
						0.64	726.016
						Income from Sales	522.73
						Profit	465.48

B: Policy Analysis Matrix (PAM) for Vegetable Production (Grand Cape Mount) for 80% sale production

	Units	Quantities		Market Prices	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Vegetable Sales	Kg	726.02	1.00	0.72			522.73		
Import Parity	Kg	726.02	1.00	1.70	1.00	1.70	1234.23	-711.50	
							TOTAL REVENUE	522.73	1,234.23
COSTS: Non-Tradable Inputs									
Labour	Labour	0.80	1.00	23.00	1.00	23.00	18.40	23.00	-4.60
Land rental	Ha	0.80	1.00	26.00	1.00	26.00	20.80	26.00	-5.20
							TOTAL NON-TRADABLE COSTS	39.20	49.00
COSTS: Tradable Inputs									
Seeds inputs purchased (per bucket = 10kg)	Kg	0.80	1.00	9.11	1.10	10.02	7.29	10.02	-2.73
Fertilizer purchase (50kg bags)	Kg	0.80	1.00	13.46	1.10	14.81	10.77	14.81	-4.04
							TOTAL TRADEABLE COSTS	18.06	24.83
							OVERALL TOTAL COSTS	57.26	73.83
							PRIVATE	SOCIAL	
							Profit (REVENUE)	465.48	1,160.40

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP)	465.48	PP = (Private Revenue - Overall Costs @ market prices)
Social Profits (USD/kg) (SP)	1,160.40	SP = (Social Revenue - Overall Costs @ social prices)
Private Cost Ratio (PCR)	0.08	PRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices
Domestic Resource Cost Ratio (DRC)	0.04	DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC)		
- On tradable Outputs	42.35%	NPC ^{T0} = (Private Revenue @ market prices) / (Social Revenue @ social prices)
- On tradable Inputs	72.73%	NPC ^{T1} = (Tradable Costs @ market prices) / (Tradable Costs @ social prices)
Effective Protection Coefficient (EPC)	41.73%	EPC = (Private Revenue - Tradable Costs @ market prices) / (Soc Rev - Trad Costs @ social prices)

Model 5: Average Bitterball, Plantain and Other Vegetable Producer (Maryland)

A: Budget for Bitterball, Plantain and Other Vegetable Production (Maryland)

Farmed area (ha)	0.8						
	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season
COSTS							
Seeds home grown (per bucket = 10kg)	Kg	10.00	40%	3.00	-		-
Seeds inputs purchased	Bundle	8.62	40%	2.00	6.90		6.90
Fertilizer purchase (50kg bags)	Kg	-	40%	1.00	-		-
Labour	Labour	1.72	40%	9.00	6.19		6.19
Land rental	Ha	-	40%	1.00	-		-
Processing costs	Unit/kg	0.025	40%	400.00	4.00		4.00
						Total Costs	17.09
REVENUE							
Total production	Kg	0.67		500.00		Production Volume in Kg	Value
Production of which:							
60% is for home consumption	Kg	0.67	60%	300.00	0.48	144	96.48
40% is for sale	Kg	0.67	40%	200.00	0.32	64	42.88
						Income from Sales	42.88
						Profit	25.79

B: Policy Analysis Matrix (PAM) for Bitterball, Plantain and Other Vegetable Production (Maryland) for 40% sale production

	Units	Quantities		Market Prices	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Vegetable Sales	Kg	64.00	1.00	0.67			42.88		
Import Parity	Kg	64.00	1.00	1.00	1.00	1.00		64.00	-21.12
							TOTAL REVENUE	42.88	64.00
COSTS: Non-Tradable Inputs									
Labour	Labour	9.00	0.40	1.72		1.00	1.720	6.19	6.19
Land rental	Ha	0.80	1.00	-		1.00	-	-	0.00
Processing costs	Unit/kg	400.000	40%	0.025		1.10	0.028	4.00	4.40
							TOTAL NON-TRADABLE COSTS	10.19	10.59
COSTS: Tradable Inputs									
Seeds inputs purchased	Kg	0.80	1.00	8.62		1.10	9.48	6.90	9.48
Fertilizer purchase (50kg bags)	Kg	0.80	1.00	0.00		1.10	0.00	-	0.00
							TOTAL TRADEABLE COSTS	6.90	9.48
							OVERALL TOTAL COSTS	17.09	20.07
							PRIVATE	SOCIAL	
							Profit (REVENUE)	25.79	43.93

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP)	25.79	PP = (Private Revenue - Overall Costs @ market prices)
Social Profits (USD/kg) (SP)	43.93	SP = (Social Revenue - Overall Costs @ social prices)
Private Cost Ratio (PCR)	0.28	PRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices
Domestic Resource Cost Ratio (DRC)	0.19	DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC)		
- On tradable Outputs	67.00%	$NPC^{T0} = (\text{Private Revenue} @ \text{market prices}) / (\text{Social Revenue} @ \text{social prices})$
- On tradable Inputs	72.73%	$NPC^{T1} = (\text{Tradable Costs} @ \text{market prices}) / (\text{Tradable Costs} @ \text{social prices})$
Effective Protection Coefficient (EPC)	66.00%	EPC = (Private Revenue - Tradable Costs @ market prices) / (Soc Rev - Trad Costs @ social prices)

Model 6: Average Bitterball and Plantain Producer (Maryland)

A: Budget for Bitterball and Plantain Production (Maryland)

Farmed area (ha)

0.4

	Unit	Value per unit	% of which goes for business sale	Quantity	Total Cost		Total Cost per season
COSTS							
Seeds home grown (per bucket = 10kg)	Kg	10.00	34%	3.00	-	-	-
Seeds inputs purchased (B and P)	Bundle	5.00	34%	10.00	17.00	17.00	17.00
Fertilizer purchase (50kg bags)	Kg	-	34%	1.00	-	-	-
Labour	Labour	20.00	34%	1.00	6.80	6.80	6.80
Land rental	Ha	-	34%	1.00	-	-	-
Marketing costs (transport)	Unit	2.00	100%	1.00	2.00	2.00	2.00
						Total Costs	25.80
REVENUE							
Total production for Bitterball	Kg	0.30		Per ha	No of Ha	Production Volume in Kg	Value
Total production for Plantain	Kg	0.96		352.50	0.15	52.88	15.86
				352.50	0.25	88.13	84.60
					0.4 (Total Ha)		
Production of which for Bitterball							
66% is for home consumption	Kg	0.30	66%	34.90	0.10	10.47	3.14
34% is for sale	Kg	0.30	34%	17.98	0.05	5.39	1.62
Production of which for Plantain							
66% is for home consumption	Kg	0.96	66%	58.16	0.17	55.84	53.60
34% is for sale	Kg	0.96	34%	29.96	0.09	28.76	27.61
				Total Kgs for sale	47.94	Income from Sales	29.23
						Profit	3.43

B: Policy Analysis Matrix (PAM) for Bitterball and Plantain Production (Maryland) for 34% sale production

	Units	Quantities		Market Prices	Conversion Factors	Social Prices	Market Values	Social Values	Transfers
		A	B						
REVENUE									
Bitterball Sales	Kg	5.39	1.00	0.30				1.62	
Import Parity	Kg	5.39	1.00	1.00	1.10	1.10	27.61	5.93	-4.31
Plantain Sales	Kg	28.76	1.00	0.96				31.64	-4.03
Import Parity	Kg	28.76	1.00	1.00	1.10	1.10			
						TOTAL REVENUE	29.23	37.57	-4.31
COSTS: Non-Tradable Inputs									
Labour	Labour	1.00	34%	20.00	1.00	20.000	6.80	6.80	0.00
Land rental	Ha	-	1.00	-	1.00	-	-	-	0.00
Marketing costs (transport)	Unit	1.00	100%	2.000	1.00	2.000	2.00	2.00	0.00
						TOTAL NON-TRADABLE COSTS	8.80	8.80	0.00
COSTS: Tradable Inputs									
Seeds inputs purchased (B and P)	Kg	10.00	0.34	5.00	1.10	5.50	17.00	18.70	-1.70
Fertilizer purchase (50kg bags)	Kg	-	1.00	0.00	1.10	0.00	-	-	0.00
						TOTAL TRADEABLE COSTS	17.00	18.70	-1.70
						OVERALL TOTAL COSTS	25.80	27.50	-1.70
						PRIVATE	SOCIAL		
						Profit (REVENUE)	3.43	10.07	

INDICATORS	RATIOS	CALCULATIONS
Private Profits (USD/kg) (PP) Social Profits (USD/kg) (SP) Private Cost Ratio (PCR) Domestic Resource Cost Ratio (DRC)	3.43 10.07 0.72 0.47	PP = (Private Revenue - Overall Costs @ market prices) SP = (Social Revenue - Overall Costs @ social prices) PCR = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ market prices DRC = (Non-Tradable Costs) / (Revenue - Tradable Costs) @ social prices
Nominal Protection Coefficient (NPC) - On tradable Outputs - On tradable Inputs	77.80% 90.91%	NPC ^{TO} = (Private Revenue @ market prices) / (Social Revenue @ social prices) NPC ^{TI} = (Tradable Costs @ market prices) / (Tradable Costs @ social prices)
Effective Protection Coefficient (EPC)	64.81%	EPC = (Private Revenue - Tradable Costs @ market prices) / (Soc Rev - Trad Costs @ social prices)

II. TREE CROP SUB-SECTOR

By

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Liberia 2007

II. TREE CROPS SUB-SECTOR REPORT

1. INTRODUCTION

Agriculture has played a predominant role in the Liberian economy in terms of livelihoods, export earnings and employment. Since the mid-nineteenth century when coffee was introduced in Liberia, tree crops (together with natural resources such as timber, iron ore and other minerals) have been the prominent feature in the dualism that has characterized to date the country's economic development.

Tree crops in Liberia have been cultivated across a range of production systems⁶⁰ and marketed through private and public entities. The purpose of this report is to examine the current status of the Liberian tree crop sector and attempt to shed some light on how the sector continues to evolve after more than a decade of conflict that significantly impacted the people, institutions, economy and infrastructure of Liberia.

As Liberia recovers from the political unrest and destruction of the civil war, and moves from a relief and rehabilitation mode to a development phase, the tree crops sector presents both challenges and opportunities as an engine for growth. In general, the challenges involve formulating and prioritizing policies and building new institutions in order to provide the incentives to smallholders and other private investors for rehabilitation of the tree crop sector in the face of a secular downward trend in international agricultural commodity market prices. Despite these challenges, opportunities exist to rebuild the sector in an equitable manner so that it contributes to growth, development and poverty reduction.⁶¹

A significant gap lies between the pre-war Liberia of the past (pre-1989) and the post war Liberia of the recent past, present and future (post-2003). This gap directly affects all aspects of Liberian life including information, business channels, political priorities, and the livelihoods of all Liberians. This report attempts to use archived secondary data from pre-war Liberia together with primary data recently collected in three counties (Bong, Lofa and Nimba) that were traditional strongholds of the smallholder tree crop sector, to provide a baseline of information from which to move forward.

This report consists of seven sections. Section 1 outlines the survey methodology used in the primary data collection and the main sources of data and information. Section 2 takes a macroeconomic perspective and discusses the traditional and current role of agriculture in the Liberian economy. Sections 3, 4 and 5 examine rural households in Liberia, land issues, and the current status of their primarily agrarian economy, respectively. Section 6 takes an in-depth look at each of the four primary smallholder tree crop sectors (rubber, cocoa, coffee and oil palm) by discussing world market trends, current tree stock and production, and the evolution of the marketing chain and its effects on market outcomes. Section 7 considers the way forward as the tree crop sector continues to re-orient itself to the post-war marketplace.

⁶⁰ Production systems have included smallholder (palm oil, coffee and cocoa, and to a limited extent rubber), commercial farms (rubber, palm oil, and to a lesser extent coffee and cocoa), and plantations, both private and parastatal (rubber and palm oil).

⁶¹ For further detail on the current challenges and opportunities facing the Liberian cocoa sector, please see Toe, Wilcox (2006).

2. METHODOLOGY AND DATA

2.1 Survey Methodology

In general, the tree crop sub-sector is comprised of a range of production systems and therefore marketing chains through which the produce is marketed. The prominent concession system of Liberian rubber involves large-scale production and essentially intra-firm transactions. On the opposite end of the spectrum, smallholder tree crop producers market their relatively small-scale production through marketing chains that range from multinational dominated rubber to chaotic and cross border cocoa/coffee transactions. Given the motivation of this report, survey data from a parallel study conducted by the International Institute for Tropical Agriculture's Sustainable Tree Crop Program (IITA/STCP), along with the University of Tennessee (UTK), is used to provide a snapshot of the current situation for smallholder tree crop production.

Many studies have examined the world trade of tree crops. These studies are typically performed using annual data aggregated to a national level. Studies that examine the particulars of a domestic tree crop marketing chain are less prevalent, partly due to the lack of appropriate data. Tree crop marketing data is collected by governments, nongovernmental organizations and private entities, but is not widely available for analysis by third parties. As discussed in Section 2.2, years of civil conflict in Liberia have created a void of primary and secondary data from which to connect the pre-war status of smallholder tree crop production and marketing and the current situation. To acquire such data, a household survey methodology was selected to facilitate an analysis of the Liberian tree crop sector. STCP, a public/private partnership between the cocoa industry and governmental/non-governmental entities, was particularly interested in the cocoa sector. STCP is also concerned with how cocoa production/marketing relates to other aspects of the agriculturally oriented household's portfolio of income generating opportunities. As such, the IITA/STCP/UTK baseline survey specifically targeted cocoa producing households while also capturing the economic activities and household characteristics of non-cocoa producing households. A significant limitation of the survey is a complete lack of village-level population and cocoa production data. In fact, recent aggregated county-level data does not exist. The paucity of such secondary data, that otherwise could have aided in the formation of survey weights, limits the representativeness of the sampling procedure and resulting analysis. In an effort to address this limitation, randomness and industry consensus were used to arrange survey logistics.

2.1.1 Selection of Counties, Buying Centres, Villages

In the past, significant cocoa production in Liberia was spread across at least three counties (in order of production from greatest to least: Nimba, Lofa, and Bong) or the "cocoa belt" (see Section 3). These counties continue to be the epicentre of cocoa production in Liberia as other counties (e.g. Grand Cape Mount) have abandoned their cocoa to the bush due to a complete lack of market and price incentives. Since one aim of the IITA/STCP/UTK study was to elucidate the current cocoa marketing situation, these three counties were chosen and surveyed between October 2006 and March 2007.

Prior to the war, cocoa produced by smallholder farmers in these counties, and others, was purchased and exported by the parastatal Liberian Produce Marketing Company (LPMC). LPMC warehouses were scattered across the countryside in larger towns where cocoa from the hinterlands was aggregated and shipped to Monrovia for export.

With the demise of LPMC, these traditional buying centres continue to serve as a base of operations for the private Liberian-based buyers who now buy and sell cocoa. In theory, these centres serve as focal points around which the Liberian cocoa markets operate. In previous studies (Wilcox, 2006; Wilcox and Abbott, 2006), buying centres have been designated as large (cocoa amassed in the buying centre is shipped directly to Monrovia as buyers have relatively high capacity to procure and transport the relatively large quantities of cocoa produced in the area) or small (cocoa often passed on to a second buying centre before it is shipped to Monrovia as farmers are more remote, produce less and the buyers have correspondingly lower capacity). Buying centre size may be associated with scale economies, availability of market information, quality of infrastructure and a particular market environment driven by barriers to entry that result from the institutional history of the market. These prospects suggest that size of the buying centre could influence the magnitude and variation of farmgate prices. Unfortunately, the lack of cocoa production and marketing data does not allow particular buying centres to be easily stratified by these factors. Instead, a list was assembled of potential buying centres in each of the three counties (Table 1). The final list was considered the best representation of all the major and minor cocoa buying focal points found in the selected counties based on professional opinion and anecdotal evidence. Given the chaotic nature of the current cocoa marketing channels, two buying centres were chosen per county, with assistance from STCP-Liberia, the Liberian Ministry of Agriculture and members of the Liberian cocoa industry. An attempt was made to include one of each designation while ensuring that each buying centre was currently active.

Table 1: Cocoa Buying Centres in Bong, Lofa and Nimba Counties

Bong	Lofa	Nimba
Belefanai	Bolahun	Bahn
Gbarnga	Kolahun	Butuo
Gbatala	Salayea	Ganta
Kokoya	Voinjama	Gbeilay (Beo)
Palala	Zorzor	Karnplay
Zoweinta		Loguatuo
		Mehnla
		Saclepea
		Tappita
		Zikepa

NOTE: Buying centres in bold and italics were chosen for IITA/STCP/UTK survey

Village selection followed Wilcox and Abbott (2006). Administrative maps (1:150,000 scale) were used to develop a comprehensive list of villages within the anticipated buying centre market area. The market area was assumed to have a radius of 30-40 kilometres based on infrastructure quality and proximity to other buying centres. When possible, cocoa buyers and farmers were asked to assist in the demarcation of market boundaries. Given the timeframe of the project, six villages were chosen at random for each buying centre. Villages were considered any settlement name listed on the maps. Cartesian quadrants (originating from the buying centre) were used to separate each buying centre market into four regions. Villages were selected under the criteria that at least one village from each quadrant was randomly selected to create a sample of four villages. A sample of six villages was desired per buying centre (one village per day during a six-day workweek), so the

remaining two villages were selected randomly from the master list of villages surrounding the buying centre, regardless of quadrant. The result was six villages randomly drawn from each of the six buying centres, or thirty-six villages in total. Once villages were chosen (see Table 2), the villages were visited before the scheduled surveying date to discuss, face-to-face, the research agenda and logistics with village leaders. This likely enhanced participation and allayed fears or concerns of ulterior motives. The pre-visit meeting also allowed the research team to discern village layout and cocoa marketing institutions that were currently in-place. On several occasions, the selected villages were found to have been destroyed/abandoned during the war or devoid of any person actively producing and marketing cocoa. In these instances, the nearest village with active cocoa farmers was chosen to replace the original village as market institutions and production practices were likely quite similar given the close proximity.

2.1.2 Selection of Survey Participants and Interviews

At the scheduled arrival time, enumerators would meet with village leaders and assemble potential participants at the previously identified meeting place. The vast majority of the meetings occurred in the morning to limit the meeting's impact on daily activities and assure maximum participation. Once the meeting commenced, one or several team members would introduce themselves and explain the research agenda in the appropriate language(s). A village-level survey was completed with input from participants. Once the village-level survey was completed, village leaders completed a list of the names of general audience members and cocoa farmers that were not in attendance. Every effort was made to include all cocoa farmers in the potential participant pool. Once the final list had been compiled, every name was assigned a corresponding number and individual interview participants were chosen randomly. Since obtaining cocoa marketing information was of paramount importance, the next randomly selected participant on the list served as an alternate and replaced chosen participants who had not sold cocoa during the 2006/07 season. Once a sample of ten cocoa farming households and approximately six non-cocoa farming households was obtained, participants were randomly assigned to enumerators. Enumerators conducted the interviews individually or as group depending on language constraints and the comfort level of participants. The survey instrument consisted of 16 pages and gathered information about household demographics and income in addition to agricultural/tree crop production and marketing (see Section 2.2). Villages were visited twice, once at the beginning of the cocoa season (October/November) and once at the end (January/February/March) to facilitate the collection of transaction level marketing data.

2.2 Data

Relevant secondary data on the Liberian agricultural sector is scarce and often fragmentary. IMF and World Bank reports fill some of the data gaps. Macroeconomic data from IMF and World Bank is based on estimates derived from collaboration with their staff and Liberian agencies. Similarly, data from FAOSTAT is broadly consistent with national data (from which it is predominantly derived) on production, area harvested and exports during the period from the 1960s to the end of the 1980s. National production estimate data was collected on a sample basis and shows considerable variation year-to-year. Production data from the 1990s to the present time is understandably either unreliable or missing. Export data for smallholder tree crops such as coffee and coca needs to be treated with some caution since cross-country transfers (in both directions) reflect, at different times, price differentials and market access in neighbouring countries – Guinea, Cote d'Ivoire and Sierra

Leone, and more recent rubber export data may include rubber produced in Sierra Leone. Data on yields is also problematic since national data was collected on a sample basis during the 1970s to late 1980s, and is invariably reported in terms of a simple division of production by area harvested, which lends itself to inaccuracies, and moreover smallholder food and tree crops are normally intercropped and rarely planted in pure stands.

There is little information on regional differences in commodity production, or based on different farming systems. Similarly, there appears to have been no attempt to collect information systematically on farm budgets or to calculate gross margins – and little information on these topics is available with the exception of basic financial analysis in project appraisal reports and stand-alone studies (the latest for tree crops in 2001). At times during the 1970s and 1980s pricing policy analysis was undertaken to examine the margins between export and producer prices of tree crops, and a market analysis was carried out for cocoa in 2005 by Pay-Bayee (2005) and followed-up with the systematic collection of primary data by IITA/STCP/UTK presented in this report.

There is little data on farm size either for food or tree crop production, and this is a significant constraint. Likewise, there are major information gaps with regard to land tenure systems, and how these may have evolved since the 1960s as tree crop production has increased and land-population ratios have changed in different parts of the country. There is, however, some time series data on household numbers at a county level and across commodity groups from the 1970s to late 1980s, and more latterly in 2001.

While all of these caveats on secondary data should be borne in mind throughout this study, the IITA/STCP/UTK survey attempted to address some of these information gaps. Though the study area was limited to the primary smallholder tree crop counties of Bong, Lofa, and Nimba, it is believed that the situation in these counties is, in a general sense, broadly representative of the situation throughout the regions where tree crops play a role in the local rural economies.

The IITA/STCP/UTK survey resulted in the completion of 794 surveys in 40 villages located around two buying centres per county (Table 2)⁶². The survey instrument consisted of twelve sections: Locational Details, Household Characteristics, Household Demographics, Farming System Characteristics, Perennial Tree Crop Investments and Production, Hired Labour Use for Tree Crop Production, Tree Crop Marketing (cocoa, rubber, oil palm and coffee), Rural Services and Rural Credit. Data from each of these sections is dispersed throughout the report to provide context to the current situation of the Liberian tree crop sector.

3. AGRICULTURE AND ECONOMIC DEVELOPMENT IN LIBERIA

Table 3 presents some key indicators for the Liberian economy. Examining Liberia's economic performance on the basis of decades is somewhat arbitrary, but the division does reflect the broad political regime changes over the past 45 years: the 1960s saw the fruits of Tubman's "Open Door Policy" approach not least in terms of the impact of the concession policies for minerals and rubber, and the consolidation of the dualism in the structure of the

⁶² Several other buying centres were encountered in the field that are closely related to those in Table 1. In general, these centres represent the exact location of a particular buyer who stores cocoa purchases in a town (village) adjacent to a traditional buying centre (e.g. Bahn is a few kilometers from Saclepea).

economy; the 1970s was the decade of Tolbert “From Mat to Mattress” (his death ended 100 years of one-party rule) and an incipient program towards broader based growth; the 1980s the military coup and the increasing repression and economic mismanagement of the Doe regime, and the 1990s until 2003 the anarchy of the civil war years during which at least 200,000 people died and the majority of the population displaced.

Table 2: Number of Surveys Completed by Village in IITA/STCP/UTK Survey

Nº of Surveys	Date	Village	Clan	District	County	Buying Centre
25	11/4/06 & 3/6/07	Weinsue	Jorpolu	Jorquelleh	Bong	Gbarnga
8	10/28/2006	Cooper-Ta	Jorquelleh	Jorquelleh	Bong	Gbarnga
23	10/28/06 & 2/26/07	Melekie	Jorquelleh	Jorquelleh	Bong	Gbarnga
16	10/31/06	Galai	Suakoko	Suakoko	Bong	Gbarnga
16	3/7/07 & 3/8/07	Gwenima	Suakoko	Suakoko	Bong	Gbarnga
16	10/3/2007	Jimmy Korkollie	Suakoko	Suakoko	Bong	Gbarnga
21	10/24/06 & 2/25/07	Nai	Suakoko	Suakoko	Bong	Gbarnga
16	9/3/2007	Benneh	Yeanawon	Suakoko	Bong	Gbarnga
16	11/3/06	Kpoe	Zota	Zota	Bong	Gbarnga
22	11/2/2006	Boepa	Bonwein	Kokoyah	Bong	Zoweinta
24	11/1/06 & 2/3/07	Gbalorkpalar	Soe	Panta-Kpai	Bong	Zoweinta
24	11/1/06 & 3/1/07	Malonkai	Soe	Panta-Kpai	Bong	Zoweinta
24	11/2/06 & 3/4/07	Mileenta	Wolota	Kpai	Bong	Zoweinta
23	10/16/06 & 1/31/07	Betibah	Bondi	Voinjama	Lofa	Voinjama
16	10/16/06	Kennedy Farm	Bondi	Voinjama	Lofa	Voinjama
16	10/17/06	Kpakumai	Bondi	Voinjama	Lofa	Voinjama
24	10/15/06 & 2/1/07	Bolongoidu	Quadu-Bondi	Voinjama	Lofa	Voinjama
16	10/18/06	Nassadu	Quadu-Bondi	Voinjama	Lofa	Voinjama
24	10/17/06 & 01/02/07	Bazzagizza	Upper Walker	Voinjama	Lofa	Voinjama
16	2/21/07	Mehmeh	Gbalein	Salaye	Lofa	Zorzar
23	10/25/06 & 2/18/07	Yeila	Gizemai	Zorzar	Lofa	Zorzar
16	2/22/07	Kokolu-Zazay	Palama	Salaye	Lofa	Zorzar
23	10/25/06 & 2/20/07	Gbanway	Vavala	Salaye	Lofa	Zorzar
25	10/2/06 & 2/19/07	Sucromu	Vavala	Salaye	Lofa	Zorzar
16	2/23/07	Nikebozu	Zeyema	Zorzar	Lofa	Zorzar
20	10/24/06 & 2/17/07	Kpassagisia	Zeyema	Zorzar	Lofa	Zorzar
25	10/23/06 & 2/16/07	Wakesu	Zeyema	Zorzar	Lofa	Zorzar
24	10/23/06 & 2/15/07	Zelemai	Zeyema	Zorzar	Lofa	Zorzar
21	10/3/06 & 1/22/07	Mlintonuo	Boe-Quellah	Tappita	Nimba	Bahn
20	10/3/06 & 1/20/07	Fiaplay	Gbor	Zoe Geh	Nimba	Bahn
16	9/06/06 & 9/29/06	Bayleglay	Zoe	Zoe Geh	Nimba	Bahn
16	10/1/2006	Miaplay Yeazlay	Zoe	Zoe Geh	Nimba	Bahn
18	10/7/06 & 1/26/07	Zahn-Boie	Zahn	Saclepea-Mah	Nimba	Ganta
18	9/27/06 & 1/15/07	Duoplay	Sango-zoa	Gbelaygeh	Nimba	Karnplay
18	9/6/06 & 1/18/07	Slangonplay	Sollay	Gbelaygeh	Nimba	Karnplay
20	9/6/06 & 1/17/07	Gbeh-Bonnah	Sroh	Gbelaygeh	Nimba	Karnplay
25	9/6/06 & 1/15/07	Zualay	Zor	Gbelaygeh	Nimba	Karnplay
23	10/04/06 & 1/24/07	Ganwee	Mehnsonoh	Yarwin-Mehnsonoh	Nimba	Saclepea
21	10/6/06 & 1/7/07	Loyee	Wee	Saclepea-Mah	Nimba	Saclepea
20	10/5/06 & 1/23/07	Beinglan	Mehnsonoh	Yarwin-Mehnsonoh	Nimba	Zoweinta

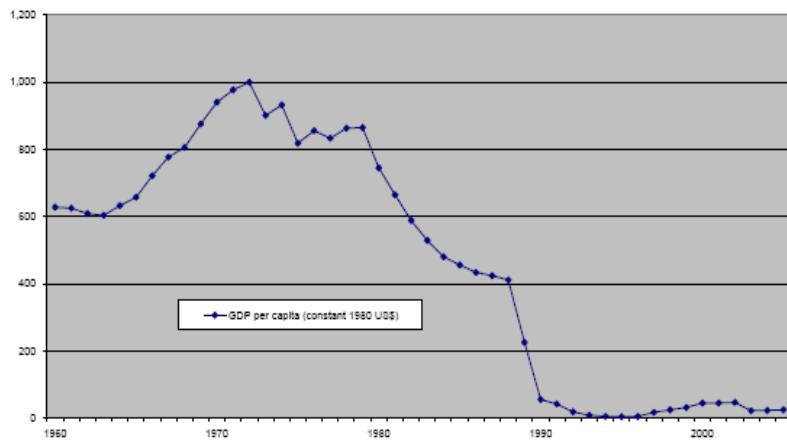
Table 3: Basic Economic and Social Indicators for Liberia by Decade (1960-2000)

Indicator		1960s	1970s	1980s	1990s	2000-2005
GDP per capita (Constant 1980 US\$)	US\$	673	898	495	21	34
GDP growth rate	% p.a.	4.7	3	-4.5	1.2	1.5
GDP per capita growth	% p.a.	1.9	0	-6.2	-3.2	-0.7
Agriculture GDP share	%	23	27	33	66	69
Tree crops as % export value	%	24	18	23		60
Total population		1.05m	1.37m	1.87m	2.14m	3.06m
Population growth rate	% p.a.	2.7	2.9	1.8	3.0	2.0
Rural as % total population	%	78	70	60	51	44
Rural population growth rate	% p.a.	1.8	1.7	0.1	1.2	0.3
Life expectancy	yrs	40	42	44	43	42
Infant mortality	per 1,000 live births	190	180	157	157	
Adult literacy	%				39%	
Total aid	US \$m	280	276	857	1,116	477
Aid as share of GNI	%	13	4	12	26	24
Aid per capita	US\$	24	17	46	50	

Source: World Development Indicators (WDI) World Bank and FAOSTAT. Study estimates NOTE: GDP per capita, GDP growth rate & per capita growth rate, agriculture share of GDP: simple averages Tree crops as percentage export value is the dollar value of rubber, coffee, cocoa and palm exports (FAOSTAT) as a proportion of total exports of goods and services in current dollars: simple averages Total population is population at start of decade Rural as percentage total population, rural population growth rate: simple averages Life expectancy & infant mortality: start of decade Adult literacy is figure for 1990 Total aid, aid as share of GNI & aid per capita: simple averages .

Over the period of the past four decades, the majority of households have experienced little, if any improvement in terms of income; and the civil war years brought for 15 years widespread destruction and appalling loss of life. The trend in per capita income is shown in Figure 1. The economy has never achieved sustained growth for a sufficient amount of time required to lift the country from the low income and high incidence of poverty by which it is characterized. The growth in average income in the 1960s and 1970s was lost by the early 1980s, prior to the collapse of the economy in the 1990s. The poor economic performance has been largely caused by the intransigence of political elite, which has levered political power and public office to generate private wealth at the expense of the well-being of the Liberian people. This in turn, affected the ability of the government in the 1970s and 1980s to undertake its basic functions, expand public services into the interior, and monitor the capacity of monopoly marketing board, and other parastatals, to operate according to their mandates. It also introduced an ambiguity with regard to those private sector enterprises not owned or controlled by the political class.

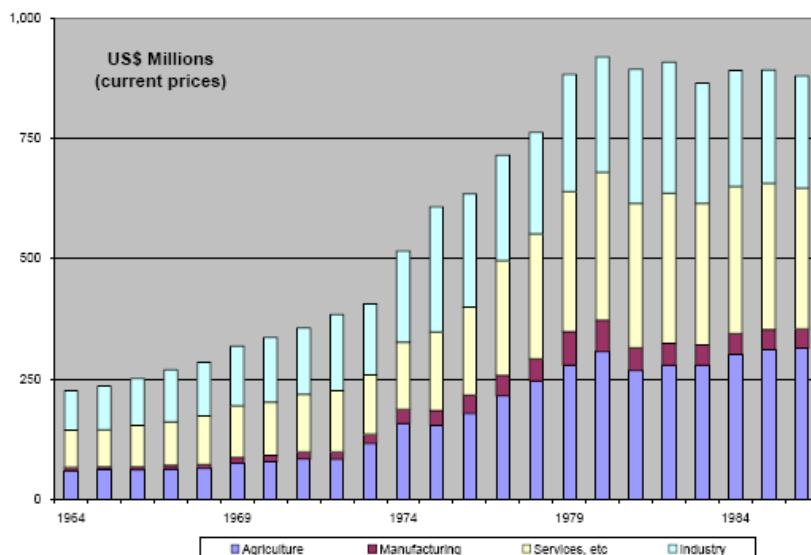
The economy is also characterized by a high degree of inequality. Wide income disparities reflect the differences between the monetized and non-monetized (“traditional”) sectors. For example, in the late 1960s it was estimated that per capita income was US\$218 but subsistence economy incomes were about US\$70 per year (World Bank, 1969). By the mid-1970s per capita incomes in the monetized and the traditional sectors were US\$900 and US\$120 respectively, with per capital incomes for the foreign concessions estimated at US\$2,400. At this time, about one-quarter of GDP each year was repatriated abroad as factor payments (World Bank, 1978).

Figure 1: Trend in GDP per capita, 1960-2005

Source: World Development Indicators and study estimates

From 1960-80s the share of GDP from agriculture was quite low at 30-40%. This reflected the dominance of the natural resource sector primarily from timber and minerals, and low levels of value added in smallholder production, rather than any structural change in the economy (Figure 2 and Table 4). With the collapse of the formal economy, agriculture's share of GDP has risen to over 70%, including forest products (IMF, 2006).

Given agriculture's current share of Liberian GDP, it is important to understand how each sector contributed to the overall economy. According to IMF estimates (IMF, 2006), agriculture and fisheries, excluding forest products, represented between 46-51% of Liberian GDP since 2000 at current prices. In 2005, tree crops (rubber, cocoa, and coffee) represented 22% of Liberian GDP. The two main staples, rice and cassava represented 14%.

Figure 2: Percentage Shares of GDP, 1964-86

Source: WDI
Study estimates

Table 4: GDP, Agricultural GDP and rubber (US\$mil)

Item	1971	1976	1980
Total GDP	429.9	761.8	1055.4
Agriculture	40.2	78.2	159.0
--Rubber	24.0	39.5	61.5
--Forestry	6.4	18.2	47.0
--Other	9.8	20.5	50.5
Mining	124.8	182.6	131.4
Traditional economy	57.5	130.2	214.0

Source: World Bank, 1982

In addition to contributing to Liberian GDP, tree crops have been a significant element of export earnings, especially rubber (Table 5). While timber's share has been eliminated due to sanctions, cocoa's share of earnings has increased, due to reclamation of smallholder farms and the likely influx of Ivorian cocoa (a by-product of the Ivorian civil war that began in 2002 and effectively split the country in half) that presently continues to cross the border into Nimba County.

Table 5: Estimates of Liberian Export Earnings by Product from 2000 – 2005

Product	2000	2001	2002	2003	2004	2005
Rubber	47.5%	42.2%	35.6%	40.3%	90.0%	88.0%
Timber	50.7%	54.1%	60.3%	50.1%	0.0%	0.0%
Cocoa	0.5%	0.4%	0.2%	0.8%	3.4%	5.1%
Coffee	0.4%	0.0%	0.1%	0.1%	0.0%	0.0%
Other	0.9%	3.4%	3.8%	8.7%	6.7%	7.0%
Total exports (\$US millions)	120.3	127.9	166.5	108.9	103.8	112.2

Source: IMF, 2006

In contrast to agriculture's relatively low share of GDP during the 1960-80s, the agricultural sector represented about 80% of employment, both formal and informal. Historically, rubber has been a major source of formal employment with 24,000 jobs on concessions in the late 1960s (World Bank, 1969) and approximately 18,500 at present plus workers on commercial rubber farms (MOF, 2006). Though census figures are not available, it is likely that a greater number of Liberians participate, formally and informally, in the entire tree crop sector providing income opportunities to thousands in the rural areas of Liberia. FAO/MOA (2001) estimates that almost 40,000 households produce cocoa in Liberia.

4. RURAL HOUSEHOLDS

The Liberian population has tripled since 1960, and with relatively high rates of population growth, the population is projected to reach about 5 million by 2020 and double again by 2050. This implies that an economic growth rate of at least 3% per year will be needed for per capita incomes to be maintained, and an annual 9% growth for per capita income to double by 2015.

The rural population as a proportion of the total population has fallen to below 50%, as rural population growth rates have been consistently less than overall population growth rates. Economic dualism has created a demand for (predominantly unskilled male) labour to work on the mineral, timber and rubber concessions. As a corollary, concession policies have also resulted in labour shortages in rural areas. Lack of public education and health services in

rural areas and latterly the reluctance of some displaced groups to return to rural areas have also contributed to the rate of urbanization. Perhaps the rural/urban dichotomy is unhelpful, since there is a high degree of mobility between household members, including temporary and seasonal migration, in addition to children being sent to urban areas, primarily Monrovia, for schooling.

Human development indicators suggest that there has been no improvement in life expectancy and (at best) a marginal improvement in child mortality, albeit from an appalling high rate. Due to a lack of data, Liberia is currently not ranked in the human development reports of the UNDP. Adult literacy is also low by sub-Saharan standards. In the absence of household income and expenditure surveys, the incidence of poverty has not been quantified. However, the recent Comprehensive Food Security and Nutritional Survey (CFSNS) indicates that half the population is either food insecure (11%) or highly vulnerable to food insecurity (40%), and stunting affects 39% of children under five years of age.

The number of agricultural households has risen from about 150,000 (World Bank, 1975) to 180,000 in the late 1980s, and to a range of 150-200,000 in 2006. Table 6 provides a summary of national level rural and agricultural household characteristics from sources.

Secondary data suggests that there are slightly more women than men working on farm, and there is quite a high proportion of the agricultural population working off-farm (about 30%). In 2001, 18% of those working on farm were paid (FAO/MOA, 2001, Table 1.4).

Table 6: Rural and Agricultural households

Item	1986	1987	1988	2001
Rural households	216,300	218,000	219,100	179,800
Rural population	1,285,500	1,294,200	1,303,840	994,930
Agricultural households	178,600	179,600	180,290	151,940
Agricultural population	1,107,200	1,111,900	1,114,440	881,400
Non agricultural rural households	37,700	38,400	38,810	27,860
Population working on farm	760,400	776,100	801,770	
Agricultural farm size (members)	6.2	6.2	6.2	
-- male		371,750	384,140	
-- female		404,350	417,630	
Farming reported as main income source		160,200	160,700	
-- % Agricultural households		89%	89%	
Agricultural population working off farm	346,800	335,800	312,670	113,530
--%	31%	30%	28%	

Source: MOA Production Estimates (1988), FAO/MOA (2001) - Does not include Lofa County.

Interestingly, the highest number of rice producing households and some of the highest levels of population are also located in counties that are traditional centres of tree crop production (Table 7). It seems reasonable to assume these are areas of high agricultural productivity.

Tables 8 and 9 show the households producing coffee and cocoa by county. The highest numbers of coffee and cocoa households are found in Nimba, Bong and Lofa counties. At least 45% of households produced palm oil in the mid-1970s, (World Bank, 1984) with again the highest proportion in Nimba, Bong and Lofa.

Table 7: Rural Population and Number of Rice Farms by County

County	Rural/Semi-urban Population (2005)	Rice Farms (2001)
Bomi	126,006	5,090
Bong	180,703	29,300
Cape Mount	76,000	6,130
Grand Bassa	123,317	13,690
Grand Gedeh	64,727	13,460
Grand Kru	41,117	5,010
Lofa	177,810	-
Margibi	119,881	9,240
Maryland	80,036	6,180
Montserrado	319,680	4,450
Nimba	238,360	41,150
Rivercess	84,236	3,330
Sinoe	56,074	7,210
TOTAL	1,687,947	144,240

Source: FAO/MOA 2001 Study. Note: Population data reflect 2001 county status therefore River Gee is included with Rivercess and Gbarpolu is included with Bomi. Monrovia and its environs are not included.

Table 8: Coffee producing households by County

	1976	1977	1978	1981	1988	% agric h'holds in 1988	2001
Bomi					140	2	50
Bong	3,800	4,700	5,500	4,000	4,850	17	4,450
Cape Mount	1,900	1,900	1,900	1,000	1,890	25	370
Grand Bassa	1,600	1,600	1,600	1,000	1,890	12	320
Grand Gedeh	700	1,000	1,200	2,170	1,700	13	380
Grand Kru					200	4	30
Lofa	12,000	12,700	13,700	12,180	14,800	54	nd
Margibi					440	4	60
Maryland	400	500	500	300	200	3	30
Montserrado	700	700	700	890	100	1	20
Nimba	17,000	17,100	17,600	15,000	22,100	57	5,970
Rivercess					110	2	10
Sinoe	300	400	400	500	100	2	70
Total	38,400	40,600	43,100	37,040	48,520		11,760
Coffee holds % all agric h'holds	25%	26%	27%	19%	27%		8%

As reflected in the data in tables 7-9, it is obvious why Bong, Lofa and Nimba were chosen as the study site for the IITA/STCP/UTK survey. Sections 4.1-4.3 discuss the general household characteristics of survey participants.

Table 9: Cocoa producing households by County

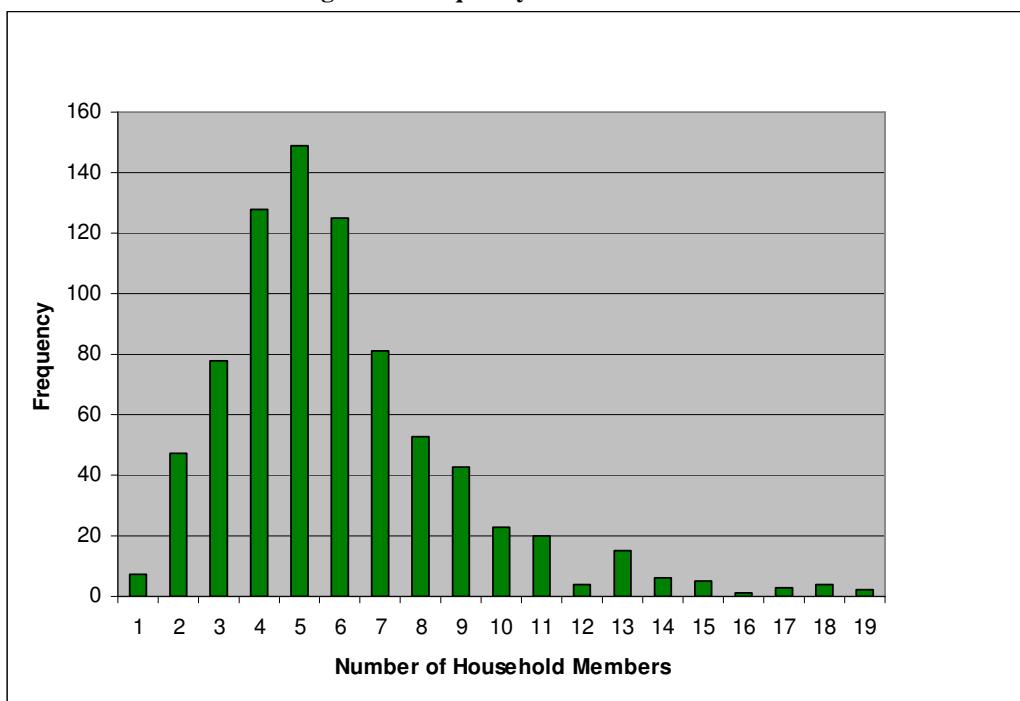
	1976	1977	1978	1981	1988	% agric h'holds in 1988	2001
Bomi							320
Bong	5,300	6,500	7,300	5,575			5,930
Cape Mount	600	700	800	300			220
Grand Bassa	3,100	3,100	3,300	1,765			790
Grand Gedeh	3,900	4,500	4,800	24,0006			1,700
Grand Kru							240
Lofa	8,600	9,300	10,400	8,800			-
Margibi							250
Maryland	2,200	2,400	2,600	4,250			550
Montserrado	1,500	1,700	1,800	1,360			40
Nimba	6,800	7,200	8,100	5,000			9,140
Rivercess							80
Sinoe	700	800	900	950			260
Total	32,700	36,200	40,000	52,000			19,520
Cocoa holds % all agric h'holds	21%	23%	25%	27%			13%

Source: MOA Production Estimates (1988) and FAO/MOA 2001.

4.1. Demographics

Of the 792 households surveyed for the 2007 IITA/STCP/UTK Survey, 80.3 percent of the households surveyed had a head of house that was male, and 19.7 percent had a female head of house. Rural villages in Liberia often follow cultural traditions of male-headed households, with extended families. However, in cases where the male dies, widows may inherit the house and work the farm. The average age for a male head of household was 44.8 years old and the average age for a female head of household was 44.8 years old. Household size ranged from single adults living alone to extended families that counted up to 19 members (Figure 3). The majority of households had 4-6 members.

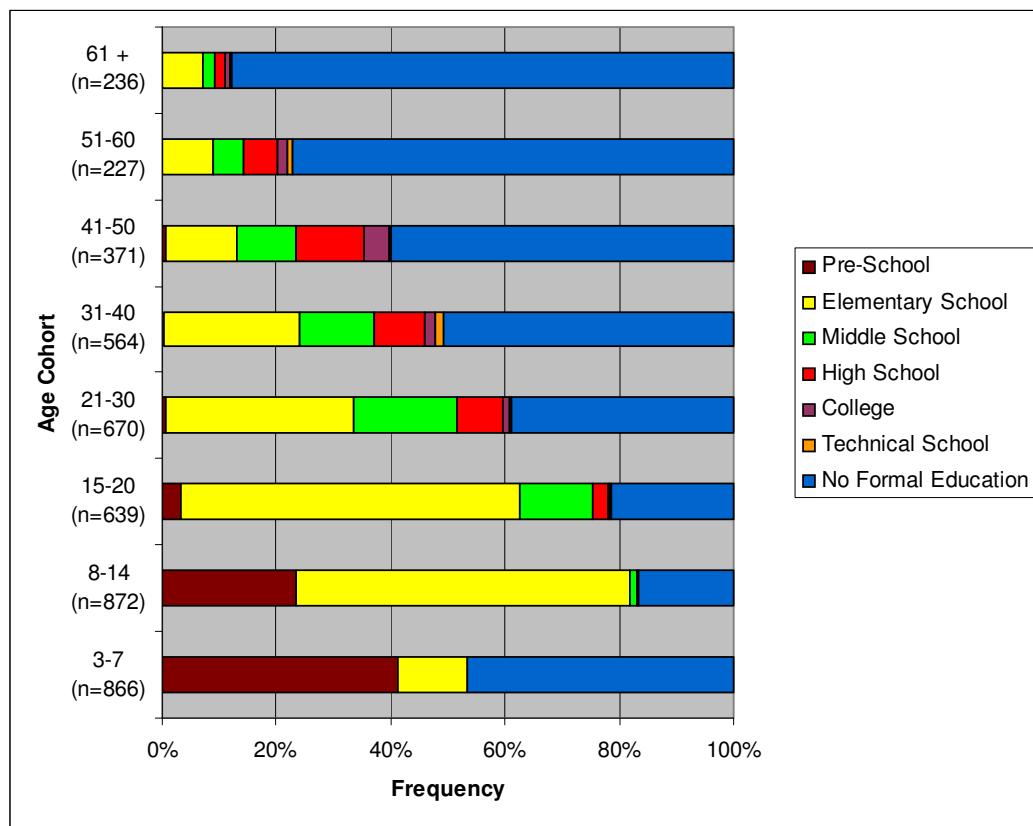
Formal education often starts earlier in Liberia as compared to the U.S or Europe for those rural families that have the means to send children to pre-school (“as soon as the children begin talking”). Children take a variety of subjects, including but not limited to reading, writing, math, and science. While the government will pay the school fees for elementary school and former young combatants, school fees serve as a barrier for rural families whose limited means and daily tasks take precedence.

Figure 3: Frequency of Household Size

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Figure 4 provides the highest level of educational attainment of all surveyed household members by age cohort. Not surprisingly, the vast majority of those household members that were born before 1956 did not receive any formal education. The level of educational attainment increases for the next generation up to the 21-30 year old age cohort. This is the age group that was arguably most affected by the war as they were the primary source of soldiers and schooling was intermittent throughout the conflict. A significant emphasis has been placed on education for the current youth by all segments of Liberian society. This is reflected in the data as more than half of pre-school aged and, roughly 80% of 8-20 year olds, have achieved some level of formal education. Overall, 22% of all surveyed household members over the age of 14 were full-time students.

Despite the current push for education, access to formal education past elementary school is limited for most rural households, even in regard to supplemental agricultural training. Only 16 survey participants indicated that they had received any formal agricultural training. The Sustainable Tree Crops Program- Liberia is working on filling this void for tree crops, especially cocoa, through the creation of Farmer Field Schools (FFS) in Bong and Nimba counties with a planned future expansion into Lofa. Through the 15 farmer field schools created in Nimba County, 349 people have already been trained in integrated crop and pest management as well as cocoa quality improvement. Forty-one female cocoa farmers were among the graduates. The training also included topics on responsible social behaviour (HIV/AIDS and child labour). Currently, 24 new FRS have been established and they should reach up to 700 direct beneficiaries and a farmer-to-farmer (indirect beneficiaries) of 2,100 new trainees throughout Bong and Nimba counties.

Figure 4: Educational Attainment Levels for All Surveyed Household Members by Age Cohort

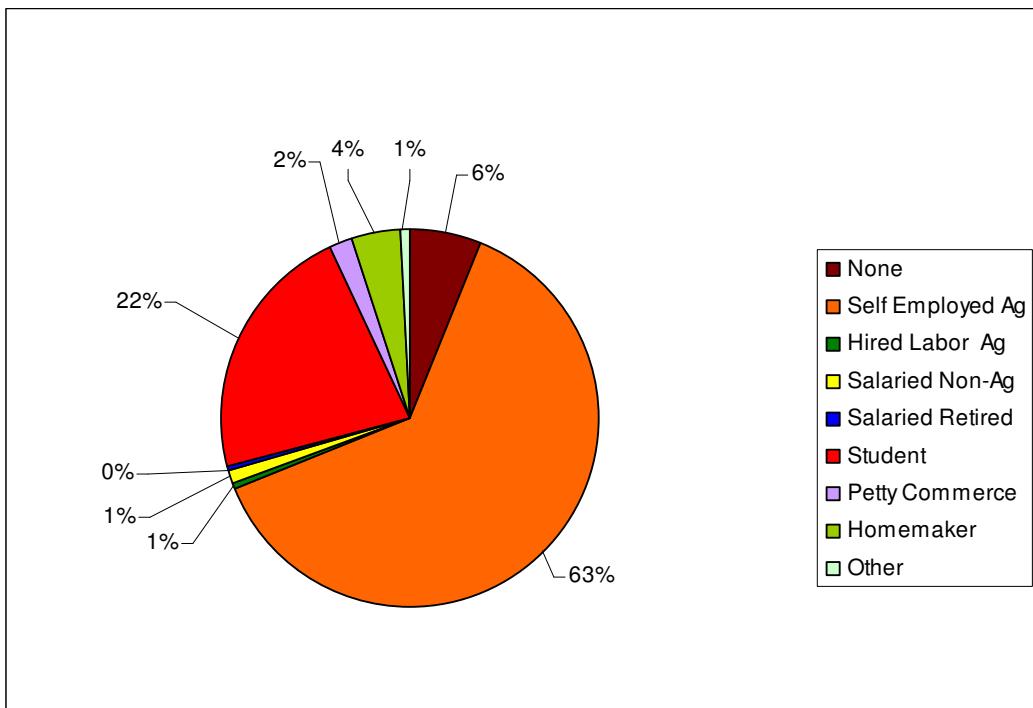
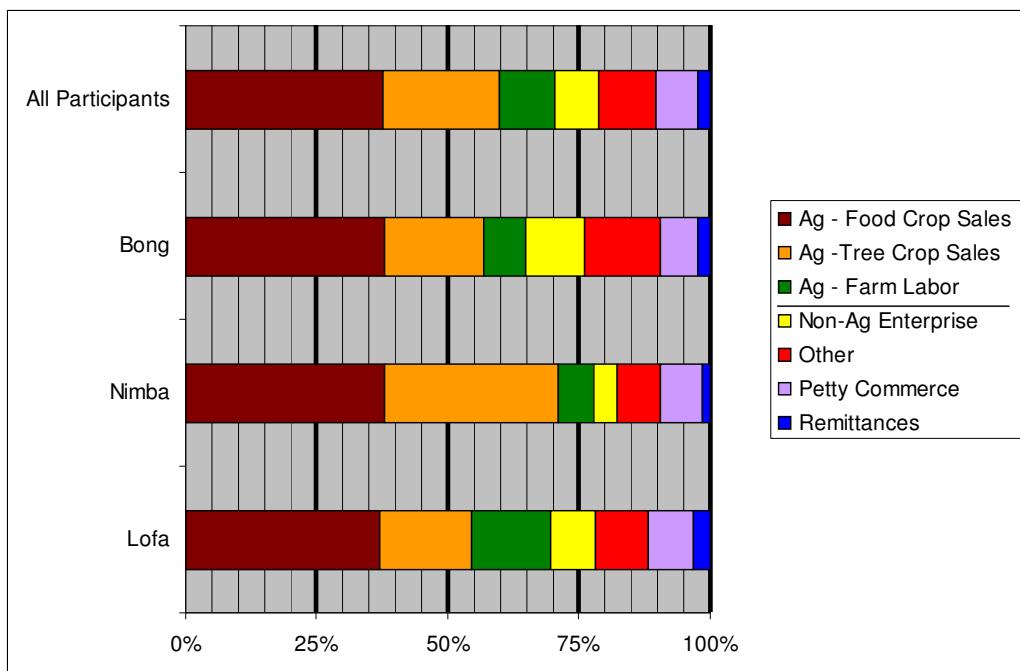
Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

4.2 Income

Income sources for the rural inhabitant are limited by available resources and markets. The principal economic activity for survey participants over 14 years old was, not surprisingly, agriculturally related (64%) (Figure 5). Interestingly, only 1% of those sampled worked primarily has hired farm labour and 2% of household members relied on petty commerce. Four percent of those sampled identified homemaking as their primary activity. Six percent of those sampled were completely unengaged or unemployed.

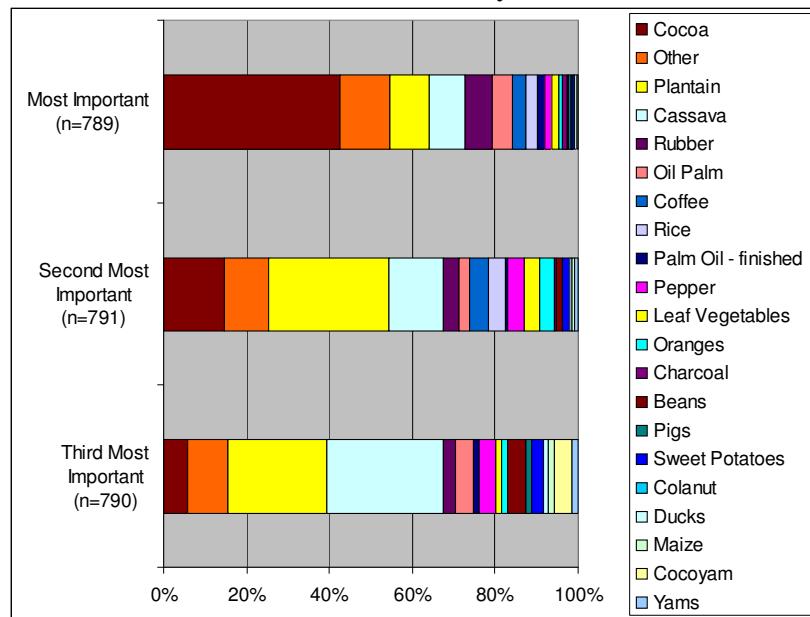
Directly related to the fact that the principal economic activity of the majority of respondents was agriculturally related, nationally, 75% of surveyed household income was derived from food and tree crop sales as well as cash generated by working as on-farm labour (Figure 6). Across the three counties, the relative proportion of income sources was similar except in Nimba where a larger proportion of income was derived from tree crop sales. Other less prominent sources of income included petty commerce, non-agricultural enterprises and remittances from relatives in larger towns or living abroad.

As food and tree crop sales generated almost 60% of household income, respondents were asked to rate the agricultural products that were most important, in terms of total sales, by gender (Figures 6 and 7). Forty percent of males reported that tree crops were the most important product produced versus 3% for females. This gender bias in tree crops has been found in other West African countries as well (see Gockowski, 2001). As was expected, female household members identified a variety of foods crops as being the most important.

Figure 5: Principle Economic Activity for Members of the Households Surveyed Over Age 14**Figure 6: Sources of Income**

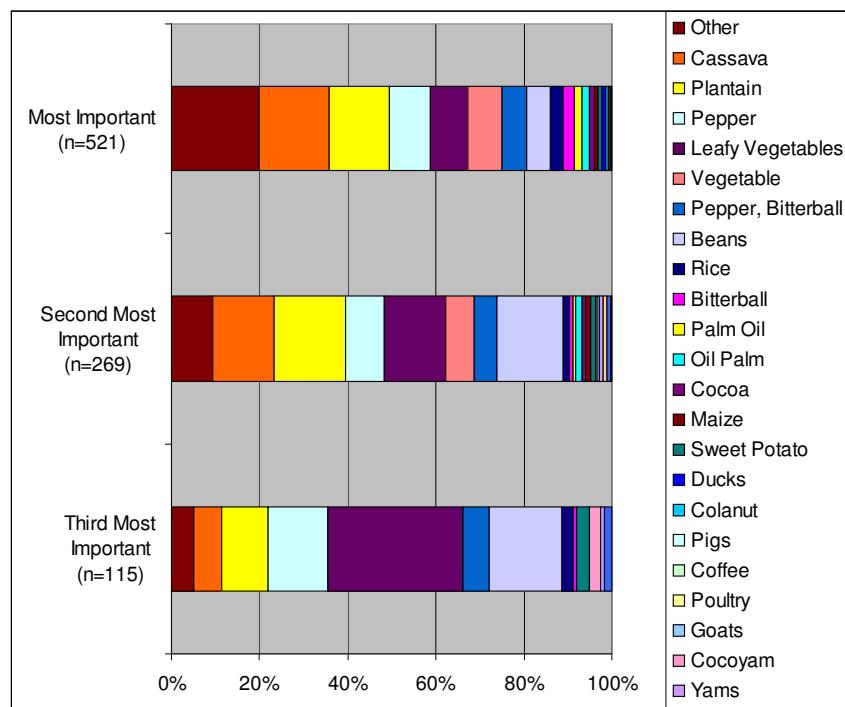
Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Figure 7: Importance of Agricultural Product, by Total Sales. Produced by Males in Households Surveyed



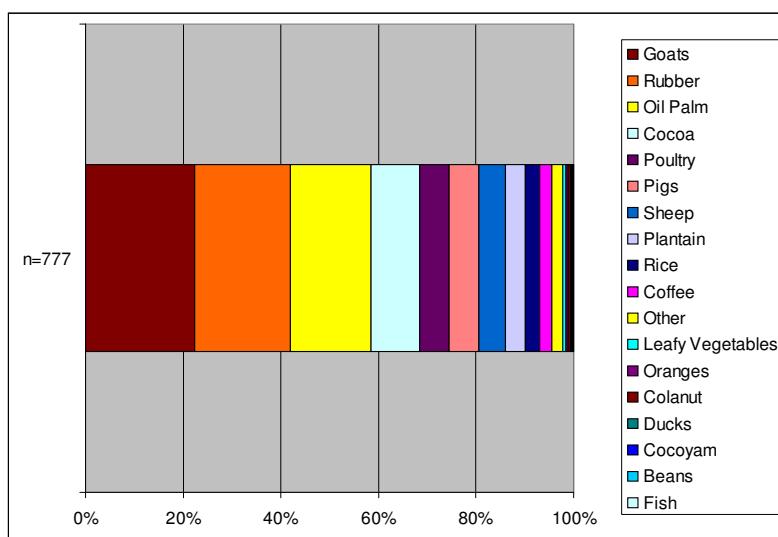
Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

Figure 8: Importance of Agricultural Product, by Total Sales, Produced By Females in Households Surveyed



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

Survey participants were also asked to identify one agricultural product (food crop, tree crop or livestock) that they wish to produce in the future (Figure 9). Goats led all possibilities with 22% of those surveyed. Tree crops (rubber, oil palm and cocoa) combined for just over 45%, with rubber being the most popular tree crop of choice.

Figure 9: Crop or Livestock Surveyed Household Would Choose to Produce

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

4.3 Inputs

Access to a wide range of inputs typically used in an agricultural production setting, such as tools, seeds, tree and animal stock, chemicals and fertilizers is extremely limited. Most farmers do not have the opportunity to purchase them, due to lack of availability, nor can they afford them. Of the 792 households surveyed in the 2007 IITA/STCP/UTK Survey, only two people indicated that they had used any type of agro-chemical or improved animal or seed variety. Of the two that indicated some kind of input, one used fertilizer on their rubber, 1 used insecticide on non-specific trees. Whereas, the number of tree crop farms with improved tree stock was 166 out of 1015 farms over the three counties.

While chemicals and fertilizers are extremely scarce, some farm implements were commonly found in surveyed households. Machetes, hoes and axes were all found in relative abundance. The majority of these common tools were in fair to good condition and ranged in quantity from 1.5 (axes) to 2.7 (hoes) per household for those who reported owning them. In regards to tree crop production, there were no oil presses, only and three knapsack sprayers. Particular to cocoa and coffee, 191 households had cocoa harvesting poles and raffia drying mats. In direct relation with the currently poor quality cocoa being produced by Liberian cocoa farmers, only 43 households reported having fermentation baskets. Tarpaulin appears to be a less frequently used drying method as only 53 households had them available for drying (this is not surprising given the number of households who are currently using tarpaulin from the UNHCR camps as roofing material). Finally, jute bags were not commonly found (1 household). Though ubiquitous through out the major West African cocoa producing countries, much of the Liberian cocoa is sold in plastic “double bags” and other recycled containers rather than the industry standard jute bag.

Lastly, labour availability is an issue (see Section 6 for labour currently available for tree crops). In Bong, Lofa and Nimba, the most common source if labour is from the immediate and extended family. Given that peace has prevailed for the most part since 2003, people are beginning to feel that they will be at their homesteads for a long period time and more food crop farms are being created or taken out of fallow. One significant source of farm labour to achieve this task is village level work groups (Kuu). Kuus are communal/rotational labour

farming groups which help prepare and harvest farms, exist in many places. Participants of the Kuu are often fed by the owner of the farm that they are working on that day. Monetary compensation is not common; however there is an in-trade value that is gained by participating. The concept being that a group works faster than an individual and it helps members to cultivate larger farms than a single person would be able.

Table 10: Available and Current Condition of Tools Found in Households Surveyed

Item	# of Households	n=	% in Good condition	% Fair condition	% Poor	% Unknown	Average Qty Per House
a. Cutlasses/machetes	773	1907	43.6%	40.4%	15.7%	1.2%	2.5
b. Axes	567	868	46.7%	17.0%	7.3%	0.3%	1.5
c. Hoes	645	1735	42.0%	34.2%	16.6%	1.9%	2.7
d. Pruning shears	15	25	40.0%	0.6%	0.1%	0.05%	1.7
e. Oil press	0	0	0.0%	0.0%	0.0%	0.0%	0.0
f. Chainsaw	2	2	50.0%	0.0%	0.05%	0.0%	1.0
g. Knapsack sprayer	3	3	66.7%	0.0%	0.05%	0.0%	1.0
h. Irrigation pump	1	1	100.0%	0.0%	0.0%	0.0%	1.0
i. Cocoa harvesting poles	191	253	61.3%	3.8%	0.8%	0.5%	1.3
j. Jute bags	81	190	62.1%	2.9%	0.1%	0.7%	2.4
k. Tarpaulin	53	58	51.7%	1.2%	0.2%	0.1%	1.1
l. Raffia drying mats	191	287	55.8%	5.1%	1.1%	0.5%	1.5
m. Fermentation baskets	44	63	63.5%	0.9%	0.2%	0.1%	1.4
n. Dibble planting stick	5	5	60.0%	0.05%	0.05%	0.0%	1.0
o. Other	89	103	42.7%	1.7%	1.3%	0.1%	1.2

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

5. LAND USE, AVAILABILITY AND TENURE

Land issues have captured the minds of many Liberians who are just recently returning after years of civil conflict or have found proof of ownership tenuous as others have tried to lay claim. Traditional inheritance of land falls within the members of the extended family, regardless if the inheritors are members of the village. In addition, land issues such as availability may serve to constrain future growth in the agricultural and tree crop sectors as the population continues to rise and congestion in the larger towns may dissuade some rural-urban migration.

Farm size data is often of limited use as it is rarely done systematically using precise measuring tools. Instead, farmer hearsay/belief/guess is often the only available information if the interviewing process is performed at the homestead and no time allotted for field measurements. This affects yield estimates, spacing pattern estimates and other commonly used agricultural production variables.

The main two staples in the Liberian diet are rice and cassava. Only the 2001 FAO/MOA study provides farm size distribution (a) for rice and cassava farms (Table 11), and (b) by county (Table 12). The average farm size for rice 1.18 ha (and 60% of farms are equal or less than this average farm size). Cassava production is skewed towards the smaller farm size classes.

Table 11: Rice & Cassava Farm Size

Farm Size Class	Rice		Cassava	
	Number	%	Number	%
Less Than 0.2 hectare	11,390	7.9	23,610	23.8
0.2 - 0.69 hectare	22,210	15.4	45,830	46.2
0.7 - 1.19 hectares	55,100	38.2	14,190	14.3
1.2 - 1.69 hectares	38,370	26.6	8,930	9
1.7 - 2.19 hectares	9,090	6.3	6,650	6.7
2.2 hectares & Over	8,080	5.6		
Total	144,240	100	99,210	100

Source: FAO/MOA 2001. Data did not include Lofa County.

Assuming equal rice yields (1,200kg per ha) across farm sizes, and an equal number of household members (6), 25% of households are rice-deficit; a reduction in yields to 900kg per ha increases the number of rice deficit households to 60%.

Table 12: Size class distribution of rice farms by county

County	Total	Proportion of rice farms in size classes (ha)					
		<0.2	0.2 - 0.69	0.7 - 1.19	1.2 - 1.69	1.7 - 2.19	>2.2
Bomi	5,090	5%	20%	22%	29%	17%	7%
Bong	29,300	12%	14%	37%	21%	11%	5%
Cape Mount	6,130	11%	19%	33%	24%	7%	6%
Grand Bassa	13,690	2%	13%	29%	46%	2%	8%
Grand Gedeh	13,460	5%	8%	47%	36%	2%	2%
Grand Kru	5,010	4%	23%	46%	15%	8%	4%
Lofa	-						
Margibi	9,240	18%	26%	33%	13%	5%	5%
Maryland	6,180	9%	11%	35%	23%	11%	11%
Montserrado	4,450	11%	30%	32%	9%	7%	11%
Nimba	41,150	7%	9%	45%	34%	3%	2%
Rivercess	3,330	8%	16%	50%	8%	10%	8%
Sinoe	7,210	14%	19%	46%	11%	5%	5%
Liberia	144,240	12,460	20,330	56,710	39,060	8,830	6,850

Source: FAO/MOA, 2001.

These figures indicate a high level of monetization, i.e. the number of paid agricultural workers, the proportion working off-farm⁶³, the number of rice deficit households (presumably purchasing food staples, or selling their labor to cover food deficits) – and the relatively high numbers of households involved in production of export tree crops. The data

⁶³ Fifteen percent of households report members that are labor migrants (average of 1.5 migrants per household), with an equal division between those within own district and county. Ninety five percent of migrant laborers are male. CNSFS.

brings up a number of conundrums: why have food staple households not cultivated more land? Is there a land constraint, particularly for upland farming, or is labor a limiting factor? Without an apparent marketed surplus for many smallholder farms, is investment in tree crops limited to 'better off' households?⁶⁴

The land market is small – only 2% of the population rented or leased land in 2006 – 67% reported having a plot or community land without a deed (Table 13). Unlike tree crop production in Cote D'Ivoire and Ghana share cropping arrangements are exceptional rather than the rule.

Table 13: Population and Land Tenure by County

	Population	%	Type of tenure				
			Personal plot with deed	Personal plot or community land without deed	Rented or leased	Squatter	Other
Bomi	79,398	5%	33%	55%	1%	11%	0%
Bong	180,703	11%	22%	62%	6%	10%	0%
Cape Mount	76,000	5%	60%	24%	2%	14%	0%
Grand Bassa	123,317	7%	6%	78%	0%	14%	2%
Grand Gedeh	64,727	4%	10%	78%	2%	9%	0%
Grand Kru	41,117	2%	0%	99%	0%	0%	0%
Lofa	177,810	11%	0%	97%	0%	2%	0%
Margibi	119,881	7%	52%	24%	7%	17%	0%
Maryland	80,036	5%	5%	83%	1%	9%	1%
Montserrado	319,680	19%	26%	43%	4%	25%	1%
Nimba	238,360	14%	48%	46%	2%	5%	0%
Rivercess	38,916	2%	6%	79%	0%	15%	0%
Sinoe	56,074	3%	3%	91%	0%	5%	0%
River Gee	45,320	3%	1%	89%	0%	9%	0%
Gbarpolu	46,608	3%	17%	70%	0%	13%	0%
	1,687,947	100%	20%	67%	2%	10%	0%

Source: GoL (2006) CFSN Survey. NOTE: In CFSNS report, Population: Table 3 - Population estimate based on voter registration 2005 and Tenure Type: Annex Table 2.4 - data refers to rural and semi-urban populations but does not include Monrovia.

Of the households surveyed for the 2007 IITA/STCP/UTK Survey only four people indicated that they had ever sold land, but in the same regard 99 people have the official title to their land. When explaining how they can farm land without having ownership 338 survey respondents said that it was their traditional/ancestral land, 13 responded that the land was communally owned, 2 responded that they had an arrangement with the village elder and only 1 person was renting their land.

Given the expansion of the area under tree crops, what has been – and what could be their potential role in transforming agriculture? It has been recently estimated based on satellite imagery that there are approximately 5.7 million ha of agricultural land⁶⁵ out of a total land area of 9.6 million ha of which 3.0 million ha (class 2.2) has 10% or greater forest cover (Table 14). This is an expected result in an agricultural system that is dominated by a bush

⁶⁴ About 25% of households cultivated coffee and cocoa in the late 1980s – see tables 8 and 9 above.

⁶⁵ 4.7 million hectares of agricultural land (class 2) plus 0.9 agricultural frontier (class 3.1) plus 0.2 million agro-plantations (class 8).

fallow cultivation. Class 3.1 represents land not only recently cleared as part of the fallow but also the dynamic of the agricultural frontier.

Table 14: Current land cover in 2004

Class	Description	Area (ha)	%
1	Urban	46,047	0.5%
2.1	Predominantly rural agricultural domain	436,747	4.6%
2.2	Agricultural area with small forest presence	3,042,091	31.7%
2.3	Mixed agricultural and forest area	1,317,873	13.7%
3.1	Agriculture degraded forest	949,615	9.9%
3.2	Open dense forest	1,013,993	10.6%
3.3	Closed dense forest	2,424,078	25.3%
5	Free water	7,649	0.1%
6	Savanna or bare soil	13,312	0.1%
7	Coastal ecosystem complex	161,390	1.7%
8	Agro-industrial plantation	178,294	1.9%
	Total	9,591,088	100.0%

Source: FRM

The FRM study also includes the results of a comparison of land cover over a 25-year period, between 1979 and 2004. Making due allowances for (a) differences in area (the 1979 estimates are based on an aerial survey, and covered only 90% of country missing some areas of the south-east) and (b) the lack of precise comparable land use definitions, the study estimates that 17% of the forest cover was lost over the period (see Table 15).

The results seem to indicate an expansion in the extensive margin (at the cost of a loss in natural forest). But this requires more detailed analysis at a county level, as cropping patterns change for in response to demand for land and market opportunities (input and output prices) and constraints (availability of labor and land). Establishing tree crops does confer a degree of ‘proprietorship’ to land, and if established in tribal communal land areas would imply either a displacement of the bush fallow (extensive margin) or an inducement for further agricultural intensification. The comparison of the 1979 and 2004 data suggests that 50% of class 2.2 is under a more intense (shorter) fallow or - to the extent that some (unknown) proportion is under tree crops or swampland rice - is now permanently cultivated. This might be expected in areas where land pressure is highest. This is supported by the IITA/STCP/UTK survey results which took place in high population counties and the data suggests that average fallowing has been reduced to less than six years, from the “rule of thumb” 10 years (Table 16).

Globally, if it is assumed that there are 200,000 agricultural households with on average 2 hectares per household and the fallow period is 10 years, then about 4 million hectares is occupied. Locally, the availability of arable land could be already constrained. Increasing population pressures will either result in a further loss of natural forest and/or land use intensification.

Table 15: Change in land cover, 1979-2004

<i>Land use 2004</i>			<i>Land use 1979</i>								
Area (ha)	%	Class	Forest	Extensive shifting agriculture	Intensive shifting agriculture	Other cultivated areas	Plantations, Tree Crops	Savannah	Towns & settlements	Water& marsh	Area (ha)
46,047	<1%	1	n.s.	n.s.	20,823	n.s.	5,053	--	13,554	n.s.	42,370
436,747	4.6%	2.1	15,857	30,092	297,313	3,241	21,184	n.s.	n.s.	n.s.	369,082
3,042,091	31.7%	2.2	275,987	585,088	1,827,877	13,302	27,118	17,103	n.s.	2,134	2,749,141
1,317,873	13.7%	2.3	366,432	415,440	378,341	n.s.	n.s.	n.s.	--	n.s.	1,162,018
949,615	9.9%	3.1	395,204	305,310	101,180	n.s.	n.s.	--	--	n.s.	804,247
1,013,993	10.6%	3.2	879,294	75,412	9,877	--	--	--	--	--	964,582
2,424,078	25.3%	3.3	1,846,147	204,749	27,946	n.s.	n.s.	n.s.	--	n.s.	2,080,636
7,649	<1%	5	--	n.s.	2,033	--	n.s.	--	n.s.	n.s.	3,212
13,312	<1%	6	5,391	n.s.	3,329	--	--	n.s.	--	n.s.	11,377
161,390	1.7%	7	n.s.	6,939	40,236	n.s.	2,565	--	n.s.	11,514	62,613
178,294	1.9%	8	6,804	3,250	69,844	n.s.	83,378	--	--	--	163,878
9,591,088	100.0%		3,791,608	1,630,066	2,778,800	19,549	142,104	19,553	15,300	16,175	8,413,155
			45%	19%	33%	<1%	2%	<1%	<1%	<1%	

Source: FRM. Totals may not sum because of rounding errors.

Table 16: Average Number of Years of Field Cropping and Fallowing By County

County	Average Cropping (years)	Average Fallowing (years)
Bong	1.083	5.625
Lofa	1.107	5.742
Nimba	1.48	5.66

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

5.1 Land Tenure for Agricultural Crops

Despite the traditional means of land distribution and tenure in the rural areas of Liberia, the conflict years have brought land tenure issues to the fore in some areas of the country. While taking rural land through eminent domain by the government for economic development purposes doesn't currently appear to be on the horizon, many returnees are taking stock of the land tenure situation. Obviously, if there is any perceived risk regarding land tenure, rural household will be less likely to make any kind of long term investment or attempt to sustain productivity.

Land tenure for food crops in the Bong, Lofa and Nimba regions appears to be strongly rooted in traditional means of land acquisition (inheritance and communal land arrangement) (Figure 10). Though the source of land acquisition varies across food crops, 80% were acquired through traditional means for all food crops. As was mentioned for tree crops above, sharecropping is not common. Very few households reported using legal means of obtaining rights through purchasing or renting. Even fewer attempted to secure rights through informal arrangements such as borrowing or squatting. This generally conforms to the data presented in Table 13 however, not as many respondents in Bong and Nimba mentioned having a deed as might have been expected.

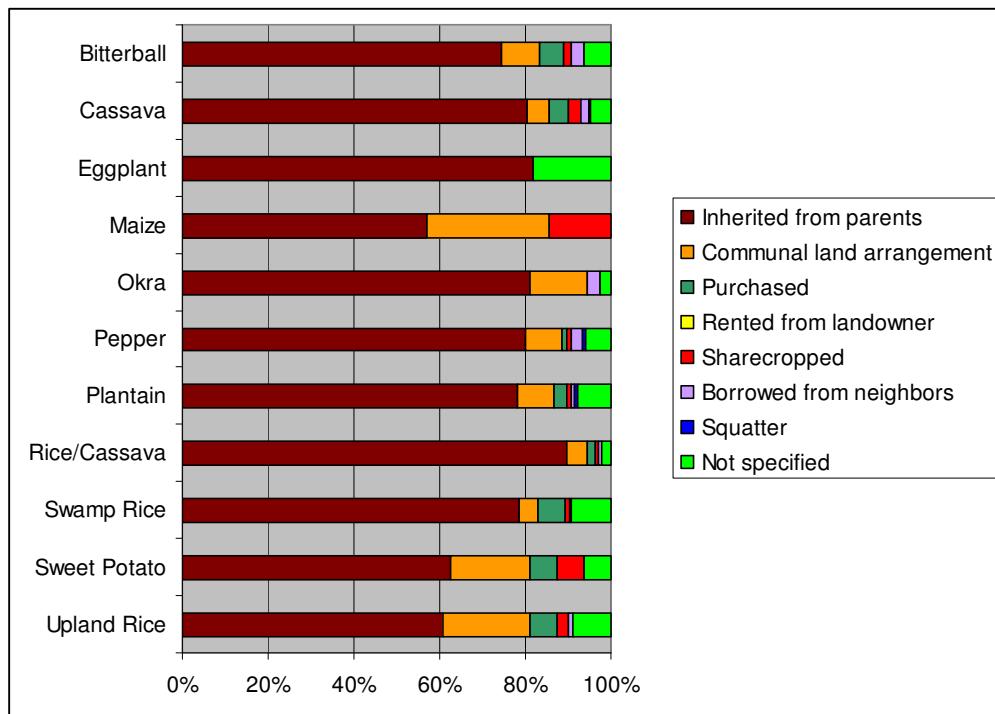
5.2 Land tenure and tree crop development

What impact has land tenure policy had on tree crop development? Liberia has a dual tenure regime, with private rights granted under the statutory "fee simple" tenure system established by the settler elite for the purpose of cash crop production primarily in the coastal lowlands on concession and private farms, together with mining and timber concessions in the interior, and with customary tenure governing the indigenous populations in the hinterlands. The descendants of the settler elite initiated indirect rule through local chiefs, reinforcing a rural elite who have used customary law including obligatory labor (voluntary, unpaid) and enforced labor (involuntary, paid), marriage arrangements and other arbitrary fines control the labor of rural youths through labor debt payments (Richards and Bah).⁶⁶ Enforced labor, which superseded domestic slavery (which itself was only legally abolished in 1930), has been used to accumulate land holdings and to supply labor for plantation development. Concurrently traditional land holdings have been lost to forest,

⁶⁶ Customary and religious law governs family issues. Such laws do provide an instrument that provides women with access to land (customary usufruct rights), but there has been a tendency for their application to discriminate against women, especially in the areas of marriage and inheritance. Revealingly, the passing of a new marriage law was one of first actions taken by the National Legislature in 2003.

mining and plantation concessions, and private land has been allocated (deeded) on customarily managed land (tribal areas).⁶⁷

Figure 10: Sources of Land Acquisition for All Food Crops Produced by Surveyed Households (n=775)



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Historically, tenure regime and related labor practices has favored the establishment of the rubber sector, permitting foreign investors to lease large tracts of land, and Liberian farmers to purchase land. Subsequently the development of infrastructure (particularly roads) has led to tribal land purchases and speculation. Consequently, the relative cheapness of land has encouraged some localized areas to be unutilized and inaccessible to smallholders.

The high proportion of smallholders who have engaged in coffee and cocoa production suggests that for these households the customary regime has facilitated and not hindered tree crop development. But questions remain about the accessibility to land for those households who have not engaged in tree crops, the extent of any possible displacement effects, and the impact of policies on the intensification of production, and the expansion of the agricultural frontier.

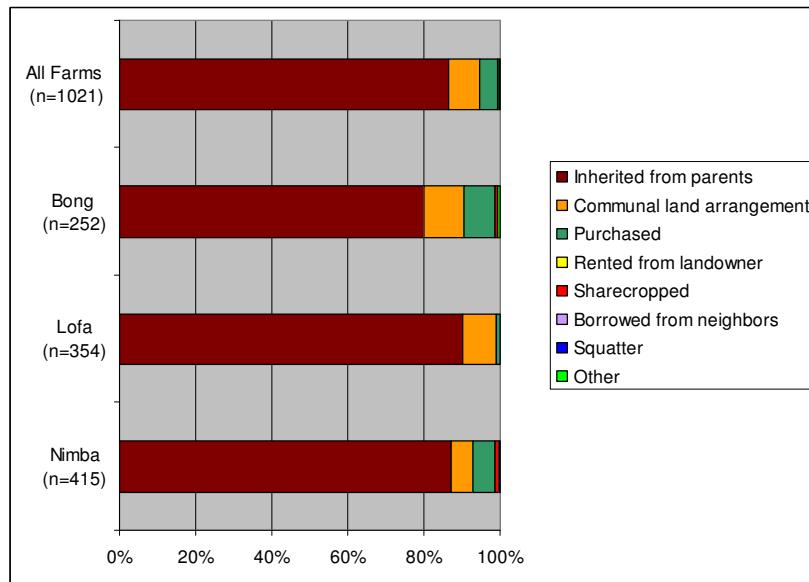
Currently, perennial tree crops provide an interesting situation as much of what was left during the war is still there (though in desperate need of rehabilitation), thus possibly leaving stake in ownership or providing impetus for another to rehabilitate for their own uses.

As with the food crops, the vast majority of land in tree crops is owned through traditional means (Figure 11). There is some variation across counties as virtually all of the land in tree

⁶⁷ A recent request by FDA for deed holders on forest areas to present their deeds has revealed 3.3 million hectares has been claimed (an area equivalent to the permanent forest estate). John Woods, Managing Director (FDA), personal communication.

crops in Lofa is traditionally owned (as would be expected from Table 12), while 5% was purchased in Nimba and nearly 10% in Bong.

Figure 11: Sources of Land Acquisition for Perennial Tree Farms Produced in Surveyed Households



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

6. AGRICULTURAL PRODUCTION

The performance of smallholders' tree crop production is determined in part by the imperative to produce food crops for own-consumption and if possible for the market, and by the incentive effect of government policies with regard to tree crop marketing and pricing, international commodity prices, and tenure regimes (statutory and customary). Surveyed farmers indicated in some circumstances, that they would sacrifice own-consumption in order to sell food crops in the market for cash in hand. Trends in production of tree crops and the two main staple food crops are shown in Table 17.

Table 17: Change in per capita production (kg) of major food and export crops

Product	1960s	1970s	1980s	1990s
Rice	112	145	136	52
Cassava	212	171	152	121
Rubber	43	53	44	18
Coffee	3.6	3.9	4.0	1.2
Cocoa	1.1	1.8	2.3	0.4
Oil palm	9.0	8.2	3.5	3.2

Source: FAOSTAT

Study estimates: simple averages

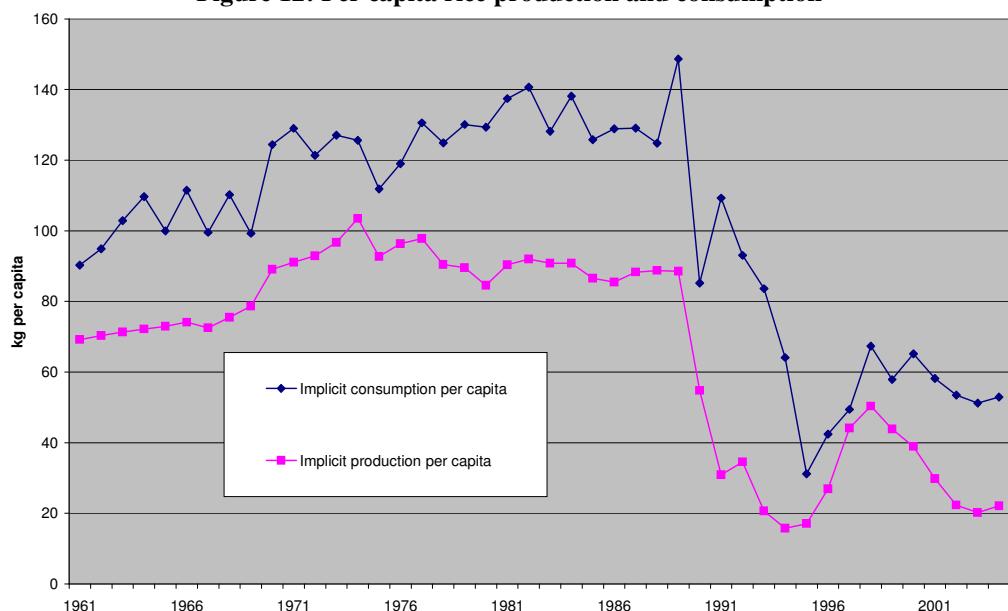
Per capita rice production rose steadily through the 1960s and 1970s before declining slightly in the 1980s (albeit still at a level above minimum requirements). Cassava production shows a downward trend, but less than rice in the 1990s (reflecting its role perhaps as a poverty crop). Food crop production therefore seems to have kept pace with the rise in population, at least until the late 1980s, but not with the rise of urbanization (including the population on concessions), as shown in Figure 12. Of the tree crops, cocoa

made progress in the 1960s and 1970s with per capita production doubling by the 1980s.⁶⁸ Rubber and oil palm fell slightly in the same period. Production trends reflect, to a large extent, the pattern of international prices for these tree crops over the same period (see Section 7).

As has been mentioned previously, rice and cassava are by far the most common staple crops in Liberia, with rice being the very base of the Liberian diet. Acquiring such staples is a very important part of overall household food consumption. So much so that rice prices are determined by the government.

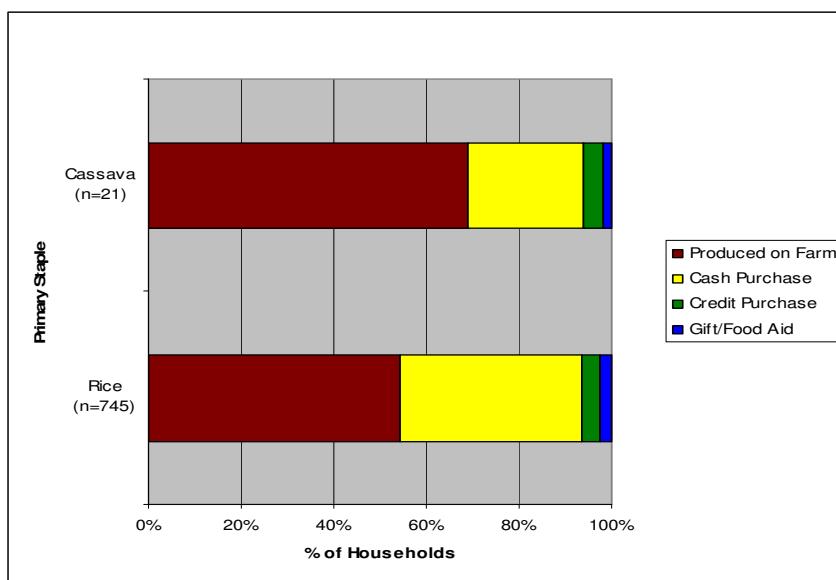
Currently, rice production has dwindled, relative to years past, due to the war and arguably the influence of an influx of cheap rice from Asia. Despite this, survey participants reported that over 50% of the rice consumed at home is grown on their own farms (Figure 13). However, another 35% of consumption is purchased. This necessitates a deviation from the traditional subsistence consumption in rural areas and requires rural families to have a source of cash income, in order to supplement lower rice production. Other, less prevalent means of securing rice for home consumption includes purchasing on credit and accessing what food aid continues to enter Liberia. Though far fewer families identified cassava as their main staple (n=21), the relatively same proportions apply.

Figure 12: Per capita rice production and consumption



Source: FAOSTAT
Study estimates

⁶⁸ It is interesting that there were about 7,000 hectares of both coffee and cocoa in the early 1960s – in spite of the lack of government services (inputs, extension or credit programmes), and presumably with a poor road network.

Figure 13: Share of Staple Food Acquisition Method by Staple for Survey Participants

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

As mentioned previously, tree crop production appears to be a relatively male dominated enterprise. In contrast, women are traditionally tasked with tending food crops for household consumption and surplus sales. Interestingly, when asked, most food crops appear to be the responsibility of each family member, regardless of gender. Field observations lead one to believe that not all of this work is done side by side. Tasks are often metered out by gender, but some of the larger tasks, such as preparing a new farm for production, are a family affair. This suggests that the lack of market incentives discussed in Section 7, coupled with increasing household consumption pressures, may work against the wholesale adoption of tree crops as a significant income source as males are drawn toward the food crop and other sectors.

Table 18: Field Responsibility by Gender

Field Type	Total Households	Women	Men	Both	No Response
Upland rice field	114	25.44%	2.63%	68.42%	3.51%
Sweet Potato Field	14	14.29%	7.14%	71.43%	7.14%
Swamp rice	233	21.03%	4.72%	67.81%	6.44%
Rice/Cassava/Mixed Food Crop Fallow Rotation	508	12.80%	3.35%	83.86%	0.00%
Plantain field	164	10.37%	19.51%	67.68%	2.44%
Pepper field	156	19.23%	1.92%	77.56%	1.28%
Okra field	37	16.22%	0.00%	83.78%	0.00%
Maize field	7	0.00%	0.00%	85.71%	14.29%
Eggplant field	11	18.18%	0.00%	63.64%	18.18%
Cassava field	214	17.76%	0.47%	79.44%	2.34%
Bitter Ball field	108	18.52%	0.00%	81.48%	0.00%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

As food crop production is re-established in Bong, Lofa and Nimba, rural households are also trying to re-establish livestock endowments that were completely decimated during the war. Livestock holdings provide an opportunity for rural households to generate income through meat, breeding stock and young livestock sales. Not only is livestock production an important source of protein for the household, it can also take the pressure off sources of

bushmeat that have been under distress for some time. Not surprisingly, chickens represent the most common livestock holding among survey participants (Table 19). In an effort to maintain a flock, a large majority of household have at least a breeding pair. Ducks are also another common animal as both chickens and ducks are expert scavengers and readily accept free-range conditions. Pigs and goats are also fairly common. Ruminants, such as sheep are less common and cattle are very rare among rural households in the three counties surveyed.

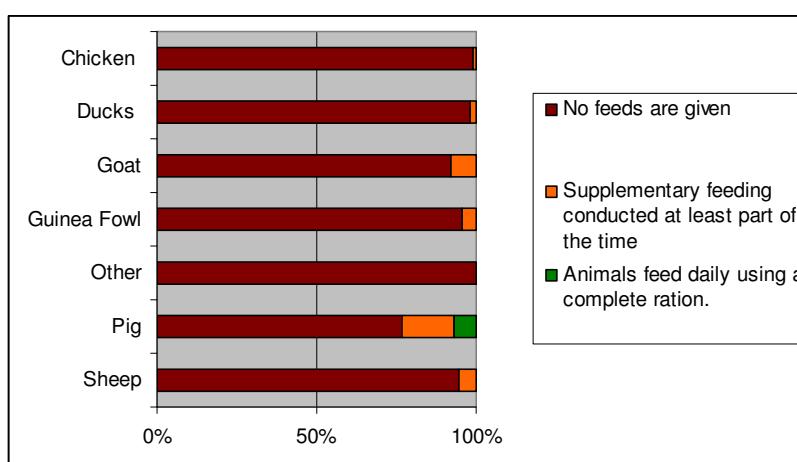
Table 19: Animals Owned by Households Surveyed

Livestock	# of Households	Sum	Average Per House	Ratio F/M	# of Households that have at least a pair
Female – Chickens	522	3228	6.2	2.0	457
Male – Chickens	462	1463	3.2		
Female – Pigs	112	349	3.1	1.3	81
Male – Pigs	85	199	2.3		
Female – Goats	148	338	2.3	1.5	90
Male – Goats	96	143	1.5		
Female - Sheep	61	132	2.2	1.5	39
Male – Sheep	40	59	1.5		
Female - Guinea Fowl	20	36	1.8	1.2	16
Male - Guinea Fowl	18	27	1.5		
Female – Ducks	158	566	3.6	1.5	118
Male – Ducks	121	280	2.3		
Female – Other	4	5	1.3	1.3	91
Male – Other	3	3	1		

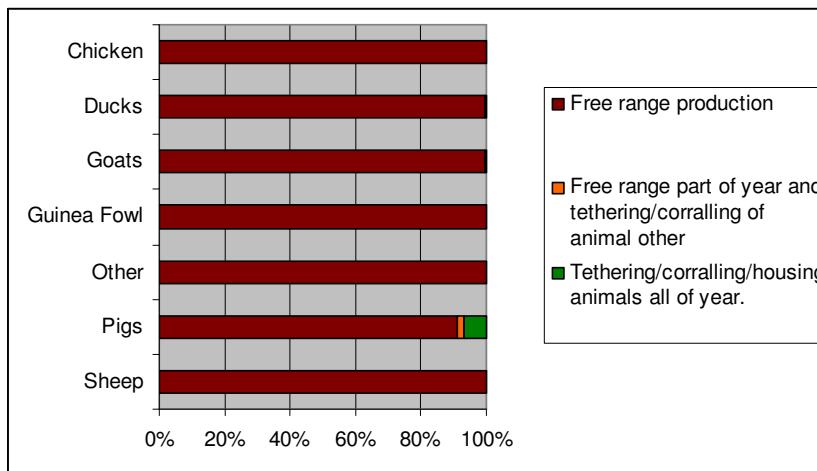
Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Though livestock production is relatively established, management practices remain rudimentary and are almost exclusively free-range in both feeding and housing (Figures 14 and 15). Apparently, only semi-intensive pig production has taken even the slightest foothold in the rural tree crop producing areas. This suggests that livestock production may serve as an income source without current competing with other agricultural ventures with regard to available capital or labor resources. However, with free-range management the farmer risk is higher to losing livestock to thieves, cars and predators.

Figure 14: Farm Animal Feeding Practices Employed by Surveyed Households



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Figure 15: Livestock Housing Management Practices for Households Surveyed

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7. TREE CROPS

Tree crops have been grown on a range of production systems in Liberia: *smallholder farms* with food and export-crop production (predominantly coffee and cocoa and more recently rubber), plus oil palm (both for own-consumption and for the market) and to a lesser extent coconut; *commercial farms* mainly established for rubber, but also diversified into coffee, cocoa, and oil palm; parastatal corporations, namely the Liberia Produce Marketing Corporation (LPMC), the Liberia Coffee and Cocoa Corporation (LCCC), and the Liberia Palm Products Corporation (LPPC); and rubber production on *foreign-owned concession* plantations.

Table 20: Change in primary commodity world prices

Tree Crop	1960s	1970s	1980s	1990s	2000-2005
Rubber	-5.4%	11.8%	-1.6%	-2.7%	14.8%
Cocoa	1.7%	19.6%	-7.5%	-0.6%	6.5%
Coffee	1.4%	17.4%	-6.4%	0.8%	-5.7%
Oil palm	-1.1%	12.6%	-4.6%	3.9%	1.3%

Source: IMF, Financial Statistics

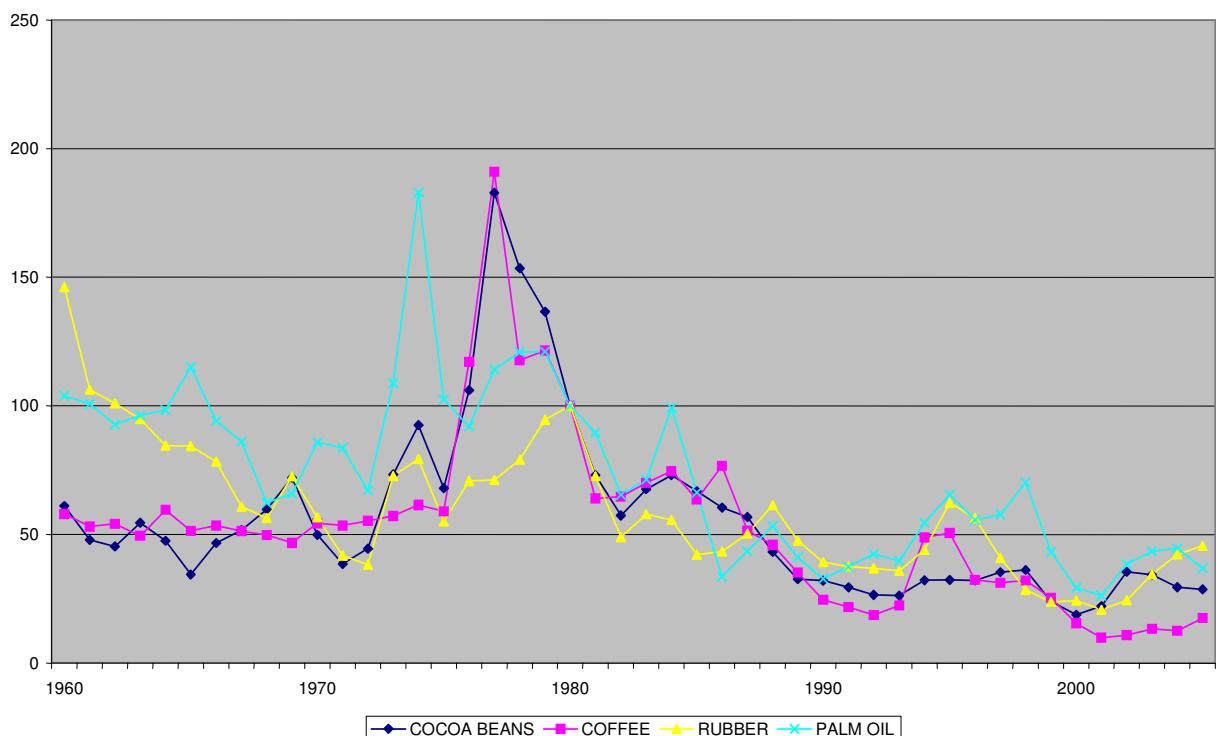
Study estimates: simple averages

World market prices for tree crops have shown a high degree of volatility over the period of the past four decades, around a long-term secular decline in prices (Table 20 and Figure 16). These trends reflect both oversupply in agricultural commodity markets, and the more recent concentration in supply chains (State of Agricultural Commodity Markets, FAO). Liberian tree crop producers have experienced a roller-coaster ride in terms of nominal export unit prices, but present nominal prices for rubber and oil palm are similar to those prices of 30 years earlier, whilst relative coffee and cocoa price trends have reversed (Figure 17).

The domestic Liberian rubber market has been largely determined by Firestone, with the other concessions following its lead, therefore pricing policy has been described as oligopsonistic. For all other tree crops the LPMC has had a marketing and export monopoly and followed a pan-territorial pricing strategy. How has pricing policy managed these

international price effects? In an unregulated market producers would receive the international prices less marketing and transport costs. Changing and unpredictable prices would be expected to discourage those producers seeking to reduce risk and uncertainty. Given the volatility of prices in the 1970s and 1980s tree crop producers would have been expected to adjust their output accordingly, and from the 1980s, to switch resources from these crops. However, switching costs and the perennial nature of tree crops meant that after more than a decade of civil strife during which the trees were abandoned, many of the pre-war trees still stand today. With LPMC setting prices and purchasing produce, there was little, if any, built-in shock absorbers to ensure commensurate pricing for smallholder farmers and LPMC's position allowed them to take a lion share of the marketing margin.

Figure 16: World market price indices for tree crops, 1960-2005 (1980=100)

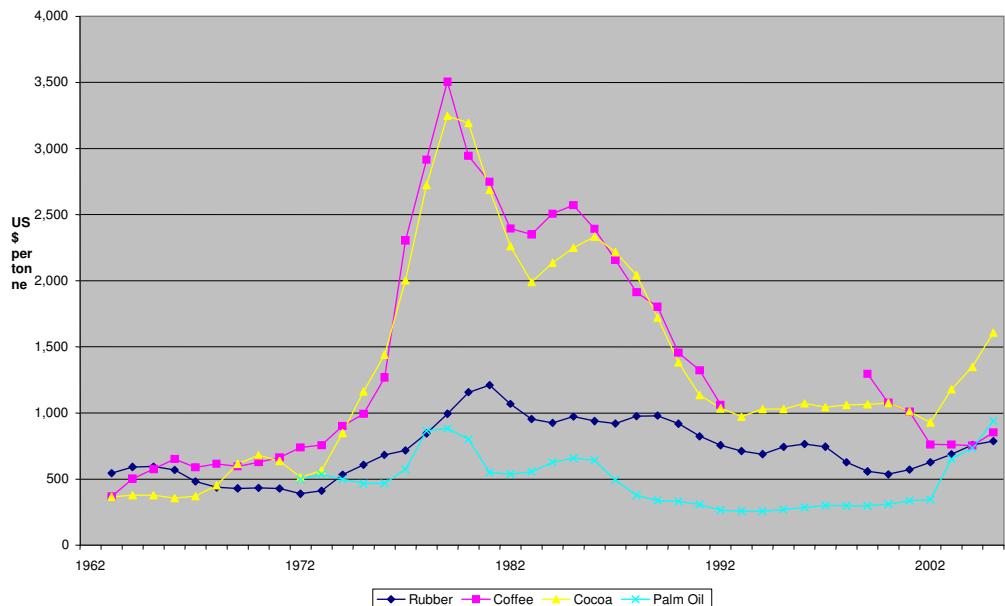


Source: IMF, WDI.

Study estimates. Nominal prices by deflated by US GDP deflator

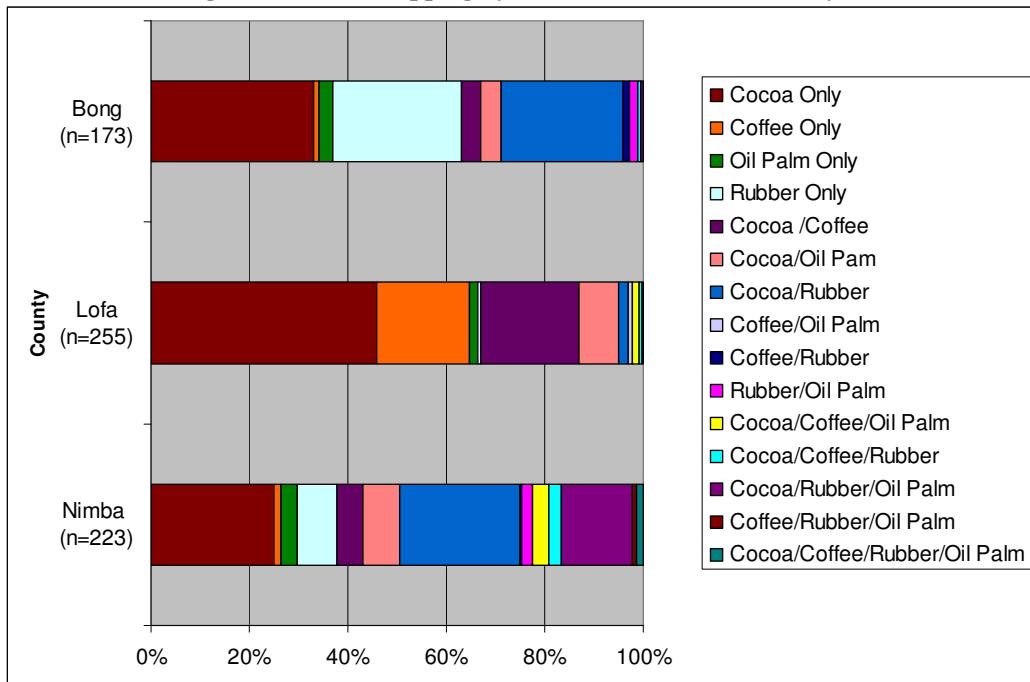
One aspect of tree crops that inherently aids farmers with price risk is the capacity to diversify their tree crop holdings. Currently, many farmers have branched out into farming more than one perennial tree crop system (Figure 18) according to the IITA/STCP/UTK survey. Although, approximately 35% of all farmers surveyed farmed only cocoa, it is important to note that cocoa is often associated with secondary food crops interspersed among the stand, while other tree crops (esp. rubber) are mostly monocultured. Lofa had the highest proportion of cocoa only tree crop portfolios while farmers in Nimba were much more likely to have multiple tree crops, especially a combination of cocoa/rubber or cocoa/rubber/oil palm. Bong had the largest proportion of rubber-only farmers.

Figure 17: Liberia nominal export unit prices, 1962-2005



Source: FAOSTAT

Figure 18: Tree Cropping Systems for Households Surveyed



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Household tree crop portfolio diversification can assist farmers with market fluctuations provided one market has an upward trajectory that can offset any downturns in another market. Market prices for both rubber and oil palm have seen significant increases over the past 5 years; in both cases the immediate forecast is for prices to soften (see Table 20). Rubber prices are expected to average US\$1.92 per kg, and oil palm US\$425 per tonne in 2007. Natural rubber markets are closely related to the price of crude oil and therefore synthetic rubber prices. Similarly, oil palm prices are related to its oil and oilseed substitutes

for food, in particular soybean oil. Palm oil also has a variety of uses which vegetable oil cannot satisfy. New markets are emerging for oil palm as a biofuel, but the extent of these markets is unclear and there will be competition from both temperate and tropical crop substitutes. Expected short-term coffee prices are not encouraging, even maintaining current (low) price levels is forecast to be unlikely. Robusta prices are expected to average US\$1.26 per kg during 2007 and fall to US\$1.21 per kg in 2008. Cocoa prices continue to fluctuate largely in response to the political uncertainty in the Cote D'Ivoire. Cocoa prices are expected to average US\$1.62 per kg in 2007, but in the medium-term face a slow downturn due to oversupply. Cocoa and coffee producers also face continuing pressure on their share of the final retail price of these commodities. Liberia will continue to be a price-taker for all these tree crops and, at the same time, will struggle to command even these average prices due to its present inability to meet the standards for high grades.

The longer-term outlook is not encouraging with all the major commodities traded by Liberia under price pressures (Table 21). However, tree crops still represent an opportunity for rural Liberians to diversify their income streams while satisfying food security needs through intercropping.

Table 21: Commodity price forecast (2005-2015)

Product	2005	2006	2007	2008	2010	2015
Cocoa, c/kg	144	140	140	140	140	128
Coffee, robusta, c/kg	104	120	111	107	90	104
Coconut oil, US\$/mt	576	543	500	475	429	441
Palm oil, US\$/mt	394	398	385	384	364	370
Rice, Thailand, 5%, US\$/mt	267	281	288	269	232	216
Logs, Cameroon, US\$/cum	0	0	301	303	304	320
Rubber, RSS1, Singapore, c/kg	140	204	183	172	151	147
Iron ore, c/dmtu	61	70	67	56	43	33

Source: World Bank Development Prospects Group (October 31 2006).

7.1 Rubber

Rubber has become synonymous with Liberia since the first concession agreement was signed by the Government with the Firestone Company in 1926. Production began in 1935. The plantation is the largest in Liberia, and it is also the world's largest contiguous industrial rubber plantation. There was a hiatus in the development of rubber plantations until the 1950s when seven additional concessions were granted. These were all initially owned and operated by foreign business interests. Firestone supported an outgrower scheme during and after the Second World War, which became the nucleus of the Liberian owned rubber sector. Other concessions, along with Firestone, also promoted commercial Liberian companies and individual farmers.⁶⁹ The contribution of Liberian farms has been significant through the concession-driven provision of planting materials on credit and exclusive purchasing agreements. However, because of the military coup in 1980, and later the civil war, only three of the plantations were left with uncontested ownership and management. A

⁶⁹ The Liberian commercial rubber farms are "owned almost exclusively by the urban elite" (World Bank, 1975). As evidenced by the IITA/STCP/UTK survey, rural smallholders are now entering the market as indicated by the recent expansion in rubber tree stock discussed in Section 7.2.2.

number of private farms were also confiscated by the state in 1980, and their present ownership status is unknown.⁷⁰

Table 22: Trends in the Rubber Industry

Item	Unit	1960s	1970s	1980s	1990s
Area harvested	ha	85,167	101,383	100,533	46,367
Production	tonnes	54,429	82,219	90,934	45,487
Export value	US\$ m	27.0	52.4	83.9	30.2

Source: FAOSTAT

With all the concessions in production by the mid-to-late 1960s the rate of growth in the area planted slowed. The increase was shared between concessions and private farms even though in the former this represented a small proportion of the total concession areas leased. The increase in output was also due to marginal increases in yields, due to availability of improved planting materials; although the yield on Liberian farms improved it remained below that of the concessions (Table 23).

Table 23: Comparison of planted area & yields on plantations and rubber farms, 1960-80

	Planted area – Concessions			Planted area – Liberian farms				Total area	
	Mature	Immature	Total	Yield (kg/ha)	Mature	Immature	Total		
1960	28,100	13,600	41,700	1,306	22,300	24,300	46,500	286	88,200
1970	39,700	15,600	55,300	1,378	33,600	26,200	59,800	641	115,100
1980	44,200	15,300	59,500	1,319	36,300	26,600	62,900	722	122,400

Source: World Bank (1984)

7.1.1 History of Rubber Concessions

Given the importance of the rubber concessions it is appropriate to appreciate their long history before considering other factors. The following is a brief history of the rubber concessions, from the start of the Firestone plantation in 1926.

The Firestone Plantation Company (located in Harbel, Margibi County) was granted a 99-year concession for one million acres (approximately 416,670 ha) in 1926. Originally the company was subject to a land tax of 6 cents per acre, and Liberian corporate income tax (a maximum of 45% of net profits). The Firestone is at present owned by Bridgestone. The National Transitional Government of Liberia (NTGL) renewed the concession agreement in 2005. This agreement was reviewed in 2006.

The Cavalla Plantation in Maryland County was initially part of the Firestone concession, but was passed on to the Doe government in 1981, and the concession was awarded in 1983 to a Belgian company SIPEF under which the government maintained a 50% stake in shares of the company. When MODEL rebels occupied the plantation during the civil war, SIPEF withdrew. Since then a number of unsuccessful attempts have been made to manage the plantation. In 2006 an interim management team was installed under the supervision of the Ministry of Agriculture.

⁷⁰ As of May 2007, it is generally recognized that all of the major concessions have been returned to their rightful owners after many were occupied by squatters.

The Cocopa Plantation (Nimba County). The original lease agreement was signed in 1949 for 40 years with the Liberia Company (LIBCO), and renewed for a further 40 years in 1967 from the date of its expiry under the condition that LIBCO had cultivated a certain percentage of the lease area by 1987. In 1996, LIBCO sublet the management of the plantation to a Liberian company owned by the then Minister of Agriculture Roland Massaquoi. In January 2007 the government suspended the agreement citing poor management.

The Sinoe Rubber Corporation. The original concession agreement was concluded in 1953 with the African Fruits Company for a period of 80 years, initially for the planting of bananas and plantains. In 1973, AFC sold out to Ernest Dennis, but another company claims that Ernest Dennis sold the rights and obligations to its subsidiary Mesurado Plantation Industries. In 1983 Mesurado leased the plantation to the Government-owned Sinoe Rubber Corporation for 20 years. Whilst the property of the plantation remained in doubt while under the de facto control of an ex MODEL rebel leader, it has been reported that UNMIL has since secured the plantation.

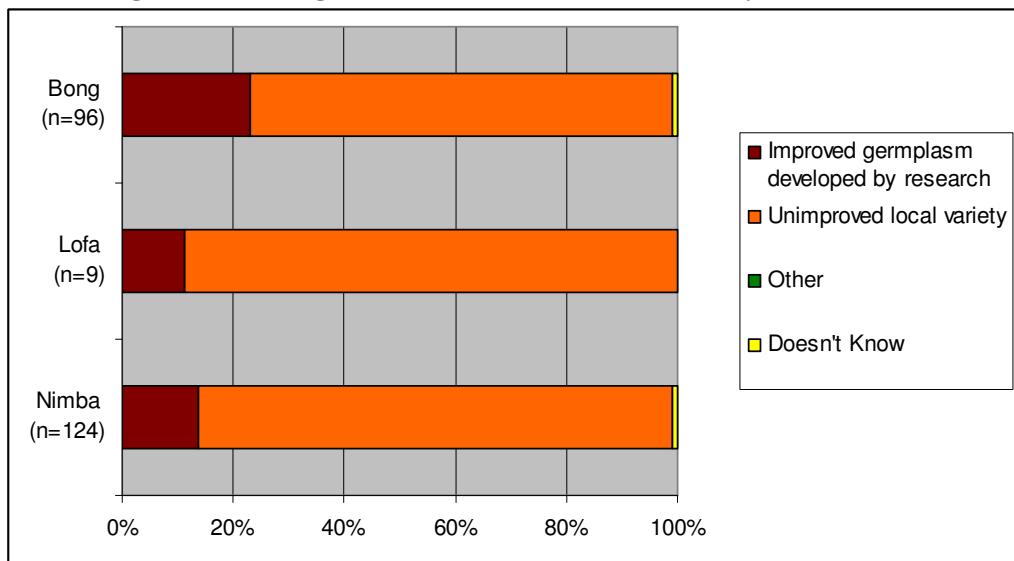
B.F. Goodrich now popularly known as the Guthrie Rubber Plantation is located in Bomi County, and was established in 1954 and production commenced in 1963. Goodrich was granted tax exemption up to 1973, and then paid corporate tax rate of 25% of net profits for the next 10 years, after which the company would pay the then normal corporate tax rate). In 1981 the plantation taken over by the government following the military coup, and the Guthrie Rubber Company of Malaysia negotiated a management contract with the government. Guthrie withdrew when LURD rebel forces occupied the plantation. Although the transitional government entered into a 45-year management agreement with Agro Resources Corporation Liberia Ltd in 2005, the plantation is currently under interim management.

The Salala Rubber Corporation in Bong County (40,000 ha) was established in 1959.

The Liberian Agriculture Corporation (LAC). The 70-year lease for 70 years 125,000 ha in Grand Bassa County was signed in 1959, originally by a construction company to whom the government was indebted, and then sold to Uniroyal. The second largest plantation, a processing plant for producing latex for export was installed in 1968. The plantation was ransacked in 1989. In 1998 a Luxemburg company Socfinco bought the leasehold rights to LAC and Weala.

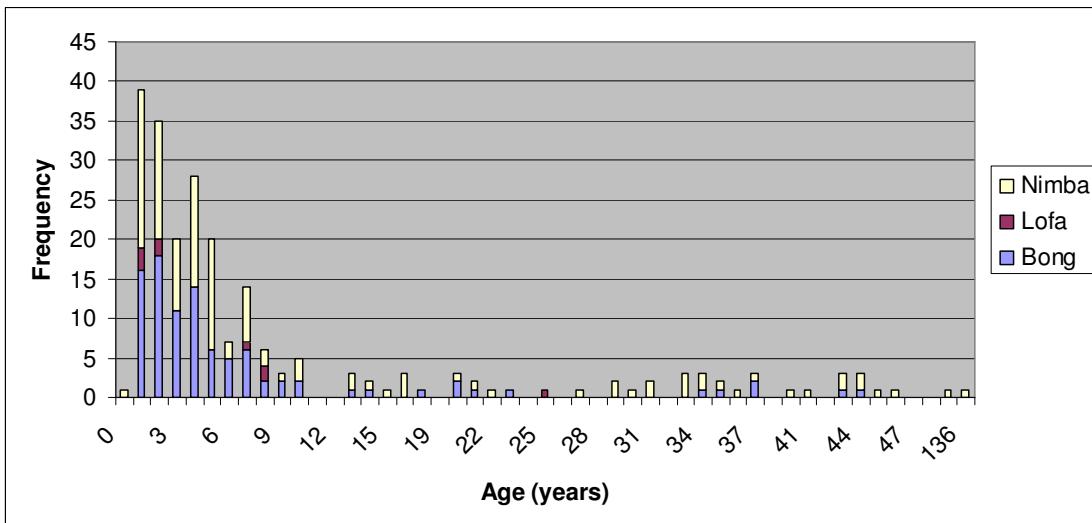
7.1.2 Rubber Tree Stock

Rubber trees of the unimproved variety become economically viable after seven years and production peaks at approximately 30 years. The latest rubber tree cultivars begin producing at 5 years and have roughly the same economic lifespan. In general, trees are tapped throughout the year. Trees will have a shorter lifespan of only a few years, if they are harvested improperly. Much of the rubber cultivation in households surveyed in Liberia is of the unimproved variety (Figure 19).

Figure 19: Planting Material on Rubber Farms of Surveyed Households

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

According to the IITA/STCP/UTK survey results, some households have been investing in new rubber trees over the last ten years. Not surprisingly, the majority of this investment has been in Bong and Nimba, as these areas were relatively calm after 1996/7 (Lofa was essentially evacuated for much of the time) and rubber is more common to these two counties (Figure 20). This also reiterates the findings illustrated in Figure 19 where rubber was identified as one of the primary opportunities that surveyed households wanted to pursue in the future. Recently high rubber prices have likely promoted this trend.

Figure 20: Age of Rubber Tree Stock by County for Surveyed Households

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.1.3 Rubber Production

In the period between the mid-1960s and mid-1970s as rubber production and export earnings doubled, the contribution of Liberian farms rose from 21% to 36% of output (Figure 21). There were about 4,000 rubber farms by the mid-1970s. Nearly 80% of the farms are greater than 20 ha in size (Table 24). The static nature of average plantation yields reflects the variation in planting material and age structure of plantations between

concessions, and between private farms. Moreover, the intensity of tapping is manipulated in response to market conditions. On the concession plantations, yields were comparable with those obtained in Southeast Asia at the time. Average yields on commercial farms were half of that achieved on concession plantations, reflecting a higher proportion of over-aged trees, the initial use of poorer quality planting material, and less intensive management (World Bank, 1975 and 1984).

Figure 21: Relative rubber output on concession and commercial farms

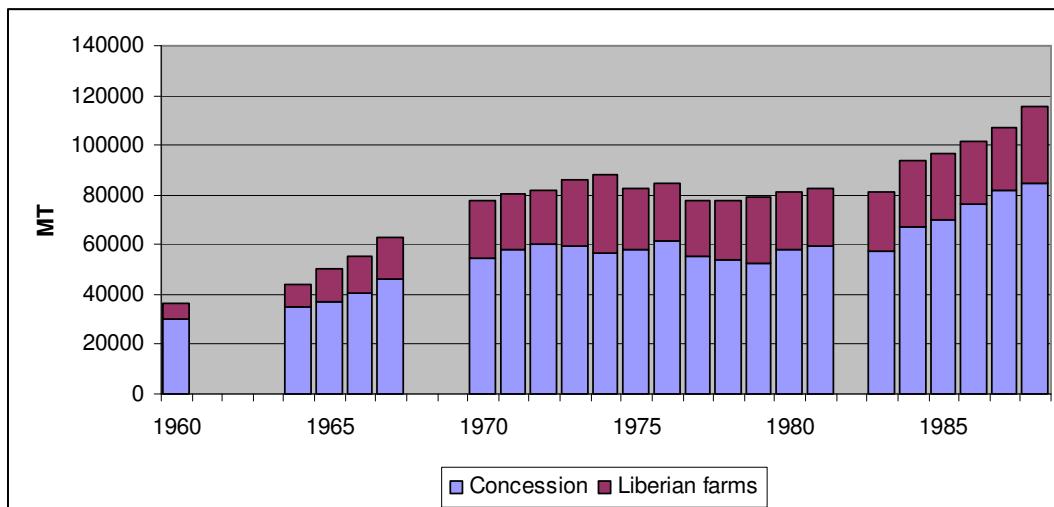


Table 24: Farm size classes and tapped area of Liberian rubber farms in 1974

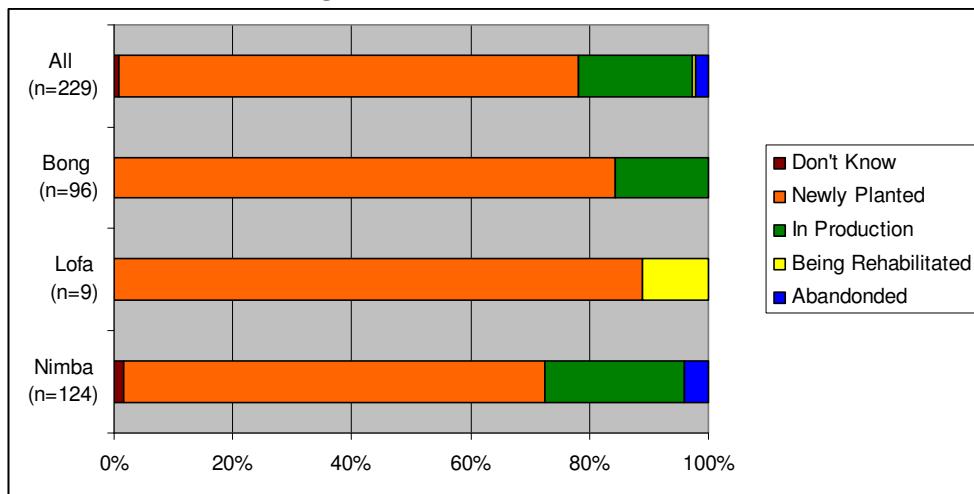
Size class (ha)	% Total area	% Tapped	% Immature
0-10.1	10.9	44	26
10.1-20.2	11.6	54	12
20.2 – 50.6	43.6	50	27
> 50.6	33.9	87	5

Source: World Bank (1984). The percentage tapped includes areas previously tapped; the remaining areas of mature tree are untapped.

Coinciding with the IITA/STCP/UTK survey tree stock findings, over 75% of the smallholder farms owned by surveyed households were found to be newly planted (Figure 22). However, it is not known if the past yield disparity between smallholder and concession rubber will continue. Traditionally, there is a wide difference between the large rubber plantations and the smallholder tree farms. With better planting strategies and the introduction of improved varieties, perhaps the trend will not continue. However, if the characteristically overgrown tree clusters of smallholders continue, the major push to plant smallholder rubber may have limited impact.

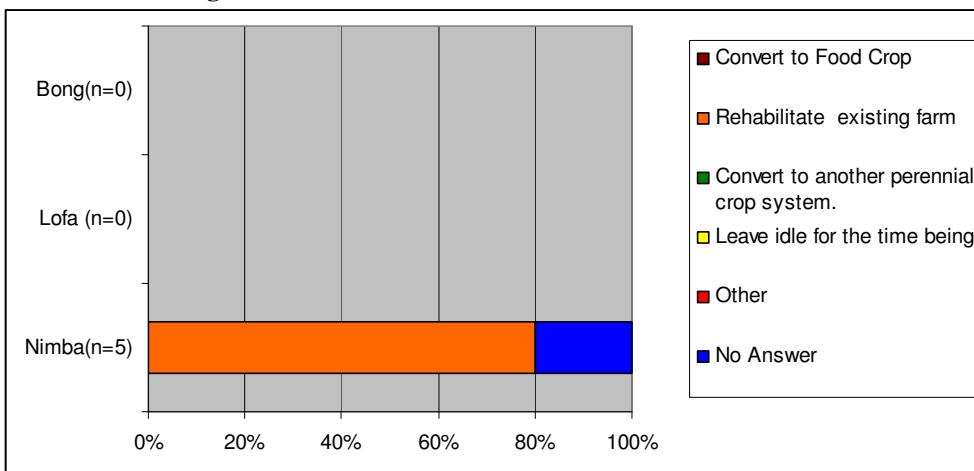
Of those few farmers that indicated that their rubber farm had been abandoned, 80% said that they were planning to rehabilitate (Figure 23). Certainly, with relatively high prices and the multinationals encouraging farmers to produce by facilitating sales at the farmgate, it is not a surprise that few farmers have abandoned their rubber to bush.

Figure 22: Status of Rubber Farms



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Figure 23: Future Plans for Abandoned Rubber Farms



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Rubber tapping is a time consuming process that is often done in the early morning hours. Once the rubber tree has been tapped and the sap is flowing into the cup, collection of the coagulum could reasonably be done by any member of the family. Tables 25 and 26 breakdown the household labor force that is currently engaged in some aspect of rubber farming by age, gender and primary economic activity.

Table 25: Household Rubber Labor by Gender and Age Cohort

Age Cohort (years)	Male (n=366)	Female (n=147)
3-7	2.73%	9.52%
8-14	8.74%	10.20%
15-20	11.20%	11.56%
21-30	18.85%	22.45%
31-40	19.13%	25.17%
41-50	19.40%	12.93%
51-60	10.66%	3.40%
61 +	9.29%	4.76%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Table 26: Rubber Farm Labor by Gender and Primary Economic Activity

Principle Economic Activity	Men (n=369)	Women (n=155)
None	5.96%	9.68%
Self Employed Ag	65.04%	52.90%
Hired Labor Ag	1.63%	0.00%
Salaried Non-Ag	2.44%	0.00%
Salaried Retired	0.54%	0.00%
Student	22.22%	25.81%
Petty Commerce	0.81%	3.87%
Homemaker	0.54%	7.10%
Other	0.81%	0.65%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

According to the IITA/STCP/UTK survey findings, the household members that are currently engaged in rubber farming are primarily men and women between the ages of 21 and 50 whose primary economic activity is farming. It is interesting to note that younger family members, who are also going to school, assist their families with tasks associated with rubber production.

7.1.4 Liberian Rubber Marketing System

Liberian rubber pricing is intrinsically related to concession policy. By the mid-1960s, when all the plantations were in production, there were concerns that the benefits in terms of employment and government revenues were small and that the companies were transferring a large proportion of gross taxes overseas. The generous tax arrangements - with tax liabilities based on net profits (but with transfer pricing and high debt equity ratios the actual contribution was kept to a minimal level) – led the World Bank to conclude that concessions should have been major contributor to government revenues but “tax receipts represent a smaller proportion of gross value added than the remainder of the economy” (World Bank, 1969). This contributed to the already regressive nature of the then prevailing tax system.⁷¹

Liberian farmers delivered latex and coagulum at the buying stations of the rubber concessions with whom they were tied through contractual arrangements. A study in the early 1970s revealed a number of anomalies – resulting in a low share of world prices being received by Liberian rubber planters. Firestone based its buying prices on the average Singapore price rather than New York prices (the implication being that transport costs are higher and the final producer price lower). The costs of company administration, processing, and declared taxes on profits were double the deductions made for comparable operations in Southeast Asia (despite Firestone and other companies enjoying a range of duty exemptions).

Margins below fob prices for different grade rubber were officially agreed upon in the late 1970s (Table 27). “The marketing and pricing system pursued by rubber concessions must be considered unsatisfactory. It has denied Liberian producers a fair return and the low price incentive has discouraged many from tapping or replanting plantations” (World Bank, 1975).

⁷¹ “Taxes press hard on the rural people from whom according to various estimates 30 to 50 percent of annual monetary income is taken in the form of various levies such as the education levy, hut tax, and assessment by counties and local chiefs”

Table 27: Margins on fob prices for Liberian rubber

Grade	% fob
Latex	69-74
Specification coagulum	53-72
Non- Specification coagulum	49-63

Source: World Bank, 1984

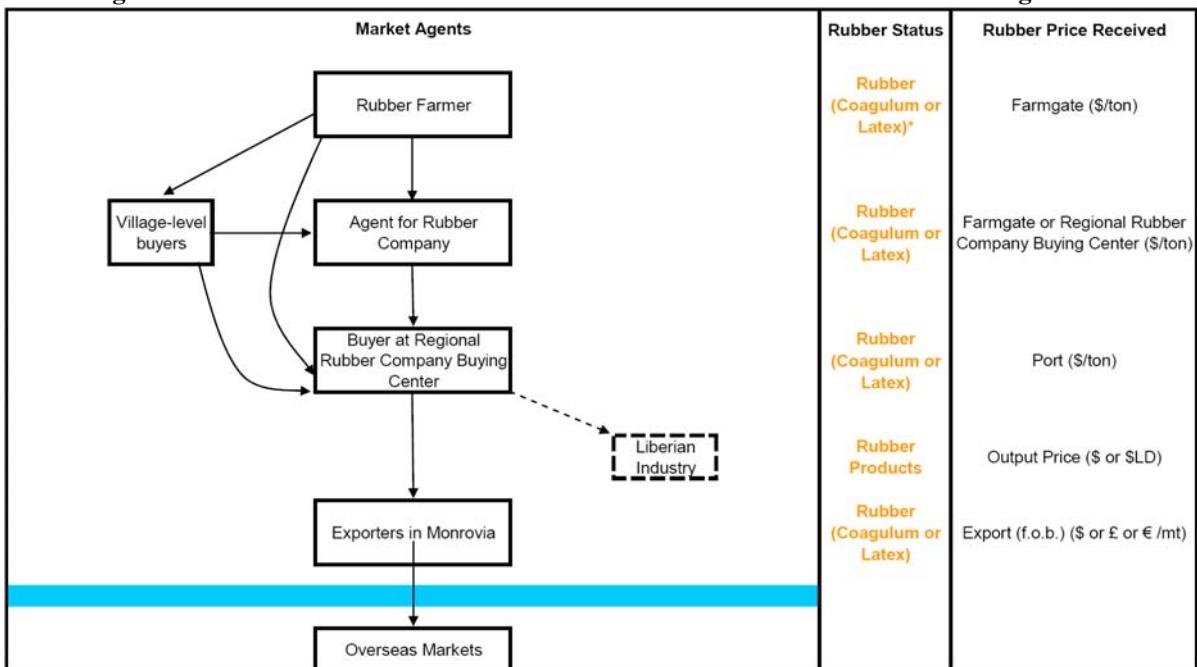
Rubber was arguably the one agricultural commodity or natural resource whose marketing chain was least affected by the years of civil unrest in Liberia. Important exports such as diamonds, timber, cocoa, coffee and oil palm sought other outlets, primarily through cross-border trade and illegal smuggling. In contrast, rubber was being exported by multinational concession owners, primarily Firestone, virtually throughout the conflicts. This is not to say that supply was not disrupted. According to IMF statistics (IMF, 2000), the Firestone concession was the sole source of measurable production from 1996 – 1999 that was marketed. Presumably, smallholder rubber production and marketing was stymied by the unstable environment up-country. At the end of the conflict, several of the large concessions could not resume formal ties to the sector due to occupation by former rebel forces (e.g. Sinoe). Since then, arguably all of the pre-war concessions have resumed/continued operation and smallholders have once again rejoined the marketing chain as a supplemental source of rubber for the multinationals who rely mostly on concession rubber (see Section 7.2.3.)

Currently, smallholder rubber farmers have limited options when trying to sell their coagulum or latex rubber (Figure 24). Essentially there are three direct outlets for their product, two of which are directly tied to the multinational exporters. Smallholders who are facing extreme cash flow constraints may look to fellow smallholders or village-level entrepreneurs who have the capacity to pay cash for the rubber at the farmgate (likely in \$LD) as an immediate source of income from rubber. The option of immediate payment from these agents may be preferable to waiting for the opportunity to sell to the multinationals whose payment is in the form of a “weigh bill” in US\$mt that is paid at a latter date. Though the US dollar is commonly used as legal tender throughout Liberia, \$LD is more commonly used in the small rural economies up-country so obtaining a convertible currency is less of an incentive than trying to meet immediate household needs. These small-scale buyers are presumed to be self-financed and likely receive the prevailing farmgate or regional buying center price that the rubber farmer would have otherwise. In order to make this profitable, the small-scale buyer must therefore pay the farmer a price that is below that of prevailing prices in order to assure a margin.

The second and third option available to smallholder farmers is through the multinationals either though their mobile agents who roam the countryside collecting rubber or directly through one of their field offices which are located in many of the larger towns throughout the “rubber belt” of Liberia. It is believed that the farmgate price that agents pay to farmers is lower than that received at the buying center, as agents must cover all transaction costs associated with the procurement of the rubber, including the agent’s margin. Otherwise, farmers themselves recoup these costs/margins to provide some incentive for them to transport their own product to the buying center. Once the rubber enters the multinational owned segment of the chain, each step downstream is an intra-firm transaction. Currently, all of the rubber produced in Liberia is presumed to be exported. Rubber is reportedly loaded for export in Harper, Greenville, Buchanan and Monrovia for sale in the overseas export markets or simply transported for further processing or use as an input in a wide

variety of rubber products. Figure 24 supposes that there may be some domestic infant industry forming around domestic rubber production but no evidence of this has been found so far.

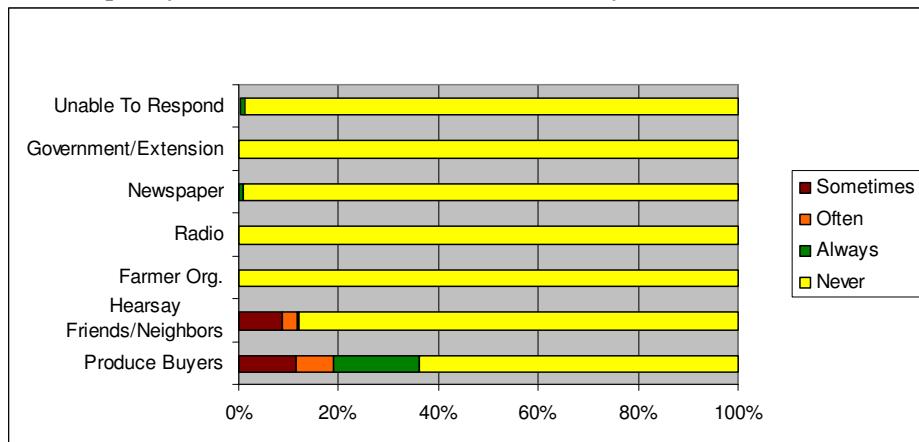
Figure 24: General Schematic of Current Liberian Smallholder Rubber Marketing Chain



The marketing information on rubber collected from the 2007 IITA/STCP/UTK survey indicated that there were 226 surveyed households that have a rubber farm. Of those farms, only 44 respondents indicated that they produced rubber for sale, all coagulum, in the last year. This result could be in part due to the fact that a majority of the tree stock is newly planted and not yet in full production. The farmers that had sold indicated that local buyers purchased the product, but did not specify if the buyer was working for a multinational or not. For these limited number of observations, the average quantity sold per transaction was 127.2 kilograms.

Much of the rubber market information used by farmers is gathered simply from buyers, who arguably have a conflict of interest. In addition, friends and neighbors were identified as a common source of prevailing price information but this is likely second-hand information from buyers (Figure 25). However, factory centers often publicly post prices.

Current factory buying center prices are listed in Table 28. These prices reflect the price setting by Firestone and the fact that other companies that are interested in securing smallholder rubber follow similar trends but do not compete directly on prices. Price differentials may be driven by transaction costs that are sensitive to scale economies, proximity to supply and other factors. Presumably, spatial price differentials are simply driven by transactions costs that increase during procurement as the rubber source's distance to port increases. This phenomenon could easily be seen in May 2007 by driving the Monrovia – Ganta highway. Prices dropped from US\$850/mt in Montserrado and Margibi counties to US\$825/mt in Bong (Gbarnga) and even further along branches off the highway in Nimba (Saclepea was at US\$800/mt).

Figure 25: Frequency of Rubber Market Information Use by Source for Households Surveyed

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

To determine the actual competitiveness of the sector, in regard to alleged market power issues, requires information that is much more detailed than is currently available.

Table 28: Price Information for Rubber per metric ton for 2007

Month	Factory Price (US\$/mt)	
	Firestone	Weala
January 2007	750	720
February 2007	800	770
March 2007	850	820
May 2007	850	820

Source: Author's field observations and personal communication with MacArthur Pay-Bayee

7.2 Cocoa

As was discussed in Section 1, cocoa was the primary concern of the IITA/STCP/UTK survey. Of the 794 surveys collected, 337 indicated that the household had sold cocoa (active cocoa farmers) in the last year (Table 29). These percentages roughly conform to the findings presented in Section 4. The distinction of active cocoa farmer is important as many farmers self-identify as cocoa farmers but have not found the time, nor perhaps have the incentive, to rehabilitate or effectively manage their existing cocoa holdings which are likely trapped in more than 15 years of over/under growth.

Table 29: Number of Cocoa Farmers Surveyed by County

County	Number of Farmers	% Of Household Surveyed
Bong	78	9.9%
Lofa	112	14.1%
Nimba	147	18.6%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.2.1 Trends in Cocoa Supply and Export

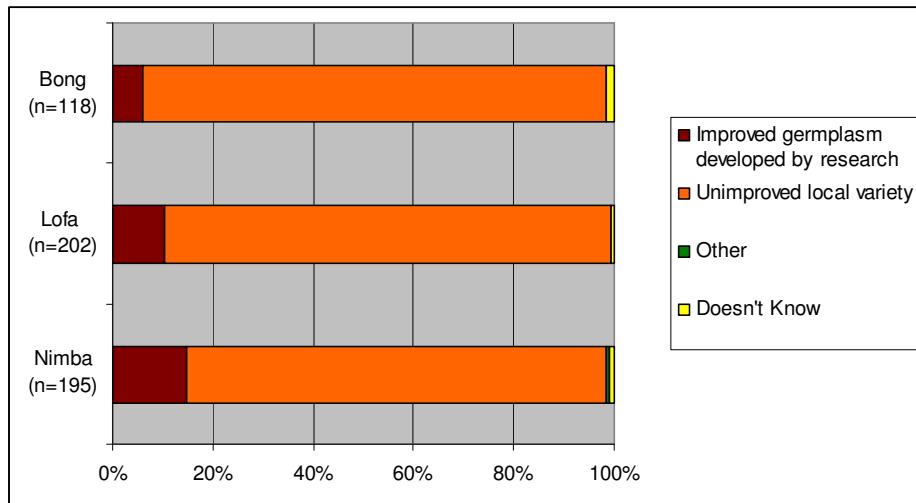
Current Liberian cocoa export volume has been directly affected by smuggling and cross-border trading to and from Ivory Coast and Guinea. Due to a lack of market infrastructure and fluctuations in international prices, markets for Liberian cocoa have stagnated and have been replaced (or left unmanaged) by marginally more profitable agricultural ventures. However, according to the rapid assessment survey done in Nimba County for the Sustainable Tree Crops Program, “income obtained from cocoa and coffee by smallholder farmers more than offset income from other sources and accordingly serves as the best alternative to other related farming activities” (Kennedy 2005). Farmers are hindered by a deficient transportation structure, lack of knowledge concerning prices and quality standards, limited credit resources and legal protection from corruption and fraud (Pay-Bayee 2005).

Though cocoa does play an important role in the rural economy of Liberia, especially in counties along the borders of Guinea and Ivory Coast, one should keep in mind its position internationally. Liberia typically exports no more than 6000mt per year versus the exports of Ivory Coast, Ghana, Nigeria and Cameroon who collectively constitute roughly 70% of the world market for cocoa. In addition, Liberian cocoa is heavily discounted on the world market due to quality concerns.

7.2.2 Cocoa Tree Stock

The available tree stock for cocoa is limited mostly to what is available from seed plantings from harvested cocoa pods or sapling tree shoots that can be transplanted. Improved germplasms arrived in the seventies; however, very few people are using the improved variety (Figure 26). Improved varieties under proper management are intended to increase production yields and renewed interest in the variety coincides with the STCP farmer field schools.

Figure 26: Planting Material Found on Cocoa Farms of Surveyed Households



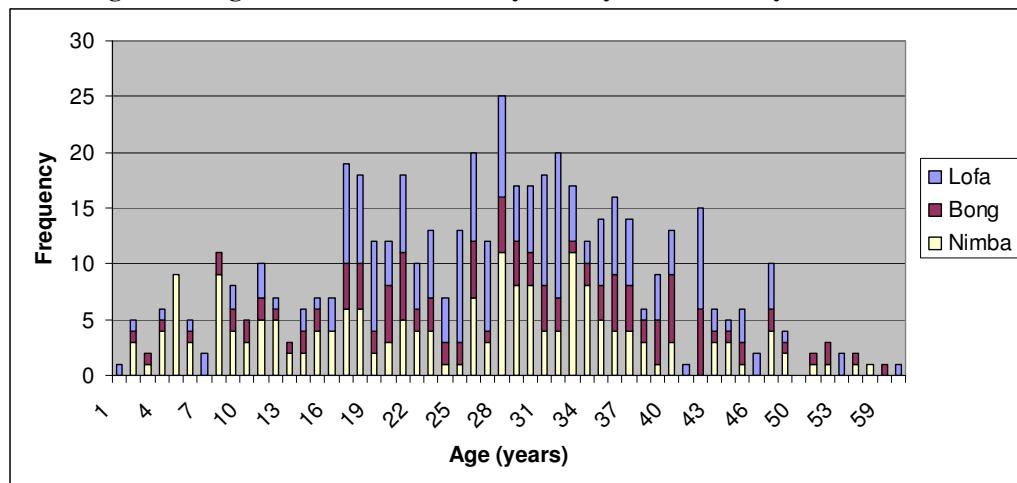
Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Cocoa trees of the unimproved variety become viable after six years, and have a productive lifespan of 20-25 years, after which the economic productivity decreases. Farmers can increase productivity and decrease the incidence of disease (mainly a high occurrence of

black pod) through proper farm management. Chemicals and fertilizer are expensive and rarely used and the opportunity cost of brushing is high.

War affected the availability of farmers to plant new trees. Heavy fighting occurred in the counties of Bong and Lofa and remained dangerous for many of the war years and villagers started returning to the areas as early as 2003 and 2004. Fighting in Nimba subsided early on and was relatively safe after 1991. The age of the cocoa tree stocks can be seen in Figure 27, this result coincides with the relative safety of the counties.

Figure 27: Age of Cocoa Tree Stock by County for the Surveyed Households

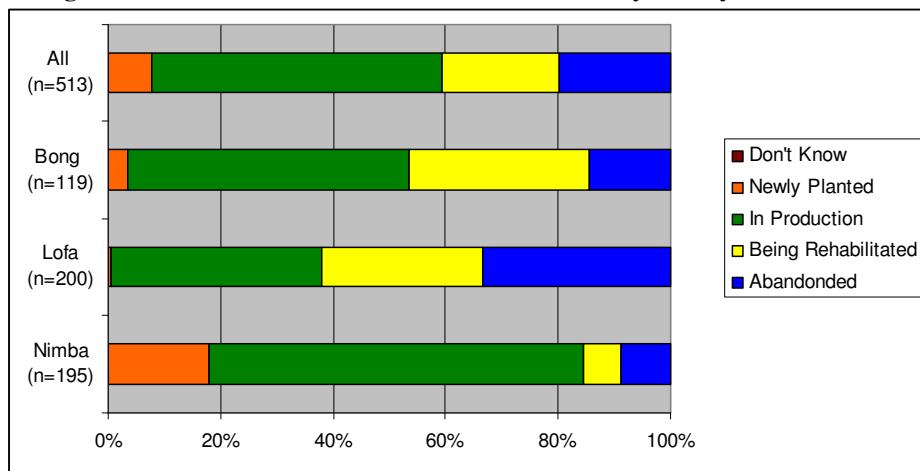


Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.2.3 Cocoa Production

During the conflict years, many people were forced to escape to other countries and bide their time as refugees, some had the ability to return but only remained for a short period of time. Other individuals and families were internally displaced to refugee camps in Bong, Margibi and Montserrado counties. Some villages were able to hide in the bush close to their village. Due to this displacement many farmers had varying access to their farms, and the incentive to manage the farms was low. As such the current status of their farms is also varied (Figure 28).

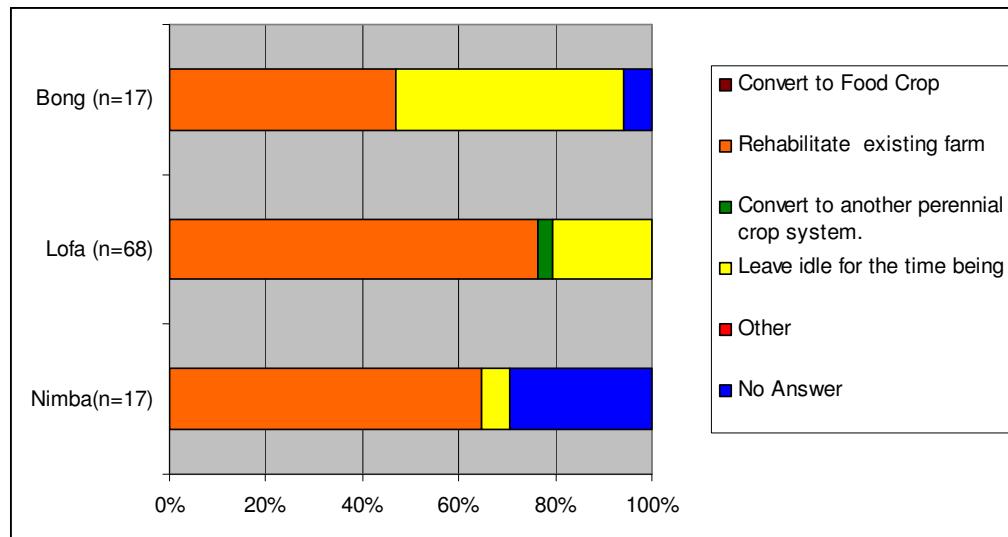
Figure 28: Current Status of Cocoa Farms Owned by Surveyed Households



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Farmers who indicated that the status of their farm was abandoned were then asked what their future intentions were for the farm. A majority indicated that they were planning on rehabilitating the current crop (Figure 29). Theoretically, this would suggest that there is marginally enough of a price incentive to motivate farmers to reinvest in their farms.

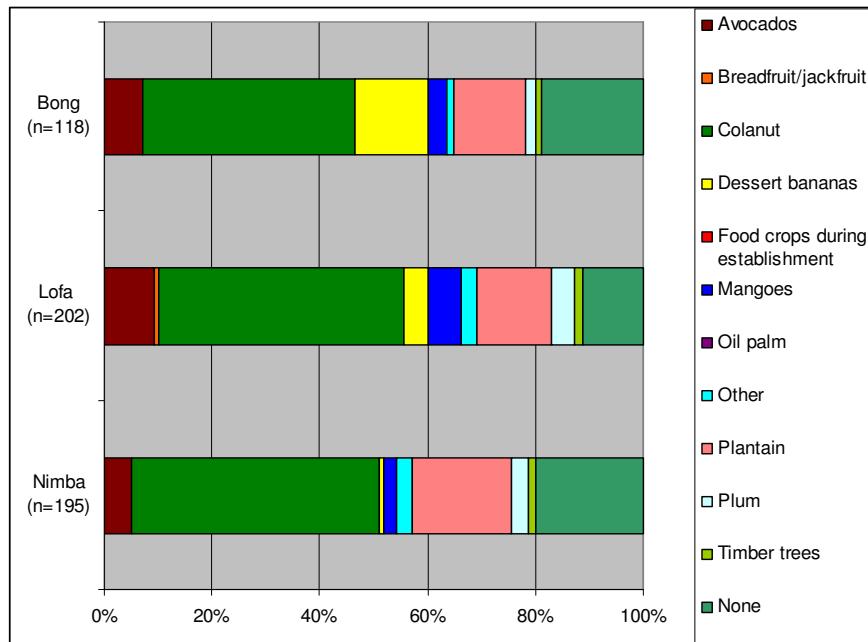
Figure 29: Future Plans for Abandoned Cocoa Farms



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Cocoa was originally planted as part of a multi-crop system, so it is common to see a variety of crops interspersed with a cocoa stand. There is cultural significance to the kolanut tree, and hence a worthwhile crop to own. The variety of crops associated with cocoa can be seen in Figure 30.

Figure 30: Secondary Tree Crops Planted with Cocoa



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Proper farm management techniques of brushing and planting are labor and time intensive. The breakdown of economic activity of active cocoa farmers that use family a source of

cocoa farming labor can be found in Table 30. The breakdown of the age of these household workers can be found in Table 31.

Table 30: Cocoa Farm Labor by Gender and Primary Economic Activity

Principle Economic Activity	Men (n=546)	Women (n=525)
None	2.38%	4.38%
Self Employed Ag	62.82%	61.90%
Hired Labor Ag	0.00%	0.00%
Salaried Non-Ag	0.92%	0.76%
Salaried Retired	0.37%	0.00%
Student	31.68%	28.00%
Petty Commerce	0.18%	0.76%
Homemaker	1.47%	4.19%
Other	0.18%	0.00%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Table 31: Cocoa Farm Labor by Gender and Age Cohort

Age Cohort (years)	Male (n=521)	Female (n=547)
3-7	1.73%	2.01%
8-14	12.28%	12.61%
15-20	17.85%	17.37%
21-30	25.14%	18.83%
31-40	20.35%	14.81%
41-50	13.63%	15.54%
51-60	5.95%	11.33%
61 +	3.07%	7.50%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Farmers unable to sell their cocoa, after the harvesting and drying period is complete must store their cocoa in a secure location, in order to prevent theft. Those that stored did so for 10 – 45 days. The most common place for cocoa storage was the house (Table 32). The average quantity stored was 100.51 kg. Good quality (well dried) cocoa can be stored for long periods of time without rotting, however, with little emphasis on proper drying techniques, cocoa in the tropical climate only lasts a few weeks.

Table 32: Storage Places for Cocoa

Place	Percent of Households (n=271)
House	92.99%
Field shed	1.85%
Warehouse	0.00%
Attic	1.11%
No Response	4.06%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.2.4 Liberian Cocoa Marketing System

The LPMC monopoly marketing and pricing policy was established in the LPMC law: “the LPMC will buy produce...and pay prices to producers, fixed periodically on the basis of world market prices after deducting expenses for freight, insurance, handling, warehousing,

shipping, and any other charges incurred (i.e., Government inspection fee) and 10 percent of the fob value to cover overhead expenses and remuneration.”

To what extent was smallholder tree crop performance (output) affected by the LPMC pricing policy - given the international price trends? Table 33 shows the export and purchase prices for coffee, cocoa and palm kernels (over a limited period of the 1970s). The data shows that the purchase price for these crops reflected changes in world market prices, but that the margin between the export and purchase prices for coffee and cocoa is wider than that of palm kernels, and for a number of years the purchase price was 50% less than world market price.

Whilst the LPMC passed on changes in world prices, the purchase prices were in fact fixed buying prices for designated agents; the actual farm-gate prices were discounted further by traders' margins and local transport costs. Moreover, LPMC's high management and administration overhead costs, and profit margins, have been criticized.⁷²

Though there had been a disincentive effect insofar as the LPMC had kept farmgate prices low in relation to world prices, the smallholder response was to increase the harvested area during the 1980s (Table 34). This suggests that at the very least the actual prices received were sufficient to provide relative returns to household land, labor and capital.

According to Pay-Bayee (2005), “when LPMC resumed operation in 1997/98 it could not operate through the established channels – cooperatives to farmers. Additionally, in the face of deterioration of its own facilities – storage, burners, graders, etc – as well as extreme financial difficulties, its functions were reduced to “regulatory” activities, and it could neither purchase nor export cocoa. With the near demise of LPMC, there are five exporters of cocoa, the extent to which LPMC collaborates or even oversees the operations of these businesses is not clear. In 1990, Liberia’s membership with the ICCO was suspended, and the exports of cocoa and coffee were de facto transferred to Lebanese and other business houses. Presently, there are five such exporters, each with several agent/buyers and subagents.

The current marketing chain, post-LPMC, has its own significant problems. As in the past, current Liberian farmgate prices do not encourage smallholders to improve yields or adopt better drying or fermentation methods. In fact, survey participants indicated that the opportunity cost of managing cocoa is high, making subsistence farming and other tree crops more attractive when the price of cocoa is low and the cocoa market persists in its underdeveloped and chaotic state.

A comparison between cocoa prices in Liberia with that found in other African countries provides some indication of the current market conditions (Table 35). These differences are driven by many factors (some of which are discussed in further detail below) including low quality beans, very few exporters (all local), relatively minuscule production, and the underdeveloped marketing chain.

⁷² “Pricing policies which have been pursued in the past by LPMC and sanctioned by the Government were primarily dictated by profit motivation” (World Bank, 1975).

Table 33: LPMC purchases, export & purchase prices 1967-1981 (US\$ per tonne)

	Coffee				Cocoa				Palm kernels			
	Purchase (clean)	Export price	Purchase price	%	Purchase (dry beans)	Export price	Purchase price	%	Purchase (dry kernels)	Export price	Purchase price	%
1966/67		678	416	61%		551	364	66%		135	94	70%
1967/68		693	409	59%		626	364	58%		170	104	61%
1968/69		665	359	54%		787	388	49%		135	94	70%
1969/70		760	376	49%		849	409	48%		149	100	67%
1970/71		861	302	35%		612	416	68%		136	102	75%
1971/72	4100	868	478	55%	2632	479	341	71%	11568	126	93	74%
1972/73	4635	1001	569	57%	2290	625	409	66%	11786			
1973/74	3635	1036	569	55%	3165	1044	591	57%	15486			
1974/75	3950	1277	699	55%	2730	1705	734	43%	13797			
1975/76	4320	1843	894	49%	2772	1310	615	47%	12399			
1976/77	10566	2570	1565	61%	2757	2770	1185	43%	9181			
1977/78	10108	3174	1743	55%	3351	3599	1296	36%	8779			
1978/79	8458	319161	1743	55%	3594	3487	1743	50%	7389			
1979/80	10240	1593	2048	129%	5142	1273	2048	161%	6593			
1980/81		2535	1921	76%		2085	1739	83%				

Source: LPMC quoted in World Bank, 1975 and 1984

Table 34: Trends in Liberian coffee and cocoa production and trade

Cocoa					
Area harvested	ha	7,610	11,700	25,310	--
Production	tones	1,330	2,840	4,800	--
Yield	kg/ha	170	285	190	--
Export quantity	tones	1,330	2,840	4,400	--
Export value	US\$ m	0.65	4.98	9.38	--

Source: FAOSTAT

Table 35: Farmgate and Port Prices for Cocoa Beans in Selected African Countries (US\$/kg)

Farmgate Price	Main Cocoa Crop 06/07					
	Sept	Oct	Nov	Dec	Jan	Feb
<i>Liberia</i>	0.33	0.32	0.35	0.37	0.39	
<i>Cameroon</i>	1.28	1.13	1.23	1.25	1.33	1.46
<i>Nigeria</i>		1.24	1.32	1.48	1.55	1.52
<i>Cote d'Ivoire</i>	0.44	0.53	0.61	0.75	0.75	0.82
Port Price	Sept	Oct	Nov	Dec	Jan	Feb
<i>Nigeria</i>		1.33	1.43	2.91	1.62	1.68
<i>Cote D'Ivoire</i>	0.67	0.72	0.78	0.87	0.92	0.97

It is apparent that Liberian cocoa farmers are not receiving market signals to produce quality cocoa and are often at the whim of the buyer's price setting (see Section 7.2.4.4). Generally, farmers will sell (possibly) dried and fermented beans to any available buyer that comes along to the farmgate or head-carry the load to a nearby market. At the farmgate, buyers may be agents for a local/regional buyer who finances village-level sales but is located in the nearby local/regional buying center. Alternatively, the buyer may be an intermediate village-level buyer with limited personally financed capital. These small-scale buyers take advantage of a farmer's pressing cash constraint and offer same day cash-on-hand along with prices that are less than the prevailing farmgate price from buyer's agents. There are also village-level buyers, looking to collect enough cocoa to make a trip to the regional buying center or to Guinea worthwhile. If the farmer chooses to take the cocoa directly to the buyer, located in a buying center or in Guinea, they may receive a better than farmgate price or open access to credit through informal, but direct arrangements with the local/regional buyers in Liberia.

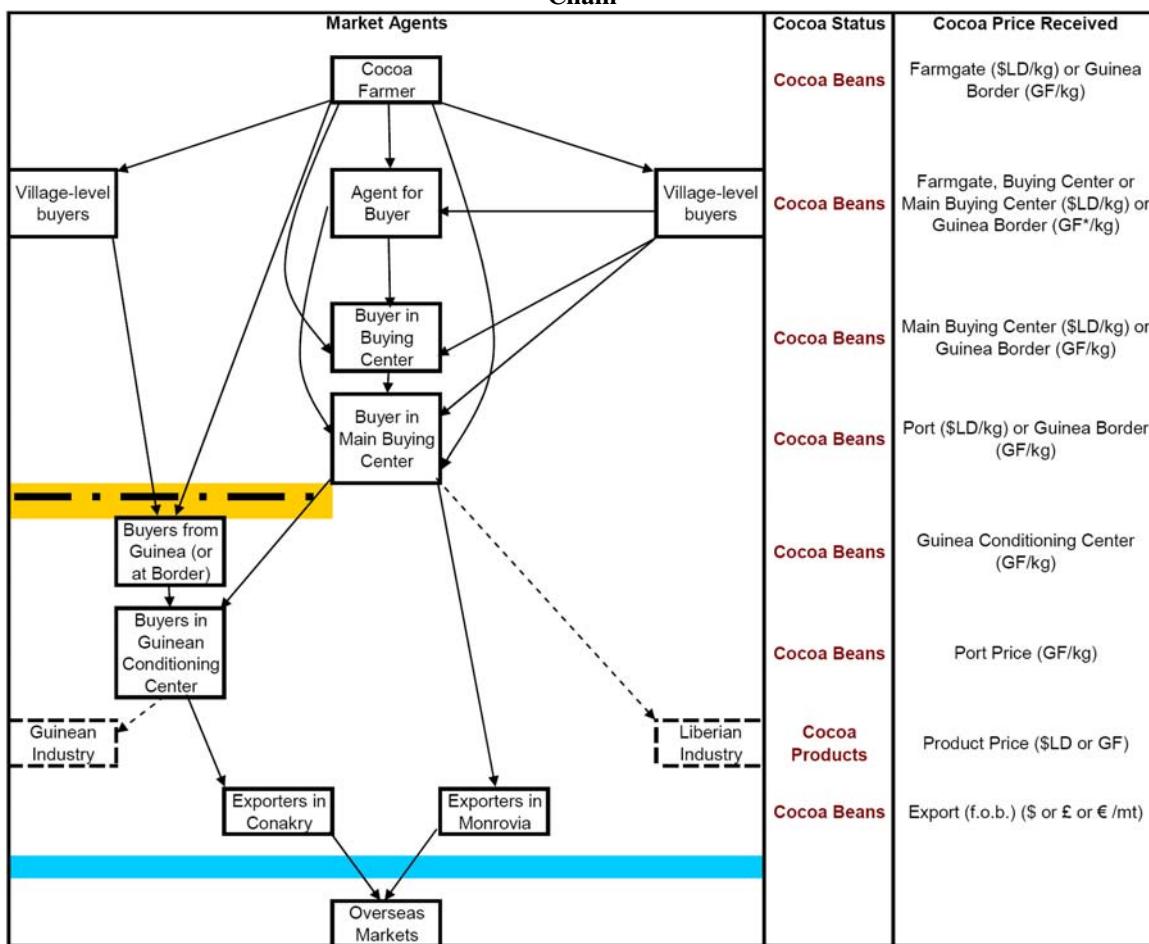
Buying centers at the local level are assumed to transport any of their accumulated cocoa to the regional buying centers. Regional buying center buyers on the other hand, can benefit from the economies of scale they have created through aggregation of smallholder cocoa and have access to motorized transport to evacuate the cocoa to either Monrovia or deeper into Guinea's territory, possibly to the Guinean regional buying center (Nzérékoré)

If the cocoa has remained in Liberia, the regional buyer transports the cocoa to Monrovia to sell to an exporter, perhaps Bridgeway or Tutex. It is believed that there is no domestic industry currently processing cocoa or using it as an input to production. Therefore, any chocolate or finished cocoa that is consumed within country is imported. The likelihood of Liberia being in a position to foster the development of a cocoa processing industry is highly suspect given the extremely limited domestic throughput and other factors that have plagued the successful pursuit of such ventures in Ivory Coast and Ghana which require subsidies from the state. Local consumption of Liberian cocoa is apparently limited to artisanal

production of the fermented liquid produced during fermentation or simply eating the raw unfermented beans. However, the consumption is insignificant as far as the marketing chain is concerned.

Cocoa that has been traded in Guinea will have a somewhat similar path. Buyers in border towns likely transport the cocoa to the main regional buying/conditioning center (Nzérékoré) for the cocoa to be sorted and repackaged. Then the cocoa is transported to the port city of Conakry and exported to the world market. It is also believed that there is no internal cocoa industry in Guinea.

Figure 31: General Schematic of Current Liberian Smallholder Cocoa Marketing Chain



A large part of the ability to market cocoa in Liberia is determined by infrastructural constraints, like distance, quality of roads and accessible methods of transportation. Villages that are far from buying centers or that are located in remote areas of the countryside face a limited or non-existent market in which to sell their cocoa (esp. outside of Bong, Lofa and Nimba). Farmers that live in border towns (esp. Guinea) often can travel across the border to neighboring countries to sell their cocoa in adjacent towns or more distant buying centers. Those options, though nominally illegal, may have lower transportation costs than traveling to Monrovia on poorly maintained roads and the risk and cost of being caught, or paying the necessary “fees”, may still be low enough to make cross-border trading profitable. Liberian cocoa is harvested primarily during and at the end of the rainy season so transportation infrastructure, and the limited time devoted to properly drying sets up a situation where the cocoa is transported down the path of least resistance and hopes for greater profit. One must

note that direct cross-border trade with any of the adjacent countries creates the need for currency exchange and these markets are primarily parallel in nature and can be rather volatile. In fact, most buyers that were interviewed by the IITA/STCP/UTK team admitted to selling all of their pre-February cocoa to Guinea. Buyers also explained that cocoa reversed direction in February and went to Monrovia after political instability in Guinea began to increase risks and move exchange rates unfavorably (and a mandate was passed by the Government of Liberia). This was also made possible by an infusion of investment capital (of likely public origin) in Monrovia that permitted the purchase of cocoa for export (at a reportedly season high Liberian port price of US\$1.02/kg which included transport and buyer's margins).

A majority of the cocoa transported from the farm is done by head loading. Means of transportation with wheels is limited. For all the active cocoa-farming households interviewed (300+), there were only at total of 13 bicycles, 4 mopeds/motorcycles, and 1 pickup truck owned by household members. Buyers are also limited in transportation means and the scale of their operations often depends on their access to rented vehicles. Most buyer's agents collect small amounts of cocoa and transport it by motorcycle to their local collection point (often their home or seasonal residence). Once cocoa purchases have reached a reasonable quantity, the agent or buyer will hire transportation to evacuate the cocoa from the village (agent's collection point). Field observations point to the fact that very few buyers own even a pickup truck. Some buyers, especially in Bong and Nimba, dry their purchased cocoa and then transport 2-3 tons at a time to Guinea (one bag = 100-120kg and each bag is \$LD300-350 to transport across the border to Nzérékoré, including all of the 'border fees', transport costs and driver's margin).

7.2.4.1 Price Determination

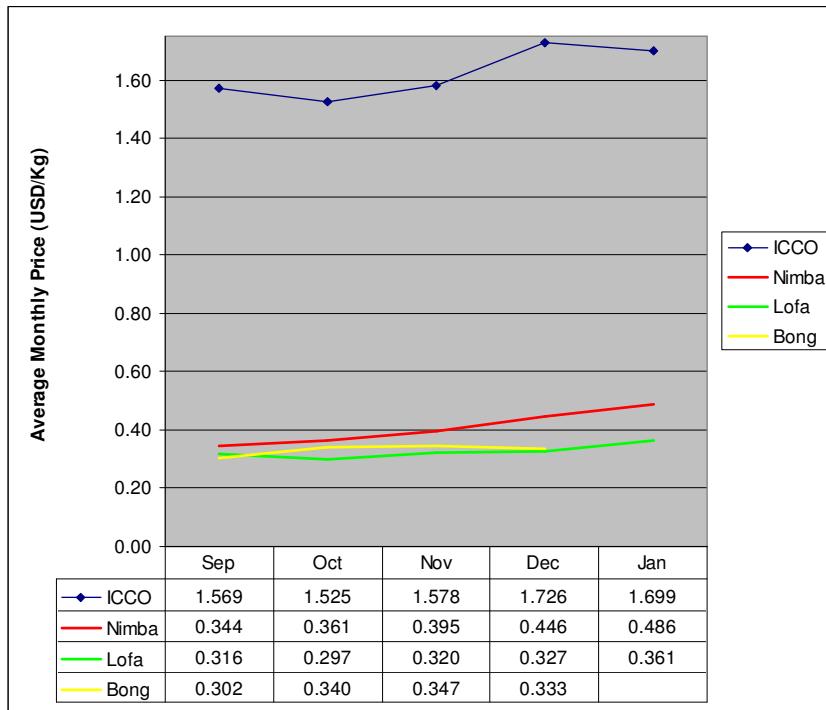
Wide margins between domestic (African) and world commodity prices are often attributed to high transport costs and low domestic quality (Kherallah et al 2002), policy reforms, marketing board influence, risk aversion, and exogenous influences, like labor organization, weather and world price fluctuations (Townsend 1999; Fold 2001). When monopsony or oligopsony practices exist, farmers are often forced to sell at discounted prices and market information has little influence. However, theory supposes that as the number of buyers and sellers increase, price information and market information may serve to provide additional limits on agents' ability to exert market power (Timmer, Falcon and Pearson 1983). In Liberia, buyers and their agents may have the ability to exert such power against farmers.⁷³ Further downstream, the reverse might be true for buyers when selling to exporters. However, all margins need to be examined rigorously if agents up-stream are to benefit from policies and actions that are aimed at increasing market efficiency.

Limited data availability has constrained a rigorous analysis of the Liberian cocoa marketing chain. Pay-Bayee (2005) and others have provided some anecdotal insight. The IITA/STCP/UTK survey sought to add additional detail. While a time series of farmgate prices has been obtained, limited cooperation from buyers downstream has led to an inability to determine conclusively the marketing margins throughout the Liberian cocoa marketing chain. This means, at this time, a true value chain analysis (e.g. Gilbert, 2006) is impossible, since the series of downstream prices in Liberia and Guinea have proven to be

⁷³ The information on the extent at which the few farmer groups in Liberia may be able to negotiate price is limited. But such ventures in other cocoa producing countries have been hugely successful.

unobtainable. Theory indicates that in a competitive market, the margin between the farmgate price and the ICCO price (Figure 32) should be explained by the addition of commodity producer prices, internal transportation and transaction costs, exchange rates and other export costs (Gilbert 2006). While explicitly measuring the influence of each on market outcomes is not possible at this time, a preliminary estimation of price determinants has been performed. Preliminary results indicate that location and the marketing chain level, quality, quantity, credit, and market information variables may impact farmgate prices. The following sub-sections attempts to examine these determinants.

Figure 32: Average Monthly Prices Weighted by Quantity Sold by County Compared to ICCO Price



7.2.4.2 Liberian Cocoa Prices

The difference between farmgate prices within Liberia at any given time is limited to only a few \$LD/kg on a county average level. This is quite different from the findings in Cameroon where provincial differences can be quite significant (Wilcox, 2006) or in Ivory Coast where weekly buying center prices are reported by the BCC and are rather variable spatially. Despite a lack of wide regional price differences at the farmgate, location of sale and the level of the marketing chain at which the sale took place may play a role in farmgate-level market outcomes.

As mentioned previously, preliminary evidence from the IITA/STCP/UTK survey suggests that farmers may be receiving better prices across the Guinean border than in the local Liberian buying center or, most certainly, at the farmgate. However, the farmers that choose to sell in Guinea pay high transaction costs, compared to selling locally, as they are required to pay entrance fees at both borders. Transporting cocoa across the border does not necessarily guarantee a better price since in either case the farmer rarely has the ability to negotiate prices. A risk factor is also involved when transporting the cocoa to Guinea, for both farmer and buyer. The prevailing prices in Guinea are often unknown to farmers from Liberia (buyers typically have ‘customers’ and cell service in the larger towns where they reside) and they must navigate parallel exchange channels. Both transactions are often held

in the farmer's rudimentary French or the Guinean buyer's rudimentary Liberian English. Despite this, it is often worth the uncertainties. Farmer's reported in interviews that they would often get the equivalent of \$LD5-15/kg more for their cocoa after accounting for transactions costs, compared to the farmgate. Of course in the villages that border other countries, the option may exist to bring the cocoa to a local/regional buying center Liberia but true border towns are often close enough to Guinea to head-load their production. Until February 2007, these farmers took advantage of favorable exchange rates and local Guinean prices to return load goods from Guinea paid with their earnings from cocoa sales thereby further enhancing the incentive of cross-border trade. Even at the buyer-level, estimates of 75 percent or much more of the cocoa purchased by buyers in Liberia is currently sold in Guinea as buyers search out the difference of \$LD15-25/kg (or more) from the Monrovia port price.

Differences across location appear to be driven by quantity (see next section), infrastructure and possibly the number of buyers. Farmgate prices were relatively constant throughout the season despite fluctuations in the world market. Preliminary evidence points to price transmissions, from downstream upwards, that rapidly decay as the level in the marketing chain increases. Low, but significant, price transmission elasticities between the buying center and the farmgate suggests that even arm's length transactions bare little resemblance to one another in regard to price variability and movement. Insignificant price transmission between the farmgate and world prices suggests that there is currently a disconnect between the farmgate and the world market. This may be driven by the buyer's ability to limit the responsiveness of prices and compounded by the fact that cocoa of Liberian origin is heavily discounted on the world market and margins downstream from the farmgate may fluctuate while farmgate prices remain relatively constant (reminiscent of the seasonal pan-territorial pricing strategies of the essentially defunct LPMC).

7.2.4.3 Quantity

Preliminary evidence shows that economies of scale are at work, in a limited sense. There is some indication that the quantity of cocoa that is sold impacts the amount of refraction taken. Buyers are looking to minimize search costs and maximize throughput, therefore the larger the sale, perhaps better off the farmer and the buyer. Almost all the cocoa grown is sold during the main season which falls between September and January. The largest lots are sold during the months of October, November and December (Figure 33). Individual transactions are typically less than 100kg and rarely over 200kg.

7.2.4.4 Quality

Farmers interviewed indicated that good quality cocoa is of less importance than quantity when selling either to Liberian buyers or directly in Guinea. Buyers will purchase quantities that are wet (and reportedly sometimes even moldy) with minor quantity refractions taken. Refractions are discounts paid to buyers through a weight deduction that is taken off of the final sale weight. This effectively lowers the price received by farmers. Often a kilogram is also deducted from the total amount sold reportedly to account for the weight of the sack holding the cocoa. Liberian buyers may be relatively more concerned with quality during the transaction and will discount the cocoa or refuse to buy it if it does not meet their needs. Despite this, a majority of the refractions found in the survey were taken for the weight of the bag alone and did not reflect quality issues (Table 36).

Figure 33: Percentage of Sales by Quantity per Month

Month	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	
Cocoa Marketing									
	0.18% (n=1)	0.36% (n=2)	1.07% (n=6)	5.16% (n=29)	16.37% (n=92)	21% (n=118)	21.17% (n=119)	4.63% (n=26)	001-100 kg
		0.18% (n=1)	0.18% (n=1)	1.6% (n=9)	1.96% (n=11)	7.12% (n=40)	9.43% (n=53)	1.25% (n=7)	101-200 kg
				0.71% (n=4)	1.42% (n=8)	1.25% (n=7)	1.6% (n=9)	0.71% (n=4)	201-300 kg
						0.36% (n=2)	0.53% (n=3)		301-500 kg
					0.18% (n=1)	1.07% (n=6)	0.36% (n=2)	0.18% (n=1)	500+ kg

Table 36: Cocoa Marketing Refractions

Item	Nimba (n=286)	Lofa (n=169)	Bong (n=108)
% of Sales with Any Type of Refraction	70.3%	85.8%	83.3%
% Sales with Quality Refraction (Wet or Moldy)	18.9%	10.1%	5.6%
Average Size of Refraction (kg)	3.0	2.9	2.3
Average Refraction per transaction (\$LD)	68	55	46

Quality is determined during the fermentation and drying stages. If the beans are not allowed to dry sufficiently they will mold, if they are dried too quickly then the beans taste acidic. Fermentation of cocoa in Liberia occurs in hanging banana leaf covered baskets or in a pile wrapped in banana leaves on the ground. Farmers reported fermentation duration ranges from two days to a week. Drying times ranged from three days to a week. Methods of drying used by survey farmers can be found in Table 37.

Table 37: Drying Methods for Cocoa

Material	Percent of Households (n=336)
Concrete Slab	1.19%
Road	0.30%
Bamboo mats	69.94%
Tarp	8.33%
Attic with fire	0.89%
Other - Raised platform with mat	0.30%

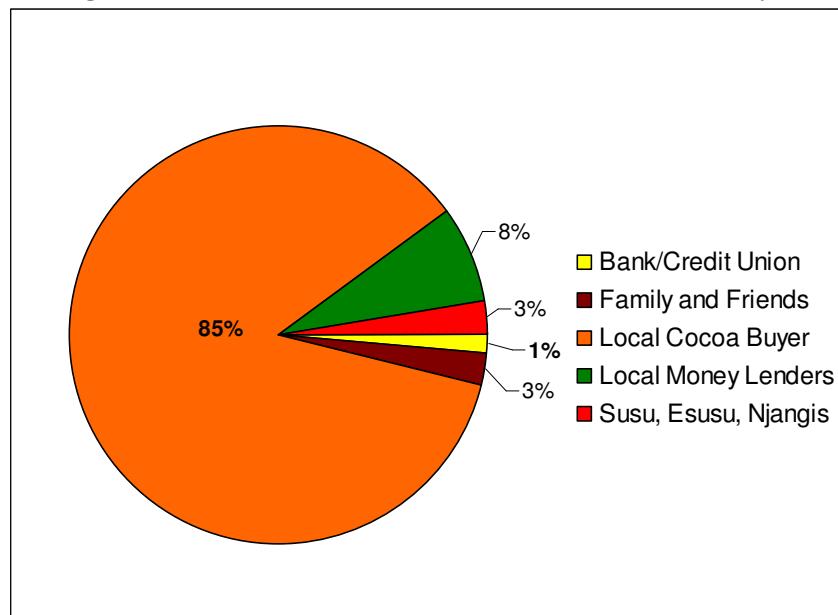
Quality is often measured by obtaining a sample of beans to ascertain, rudimentarily, bean moisture level (by breaking open beans or rolling beans in one's hand) and level of fermentation (through color differences). Measuring quality and determining discounts or premiums is highly subjective and depends on the buyer's/farmer's knowledge of good quality and the honesty of the buyer's assessment, since no instruments are used. Farmers, for their part, may be improperly fermenting and drying the beans as a means of saving time or lack of knowledge. Buyers are willing to buy wet beans as they can buy them at a discount and add value by drying the beans at the collection center.

7.2.4.5 Credit Availability

Another dimension of the cocoa markets that affects the price for cocoa is the accessibility of credit and its source. There are currently very few sources of credit or loans in Liberia. As such, a farmer's capital constraints becomes an opportunity for buyers to either offer lower prices at the time of sale to take advantage of the farmer's pressing needs or offer the farmer loans/credit that can be paid back in cocoa at harvest. Such loans help the buyer limit search costs as they typically only make loans to farmer's whose production capacity is known and this contractually, albeit informally, obligates the farmer to sell to that buyer to repay the loan. Loans are often made directly by the cocoa buyer in a regional buying center to the cocoa farmer. Buyer's agents may also have this capacity though on a small scale. These loans are usually given in the form of cash or food during the starvation months of the rainy season. Typically, the farmers will pay back loans in cocoa but it is currently unknown if these farmers receive lower than average farmgate prices (thereby paying interest on the loan). For the cocoa farmers surveyed, the average length of loan was 3.3 months. Loans were used primarily for

farm cleaning and maintenance. Motivating or enabling farmers to complete these farm management tasks is one way that the private sector is actually helping to increase production as farmers begin to rehabilitate their farms. Several buyers that were interviewed identified proper farm management, which increases throughput, and infrastructure, which lowers transportation costs, as the two most important things that need to be rectified at the village level.

Figure 34: Sources of Credit for Active Cocoa Farmers Surveyed

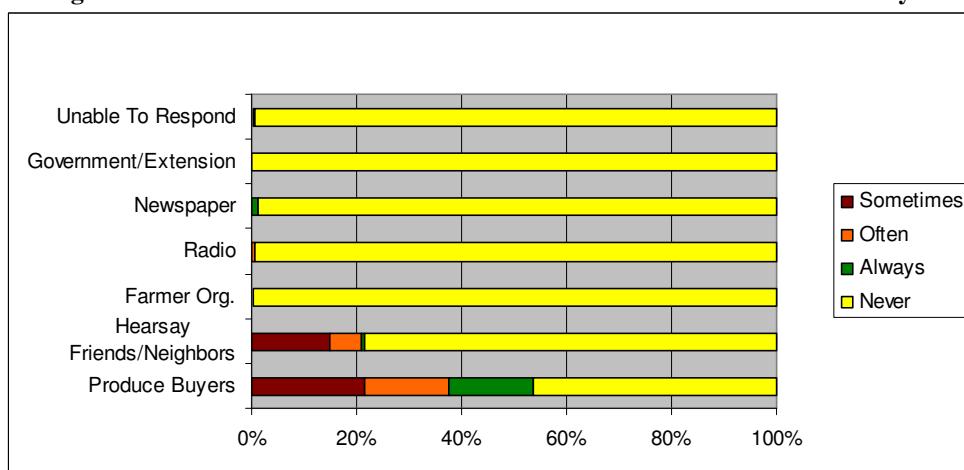


Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.2.4.6 Market Information

Rural Liberia, has limited access to communication tools that might be effectively used to transmit price information. Cell phones have limited signal availability and few people have access to one. In fact, only 38 people of the 792 people surveyed had a personal cell phone. Much of the information for prices is gathered from non-reliable or nonobjective sources, such as buyers, who have a conflict of interest. Friends and neighbors also play a role but they may also be poorly informed or getting their information from buyers.

Figure 35: Sources of Market Information for Cocoa for Households Surveyed



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practice

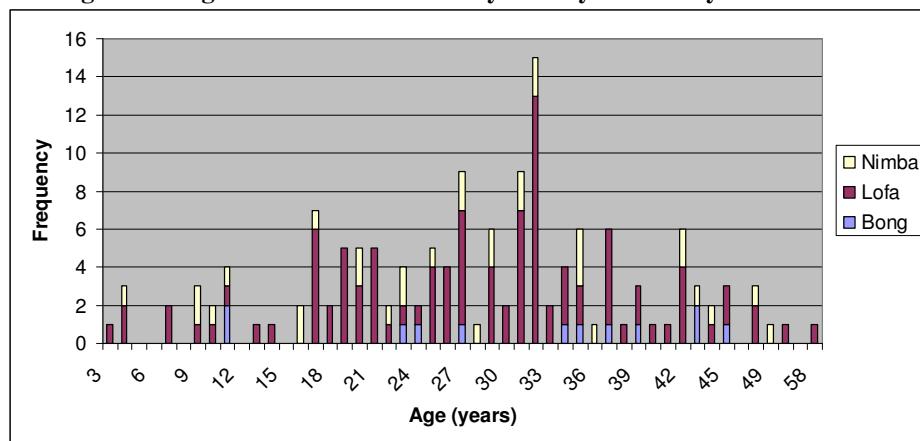
Currently, given the complete lack of market information it is impossible to estimate if informed sellers are actually able to negotiate significantly higher prices. Evidence from other countries, such as Cameroon, suggests that the dissemination of accurate market information can have a positive effect on market transactions for farmers.

7.3 Coffee

7.3.1 Coffee Tree Stock

International prices for coffee have discouraged farmers from planting new coffee tree stock, since the 80s (Figure 36). The available tree stock for coffee is limited mostly to what is available from seed plantings, very few people are using or have access to the improved variety, which can be seen in Figure 37.

Figure 36: Age of Coffee Tree Stock by County for Surveyed Households



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

unavailability of improved varieties and projected low prices will likely hamper any resurgence of the sector. In addition, finding buyers has proven difficult for those few Liberian coffee farmers who decide to spend their time harvesting, drying and storing their coffee production.

7.3.2 Coffee Production

Coffee was the first tree crop introduced as an export crop (together with sugarcane) in the mid-19 century. Both coffee and cocoa saw a large expansion in area harvested during the period of the 1960s to 1980s (Table 38). In spite of extension programs under various agricultural development projects, yields for both crops have remained low, and appear to show a greater response to falling world prices than the area planted. Export earnings can reflect cross-border trading in both directions: for example it was estimated that in late 1960s at least 50% of cocoa exported from Liberia originated in neighboring countries (World Bank, 1969). By the end of mid-to-late 1980s coffee export earnings fell sharply – to less than US\$10m, and cocoa was replacing coffee as the dominant smallholder tree crop.

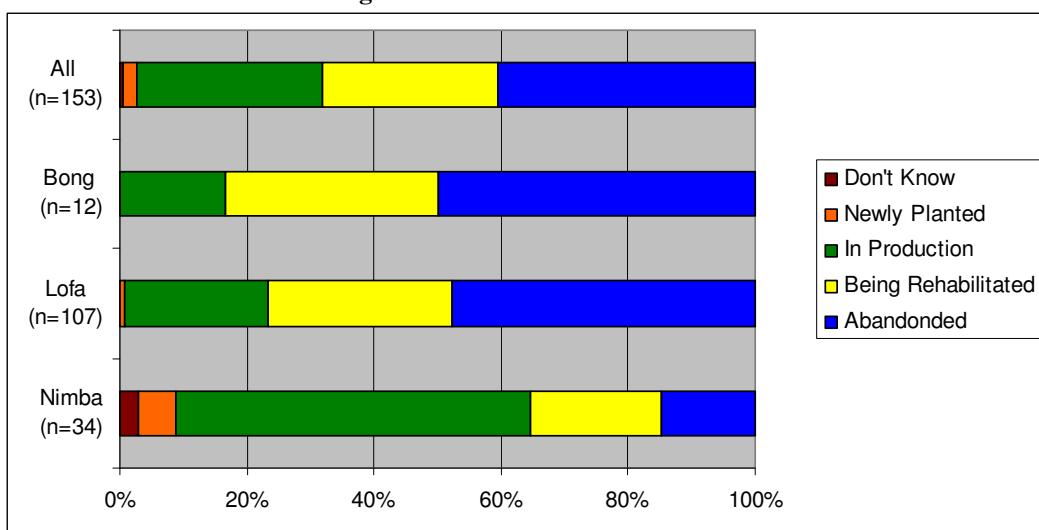
Table 38: Trends in Liberian Coffee Production and Trade

Coffee	Unit	1960s	1970s	1980s	1990s
Area harvested	ha	8,670	18,180	21,310	--
Production	tones	4,410	6,180	8,250	--
Yield	kg/ha	510	350	385	--
Export quantity	tones	4,420	6,170	7,600	--
Export value	US\$ m	3.0	12.9	17.0	--

Source: FAOSTAT

Liberian coffee, without having an internal marketplace for the finish product, faces a large competitive international marketplace with extremely limited ability to enter let alone compete. Downturns in coffee commodity prices and the opportunity cost of growing another more profitable agricultural venture being high, the desire to grow coffee tree stands is limited. This can be seen in Figure 38, hardly any new trees have been planted and 40% of existing farms have been abandoned to bush.

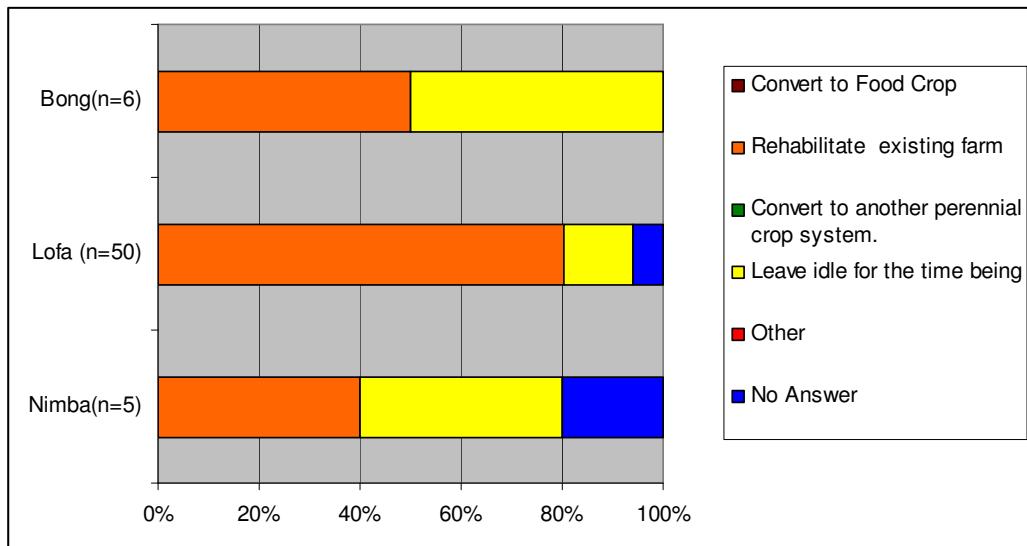
Figure 38: Status of Coffee Farms



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

The farmers surveyed were asked what their intentions were for the abandoned farms. A majority said that they were looking to rehabilitate the farm, while a large portion said that they were going to leave the farm idle (Figure 39).

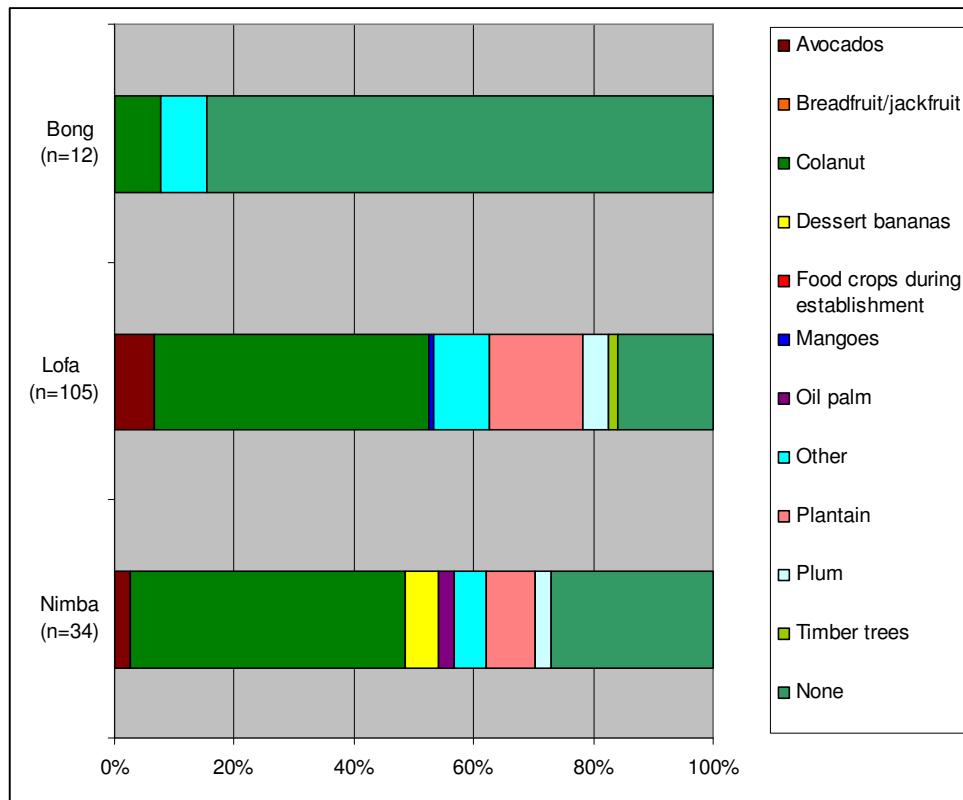
Figure 39: Future Plans for Abandoned Coffee Farms



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Coffee is known to be a very particular tree crop, which is sensitive to intercropping and overgrown bush. However, with very few people growing coffee for sale and the need to subsistence farming high, coffee is interspersed with a variety of secondary crops (Figure 40).

Figure 40: Secondary Crops Planted with Coffee



Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.3.3 Liberian Coffee Marketing System

Many aspects of farming coffee are similar to those of farming cocoa. The harvest season for coffee falls within the same period that cocoa is harvested. The marketing system for coffee is identical to the marketing system for cocoa, except for the fact that coffee can be stored for greater amounts of time if it has been properly dried, thus extending its on-farm shelf life. See Section 7.2.4 and Figure 31 for more details on the cocoa marketing chain.

Production and sale is limited in Liberia, although there were 147 households surveyed that had a coffee farm, only 37 respondents indicated that they produce coffee for sale. Survey respondents indicated that they had sold to the local buyer, but were not asked to specify the buyer's origination point. Twenty-two of the sellers indicated that they sold Arabica and the other 15 indicated that they sold Robusta varieties of coffee. The average minimum monthly sale was US\$35.17 and the average maximum monthly sale was US\$45.37. With the limited response an average price could not be calculated.

7.4 Oil Palm

7.4.1 Trends in Oil Palm Supply and Export

Oil palm is a ubiquitous crop for smallholders, produced from wild (natural) groves primarily for own-consumption, but also as a cash crop (cooking oil, soap), together with palm wine. Palm oil continued to be imported in small quantities in late 1960s, and more sporadically in the 1970s and 1980s. The installation of processing mills saw the substitution of palm kernel exports with palm kernel oil, and the establishment of oil palm estates by parastatals and private companies resulted in an increase in oil palm exports (Tables 39 and 40).

Table 39: Trends in palm oil production and trade

		1960s	1970s	1980s	1990s
Area harvested	ha	12,670	14,950	10,900	--
Production (palm kernels)	mt	10,900	12,675	7,200	--
Export quantity (palm kernels)	mt	10,850	4,500	595	--
Export value (palm kernels)	US\$ (mil)	1.36	0.65	0.17	--
Export quantity (palm kernel oil)	mt	--	4,620	1,850	--
Export value (palm kernel oil)	US\$ (mil)	--	2.48	1.10	--
Export quantity (palm oil)	mt	--	990	4,600	--
Export value (palm oil)	US\$ (mil)	--	0.64	2.29	--

Source: FAOSTAT

Although there are 119 households that have an oil palm farm, only 47 respondents indicated that they produce palm oil for consumption or sale (Table 41). Processing oil palm kernels into palm oil is a laborious process. Even, if the village has a dedicated processing area where a drum of kernels can be pounded, boiled, and cleaned, the process takes a full day to complete with several individuals working at the same time. None of the survey respondents indicated a means of processing other than the traditional method of hand pounding the kernels.

Table 40: Oil palm estates established by parastatals

LPMC	County	Area (ha)
Foya		2,300
Ziah Town Oil Palm	Grand Gedeh	830
Kpatawe Oil Palm Farm	Bong	560
Voinjama,	Lofa	23
Gbarnga		70
LPC		
Butow Oil Palm Company (BOPC)	Sinoe	
--Nucleus		2914
--Smallholder		124
Dube Oil	Grand Gedeh	1214
DOPC		
Decoris	Maryland	
--Nucleus		890
--Smallholder		210
Total		8,000

Source: World Bank (1984) and EC

Table 41: Oil Palm Usage in Surveyed Households (n=47/792)

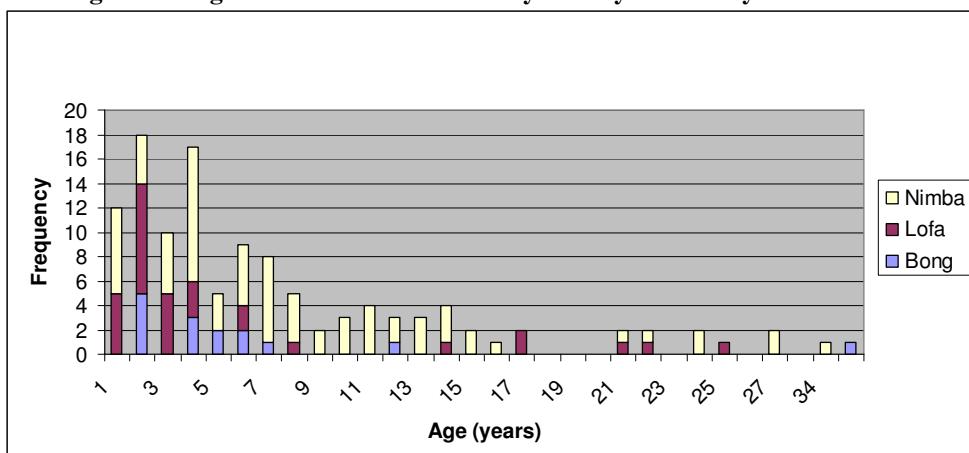
Use	Percent of Households
Home consumption only	55.32%
Sell bunches to oil processor	6.38%
Pay a fee or percentage for processing and then sell oil	4.26%
Process into oil on farm and then sell oil	29.79%
Other	4.26%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

The finished product is used in a variety of applications, from cooking to making soap.

7.4.2 Oil Palm Tree Stock

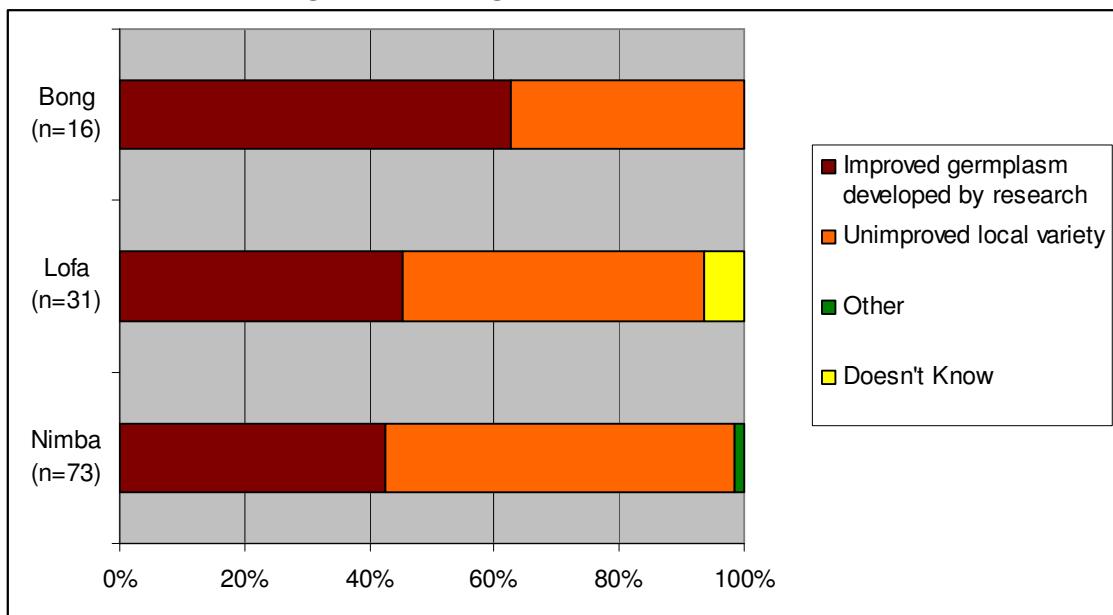
Oil palm has such a variety of household uses that although few people sell it, the benefit of growing it may be high. Most of the current tree stock was planted throughout the war years but not in such a way that it would be viable for large-scale production (Figure 41).

Figure 41: Age of Oil Palm Tree Stock by County for Surveyed Households

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices.

Of all the tree crops observed in this study, oil palm leads the group in using improved varieties of tree stock (Figure 42). This is a direct result of the availability of these varieties.

Figure 42: Planting Material For Oil Palm Farms

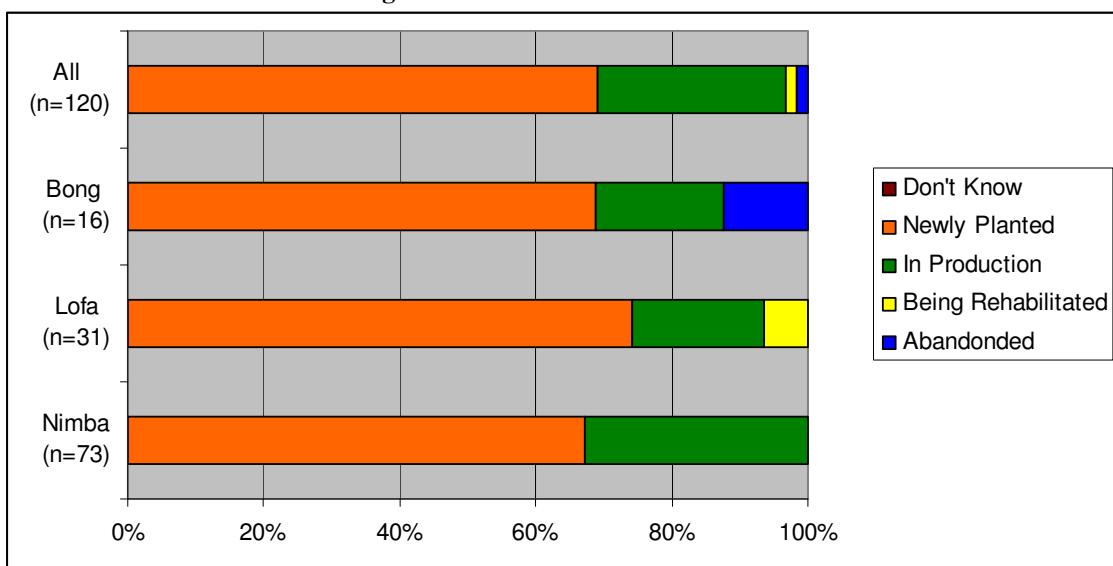


Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

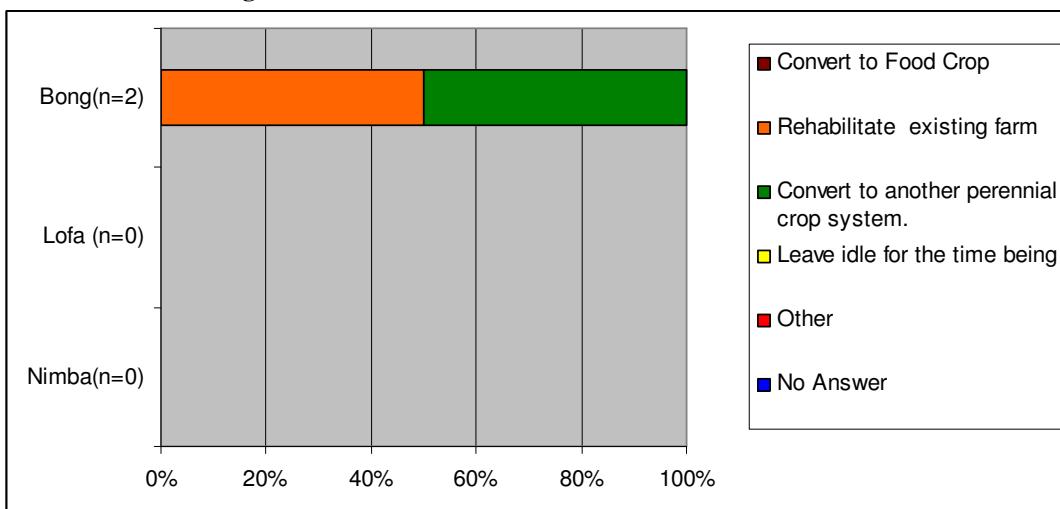
7.4.3 Oil Palm Production

Surveyed households were asked about the status of their oil palm farms. Over 60% of the farms were newly planted (Figure 43), which coincides with the age of the tree stock. Very few farms are abandoned, but the two that have been (Figure 44) - appear to be split between rehabilitation and conversion to another crop.

Figure 43: Status of Oil Palm Farms

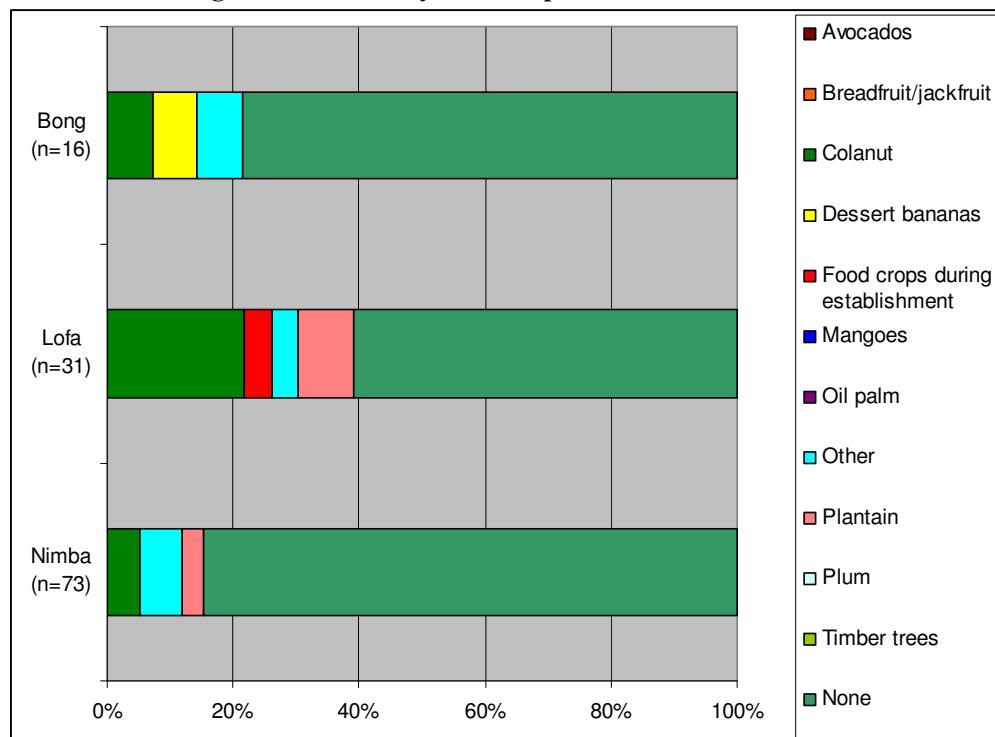


Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Figure 44: Future Plans for Abandoned Oil Palm Farms

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Oil palm stands have traditionally been planted as a stand-alone tree crop; therefore it is not a surprise to see a very small amount of secondary intercropping (Figure 45). This is in contrast with the wild or random plantings that are found on some smallholders' property.

Figure 45: Secondary Tree Crops Planted with Oil Palm

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Oil palm farming requires very little upkeep and the harvesting of the palm kernels must be done by someone that is very strong, in order to climb to the top of the tree to collect the palm kernels and to tap for palm wine. This is especially true for much of the old tree stock as it was observed to be quite tall and prime candidates for replanting. The economic and demographic information for family labor that is used in oil palm harvesting can be found in tables 42 and 43.

Table 42: Oil Palm Farm Labor by Gender and Primary Economic Activity

Principle Economic Activity	Men (n=184)	Women (n=92)
None	71.20%	61.96%
Self Employed Ag	0.54%	0.00%
Hired Labor Ag	0.00%	0.00%
Salaried Non-Ag	0.54%	0.00%
Salaried Retired	26.09%	31.52%
Student	0.00%	3.26%
Petty Commerce	0.54%	3.26%
Homemaker	1.09%	0.00%
Other	0.00%	0.00%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

Table 43: Oil Palm Farm Labor by Gender and Age Cohort

Age Cohort (years)	Male (n=187)	Female (n=94)
3-7	0.53%	1.06%
8-14	6.95%	9.57%
15-20	9.63%	15.96%
21-30	19.25%	23.40%
31-40	28.88%	28.72%
41-50	21.93%	12.77%
51-60	7.49%	6.38%
61 +	5.35%	2.13%

Source: 2007 IITA/STCP/UTK Household Survey on Tree Crop Supply and Production Practices

7.4.4 Liberian Oil Palm Marketing System

Palm oil is a ubiquitous ingredient in West African cuisine. During the years of civil strife, marketable surpluses, generated in areas where travel was an option, were often part of cross-border trade (esp. Guinea and Ivory Coast). Since main domestic population centers (e.g. Monrovia) were often relatively inaccessible, the palm oil needs of neighboring countries were partly satisfied by spill-overs from Liberia. As the conflict was resolved, palm oil markets began to respond to the demand in the formally inaccessible urban centers of Liberia. Some of this demand has been satisfied by imports while other consumers prefer to purchase the raw palm nuts for home processing and others choose to purchase a share of the production that originates from up-country.

Generally, the majority of palm oil produced by smallholders is consumed in the rural areas of Liberia and produced at a subsistence level. If surplus oil is available for sale, it is often purchased and consumed at the village level. Those oil palm growers who have a marketable surplus have three options to market their product (and potentially a fourth). As discussed in Section 7.4.3, palm oil trees and their direct produce have a variety of uses. Here, only palm nuts and oil are considered.

Oil palm produces bunches which contain nuts that can be marketed at a village, local market or regional market level depending on the quantity produced and the entrepreneurial spirit, coupled with the economically available options, of the producer. Oil palm nuts require further processing so the only value added are the margins associated with transactions costs and market conditions further downstream in areas which are presumably more urban. Palm nuts are typically processed further to oil in small batches at the village level using traditional methods that often involve assistance in the form of informal hired labor. Once the palm nuts

have been processed to oil, it is decanted into containers for sale at the village, local market or regional market level. There is the possibility for agents, financed by large agricultural commodity dealers in towns or cities, to purchase palm oil up-country for sale in highly urban areas but it is unknown whether smallholder farmers, or the marketing linkages, have been connected formally to take advantage of such opportunities. (See Figure 46)

Figure 46: General Schematic of Current Liberian Smallholder Oil Palm Marketing Chain

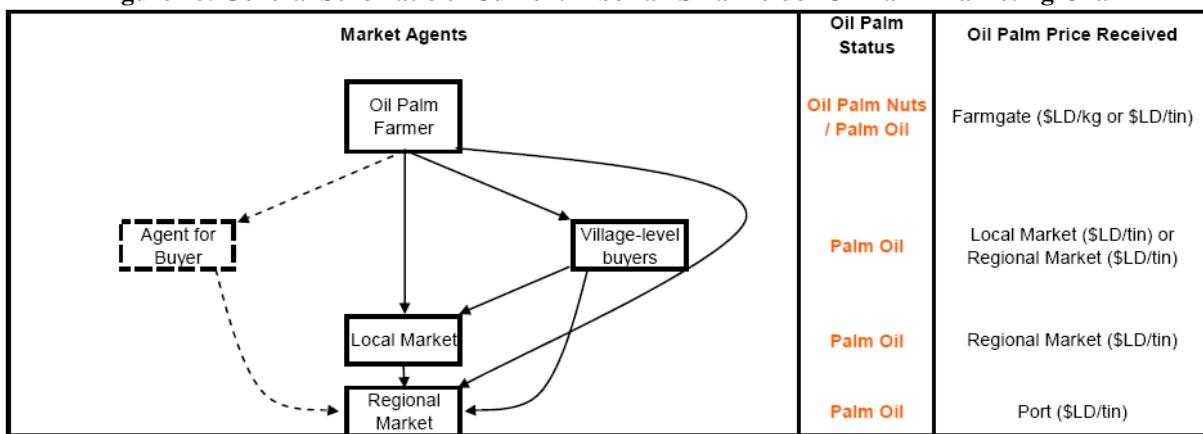


Figure 46 outlines the marketing chain described above. At the moment, it appears that, informal cross-border trade in adjacent countries notwithstanding, Liberia is not a significant exporter of palm oil. As such, the marketing chain available to smallholder oil palm producers is domestic in nature. Sellers in large regional markets may indeed have some access to export markets (thus some “port” price that may or may not command \$LD) but this is currently unknown.

Oil palm sale information is incredibly limited, since much of what is produced is used in home consumption and the time and cost are prohibitive to making a profit by selling or transporting the palm oil. Prices are considerably low for farm-produced oil palm since most people may sell oil palm that was bought in bulk in the market (Table 44).

8. THE WAY FORWARD

Agricultural development in Liberia was initially dominated by the policy to attract foreign investment, to establish rubber and then timber concessions. Foreign exchange earnings and employment undoubtedly contributed to growth but the creation an enclave economy caused a structural imbalance between the monetized and traditional (or smallholder sector). The vulnerability of the export sectors to cyclical demand for commodities (e.g. iron ore, timber) induced the government to seek to diversify production, widen the base of the agricultural economy, and improve the distribution of income.

From the late 1970s the strategy for agricultural development included support for smallholder coffee, cocoa (through the integrated agricultural development projects) and rubber production, together with the establishment of large-scale nuclear plantation estates (including oil palm and coconut) run by public corporations with smallholder outgrower plantations.

The paradox of dualism in Liberian agriculture has been its ambiguous role in the development of the economy to date, contrasted with its present potential to generate employment, foreign exchange and public revenues for poverty reduction programs. Economic development in the

short to medium term will largely depend once again on the traditional growth sectors – iron ore, tree crops, and forestry. The country will need to secure foreign investment, as the Liberian private sector is limited and under-resourced, and seek access to export markets, as the growth in demand in domestic markets for agricultural commodities will be insufficient to sustain the high growth rates needed to reduce poverty. Despite Liberia's liberal economic policies investors will remain wary - given the history of political uncertainties and endemic corruption - until the government establishes a track record for fiscal discipline and economic management.

Rebuilding the sub-sector is however predicated on supporting key economic reforms and new governance structures, and building new coalitions for change focused on establishing competition and market access - to reduce opportunities for rent seeking and state capture - by eliminating structural, policy and market distortions in supply chains.

The policy objective for the sub sector should be to raise rural incomes and employment, export earnings and public revenues through the promotion of both tree crop production and agricultural marketing. The strategy should aim to strengthen policies, institutions and practices that increase pro-poor private sector development including marketing and processing, with an emphasis on agricultural competitiveness in both traditional and new tree crop markets:

- For the existing tree crop plantation estate (rubber and oil palm) the first step will be to review all concession agreements and audit all parastatal holdings and estates in order to establish a roadmap for the renegotiation of concessions as necessary, and the competitive tendering of concessions and other plantation estates.
- For smallholder and commercial farmers of tree crops the challenge is to make output markets work, and to provide public goods and services to rehabilitate and promote sustainable production, and improve household livelihoods.

Both of these broad processes emphasize the need for public-private dialogue. The MoA would be expected to play a stewardship role in forum discussions, which should cover, for example, options for regulatory policies (pricing policy, improving marketing), legal reform (labor law, investment code), fiscal reform (concession policies, corporate and other taxes, investment incentives, funding for replanting), and research. Trade finance and microfinance programs should be facilitated by public entities and financed through private means or via public/private partnerships.

The priority for the tree crop plantations is to resolve the governance issues that affect the majority of the rubber concessions, as well as the oil palm industry, in order to attract the new investment needed to replant and re-install processing capacity. The situation is analogous to that faced by the forest sector will the imposition of UN timber sanctions: the sector could not restart without a review of the legality and status of present contracts and agreements. A similar approach to that undertaken by Forest Concession Review Committee in 2005 could be adopted, which included the:

- verification of the status of the concession holder as a business entity authorized to operate in Liberia, and the authenticity of the concession contract;
- review of the concession contract for compliance with rule of law (national and international);

- assessment of the concession contract for compliance with its financial obligations, applicable labor and environmental laws.

The forest concession review was the first step in the overhaul and reform of the sector culminating in the New National Forest Reform Law in 2006.⁷⁴ The objective of the a review of contracts in the plantation sector would to bring existing and new agreements into line with accepted international practice, and the awarding of agreements in line with the policies of the Contract and Monopolies Commission (CMC) and the Public Procurement Law (2006). The new agreements would provide a level playing field with respect to (a) labor, social and environmental, and wider community obligations; (b) fiscal policy (the definition of taxable income – including non-resident dividend income and the removal of individual plantation blanket duty exemptions); (c) a formula and mechanisms for negotiating and reviewing prices based on international prices and grades both paid at the factory gate (whether a concession or an independent processor) for private, contract and outgrower farmers, and for purposes of payment of export taxes, and (d) contracts for outgrowers, including cultivation rights, inheritance rights, and management standards, and mechanism for third-party monitoring of compliance.

For the smallholder sector the immediate priority are to (a) resolve the financial status of the LPMC (in terms of debts and assets); (b) explore the institutional options for regulating the marketing of tree crops. International markets have changed, and to ensure farmers receive a fair price requires a greater emphasis on regulators to work with the private sector to improve performance on quality through the mandatory certification of instruments used for quality and quantity assessment in the field (scales, hygrometers, etc.) and ensuring that all product is meeting appropriate international/industry grading, sanitary and phytosanitary standards; provision of market information that is timely, objective and disseminated using technology that is appropriate for the rural areas in which tree crop farmers live and work, and to agree on mechanism for the licensing and monitoring of buyers/exporters; and (c) discuss funding options for the private provision of public services including: (i) the support of common initiative groups, such as farmer associations and marketing groups, and (ii) grant funding for the continuation and evolution farmer field schools across all smallholder tree crops.

In the short-to-medium term options for investment to the tree crop sector could include (a) programs to support tree crop rehabilitation and expansion, and (b) marketing and export promotion, including enhancing efficiency and ensuring competitiveness.

8.1 Tree crop rehabilitation and expansion

In order for tree crops to be rehabilitated and expanded successfully, market reforms need to be put place either before or concurrently as to ensure incentives for all market agents involved. Great care should be taken to eliminate or revise any regulations or laws that may otherwise serve as barriers to the introduction of well established, effective and environmentally safe cultivars that are disease resistant, high yielding and agronomically appropriate for the Liberian tree crop sector. Without the introduction of improved varieties and farm-level incentives, the smallholder tree crop sector will stagnate or decline.

⁷⁴ The law mandates benefit sharing arrangements, social agreements with affected communities and a mechanism for annual contract compliance review (NFRL, 2006).

Currently, many of the farms that were abandoned either are in desperate need of underbrush management and pruning or have long since past their economic viability. Public/private partnership programs, such as the Farmer Field Schools pioneered in the Liberian cocoa sector by STCP, should continue to assist farmers with inventorying the current status of their tree stock, help farmers devise short, medium and long-term plans for their tree crop farms and facilitate the identification and introduction of improved varieties.

Lastly, an examination into the input markets associated with tree crops should be undertaken and the needs of the sector identified. Yield enhancing best management practices that eliminate or significantly reduce the need for chemicals, which are currently not readily available to smallholders anyway, should be promoted.

8.2 Research

Little if any research has been undertaken on the linkages between household livelihoods strategies and farming systems, including tree crops. Assumptions that productivity can be raised through the supply of improved varieties and other inputs need to be tested: the experience during the 1980s with the agricultural development programmers should serve as a salutary reminder of the constraints faced by households, and the central role of social relations in their livelihood strategies, which limited their response to supply-side approaches. If little was known prior to the civil conflict, then even less is known at present as displaced households return. Research is needed to examine the impact of customary land tenure on the adoption of tree crops, and land-use intensification. Tree crops are a potential source of alternative incomes for communities not least near proposed protected areas. The option of offering young farmers guaranteed short-term tenancies for food and tree crops could be explored. In addition, it will be important to ascertain how best to develop a farm-level portfolio of offerings that can address household food security issues while balancing household financial needs through the sale of tree crops and surplus food crops given a farmer's current endowment of land, labor and capital.

8.3 Establishment of a replanting fund for smallholders

The case for establishing a replanting fund for rubber has been made in the past. However, such funds could be established for rubber and other smallholder tree crops. The approach would be a private sector initiative, based on voluntary contributions (for example, an export levy, or on a cost-sharing basis), involving no public funding and with members assuming the benefits and risks. Nonetheless replanting funds would require initial seed funding and technical assistance.

8.4 Marketing and export promotion

The secular decline in agricultural commodity markets will increase the vulnerability of producer countries and reduce farmers' real incomes. A twin-track approach focusing on product differentiation and export diversification would aim to reduce these vulnerabilities.

Product differentiation is a means to capture a "fair price", and includes options such as fair trade arrangements, organic and other certified products. The experience with certified timber products indicates that the benefits are mainly to maintain market share or gain market access rather than a price premium. However, entry costs tend to be high, and the size of these

markets is unknown.⁷⁵ Beyond niche markets, production and quality also needs to attain a level that will make the Liberian tree crop sector, especially cocoa and coffee, such that exporters will be willing to install themselves (accompanied by capital investments) in the marketplace.

The Everything But Arms (EBA) and the African Growth and Opportunities Act (AGOA) provide trade preferences for quota- and duty-free entry into the EU and US markets respectively. Agricultural products are a promising area for Liberia under AGOA, which provides trade and technical assistance packages.⁷⁶

An important factor to consider is the informal regional trading sector that dominates the marketing of non-rubber tree crops (esp. cocoa and coffee and to some degree palm oil). The ECOWAS nations that are involved in this cross-border trading should seek ways to make the marketing chain and trading system more transparent and efficient. In addition, Liberia should re-examine its taxation regime as it pertains to tree crops to ensure that the sector effectively contributed to the rebuilding of the nation without adversely affecting or distorting markets.

⁷⁵ Liberia could have a ‘comparative advantage’ in organic markets given that no chemicals are used in coffee or cocoa production. The production of oil palm for biofuel production offers an emerging export market and a potential import-substitution opportunity. Providing oil palm plantations are only established on existing plantations or land that is already in agricultural use the promotion of certified sustainable biofuel is an option.

⁷⁶ Effective December 29, 2006, Liberia was designated as AGOA eligible

ANNEX 1

PEOPLE MET

Dr Chris Toe, Minister of Agriculture

Mr James Logan, Deputy Minister, (Planning & Development)

Dr Wilbur Thomas, Director USAID, Monrovia

Mr Alfreyda Myers, Economic Counselor, US Embassy, Monrovia

Mr MacArthur Pay-Bayee, Project manager, Sustainable Tree Crops Program (IITA)

Mr Mario Bovin Consultant (SOCODEVI) STCP.

Mr Teague, Managing Director, Liberia Rubber Development Authority

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III. LIVESTOCK SUB-SECTOR

By

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Liberia 2007

ACRONYMS

ABL	Association of Butchers of Liberia
ACDB	Agricultural Cooperative Development Bank of Liberia
ACDI	Agricultural Cooperative Development International of the USA
AfDB or ADB	African Development Bank
AFRACA	African Rural & Agricultural Credit Association
AGOA	The US Government's "African Growth & Opportunity Act" programme to promote African exports to the USA
BIVAC	A private firm certifying the quality of exports from Liberia
BNF	The Liberian Bureau of National Fisheries
CAAS-LIB	FAO-funded "comprehensive assessment of the agricultural sector in Liberia" that this report is a part of
CARE	Cooperative for American Relief Everywhere, an international NGO
CARI	Central Agricultural Research Institute of Liberia (Gbarnga, Bong Country)
CBL	Central Bank of Liberia
CBO	Community Based Organizations
CDA	The GoL's Autonomous Cooperative Development Authority
CHF	Cooperative Housing Foundation of the USA
CLUSA	Cooperative League of the USA/National Cooperative Business Association (NCBA)
CRS	Catholic Relief Services, and International NGO
CU	Credit Union, i.e., a savings and credit cooperative or association
EAC	A Liberian company formerly owning part of the LBDI
ECOWAS	The Economic Community of West African States
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOR	The FAO Representative or the entire Representation in Liberia
FCFA	The CFA Franc currency used by some of Liberia's neighbouring countries
FFA	Farmers' Field School
FX	Foreign Exchange
GDP	Gross Domestic Product
GoL	Government of Liberia
IAS	International Associated Services, a farm inputs and supply dealer in Monrovia
IDPs	Internally-Displaced Persons
IFAD	International Fund for Agricultural Development of the United Nations
IFDC	International Centre for Soil Fertility and Agricultural Development
ILO	International Labour Organization of the United Nations
IMF	International Monetary Fund
INGO	International Non-Governmental Organization
Kg.	Kilogramme
LBDI	Liberian Bank for Development and Industry
LCUNA	Liberia Credit Union National Association
LD	Liberian Dollars
LEAP	Local Enterprise Assistance Programme, a Liberian MFI
LiMFU	Liberia Marketing and Farmers Union
LMA	Liberia Marketing Association

LoA	Letter of Agreement
LPMC	Liberia Produce Marketing Corporation
LT	Long-Term
LWS	Lutheran World Service
M&E	Monitoring and Evaluation
MCI	Ministry of Commerce & Industry
MF	Micro Finance
MFI	Microfinance Institution
MIS	Market Information System OR Management Information System
MISTOWA	IFDC's Market Information Systems and Traders' Organizations Network and Project in West Africa
Mm	millimeters (of rainfall)
MoA	Ministry of Agriculture
MoF	Ministry of Finance
MPE	Ministry of Planning and Economy
NEPAD	The African Union's New Programme for African Development
NFC	National Federation of Cooperatives
NGO	Non-Governmental Organization
/P	per person
PSI	Pre-Shipment Inspection
RAF	The FAO's Regional Office for Africa, located in Accra, Ghana
RAFP	RAF's agricultural policy development unit
RF&MO	RAF's Rural Finance and Marketing Officer
RO	Reporting Officer (i.e., the author of this document)
SFC	FAO's new Sub-Regional Office for Central Africa located in Libreville, Gabon
SIGOA-	The "Système Informatisé de Gestion des Opportunités d'Affaires" or "Trade Opportunities Management System" created by ECOWAS to promote intra-regional trade
TOPS	
SPFS	The FAO's Special Programme for Food Security
T	Tonnes
TA	Technical Assistance
TCP	The FAO's Technical Cooperation Programme, its internal project window
U of L	University of Liberia
UN	The United Nations
UNCDF	The United Nations Capital Development Fund
UNDP	The United Nations Development Programme
UNFPA	The United Nations Fund for Population Affairs
UNICEF	The United Nations' Information, Cultural and Education Fund
UNIDO	The United Nations Industrial Development Organization
UNMIL	United Nations Mission in Liberia
UNOPS	United Nations Office for Project Services
US\$	United States Dollars
USAID	The United States Agency for International Development
WB	The World Bank
WOCCU	World Council of Credit Unions, Inc. (USA)
WTO	The World Trade Organization
WVI	World Vision International, an international NGO

OVERVIEW

With peace progressively taking hold in Liberia, the new Government wishes to reinvigorate the agricultural sector and food security to create employment and generate sustainable revenues for a population impoverished by the civil war. The livestock sector, although abandoned in the past, offers interesting perspectives insofar that national needs in animal products are enormous and the availability in natural resources are abundant (more than 2,000,000 ha for only 141,641 units of livestock) according to 2005 estimates.

To better understand this paradox, the mission decided to start by reviewing of existing documentation before visiting the field and discussing with the major actors concerned: traditional cattle farmers and modern traders, government officers, NGOs, butchers, and consumers. The mission then visited poultry markets, abattoirs, training and research institutes, old ranches for multiplying livestock to appreciate their condition and their sanitary status. The mission visited Montserrado County, as well as Bong County, and finally met officers responsible for the Ministry of Commerce and had contact with Livestock Department officials in Loffa, Nimba, Maryland and Grand Bassa counties

Previous livestock situation (pre-war)

Livestock already occupied a minor role in the Gross Domestic Product (GDP) before the war. The most important contribution came especially from modern poultry (egg productions for consumption and chicken). Beef and pig production were highly limited; goats and sheep are found at the level of the traditional economy. There were also chickens and guinea fowl in villages which ran freely. The number of cattle was already low because of tsetse flies which transmit Trypanosomiasis. Livestock had never been the subject of serious statistical research. The country also never undertook a systematic vaccination campaign which would have produced a good estimate of the real number of units and their territorial distribution.

1984 estimates (Shaw and Hoste, FAO, 1987) indicated: 12,600 head of cattle; 210,000 sheep; 200,000 goats; 110,000 pigs and 687,000 birds producing 5,491 tons of meat annually. Animal meat imports come mostly from Mali and Guinea (12,000 head of N'Dama with an average weight of 110 kg/carcass and 14,000 zebus with an average weight of 140/kg/carcasse. Meat importation was about 8,513 tons, in addition to local production of 5,491 tons making 14,000 tons for annual consumption by a population estimated at 2,061,500 inhabitants; that is 6.8 kg/p/year (Shaw and Hoste 1987). Regarding milk production, the national needs were mainly covered by 20,330 tons of import; that is 9.8 kg/p/year. Before the war, the price of imported meat was 30% lower than the meat locally produced because of an economically attractive fiscal and institutional environment; the price of the meat was not fixed and there were no quotas before for livestock and meat importation.

*Concerning pasture land, the annual density was estimated at 0.1 cows/km², 2.2 sheep/km² and 2.1 goats/km². The pastoral areas were evaluated to about 2,000,000 ha (FAO 1980). Out of this total, 182,000 ha were to be rehabilitated but this was not subjected to any feasibility study. Some N'Dama Livestock multiplication centres were created before the war. The ranches are: **Foya Cattle Ranch**: 1000 ha for 500 head;*

Todee Cattle Ranch: 100ha for 100 head; **Panama Cattle Ranch** 25 ha for 25 head; **Cari Cattle Ranch**, 300 ha for 100 head; **Kpain Cattle Ranch** 50 ha for 50 head; **Parta Cattle Ranch** 500 ha for 500 head; and **Sanghai Cattle Ranch** 50 ha for 50 head.

The present demand for animal products

On the basis of interviews, visits to market centres and by updating urban and rural population figures, the current needs can be estimated at 35,200 tons of meat; that is 10 kg/p/year on average (5.6kg of meat from livestock and 4.4 kg of bush meat. The visit to market centres facilitated the observance of the importance of bush meat available in the market as a substitute to the existence of and with high price of meat produced from livestock. This phenomenon needs a special attention to put in place appropriate animal production policies. Concerning milk, the need is figured at 33,440 tons; that is 9.7 kg/p/year, entirely covered by imports. On the basis of local production and figures made available regarding the importation of eggs, it is possible to estimate the average consumption per person per year at 11 eggs./p/year. The need can be estimated to be 2683 tons in 2007, although this will undoubtedly increase with growth in income per capita. In the meat category, the level of frozen chicken and imported turkey tails has reached 2,041 tons; equivalent in unit to about 2,041,000 birds.

The cattle population is made-up mainly of N'Dama (56%) and local Muturu species (44%) Both species are trypano-tolerant. Milk production is insignificant. Despite previous improvement actions, nothing but empty ranches remained after the war. The ranches still exist, but without the infrastructure: buildings having been looted and lack roofs and doors, and brush has taken over. Some private establishments are beginning to occupy them with N'Dama and Zebu cattle. This is the case of Haddad Farms, which has some concessions around Monrovia. The cattle continue to come from Mali through Cote d'Ivoire and from Guinea (Conakry) through Sierra Leone. They are loaded onto trucks at the border and transported to the slaughterhouse in Monrovia. The price of cattle sent to Monrovia varies between 350 and 500 US\$. On the basis of the number slaughtered per week, one can estimate the number of cattle imported annually at about 25 to 27 thousand, to which are added the young ruminants (sheep and goats) to the rhythm of around 300 per week; that is about 15 to 16 thousand per year. The price per pound of meat from the slaughterhouse is 150 LD\$ (approx US \$2.60) for beef and 175 LD\$ (US \$3.00) for goats.

Regarding modern livestock enterprises, the production has been reduced considerably due to importation of frozen chickens. Some producers say that even UNMIL (United Nations Mission in Liberia) supplies its forces with quantities of imported frozen chicken. The capacities of modern farm production are considerable. For now, Haddad Farms and that of Urey's are functioning again with large numbers, but produce mainly eggs. The Haddad Farms possesses 36,000 layers on batteries producing about 26,000 eggs/day at a price of 0.04 US\$/piece; that is 2.6 Liberian \$ (about 23 FCFA/egg). The price of egg retail sales in town is 5 LD\$ (that is 0.08 US\$ or 40 FCFA).

At the institutional level, human and infrastructure capacities are extremely poor. The Department of Livestock has only one veterinary doctor and 26 lower ranks, with 2 at Lofa, 1 in Nimba, 4 in the slaughterhouse, 1 in Grand Bassa in an NGO. The rest are in the Ministry of Agriculture. The Department of Livestock has no vehicle, nor slaughterhouse, nor technical equipment and infrastructure which would have helped to improve the efficiency coefficient of the various agents. Also, there is no veterinary

pharmacy or livestock officer training school. The only school that existed closed its doors in 1990. Veterinary legislative texts are also very old. The freezing slaughterhouse of Monrovia is in a terrible state of disrepair which does not guarantee sanitary quality meat. The situation is even worse outside Monrovia, where rotten meat is often sold in deplorable hygienic conditions.

The livestock sub-sector does not have any supporting project. Only some NGOs are trying to intervene to reconstitute livestock herds through young ruminants and poultry, but the strategies used do not guarantee the sustainability of these operations. FAO also intervened through a small Telefood project (now completed). Other agencies, notably UNDP, USAID, EU and Germany, all intervene through international and local NGOs: CHF, World Vision, German Agro-Action, and Africare.

The document is structured as follows:

- Introduction
- Methodology Employed
- Current Status of Liberia's Livestock Sector
- Strategic orientations
- Priority action programmes

1. INTRODUCTION

With peace progressively being established in Liberia, the new Government wishes to reinvigorate the agriculture sector and food security, with the intention of creating employment for the masses and to generate lasting revenues for a population impoverished by more than 14 years of war from 1990 to 2004.

It is in this context that the Government requested FAO'S assistance to help carry out a review of the agriculture sector. This assistance was put into concrete form through TCP/LIR/3012.

Although neglected in the past, the livestock sector has regained attention. Only a small proportion of the national needs for animal products are satisfied from local production. Yet the country possesses abundant natural and pastoral resources (more than 2 million hectares of pasture land, but only 141,641 units of cattle, according to the FAO/AGAL figures updated in 2005).

To better understand this paradox and to suggest appropriate measures, it is necessary to agree on the strategies and on pertinent activities to implement to accelerate livestock development in accordance with the high expectations of national authorities, development partners and the entire Liberian people, including thousand of youth currently unemployed and which continue to migrate to the country's major urban centres and especially Monrovia.

2. METHODOLOGY EMPLOYED

The methodology used to carry out the review of the livestock sector is as follows:

- Review of existing documentation; (see annex on bibliography).
- Field visits to Montserrado and Bong counties and various markets in Monrovia and Gbarnga.
- Meetings with senior staff of the Ministries of Agriculture and Commerce, as well as with those of agriculture research.
- Visit to slaughtering infrastructures and cattle markets in Monrovia and Bong County.
- Discussions with major actors who intervene in the livestock sector (producers, processors, marketers, and consumers) and in particular with traditional and modern cattle farmers, NGOs, butchers and consumers.
- Visits to some run-down old ranches, the Central Agricultural Research Institute (CARI) and the university-level agricultural training centre in Gbarnga.
- Meeting with correspondents of the Livestock Department in Lofa, Nimba, Maryland, and Grand Bassa Counties.
- Analysis of the data thus collected and specification of development priorities and intervention programmes.

The preparation of the livestock sector review was not easy due to the absence or inaccessibility of adequate documentation. Neither was collection of data in the field.

3. CURRENT STATUS OF LIBERIA'S LIVESTOCK SECTOR

3.1 Physical Context

Liberia had a population of 3.2 million people in 2005 with a growth rate of 2.4% per annum. It covers a total area of 111,370 Km² out of which 96,220 Km² consist of *terra firma*. The country has very good rainfall, with a forestry and savannah climate. The main rainy season is from April to October, while the short rainy season lasts from November through March. Total annual rainfall varies from 4,500 mm along the coast to 1,800mm in the North. Of the 96,220 Km² of land, 35% is made up of forests, with only 4% being farm land, of which only 6,200 Km² are actually cultivated (1984 Hoste Study). More than 37% of the people live in the cities and about 73% depend on agriculture for their subsistence and mostly live in rural area. The pasture lands are estimated to about 2,000,000 hectares.

3.2 Farming systems

Pre-Civil War farming systems in Liberia were of four types:

- **Foreign companies' plantations** (concessions) essentially to produce rubber and palm oil, tree crop farms which utilized modern production and management techniques;
- **Private commercial farms** belonging to Liberians which also produced rubber, chickens, coffee, coconuts, palm oil, rice and vegetables on areas varying from 3 to 10 hectares.
- **Traditional farms**, which represent more than 90% of farms. They are made up of 4 to 5 persons on average, working on farms averaging around 1.5 hectares in size. The production is mainly on a subsistence/consumption basis heavily focused on the production of rice, cassava, maize, and pepper. The products which are commercialized are mainly coffee, coconuts, and palm oil. These farms are characterized by low yields and very low agricultural technology using the "slash-and-burn" mode of farming.
- **Communal farms initiated in 1981** by the government of the day. In accordance with this formula, each County or district possessed communal farms; each farmer had to provide 2 to 3 days of work per week during the rainy season. The area covered by communal farms is estimated at 12,789 hectares, that is, about 1,420 hectares in average for each of the 9 counties existing at the time (there are now 14).

Access to land varies widely, according to the local property systems. Land is either public, communal or private. For communal system, the land belongs to the community (family, village, tribe). The possession of private lands varies by County. Government lands and communal lands are reserved for agriculture and industrial development programmes.

Economically, agriculture contributed about 35% of the GDP in 1989, occupying 70% of the population, and produced 72% of the country's exports, but this capacity was destroyed by the more than 14 years of war between 1990 and 2004. The annual production of rice, Liberia's principal staple food, was estimated at 209,000 tonnes in 2001. This, however, only covered 61% of the country's needs. Livestock alone contributes a maximum of 14.4% of agricultural sector GDP. The country accordingly is forced to import more and more frozen meat, eggs, milk and dairy products to satisfy national needs.

Finally, socially, the demobilisation of thousands of ex-combatants is a source of insecurity today if these groups are not transformed into appropriate development agents through their rapid insertion into the socio-economic fabric, especially in the rural sector which has a huge

potential that can constitute viable auto employment opportunities in view of the current needs of the country to satisfy its basic food requirements.

Photo 1: Liberian cattle of Muturu race



3.3 Major Livestock Product Chains in Liberia

The major livestock product chains in Liberia are the *cattle meat industry*, the *poultry industry*, the *swine industry*, the *dairy industry* and the *animal health industry*.

The livestock situation before and after the war has to be analyzed along with consideration of the general organization of the various industries, from the production or importation of products to their marketing/commercialization through necessary processing, sanitary control and veterinary technical assistance required at each level of the industry.

One must also identify different participants/actors to know who one can count on, who has the ability to invest, who has technical know-how/knowledge, and who should be assisted financially and technically.

Finally, one must analyse the natural environment, institutional and legislative environments, constraints and strengths before suggesting strategic orientations and priority programmes which help the country to relaunch this neglected sector of the Liberian economy.

The native Liberian cattle species consist of the N'Dama and Muturu races are all trypanotolerant, as are the Djallonke type small ruminants. These races adapted to local conditions should be considered the base on which improvement might be made.

Table 1. Estimates of the Evolution of Liberia's National Herds

Species	1980	2002	2005	Compound Annual Growth Rates (2002 – 2005)
Cattle	39,000	36,000	25,200	-11,21%
Sheep/goats	400,000	430,000	435,160	0,40%
Pigs	103,000	130,000	131,950	0,50%
Chicken	2,620,000	5,200,000	5,428,000	1,44%
Total (LUs)	106,000	139,000	136,786	-0,53%

Sources: FAO/AGAL – 2005; LUs = Livestock Units, converted on the basis of cattle = 0.50; sheep and goats = 0.10; pigs = 0.2 and chickens = 0.01.

Table 2: Importation of Frozen/Processed Meat and Live Animals in 2005

Meat	Quantity (tonnes)	Value in US\$
Frozen buffalo meat	56	47,600
Frozen beef	66	95,960
Frozen turkey wings	148	221,449
Frozen pig meat	690	524,886
Frozen chickens	1,893	1,464,135
Pigs' feet	8,082	378,339
Total Frozen & Processed Meat	10,935 tonnes	
• Live animal importation: 12,000 head of N'Dama and 14,000 of Zebu;	3,000 tonnes	
• 15 to 16,000 head of sheep and goats/year	312 tonnes	
Grand Total	14,237 tons	

Source: Based on figures provided by the Ministry of Commerce

Table 3: Fresh Egg Imports in 2006

Importation	Quantity			CIF
	Cartons	Dozens	Tonnes	US\$
UN Drive Supermarket	6,560	196,800	125.20	98,928.00
Roomy Brothers	13,128	393,840	250.74	195,488.00
West Africa Enterprise, Inc.	24,928	747,840	4761.24	271,741.44
Fouani Brothers Corp.	28,800	864,000	550.06	320,190.40
Monoprix Supermarket	19,680	590,400	375.88	314,369.70
Venus Corp.	96,705	2,901,150	2901.15	1,420,005.70
Eid Supply Centre	13,058	391,740	391.74	180,220.98
Abi Jaoudi & Azar Trading	15,593	467,790	467.79	372,939.80
Total	218,446	6,553,560	10,833.91	3,173,882.87

Source: Based on figures provided by the Ministry of Commerce

3.4 Participants in the Livestock Sector

The various participants in the livestock sector are the following:

- **Traditional livestock farmers** hold 100% of cattle, goats, and sheep; 57,67% of pigs; 0% of rabbits; 100% of guinea pigs; 0,45% of chickens; 38,78% of ducks; and 100% of guinea fowl (E.G Smith 2002 Report). Traditional farmers breed local, less productive animals, and use basic techniques. They have access to few inputs and receive less support services.
- **Modern peri-urban livestock farmers (semi-intensive and intensive)** are few. Pre-war, they held 42,33% of pigs, 100% of rabbits, 100% of guinea pigs, 99,5 of poultry, and 61,20% of ducks (E.G Smith 2002 Report). Among leading current modern livestock farmers, one might mention the Georges Haddad Farms in Po River; Benoni Urey's Farm in Montserrado County; and Belle Dunbar's Farm in Caresburg, Montserrado County.
- **Livestock and meat professionals** are made up of buyers, market/toll collectors, negotiators, butchers, wholesale butchers, butcher-apprentices, sellers of roast meat, retailers, and importers. The Association of Butchers of Liberia (ABL) is the most organized structure that intervenes in the sector. This Association was officially recognized in 1977 by the national authorities; its headquarters is in Monrovia. Its President is also the Consul of Mali in Liberia. The Association has more than 50 principal members who all reside in Monrovia. Other active members (about twenty) live outside Montserrado County, particularly in Sinoe, Grand Gedeh, Bassa, and

Nimba counties. According to the estimates given by the President of the Association of butchers of Liberia, each principal member employs 5 to 8 assistant butchers in addition to other small retailers, that is about 8,000 persons.

- ***Support and control services*** are not very operational. The Liberia Livestock Service only has two senior technicians (a veterinarian and a zootechnician) and 17 middle level technicians (7 veterinary technicians and 9 zootechnicians). Four (4) work in the Monrovia slaughterhouse and four (4) other technicians work in counties outside Montserrado. There is, moreover, no training school for livestock technicians.
- ***NGOs***, which provide support to Liberia. At least three intervene slightly in the livestock sector: German Agro-Action, Africare and CHF. The assistance given by most of the NGOs is more of a social and human nature to reconstitute the livestock from young ruminants.

3.5 The institutional, legislative and infrastructure environment

The creation of the livestock service dates from 1956. Since then till 1983, the service was always managed by expatriate technicians, particularly Israelis, Egyptians, and Sierra Leoneans. The first Liberian veterinarian took office in 1983. Then from 1990 the structure collapse with the civil war which lasted until 2004. Today the livestock service is still not entirely functional.

Relevant legislation and regulations are very old and were unavailable, even at the Livestock Service. The regulations on the sanitary protection against contagious illnesses and concerning sanitary and qualitative inspection of produce of animal origin are lacking. ***The Livestock Service's organization chart is unclear and needs to be reviewed.***

3.6 Major Constraints in the Livestock Sector

The major constraints of the livestock sector are:

- ***Institutional constraints*** The livestock service does not have sufficient officers in quality and in number and the importation of animal products does not undergo rigorous control. Moreover, the laws are very old and are not even available. Furthermore, the Service's current organization chart is not clear, and there are practically no technical officers in the field.
- ***Constraints related to insufficient infrastructure and equipment*** The livestock service does not have a veterinary laboratory to diagnose and control the quality of products of animal origin. The premises which house the service are scanty and barely useable. The slaughterhouse in Monrovia is in deplorable state on the salubrity scale. The slaughterhouses outside Monrovia are practically non-existent and the slaughter slabs provided to the general public do not meet elementary hygiene requirements. In the other Counties, livestock infrastructures simply do not exist. The nine (9) livestock multiplication ranches are in a state of total neglect. The insufficiency of road infrastructures as well as the absence of animal passage corridors makes the movement of animals and their produce very difficult. This situation naturally helps increase the cost of locally-produced meat and chicken products.
- ***Technical constraints related to the livestock system practised in Liberia.*** This system is mostly extensive. Livestock, as few as 2 to 3 head per proprietor, is left to

look for its own food through straying. The bovine races consist mainly of N'Dama (41%) and Muturu (59%). The latter is less productive and of small format with an average carcass weight of 95 Kgs (Hoste 1984). The age of first calving is from 30 to 35 months. The rate of fertility rarely goes beyond 82%. The mortality rate between 0 and 1 year was estimated at 27%, according to 1984 Hoste Study. Dairy production is essentially nil. The weight of calves at birth rarely exceeds 18 Kgs. Sheep and goats of Djallonke race are also less productive; their average carcass weight is respectively 11 and 9 Kgs, according to the 1984 Hoste Study.

- ***Constraints related to animal diseases.*** There is little information available on this subject. The major diseases usually cited by participants are as follows: Trypanosomiasis, (congoles T, Vivax T, brucei T), parasites, brucellosis, cattle contagious peri-pneumonia (introduced by living imported animals) foot-and mouth disease, anthrax (bacterial and symptomatic, pastoralosis emorragic septicemia, piroplasmosis, anaplasmosis, babesiosis and theileriosis). Their importance is not yet well known. Currently, there are no research programmes on animal diseases or on the improvement of animal productivity in Liberia. Extension services are unavailable in the field, and national officers based in Monrovia lack the means to assist livestock sector actors.
- ***Constraints related to administrative harassment and difficulties of all sorts, including illicit taxes.*** Administrative difficulties and harassment are enormous and varied on all routes used by trucks carrying living animal from Mali, Cote d'Ivoire, Guinea (Conakry) and Sierra Leone. About 26,000 head of cattle (14,000 Zebu and 12,000 N'dama and 15,600 small ruminants – sheep and goats) arrive every year by truck, averaging 137 trucks/week). The cost of renting each truck is about 500,000 CFAF, that is around 1,000 US\$. The trucks take 10 days to arrive in Monrovia from the border. Each truck pays between 15 and 300 US\$ in illicit taxes. This constitutes unfair competition with imported meat for which a relatively low tax is paid in comparison (source – interview of executives of butchers Association of Liberia).
- ***Constraints related to massive importation of frozen and processed meat.*** This was more than 10,935 tons in 2005 (Sources – summary of statement on importation provided by the Ministry of Commerce of Liberia). Most livestock farmers contacted raised the issue of UNMIL supplying its troops with significant quantities of frozen chicken without consulting local producers. Yet it has not been possible for the mission to discuss this concern with the UNMIL officials who were not available during the mission.
- ***Constraints related to the demobilization of ex-combattants.*** These numbered 101 495 in 2004 (according to UNMIL sources). Out of the total number only 60,000 were able to participate in the professional training programmes in particular plumbing, carpentry and masonry. The risk of insecurity exists if solutions are not found to integrate ex-combatants into economic activities.

Photo 2: Monrovia abattoir**Photo 3: Monrovia abbatoir in bad situation**

3.7 Major Liberian Livestock Assets

*Liberia has more than 2,000,000 hectares of pasture land ; the animal density/population ratio would be less than 0.1 head/Km² for cattle, 2.2 ovines/Km² and 2.1 caprines/Km². Seven ranches totalling more than 2025 hectares were constructed in the past to help multiply trypanotolerant livestock ; they are **Foya Cattle Ranch**: 1000 hectares for 500 head; **Todee Cattle Ranch**: 100 hectares for 100 head; **Panama Cattle Ranch**, 25 hectares for 25 head; **Cari Cattle Ranch**, 300 hectares for 100 head; **Kpain Cattle Ranch**, 50 hectares for 50 head; **Parta Cattle Ranch**, 500 hectares for 500 head; and **Sanghai Cattle Ranch**, 50 hectares for 50 head. These ranches still exist, but are in a state of neglect, yet if rehabilitated they would constitute a considerable potential. Their exploitation should receive the highest priority in the framework of optimal utilization all existing pastoral area.*

Photo 4: Pasture land dominated by paricum maximum or Guinea grass

Several modern farms (semi-extensive and extensive) invested in raising of poultry and pigs and succeeded in producing before the war more than 42% of pigs, 100% of rabbits, 100% of guinea pigs, 99.5% of poultry and 61.2% of ducks. A capacity to produce therefore exists in Liberia. The Georges Haddad Farm succeeded in producing more than 26,000 eggs/day at a price of 0.04 US\$ or 2.6 Liberia dollars, or again 23 CFA F (the retail price of eggs in Monrovia is 5 Liberia dollars, or 40 CFAF, thus showing a real potential for the industry.

3.8 Synthesis and conclusions

1984 statistical data showed meat and milk consumption respectively of **14 000 tons (6,7 kg/person/year) and 20,000 tons that is (9,8 kg/person/year)**. Only 9.2% of these needs were covered by local meat production, and 0% of national milk needs were covered by local milk production (Hoste Study).

On the basis of updated AGAL data, **the current meat consumption of the country** is estimated in 2005 at some 35,200 tons (**about 11 kg per person and per year on average**), which is currently covered by 2.6 kg of national production or coming from live animals, 4kg of imported meat/person/year and 4.4 Kgs. of bush meat (wild meat), according to data collected by the mission and on the basis of FAO/AGAL 2005 figures updated by the team.

The three following tables (4, 5, and 6), as well as the chart (Figure 1) respectively present the evolution of national human population between 1984 to 2015, along with the percentage of national consumption of meat, milk and eggs needs (4,5,6) covered by national production.

Table 4: Projected evolution of local meat production and demand from 1984 to 2015 (in tons)

Sources	1984	2005	2007	2009	2011	2013	2015
Total population (Rate 2,4%/year)	2 101 628	3,200 000	3 354 624	3 435 134	3 602000	3 776 970	3 960 439
National production (in T)	5 491	8 320	8 639	8 950	9 272	9 605	9 950
Total demand (11 kg/P/year)	14 004	35 200	36 900	37 786	39 622	41 546	43 564
National Production as % of total	39,2%	23,6%	23,4%	23,6%	23,4%	23,1%	22,8%

Sources: FAO/AGAL 2005 figures updated by Rhissa

Table 5: Projected evolution of national milk production and demand from 1984 to 2015 (in tons)

Sources	1984	2005	2007	2009	2011	2013	2015
Total population	2 101 628	3 200 000	3 354 624	3 435 134	3 602 000	3 776 970	3 960 439
National production (in T)	0	0	100	200	250	300	500
Total demande (9,5kg/P/year)	20 330	30 400	31 800	32 633	34 219	35 881	37 624
National Production as % of total	0%	0%	0,3%	0,6%	0,7%	0,8%	1,3%

Sources: FAO/AGAL 2005 figures updated by Rhissa

Table 6: Projected evolution of national egg production and demand from 1984 to 2015 (in tons)

Sources	1984	2005	2007	2019	2011	2013	2015
Total population	2 101 628	3 200 000	3 354 624	3 435 134	3 602 000	3 776 970	3 960 439
National production (in T)	1 450	456	730	912	1 450	1 600	2 000
Demand in eggs (16 eggs/P/year)	2 000	2 560	2 683	2 748	2 881	3 021	3 168
National Production as % of total	72,5%	17,8%	27,2%	33,18%	50,3%	53,0%	63,1%

Sources: FAO/AGAL 2005 figures updated by Rhissa

Table 7: Some indications of the price of live animals in US\$ (2006)

Provinces	Cattle	Goats	Sheep	Guinea Fowl	Chickens
Monrovia	550-650	60-75	75-90	15	5-7
Nimba	450	40	66.7	-	4,17
Lofa	450-500	50-80	75-80	3.35	2.50-3.35

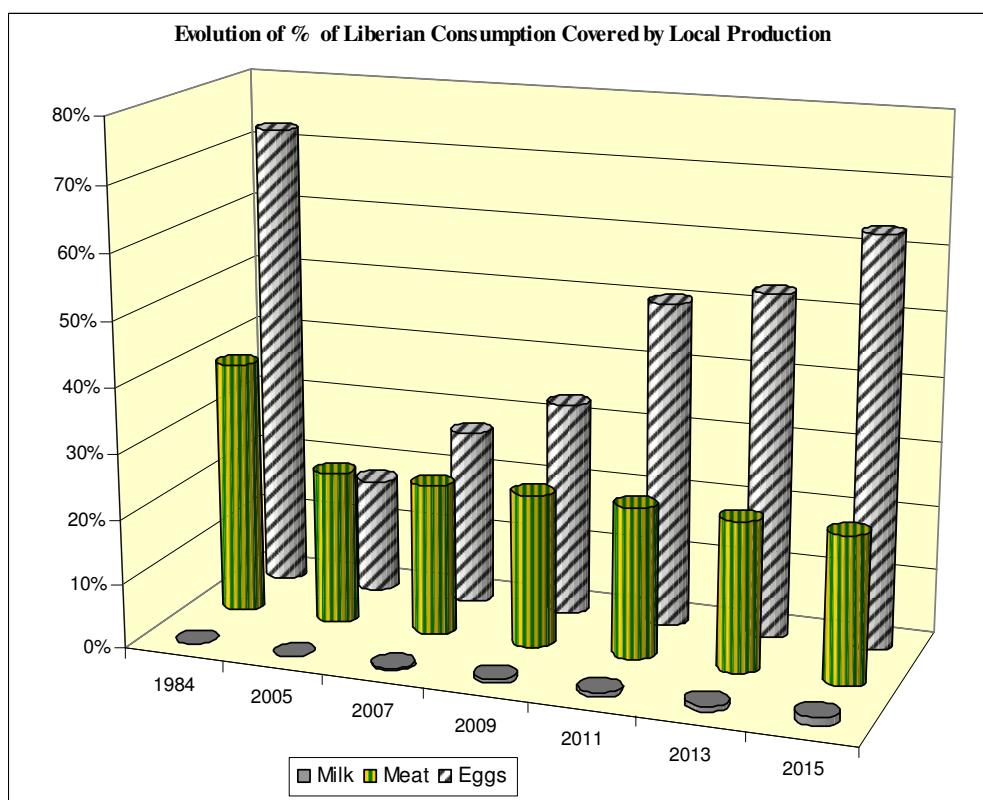
Sources: FAO/AGAL 2005 figures updated by Rhissa

Table 8: Price of Meat in US\$ (2006)

Provinces	Cow Beef/kg	Goat Meat/kg	Sheep Meat/kg	Chicken Meat/kg	Eggs/Unit
Monrovia	3.35	5.84	5.84	N.A.	0.08
Nimba	3.00	-	-	N.A.	N.A.
Lofa	2.70	3.35	N.A.	N.A.	N.A.

Sources: National consultant

A large potential national market exists therefore for livestock products in Liberia which can be satisfied locally but on condition that production techniques are adapted to the country's local context. It will require priority valorization of locally-available natural resources through adaptation of existing local techniques. Solutions must also be found to constraints identified, creating **employment and income** generation opportunities for thousands of Liberians currently without other prospects, in order to contribute more efficiently to fight against **poverty, insecurity, and unemployment** and to thus guarantee the country's internal security in the medium to long term.

Figure 1: Projected national milk, meat and eggs production as % of total consumption between 1984 and 2015

Sources: FAO/AGAL 2005 updated by Rhissa

4. STRATEGIC ORIENTATIONS AND PRIORITY PROGRAMMES

Analysis of the current status of Liberia's livestock sector seems to indicate that the development of this activity constitutes an important opportunity for Liberia that national authorities and technical and financial partners should use it as a development lever to assist the country to succeed. How can we succeed? What types of intervention should be favoured? What priority programmes should be put in place?

4.1 Recommended Major Strategic Orientations and Priority Programmes

The strategic orientations will be articulated around the following four aspects:

I. To make livestock a pillar in the fight against poverty, food insecurity and unemployment and put in place a micro-projects approach whereby each participant works at his/her own rhythm. The priority programmes for the promotion of animal production poles and support to the modernization of the Liberian livestock sector are as follows:

- Promote production poles and support the modernization of key livestock sub-sectors (milk production, bovine and ovine husbandry, poultry, pig raising, Guinea fowl and grasscutter promotion).
- Adopt and put in place a village approach permitting authorities to identify which villages to cover each year.
- Adopt and put in place an approach tailored to both farm size and technology level where everyone moves according to his/her own rhythm.

- Put in place appropriate communications media to assure increased internal and external financing for livestock development.
 - Promote youth and women employment in livestock product chains and support rural entrepreneurialship.
 - Carry out the economic reintegration of ex-combatants and poor people through different livestock product chains.
- II. To act to improve the institutional environment and infrastructure, strengthen programme inspection and healthfulness of animal product foodstuffs, including strengthening of veterinary services and support to zootechnique research. The priority action programmes are in this domain are as follows:
- Review of existing legislative and regulatory texts, particularly to: (i) Inventory laws relating to existing veterinary sanitary regulations and to analyze these; (ii) develop a functional organization chart for veterinary and zootechnique support services; (iii) propose laws or regulations relating to diseases legally known to be contagious to veterinary sanitary inspectors, and for the running of the national veterinary services.
 - Put in place structures to coordinate the various mechanisms of implementing programmes to improve Liberian livestock.
 - Train the various participants to improve the quality of inspections and improve hygiene in livestock distribution channels to guarantee the innocuousness of foods.
 - Rehabilitate and support veterinary and zootechnique research.
 - Train and assist senior staff and the various actors involved in the production circuits to specialize (professionalization of producers).
 - Through legislation, put in place a mechanism to improve animal food and make necessary inputs accessible in order to increase productivity of various channels of animal production.
 - Strengthen programmes related to the fight against epizooties and health monitoring by supporting decentralized national services.
 - Study the internal tax system and suggest measures that will promote livestock industries.
- III. To improve the marketing, processing and distribution channels of animal-based products. The priority programmes to reinforce the capacity of actors include the following:
- Carry out a study of the characteristics of internal demand for animal products and their evolution in time and space (characterization of demand).
 - Carry out a study aimed at improving distribution channels and support to consumer organizations.
 - Study the possibilities of establishing a fund for livestock development in Liberia.
 - Implement means to improve sanitary inspection and healthiness of products from animal.
 - Put in place measures of support facilitating adequate application of quality norms adopted by ECOWAS.
 - Undertake a census the livestock and analyze with more emphasis the characteristics of offer in animal products.

IV. To preserve, improve and exploit better pastoral resources through a programme of assistance to the rehabilitation of pastoral areas and natural resources prevention. The priority programmes of action in this domain are as follows:

- Put in place actions facilitating the elaboration of schemes and plans or territory management at the commune and County levels.
- Develop and establish a pastoral chart.
- Monitor the evolution of the pastoral systems.
- Promote sound range management.

4.2 Tabular Recapitulation of Major Proposed Strategic Orientations, Priority Programmes and Activities

Strategic orientations	Priority programmes	Activites	Total cost in US\$
Make livestock one of the pillars of the fight against poverty, food insecurity and unemployment	Poles promotion programme and animal production to support livestock modernization in Liberia.	Establishment of units of livestock or micro projects	1,720,000
Adopt and implement a technical approach (everyone must move according to his/her own rhythm)	idem	idem	
Act to improve the institutional environment and infrastructure	Programme to strengthen veterinary services and assistance to zootechnique research	Improvement of livestock sanitary coverage	3,600,000
Strengthen programmes to fight against epizootic disease and old sanitary infrastructure	idem	Reinforce veterinary services and to equip laboratories	?
Establish ways and means to improve sanitary inspection and healthiness of food of animal origin	idem		?
Improve the marketing, processing and distribution circuits of products of animal origin	Programme to reinforce the capacity of various livestock product chain actors	Rehabilitation of the slaughterhouse in Liberia, construction and equipping of four provincial slaughter-houses. Training of various actors in downstream production, development and equipping pastoral areas	2,000,000
Preserve, improve and exploit pastoral resources better	Programme of support to the development of pastoral areas and preservation of natural resources	Rehabilitation of seven ranches and put them in service	1,600,000
Total			8,920,000

4.3 Programme to promote animal production poles in support to the modernization of the Liberia livestock sector

Exposition of motives

The assistance to the promotion of production poles aims therefore at increasing production yields in Liberia's various livestock product chains (cattle-meat industry, poultry industry, pig industry, and small ruminants industry) by putting special emphasis on improvements in food, habitat, sanitary monitoring, and management of small farms. It aims at progressively introducing technical progress in order to better utilize locally available resources, with the view of contributing more efficiently to the fight against poverty, food insecurity, youth unemployment and the reintegration of ex-combatants.

Objectives of the programme

The objectives aimed at are particularly simple, precise, concrete and measurable, by making arrangements to monitor their implementation and to evaluate the results on a regular basis, in terms of increases in production and productivity and revenues generated. Finally and in particular is to ensure that the productive micro-projects which will be implemented by the promoters themselves generate sufficiently revenues to produce viable employment.

This will involve:

- Demonstrating that economic alternatives exist in the country and in the villages, then showing that motivated persons are capable of generating substantial revenues by putting in place livestock businesses according to the approach developed by the Special Programme for Food Security (SPFS).
- To contribute to installing the youth in their areas to initiate local development by facilitating the participation of ex-combatants in the economic development of their villages.
- To fight more efficiently against poverty and food insecurity by contributing more to the creation of lasting employment in the rural and peri-urban centres in favour of youth and women by developing complementary economic activities through the use of locally available resources.

Strategies of the programme

The strategy of the programme will be based on the implementation of the **micro-project approach** in targeted areas to implant a viable livestock business model on technical, economic, ecological and social levels. The approach is designed to quickly arrive at a critical mass, with private and public investments, to boost profitable local economic activities and constitute as well an alternative for the reintegration of ex-combatants. *This approach has already produced impressive results in Burkina Faso, Burundi, Cameroon, Chad, the Congo Republic, Guinea Bissau, Mali and Niger* (See principles of the approach in the Annex).

Estimated costs of the programme

Summary of Livestock Production Modules Proposed:

MODULES	Number of units	Cost per unit in \$	Total Funding in \$ US	Number of beneficiaries
Units of layers	200	1,000	200 000	200
Units of flesh-fed chicken	200	1,000	200 000	200
Units of guinea-fowl	200	1,000	200 000	200
Units of local chicken	400	500	200 000	200
Units of sheep (newborn)	200	1,000	200 000	400
Units of goats (newborn)	200	1,000	200 000	200
Units pigs	200	1,000	200 000	200
Units diary	50	3,000	150 000	100
Units bush cattle	50	1,000	50 000	50
Units bush sheep	50	1,000	50 000	50
Units grasscutters	50	500	25 000	50
Units of rabbits	50	500	25 000	50
Units of animal health service	10	1,000	10 000	10
Units of zootechnique inputs	10	1,000	10 000	10
Total	1870		\$1 720 000	1 920

4.4 Programme to reinforce veterinary services and assistance to zootechnique research

Exposition of motives

Good animal health is one of the current major sources of increased animal production in Liberia, especially through a reduction in morbidity and mortality. Besides, many diseases are transmitted to people by animals; this makes the fight against these diseases a means of contributing to generally improving public health.

Strategies

Increased animal production therefore requires continuous efforts to fight against animal diseases. The objective targeted through this programme consists of ensuring the protection of animal health and that of public health through the prevention or handling of large epizooties of domestic cattle and poultry and to improve veterinary public health (control of zoonoses, minimization of health risk related to consumption or to the handling of products of animal origin).

Actions envisaged

Actions envisaged will be especially to: (i) improve livestock sanitary coverage; (ii) strengthening of inspection services and diagnostic and quality control laboratories; (iii) encouragement of the privatization of the veterinary profession; (iv) supervision and monitoring of the fight against priority diseases; (v) strengthening and adaptation of veterinary research on livestock; and (vi) strengthen the infrastructure (laboratories and vaccination parks, etc.) related to the fight against disease.

Actions	2007	2008	2009	Total US\$
Improvement of livestock sanitary coverage	300 000	400 000	300 000	1 000 000
Strengthening of zootechnique and veterinary research	300 000	1 000 000	700 000	2 000 000
Strengthening of zootechnique and veterinary research	100 000	150 000	50 000	300 000
Training of livestock technicians	50 000	100 000	50 000	200 000
Privatization of the Veterinary Service	30 000	50 000	20 000	100 000
Grand Total	780 000	1 700 000	1 120 000	3 600 000

4.5 Programme to strengthen the capacities of livestock product chain actors

Exposition of motives

The reinforcement of the capacity of various livestock sector actors aims at doing away with of previous practices by favouring giving increased responsibility to various livestock sector actors (producers, locally elected officials, NGO, marketers, private service providers, etc.) in the conception, design and implementation of animal production projects and the planning of livestock development.

The promotion of livestock product marketing and processing of livestock products targets meeting the objectives of food security and self-sufficiency of the people in animal products, as well as increase livestock value added. The improvement of the organization of producers, the assistance to the strengthening of their means of intervention, and the acquisition of necessary knowledge constitute the appropriate responses to the current stagnation in animal product production. It is accordingly necessary to promote the professionalization of all actors having human and material resources and the know-how enabling them to efficiently undertake production, processing and marketing activities of livestock products and by-products.

Actions envisaged

The priority actions are as follows: (i) the creation and/or modernization of slaughtering infrastructure; (ii) the creation and the equipment of cattle and poultry markets; (iii) the reinforcement of processing and marketing financing of livestock products (investissments and revolving credits to actors); (iv) carry out a study to characterize internal demand in animal products (v) and especially on the training of all the actors concerned.

Actions	Total \$	2007	2008	2009
Rehabilitation the slaughterhouse in Monrovia	300 000	100 000	200 000	-
Construction and equipment of four slaughterhouses in the province	800 000	200 000	400 000	200 000
Conception and extension of kiosks for meat distribution	200 000	50 000	100 000	50 000
Construction and equipment cattle market	200 000	50 000	100 000	50 000
Training of different production actors downstream	200 000	100 000	100 000	
Make arrangement for credit lines for actors	300 000	100 000	200 000	
Grand total	2 000 000	600 000	1 100 000	300 000

4.6 Programme of assistance to the development of pastoral areas

Expositions of motives

The life span of natural resources requires a utilization that helps to satisfy the needs of present and future generations. The objective of this programme is just to reduce the degradation of pastoral natural resources by ensuring their rational management with the view to increase animal productions and to satisfy the needs of the people. Furthermore, the disappearance of a number of channels or again the management of hydro-farming will the potential sources of a number conflicts between farmers, herdsmen and fishermen, due to the competition for the same space. It is therefore necessary to put in place from now appropriate arrangements to prevent these conflicts which could emanate from the most important pastoral livestock development.

Actions envisaged

The actions to undertake at this level concern: (i) the design and the establishment of schemes and plans for local resource development at the communal, local, county and national levels; (ii) the liberation and materialization of animal passage channels; (iii) a mapping of pastures and watering sites ; (iv) the design and implementation of a programme for equipment and rehabilitation or of creation of new watering sites (ponds, wells, dams, micro-dams, etc.); (v) the liberation of areas infested with glossina; (vi) the design and putting into use of a pasture chart; and (vii) monitoring of Liberia's pastoral ecosystems.

Actions	2007	2008	2009	Total US\$
Inventory of ranches and pastoral areas	200 000			200 000
Rehabilitation of seven ranches and their being put into production	100 000	400 000	200 000	700 000
Development and equipment of pastoral areas	100 000	200 000	200 000	500 000
Management training in pastoral areas	100 000	50 000	50 000	200 000
Grand total	500 000	650 000	450 000	1 600 000

ANNEX 1**BIBLIOGRAPHY**

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ANNEX 2

NOTE D'INFORMATION SUR L'APPROCHE PAR MICRO PROJET DANS LE CADRE DE LA LUTTE CONTRE LA PAUVRETE, L'INSECURITE ALIMENTAIRE ET LA MODERNISATION DE L'ELEVAGE

1. Les principes

Les principes sur lesquels se base l'approche sont les suivants:

- Principe de rentabilité: chaque opération ou unité d'un coût moyen compris entre 400 et 1.000 dollars EU devra présenter une rentabilité financière suffisante pour garantir le remboursement partiel des appuis fournis. Les remboursements permettront d'alimenter les fonds de roulement des groupements ou des associations afin d'assurer la pérennité des actions. Des sous unités de 1 à 5 peuvent être acceptables à l'intérieur d'un groupement pour tenir compte aussi de certaines contraintes sociales d'extrême pauvreté de certains bénéficiaires.
- Principe de genre : 50 % au moins des projets seront gérés par des femmes.
- Principe de sélection des bénéficiaires par un comité ad- hoc sur la base de critères objectifs et d'un cahier de charges qui seront élaborés par le Coordonnateur du PSSA.
- Principe d'utilisation des acquis: l'expérience acquise au sein des projets antérieurement mis en œuvre devra être capitalisée.
- Principe de remboursement des investissements consentis sur une ou plusieurs années, soit en nature (animaux), soit "cash", suivant la rentabilité du projet dans la perspective de faire bénéficier, sous la pression sociale des villages, d'autres exploitants du groupement.
- Principe de gestion villageoise ; sous la tutelle d'un comité villageois et en utilisant au mieux les structures existantes ou les réseaux d'épargne et crédit de proximité).

2. Les étapes de mise en œuvre

- Sélection des bénéficiaires par la communauté villageoise et validation de ce choix par les instances mise en place a cet effet.
- Responsabilisation entière des bénéficiaires retenus par la communauté pour tout ce qui pourrait être considéré comme prêts qui leur seront octroyés.
- Construction des habitats par les bénéficiaires sur la base des schémas fournis par l'équipe technique.
- Contribution du projet en faveur des bénéficiaires sous forme de prêt pour aider à l'achat des matériaux non disponibles sur place (la contribution du projet concernant ce aspect devra être déterminée et indiquée au bénéficiaire dès la phase de sensibilisation et d'identification).
- Contribution du projet aux bénéficiaires sous formes de prêt pour l'achat des animaux (petit élevage), sur la base des conseils de l'encadrement et sous le contrôle du projet et de la Représentation.
- Contribution du projet sous forme de prêt pour l'achat des équipements techniques sous forme de prêt aux bénéficiaires, sur la base des conseils de l'encadrement et sous le contrôle du projet et de la Représentation.

- Contribution du projet sous forme de prêt pour aider à assurer l'alimentation des animaux après formation pour s'assurer d'une bonne mise en place des activités en attendant le démarrage de la production.
- Contribution du projet pour aider aux soins vétérinaires pendant la phase de mise en place et de démarrage en attendant que les privés prennent la relève.
- Contribution du projet pour assurer le suivi technique pendant la phase de mise en place et de démarrage sur la base de contrats pour une durée de trois mois à passer avec des mandataires de jeunes diplômes ou à défaut des cadres techniques disponibles localement. Il s'agira de créer un petit réseau local entre les éleveurs, vétérinaires, et autres prestataires privés de services.
- Assainissement du milieu villageois avant l'introduction des animaux achetés.
- La base de l'alimentation des animaux devra être trouvée sur place. Seuls les compléments devront être achetés à l'extérieur de l'exploitation.
- Le principe de l'élevage est la semi-liberté. Le parquet en grillage ou en banco devient l'élément principal de l'innovation pour éviter toute divagation incontrôlée des animaux.
- Des synergies devront être trouvées avec les instituts de recherche, les stations d'élevage et les programmes existants.
- Un protocole d'accord de partenariat sera signé entre le projet et le groupement avec le visa des autorités locales (chef de Poste, chef de Canton, et chef de village). A ce protocole d'accord seront annexés l'engagement de caution du groupement et le contrat de prêt entre le groupement et le bénéficiaire (modèle disponible).

3. Les modalités de mise en œuvre

Objectifs visés

- Création d'emplois
- Introduction de la technique pour impulser le développement local et national
- Assurer une auto développement (pérennité)
- Permettre une généralisation rapide des micro projets
- Susciter l'espoir auprès des jeunes et des femmes sans perspectives

Critères de sélection des sites

- Accessibilité
- Motivation des bénéficiaires
- Proximité d'un marché potentiel
- Dynamisme économique à promouvoir
- Accès à des services techniques essentiels
- Possibilités pour servir de modèle
- Promotion d'un potentiel spécifique existant

Exemples de fiches à préparer

- Amélioration de l'aviculture familiale
- Promotion de l'élevage de la pintade
- Elevage de reproducteurs ovins
- Transformation des produits laitiers

- Transformation de la viande
- Elevage de reproducteurs caprins
- Plan de prophylaxie pour l'aviculture villageoise
- Les Protocoles d'alimentation
- Plan de prophylaxie des petits ruminants
- Plan de formation des auxiliaires et bénéficiaires
- Contrat d'appui conseil

Eléments constitutifs de la fiche technique (4 à 5 pages)

- Titre
- Localisation
- Contexte
- Raison d'être du micro-projet : problématique
- Contraintes, potentialités
- Objectif général
- Actions envisagées (plan technique et organisationnel)
- Moyens nécessaires (investissement)
- Résultats escomptés (calcul de rentabilité)
- Modalités de remboursement de l'investissement
- Critères d'évaluation et de succès
- Propositions pour la généralisation

Fiche de suivi évaluation des unités

Octobre 2006

ANNEX 3**ANIMAL RESOURCES DIVISION**

The only institution set up on livestock in the country is Livestock Bureau and now Animal Resources Division and the work force is as follows

NO	NAME	QUALIFICATION	JOB DESCRIPTION	AGE
1	Dr. Kpadeh K. Koikoi	D.V.M	Director of the Division, supervises all livestock activities in the country	56
2	Edward S. Fatoma	AA Certificate Senior student at the University of Liberia	Assistant to the Director, processes all officials papers (certificates) for the Director's signature, animal health.	49
3	Levi K. Jones	AA Certificate	Senior Meat Inspector	60
4	Solomon G. Page	AA Certificate	Meat Inspector	63
5	Terence D. Kpabar	AA Certificate	Meat Inspector	48
6	Jacob Borbor	AA Certificate	Meat Inspector	60
7	Samuel Tucker	B.Sc. General Agriculture, AA – livestock	Senior Livestock Officer	54
8	Solomon N. Brown	B.Sc. General Agriculture	Senior livestock, field visits and animal health	54
9	Nimpson S. Todd	AA – Certificate in Meat Inspection	Livestock supervisor and Meat Inspector	53
10	Ouditche Cooper	AA Certificate in Animal Husbandry	Livestock officer, farm surveillance	56
11	Mary Newon Kanty	AA Certificate – Animal Husbandry and Animal Health	Animal health officer	47
12	Austin Boggeh	AA in Labouratory	Labouratory technician for the Avian Labouratory now under construction	53
13	Stephen K. Gbanue	AA Certificate in Animal Disease Control	Field survey for animal diseases	54
14	Morris S. Smith	High School Diploma	Office Attendant	35
15	Joseph Dweh	High School Certificate	Extension Officer	39
16	Morric D. Kanuah	B.Sc. General Agriculture	NGO	45
17	Bob Yimi	AA Certificate – Student at the University of Liberia	Livestock Officer	48
18	Lyn Lincelot	B.Sc. Animal Husbandry	Specialist in Livestock	66
19	J. Hilary Mason	B.Sc. in Animal Husbandry	Advisor to the Minister of Agriculture	73

IV. THE FISHERIES SUB-SECTOR

By

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Liberia 2007

IV. THE FISHERIES SUB-SECTOR

1. INTRODUCTION

The methodology of the study for the assessment of the fisheries sub-sector entailed reviewing the existing literature on fisheries and aquaculture; questionnaire surveys; consultations, discussions and interviews with diverse public and private sector stakeholders and actors (individually and in groups) including the Minister of Agriculture and other senior officials of the Ministry, FAO Resident Representative, personnel of the United Nations Mission in Liberia, representatives of industrial fishing companies, representatives of Non-Governmental Organizations, representatives of Community Based Organizations; officials of Local Government agencies, fisher folk and fish farmers including ex-combatants and women. Field visits were undertaken in Monrovia and environs; in Bong and Nimba Counties in the North and North East; Bomi and Cape Mount Counties in the South West; Margibi, Grand Bassa and Rivercess Counties in the south. Industrial fish processing establishments, artisanal fish landing sites and aquaculture establishments were also visited. The study also included data collection and analyses; the Bureau of National Fisheries (BNF) compiled most of the data. Information was also obtained from some international NGO's in the form of interviews and from Annual Reports.

Although the literature review provided useful data and information (to be verified and validated), much more information was obtained from the discussions with key informants and beneficiary groups. The group discussions were participatory and elicited more in-depth and revealing information and reactions. Whereas institutional memory is evidently lacking in Government institutions, the fisherfolk and the beneficiary communities have better recollections of past interventions and are clear about their constraints/problems and needs.

1.1 Background Information

Liberia has a coastline of 570 km and a continental shelf averaging about 34 km in width extending 200 nautical miles off-shore from the geographical baseline providing an area of about 20,000 km² of fishing grounds. Liberia's continental shelf has considerable maritime fish resources and the most abundant species are Engraulis encrasicolus, Sardinella aurita, Decapterus spp, Caranx spp and Ethmalosa fimbriata. The main oceanic pelagic resources are tuna and tuna-like species such as bonito and marlin. Crustaceans such as shrimps and lobsters are less abundant but are of much higher value than finfish species. The pre-war estimated maximum sustainable yield (msy) of the continental shelf area was 180 000 tons per year. Liberia also has approximately 1 810 125 km of rivers that transverse the country and countless perennial swamps and inland water bodies with enormous potentials for increased production in inland fisheries and aquaculture. The estimated maximum sustainable yield (msy) for the inland fishery is 40 000 tons per year.

The fisheries sub-sector contributed 12 percent of agricultural GDP and 3.2 percent of the total GDP in 2002 and is a major source of revenue and foreign exchange earnings for the country. The sub-sector created job opportunities and income earnings for thousands of rural inhabitants particularly women; an estimated 33 121 full-time fishers and processors are operating in both marine and inland fisheries.

1.2 Institutional and legal frameworks for sustainable fisheries and aquaculture

The institutional framework for the management of fisheries and aquaculture is within the purview of the Ministry of Agriculture (MOA) through the Bureau of National Fisheries (BNF). The MOA is the highest Government institution responsible for the management and development of the agriculture sector of Liberia. The Minister of Agriculture supported by four Deputy Ministers and four Assistant Ministers heads the MOA. The MOA is divided into four main Departments namely: Department of Technical Services; Department of Planning and Research; Department of Administration; and Department of Extension and Rural Development. The Bureau of National Fisheries is sub-divided into Artisanal and Marine, Aquaculture and Inland Services, and Research & Statistics divisions. The Coordinator and Deputy Coordinator of the Bureau of National Fisheries (BNF) head the Bureau. The MOA makes policy pronouncements on fisheries and aquaculture and the BNF implements Government policy.

The BNF was created by an Act of the National Legislature under the Natural Resources Laws of 1956 and charged with the responsibility of managing and developing fisheries and aquaculture in Liberia. The BNF is divided into 4 Units: Statistics, Marine Fisheries, Aquaculture and Inland Fisheries, and Research. The current staffing is shown in Table 1. The role of the BNF is to implement fisheries policy; formulate guidelines, rules and regulations to govern national fisheries and aquaculture for its planning, development and management. NGOs are also active in the fisheries sector (Table 2).

Table 1. Institutional capacity of the Bureau of Fisheries

Nº of Staff	Nº of Ph.D	Nº of M.Sc.	Nº of B.Sc	Nº of AA	Nº of Dip. & Cert.	High School	Below High Sch.
28	0	2	3	2	1	18	2
Specialty	-	Fisheries& Agronomy	Management	Aquaculture & Education	Maritime safety	-	-

Source: Bureau of National Fisheries (2006)

Table 2. List of NGOs in Fishery related Activity

Name of NGO	Type of Activity	Area of Operation
Lutheran World Service	Aquaculture	Maryland, Lofa, Bong, Montserrado, Bomi, Grand Gedeh
Samaritan Purse	Aquaculture	Bong, Lofa
Faimaba Fisheries Development Coop. Inc	Aquaculture & Artisanal Fisheries	Bong, Nimba & Montserrado
Catalyst, Inc	Aquaculture	Bong, Nimba & Lofa
Caritas	Artisanal fisheries	Maryland, Grand Kru
Kpan-kpan Gbo, Inc.	Artisanal Fisheries	Cape Mount, Bassa
BUCCUBAH	Artisanal	Bassa
Asur-Liberia	Inland fisheries Research	Bong, Nimba
Solidaritaire	Aquaculture	Bong
CUSD	Aquaculture	Nimba
German Agro Action	Aquaculture	Grand Gedeh
Action Against Hunger	Aquaculture	Grand Gedeh
SDP	Aquaculture	Bong
Africare-Liberia	Aquaculture	Bong, Nimba

Source: Bureau of National Fisheries (2006)

2. REVIEW OF PAST EXPERIENCE IN THE SUB-SECTOR

Traditional fishers have operated along the Liberian coast and inland waters for centuries mainly at the subsistence level. Fishers were catching fish to feed their families and excess catches were bartered for other essential commodities and goods. The first attempt at commercial fishing in Liberia was in 1848 when the then President of the country, Joseph Jenkins Roberts, converted his yacht into a fishing boat. The first fishing trawler to operate in Liberian coastal waters belonged to Woerman Company, a German company that operated in the country between 1938 and 1939. Fishing was a daily activity with the trawlers returning to port at the end of each fishing day and catches were sold immediately to avoid post harvest losses because of lack of means for preservation of fresh fish.

Considering the success of the Woerman Company and the realization of the potential important role of fisheries in national socio-economic development, the Government of Liberia, in 1952, requested the assistance of FAO and the United States Government to help develop its fisheries sub-sector. This marked the beginning of research activities in fisheries. Experts were sent from FAO and USA to assess the fisheries potential of the country. As a result of months of exploratory fishing, it was established that a medium striving fishing industry could be established in the country.

The industrial fishery began in the mid 1950's and targeted mainly the shrimp resources within the Sherbro fishing grounds, which extends into Sierra Leone. The Mesurado Group of Companies became operational in the early 1960s and developed into the most dominant force in Liberian fisheries. The company owned and operated more than 25 vessels, including shrimpers and double rigged trawlers. The company was owned by the Tolbert family and operated its own harbour and processing facilities with three thousand (3 000) metric tons of freezing capacity. Shrimp was the company's major export commodity, with a monthly shipment of about 60 metric tons to Europe and Asia. The success of the Mesurado Group of Companies was quickly followed by the installation of shore-based infrastructure including cold storage facility of 2 000 tons, an 18-ton per day blast freezer, and a dry dock and associated repair and maintenance facilities at the fishing pier in Monrovia harbour. The Mesurado Group of Companies is said to have been one of the largest fishing entities in sub-Saharan Africa until 1980 when she began to decline following the military coup. The company's facilities are now in complete ruins, with all the cold rooms completely looted and vandalized. The success of the Mesurado group led to the acquisition of a research vessel by the government of Liberia. However, the needed manpower capacities and policies were not developed to enhance research and fisheries development.

Despite the civil war and difficult operating conditions, seven fishing companies managed to survive catching an average of 222 tons per year of shrimps and 4 500 tons per year of demersal fish between 1996 and 1999. At that time, most of the industrial fishing companies had adequate processing facilities and were exporting frozen crustaceans (shrimps) and small quantities of frozen demersal fish species to Belgium, Greece, United Kingdom and America. Fish distribution and marketing from the coastal area to the interior of the country was done through a system of depots and agents but this activity ceased because of civil strife and the poor conditions of the roads.

In the mid 1970's, small-scale fish culture was begun with the construction of fishponds at Suakoko village in Bong County to conduct research on *Tilapia nilotica*. Aquaculture development moved fairly quickly into Lofa County in the early 1970s through the initiatives

of the American Peace Corps. By the late 1970s, small-scale aquaculture development had gained momentum and spread into Nimba County with support from the German Technical Cooperation through NCRDP. The World Bank through LCADP and BCADP also supported the development of aquaculture in Bong and Lofa Counties. Aquaculture however remained subsistent, with no major fish multiplication and distribution-taking place. There was not much research done on developing local species for culture, as exotic species of Tilapia and Carp were often brought in and comprised the main culture species.

Prewar interventions by Government to develop artisanal fisheries was aimed at reducing post harvest loses. Government set up a mini- cold room for use by the artisanal community in Robertsports, Grand Cape Mount County in the mid 70s. This again broke down due to the lack of capacity & community ownership for its management and interference by MOA officials.

3. ANALYSIS OF THE CURRENT SITUATION

The fisheries sector of Liberia comprises: a Marine fishery involving industrial and artisanal fishing activities; an Inland fishery, which is exclusively artisanal; and Aquaculture that is practiced in rural areas through fishpond culture.

Fish production by the marine fisheries in Liberia has fluctuated between 856 901 mt to 15 472 mt per annum during the post-war period (Table 3). Sixty percent (60%) of fish is produced by the artisanal fishery, all of which is consumed locally.

Table 3. Total fish production (tons) including inland fisheries and aquaculture

Year	Total
1994	7721
1995	8829
1996	8308
1997	8580
1998	10830
1999	15472
2000	11748
2001	11300
2002	11014
2003	11714
2004	10359
2005	6856.901

Source: FAO (2005), BNF (2006).

Government revenue sources in fisheries are shown in Table 4.

Table 4. Sources of Fisheries Related Revenue

Agency/Type of charges	Import Permit	Import Duty	Export	GST	Sea Worthiness	Licenses	Customs Charges on local catch
BMA					\$25/GRT		
Commerce	1.5% FOB						
Finance		2.5%		7%			\$25/Ton
BIVAC	\$5/ton						
BNF	\$1.5/ton		2%			\$15/GRT/yr	

Source: Statistics and Regulatory Unit, Bureau of National Fisheries.

3.1 Artisanal Fishery

The artisanal fishery provides a means of livelihood to 33 121 full-time fishers and processors in both marine and inland waters. Liberian participation is about 80.1% with females accounting for 59.86%. (Annex 5). Artisanal fishery operators are mainly indigenous Kru fishers and their families, and the Fanti, Popoe fishers and their families who migrated to Liberia from Benin, Ghana and Cote D'Ivoire. A recent development is the presence of Gambian and Senegalese fishermen in Cape Mount County. Malian and Fulani fishers operate in inland areas. Table 5 shows that about 7 700 mt of fish were landed at 10 sites around the country in 2004.

Table 5. Distribution of Fish Landing Sites in the Country

County	Nº of Landing Sites	Ave. Catch (tons) 2004
1. Grand Cape mount County	14	1,095.2
2. Bomi County	4	739.3
3. Montserrado County	13	1,127
4. Margibi County	5	869.73
5. Grand Bassa County	18	2,304
6. Rivercess County	12	345.6
7. Sinoe County	30	526.7
8. Maryland County	8	439.95
9. Grand Kru County	35	312.4
10. Inland Sites	19	13.6
Total	137	7,773.48

Source: Statistics and Regulatory Unit, Bureau of National Fisheries.

3.1.1 Artisanal Fleet Structure

According to BNF, there are 3,473 canoes operating in the inland and marine waters of Liberia, 7.89% of which are motorized. Canoe sizes range from the 1-3 man kru canoes, (5-7meters) long, which are hand-paddled with a few powered by 15 or 25 horse power outboard engines, to the 15-18man (10-15meters) long fishing canoes that are powered by 45 horse power outboard engines. Senegalese and Gambian fishermen operating in Grand Cape Mount County are using much larger fishing canoes (above 20 meters).

3.1.2 Catch/Production

The average catch per canoe/annum was 2.2 tons and 1.16 tons in 2004 and 2005 respectively (BNF, 2006). The major species exploited are the Sardinella, Barracudas, Croakers, Sharks and Ilisha africana, which make up the major commercially valuable species for the local markets, and constituted 83 % and 59.06% of local fish supply in 2004 and 2005 respectively.

3.1.3 Value Chain

The value chain for the artisanal fishery is very short, and in most cases there is very little or no value addition at all. There is no use of ice or chillers for post-harvest fresh fish preservation. Fish once landed on the beaches is available for sale. The processes of value addition are simple. The fish is first washed with seawater and then gutted (for small size fish) and for larger fish, decapitation and dismemberment, before being smoke dried using

firewood. Metal drums are most commonly used for smoking in all coastal communities. There are however some improved chokor smoking ovens built of clay in use particularly in Margibi and Grand Bassa Counties. In inland artisanal communities, traditional smoking kilns made of sticks or wire meshes are used. Traditionally, the Fanti and Kru fish processors mainly practice this method of smoking. Salting and fermentation is also used to process fish into what is locally known as “moin-moin”.

3.1.4 Market Chain

There are two market chains; a shorter one for fresh fish leaving the beach directly to the markets for sale to consumers, and a much longer chain for smoke dried fish. Dried fish products are bought from the fish landing sites of Monrovia, Robertsport, Marshall and Buchanan and taken (by road transport) to the major rural markets from where they are purchased and distributed to towns and villages by women, usually on foot. Fresh water species are often smoke dried and transported to urban markets for higher market value.

3.1.5 Price structure

Table 6 below shows the price/kilo of Herring, which is of major commercial value on the local market. The price structure for other species is very much the same. Prices tend to increase at every stage of the market chain. Consumers at the village level tend to spend more money per kilogram of fish.

Table 6: Fish Price distribution and variation along the market chain

Price/kg(LD\$)	Beach	Urban Market	Rural Market	Village Level
Fresh Fish	25	35	45	55
Smoked Dried	35	45	55	65

Source: Statistics and Regulatory Unit, Bureau of National Fisheries.

Note: Exchange rate: US\$1 = 58 LD (Liberian Dollar).

3.1.6 Cost of fishing inputs:

The costs of construction of fishing canoes vary according to size, locality and the type of wood used for construction. Table 7 below shows the prices of canoes by sizes, capacities and their construction time.

Table 7: Costs of constructing fishing canoes in Sinoe County

Types of canoe	Size	Capacity	Production time	Price
Kru Canoe	< 1.5 furlong	1-2 man	2 weeks	6,000 -12,000 LD
Kru Canoe	1.5 furlong	2-4 man	2 weeks	17,000 LD
Fanti Canoe	2 furlong	5-7 man	3 weeks	20,000 LD
Fanti Canoe	Above 2 furlong	15 – 17 man	4 weeks	25,000 LD

Source: Statistics and Regulatory Unit, Bureau of National Fisheries.

Note: Exchange rate: \$1 = 59 LD (Liberian Dollar).

The availability of fishing gears and inputs is dependent on importation by merchants. The high import charges on fishing gear have put these materials out of the reach of many ordinary fishers.

Table 8: Average unit price (US\$) of fishing inputs

Nets (bill)	Rope (Roll)	Float (piece)	Lead (sheet)	Hook (pkt)	Outboard Motor (15HP)
\$500.00	\$60.00	0.25	3.00	4.00	3,275.00

Source: Statistics and Regulatory Unit, Bureau of National Fisheries.

Note: Exchange rate: \$1 = 59 LD (Liberian Dollar).

3.1.7 Situational analysis

Artisanal fisher folk are still operating in individual family units but are slowly coming together through established cooperative societies for the pursuit of common aspirations/interests. However, migrant fisher folk are better organized and tend to cooperate better with the fisheries administration. Migrant fishers operate bigger fishing units and catch more fish and realize more revenue from fishing than the local fishers. The fishing units owned and operated by Liberian nationals are small in size and non-motorized and the mesh sizes of the fishing nets are very small catching many juvenile fish and threatening resources sustainability. There are high operational costs in artisanal fisheries because of the high costs of fishing inputs (fishing nets, related equipments and materials, outboard motors, premixed fuel) as a result of high import duties on these items. The average cost of a fishing trip is LD\$ 7,000.00 (cost of gasoline, food and supplies for the crew). Industrial fishing vessels are habitually encroaching in artisanal fishing grounds destroying fishing nets of artisanal fishers and disrupting artisanal fishing operations. The encroachments are causing economic losses to fishers (loss of fishing gears, loss of earnings) and reductions in catch landings for the domestic market. There is no MCS system to control and regulate fishing activities in Liberian waters. The fishing gears are difficult to replace because of their high prices made worse by the absence of credit schemes to support artisanal fishing and related activities.

The artisanal fish landing sites are devoid of basic fisheries infrastructures such as fish handling and processing areas, storage facilities for processed products, ice and chill storage facilities. Potable water supply systems and sanitary facilities are also not available and environmental hygiene is a major problem. Fish when caught is landed on the ground affecting fish quality through microbial contamination.

Fish processing in artisanal fisheries is still traditional in nature and is limited to fish smoking and fermentation to a lesser extent. The increasing demand for fuel-wood for fish smoking is causing deforestation in the coastal areas and the loss of mangrove forests. All fish and fishery products produced by artisanal fisheries operators are for local consumption and fish marketing is the exclusive domain of women fish traders who walk several miles to and from markets because of poor road transport conditions.

Fisheries development projects and programmes should be directed at improving local artisanal fisheries and should have components to specifically address issues such as capacity building (training in modern fishing, improved fish handling and fish processing technologies); credit schemes; numeracy and literacy; infrastructural development including Community Fisheries Centres, health centres, schools; Strengthening fisheries cooperative societies; Co-management; empowerment particularly women fisher folk.

3.2 Industrial Fishery

The industrial fishery is high capital investment involving fishing trawlers and cold storage facilities. Foreigners presently dominate this fishery. There are currently fourteen (14) fishing companies operating legally in Liberia; 6 companies are solely engaged in the importation of frozen fish from the high seas, and 8 companies are engaged in industrial fishing activities operating 27 fishing vessels with a combined Gross Registered Tonnage (GRT) of 4 122.71. The fishing vessels operating in Liberian waters range in size from 91 GRT Chinese pair trawlers (ice carriers), to 251GRT fishing trawlers with onboard freezing, processing and storage facilities. Industrial fishing vessels land their catches at the fishing pier in the Free Port of Monrovia. The employment of Liberian nationals in industrial fisheries is estimated at 75%, representing 28.4 % of the total employment in the fisheries sub-sector.

3.2.1 Fish Production

Fish landed locally by all trawlers is estimated as 1 502.71 and 2 806.81 metric tons for 2004 and 2005 respectively (BNF, 2006). It is believed that the catch is grossly under reported, and there is strong suspicion that a number of industrial fishing vessels are engaged in illegal transhipments in the high seas which is not reflected in the national statistics. Catch statistics reported by Observers posted on board licensed fishing vessels are also not reliable because of the loyalty of the Observers to the vessel owners who pay their salaries. Some licensed fishing vessels have no Observers posted on board and catches by these vessels are not reported.

The importation of fish is much higher with 4 738.47 tons in 2004 and 11 071.743 tons in 2005 (Table 9), than recorded fish landings by licensed fishing vessels for the same period.

Table 9. Frozen Fish Imports

Year	Import (mt),	Value (US\$)
2004	738.47	1,139,274.20
2005	11,071.743	2,013,575.56
Total	11,810.213	3,152,849.76

Source: Division of Foreign Trade, Ministry of Commerce (2006)

3.2.2 Value Chain

The industrial fishery is expected to be the main avenue for fish exports to international fish markets to earn much-needed foreign exchange for the country but presently there are no reported exports of fish and fishery products. At the moment, there is very little value addition in industrial fisheries and the value chain is very short as in artisanal fisheries. Fish is preserved on ice or packaged and frozen on board fishing vessels. The processes involved are: washing, sorting into size categories and according to species, crating or packaging in cartons, icing or freezing and outright sales to fish traders (women). Onshore processes are very much the same: icing, freezing, crating and packaging. The packaged products are landed, transported to the factories and sold to the fish traders.

3.2.3 Market Chain

Unlike the artisanal fisheries, fish from the industrial sector is marketed frozen from factories in and around Monrovia. The fish distribution network for industrial fisheries is more urban-based and involves the establishment of depots with mini- cold rooms in major cities and

towns scattered around the country (Table 10). Good road access for supply and distribution of fish and regular electricity supply is needed for the operation of the cold rooms. Unsold frozen fish is often returned to the factories and re-frozen or smoked if freezing is no longer possible. The women also dominate the marketing of fish landed by the industrial fishing vessels.

Table 10: Distribution of Cold rooms and price structures for two major species

Location	Number of cold rooms	Total Capacity(MT)	Price (US\$/30 kg)	
			Horse Mackerel	Sardinella
Monrovia	32	18,808	34.00	29.00
Kakata	4	96		
Totota	1	32		
Gbarnga	3	84		
Tubmanburg	2	48	35.00	30.50
Ganta	4	96		
Buchanan	2	60	35.60	31.00
Sanniquellie	1	24		
Zorzor	1	24		
Harbel	2	60		
Total	52	19,332		

Source: Bureau of National Fisheries 2006.

As the situation of fishing improves and fish catches increase, it is expected that Cold rooms will play more important roles in fish distribution and marketing in the country especially in rural communities where protein intake is low and malnutrition is a major health concern.

3.2.4 Situational analysis

Foreign nationals presently dominate the industrial fishery. The development of industrial fisheries in Liberia is hampered by various constraints, worsened by the civil war, which ruined what little infrastructures there were.

The sanitary conditions at the fish factories are very poor and do not meet international standards and requirements. The fish factories do not have appropriate fish-processing facilities, proper drainage systems and potable water supply is a major problem; ice and cold storage facilities are absent in some of the factories. The factory workers have no uniforms and the work in the factories is haphazard and without proper flow of products. None of the factories are implementing Quality Management Programmes.

There is potential for adding value to fisheries production, handling, processing, distribution and marketing particularly for industrial fisheries. It is quite possible to produce value added fish products such as cocktails, fillets, marinated products, fish fingers, peeled/boiled products, colouring of products, ecolabelling etc. However, this can be done when fish factory standards (technical and hygiene) are improved and that the factories implement quality control (QC) programmes and good manufacturing practices to ensure food fish product safety and quality that meet international standards and requirements. This will require institutional strengthening and capacity building at the fish processing factories. Value addition will significantly increase the profitability of the fisheries sub-sector. Fish

quality and safety should be addressed across the entire value chain. It is also important that the relevant Government institutions are capable and have the requisite human, financial and technical resources to ensure compliance with the agreed international standards and requirements and to offer technical support to the fishing industry in the form of training programmes on fish handling, processing, quality assurance and inspection.

The absence of a fisheries harbour to facilitate the discharge of cargo (fish) and the supply of essential commodities, refuelling, transhipment, and for dry-docking is a major constraint to development of industrial fishery. Fishing vessels are obliged to buy fuel and essential supplies from others ships and carriers operating in international waters.

The tariffs on the importation of fishing inputs are high, so are import duties, landing dues, inspection dues and other charges. Operational costs are also very high reflecting on the high prices of fish.

3.3 Aquaculture

Fish farming in Liberia is largely subsistent. There are about 3 581 fish farmers nationwide engaged in some form of fish culture on part-time basis. 449 ponds of various sizes with a total area of 17.47 hectares are distributed in 159 communities around the country. Most of these ponds have been dormant since 1990 and are now being rehabilitated although the process of rehabilitation is slow and labourious. The rehabilitation works are providing employment for women and youths; currently there are 704 women, constituting 20% of total female participation in aquaculture (BNF).

The major species cultured in Liberia are *Oreochromis niloticus* and other local species of Tilapia, and catfishes, including *Heterobranchus longifilis* and *Clarias sp.*

The production method is extensive and very simple technology is used to develop earthen ponds, which are supplied water from natural creeks or springs by gravity. Most fish farmers cannot afford to adequately feed their fish due to competition for feed ingredient by the households for food.

3.3.1 Production

Aquaculture production in Liberia has been concentrated around Bong, Nimba and Montserrado Counties with an estimated annual production of 38.81 tons in 2004 (BNF). With peace prevailing in the country and pond development and rehabilitation gaining momentum in other parts of the country, aquaculture production is expected to increase.

The irrigation potential of Liberia is estimated as 600,000 Ha, with a renewable water potential of 235m³/yr. These factors present a great potential for aquaculture development. However, culture methods should be diversified to include; Cage, Pen and tank culture, considering the increasing demand for lowlands for irrigated rice production.

3.3.2 Value Chain

There is no value addition for aquaculture. Fish is usually bought fresh and/or live from pond sites during harvest for direct consumption.

3.3.3 Market Chain

The market for aquaculture product is more localized in the pond communities since production is still low. Production around large urban centres has high value due to increased demands for fresh water fish. Around Monrovia, pond fish is sold for US\$ 3.00/kg, but prices also vary according to species with the air-breathing catfish, *Heterobranchus sp.* more highly priced at US\$6.00/kg.

3.3.4 Situational analysis

The development of aquaculture is constrained by several factors including the following: the lack of tools and materials for pond development/ or rehabilitation; lack of an aquaculture policy and development plan, lack of sufficient trained manpower in aquaculture development; lack of quality fish fingerlings for stocking; lack of improved fish feed; lack of proper irrigation schemes for sustained aquaculture production; the absence of credit facilities, and low level of research on aquaculture. Pond sites, which are isolated from other activities of the farmers, tend to be forgotten and not maintained to inadequate water storage and control scheme.

The existing fish hatcheries were looted and vandalized during the civil war. Furthermore, the quality of fingerlings produced is poor due to very poor brood stock quality and hatchery management. The number of hatcheries is inadequate and they lack transportation facilities for moving live fish over long distance.

The absence of credit facilities for farmers is responsible for the non-sustainability of many projects, especially after donor funding runs out. The ACDB, which was the main government institution for granting loan to farmers, is no longer operating.

The lack of improved fish feed has contributed to a large extent to farmer disenchantment, as the expected yield at harvest is often quite low and discouraging.

The development of proper irrigation and water control structures is vital for sustaining continuous aquaculture production. Production is often hampered by either flooding of production facilities during the heavy rains, or the lack of water during the dry season, due to There is very little research activity in aquaculture.

4. THE WAY FORWARD

The Government of Liberia is fully aware of the enormous potential of the fisheries sub-sector both marine and inland (including aquaculture), to make substantial contribution to national socio-economic development and help address the major challenges of the rehabilitation and recovery efforts of the country's economy in the short and long-term. The Government is also aware and concerned but is, at present, totally unable to address the serious problem of poaching and other forms of illegal fishing especially along coastal and marine waters, which are impacting negatively on the national economy and possibly on national security. The Government is also lacking the economic, fiscal, human and institutional assets with which to manage the fisheries sub-sector on a sustainable basis to benefit present and future generations of Liberians. The MOA was allocated US\$ 3 million only out of the total national budget of US\$ 126 million in 2006. However, the Government

is determined to harness the potential of the fisheries sector. The following actions are recommended, some of which are already in the plans of the Government.

4.1 Sub-sector policy objectives for sustainable fisheries and aquaculture management and development

There has never been a Government fisheries policy and the fourteen years of civil war, which ended in 2003, compounded this situation by rendering the concerned Government institutions unable to function properly. The Government of Liberia should formulate national fisheries and aquaculture policy and strategy and will strengthen the country's maritime and fisheries laws, regulations and capacity to ensure sustainable management and development. Fisheries management should be geared towards the attainment of sub-sectoral development policy objectives such as: contribution to national food security and improved nutritional standards, creating employment opportunities and poverty reduction particularly in rural communities, improving incomes and quality of life, and revenue and foreign exchange earnings for the country. The policy should address the following: the development of the requisite infrastructures for industrial and artisanal fisheries and aquaculture development; improve monitoring, control and surveillance; capacity building and man power development; community capacity building and co-management; conduct scientific research and data and information collection and analyses on a regular basis; promote sub-regional, regional and international cooperation in fisheries management. Government should create the enabling environment for local and foreign investments in fisheries and aquaculture by reviewing the investment code and putting into place appropriate provisions including an incentive package. *The Code of Conduct for Responsible Fisheries* should guide the national policy and relevant sections/provisions of the Code will be incorporated in the national fisheries legislation.

The Government should endeavour to undertake the development and management of fisheries and aquaculture with the collaboration and support of its development partners: FAO, World Bank, IFAD, FRG, USAID, African Development Bank, The Government of the Peoples Republic of China, Swedish International Development Agency, Islamic Development Bank, DANIDA, and WFP. Grass roots (including community-based organizations) participation in all phases of management and sustainable development is critically important. Also important is the support from the local private sector and that of international and local Non-Governmental Organizations involved in fisheries and aquaculture.

4.2 Fisheries Legislation

In 1972, FAO assisted the Government of Liberia to revise the Natural Resources Laws of 1956 but Presidential approval was not obtained up to the time of the Coup d'etat in 1980. In March 1999, draft fisheries legislation was prepared but never finalized and approved by Government.

Government should seek the assistance and technical support of the Legal Department of FAO to which elaborate a new fisheries legislation to replace the Natural Resources Laws of 1956. The new fisheries legislation will have an international character incorporating relevant provisions of the Code of Conduct for Responsible Fisheries and other international agreements, conventions and protocols addressing fisheries, natural resources and environmental issues. The new fisheries legislation will strengthen the maritime and fisheries

laws and regulations and at the same time strengthen national capacity for Monitoring, Control and Surveillance (MCS) to control and regulate fishing and effectively curb and eventually eliminate poaching and other forms of IUU fishing within the Exclusive Economic Zone (EEZ) of Liberia.

4.3 Improve Monitoring, Control and Surveillance (MCS)

In addition to poaching, Illegal, Unreported and Unregulated (IUU) fishing is another serious concern that the Government cannot address at the moment. Poaching and IUU fishing pose serious threats to the continued availability of fisheries resources. Without an effective MCS system, the management of fisheries on a sustainable basis may prove unattainable because the fisheries resources are likely to be at risk of being depleted and may lead to the failure of development projects and programmes and Government not able to achieve sub-sectoral development objectives and aspirations.

However, Government is totally committed to combat poaching and IUU fishing with the collaboration of national agencies and institutions, fisheries stakeholders and support of international development partners. Government should request UNMIL to once again provide support to MCS activities on a short-term basis. Although UNMIL's mandate is on territorial surveillance and security, UNMIL is willing to once again lend support to fisheries surveillance activities by conducting aerial surveillance in support of maritime surveillance. During the period of UNMIL assistance and support, Government should prepare and submit a funding request to a friendly Government for the supply of two patrol boats.

Henceforth, maritime patrols would not exclusively target unlicensed (poaching) fishing vessels but also regular boarding of fishing vessels operating with valid licenses/permits to inspect fishing gears to ensure that fishing gears conform to the conditions of license. The maritime patrols would also enforce the zonal limits for the different categories of fishing vessels.

Parallel to this, the BNF should liaise closely with importers of fishing gears to ensure that fishing nets of approved mesh sizes are imported into the country. The Department of Customs will be requested to assist in monitoring of imported fishing materials. Co-management between Government and fisher folk would ensure that all restrictions are observed at the community level. Inspection of artisanal fishing gears at landing sites should become a regular activity of fisheries extension personnel. Fisher folk will be encouraged to participate in MCS activities and will be equipped to report to the MCS Coordinating Unit any poaching, IUU fishing, transshipment at sea, and encroachments in unauthorized fishing zones.

But given the present situation of the Ministry of Agriculture in terms of limited capacity and resources to undertake MCS activities on its own and without adequate fisheries legislation to prosecute violators, the Ministry should seek interagency collaboration in MCS activities. This implies working in close collaboration with the following Government agencies: Ministry of Defence, Ministry of Justice, Maritime Affairs Agency, Police Department, Immigration Department and Customs and Excise Department. The legislation of the Maritime Affairs Agency is adequate and shall be used to prosecute arrested fishing vessels pending the coming into force of the new fisheries legislation.

4.4 Capacity Building

Without the requisite manpower and resources, the Bureau of National Fisheries will not be able to meet its mandate. Presently, human resources and enforcement capacity are almost non-existent. There is an acute shortage of trained personnel in key disciplines (Biology, Statistics, Management, Economics, Fishing Technology, Aquaculture, Extension etc). The BNF has been ruined by war; ill equipped and lacks the capacity to monitor the fisheries resources. The role of the BNF has now been limited to licensing control and fisheries statistical data collection. Fisheries catch data collected by the BNF does not have national coverage and the data is often inaccurate and the data cannot be analyzed and interpreted into useful management tools. The BNF does not have budgetary allocation to support its activities around the country including: training of its personnel, data collection & analysis, providing extension services to fish farmers and artisanal communities, research in fisheries and aquaculture, monitoring of the fishing grounds and regulation of fishing activities.

The NBF should be strengthened as a matter of priority and a capacity building programme should be elaborated and implemented for staff of the BNF. Also, the Ministry of Agriculture should advocate the introduction of Fisheries Science in the Curricular of the University of Liberia and Cuttington University so that Liberians can study fisheries science and related disciplines in country; this will reduce the cost of training personnel of the BNF in institutions outside of Liberia.

Capacity building programmes should also be implemented for private sector operators in industrial and artisanal fisheries and in aquaculture. Training programmes on improved fishing, fish handling and fish processing technologies, and modern aquaculture techniques should be designed and implemented. Training programmes on good manufacturing practices, quality management programmes are also important and relevant to sustainable development. Numeracy and literacy programmes will help artisanal fisher folk and fish farmers to improve the performances of their respective business operations.

4.5 Fisheries Scientific Research

The Government realizes that the sustainable management and development of fisheries will have to rely on a sound research based management programme that recognize the limitations of the fisheries resource base and the need to improve the productivity of public and private investments to generate sustainable development and growth. Government should promote fisheries scientific research at the national level including capacity building and institutional strengthening.

At the sub-regional, regional and international levels, Government should seek collaboration and cooperation with neighbouring countries on scientific research especially on the shared fisheries resources and on how best to manage the shared resources on a sustainable basis for the benefit of all countries. The cooperation with the Nansen Programme on acoustic surveys is very useful to the country as it provides accurate data and information on the status of the pelagic fish resources on a regular (annual) basis. Government should seek to expand the cooperation with the Nansen Programme to include periodic surveys of the demersal fisheries resources. In addition, Government should also seek collaboration and technical support from the IRD (Institute for Research and Development) of France, to conduct studies on the fisheries resources of the river systems of Liberia. Similar to the Nansen Programme, the IRD

assistance will be on a continuous basis and would include capacity building and institutional strengthening components.

The rehabilitation of CARI and the resumption of applied aquaculture research are crucially important, as the institution will be the main source of expertise and technical knowledge to assist in the sustainable development of aquaculture. The production of fingerlings and brood stocks to supply fish farms will be an important activity of CARI.

As a country within the Guinean Current Large Marine Ecosystem (GCLME) region, Liberia shares the concern of the other countries about the effects of climatic, environmental and socio-economic factors on the fisheries resources, the maintenance of biological diversity, and also on the health and proper functioning of the Large Marine Ecosystem.

Liberia should actively participate in research activities aimed at providing useful data and information on fisheries, natural resources, environments and ecosystems. The results of scientific research will be quite essential as they provide reliable data and information that will enable fisheries administrators and policy makers to make informed decisions on sustainable fisheries, natural resources, environment and ecosystem management.

4.5.1 Baseline Surveys

The 14 years of civil war did not allow for the collection, analyses and storage of other useful national fisheries data (number of artisanal fishermen, artisanal fisheries production on a regular (monthly) basis, catch statistical data from industrial fisheries, annual audits of industrial fish processing establishments etc. Fisheries trade data (imports/exports) on a time series basis is also not available. Certain figures (data/information) are available but the accuracy and validity of the data/information cannot be confirmed. As peace and stability return to the country, it is the ideal moment to start compiling some useful data/information on fisheries and aquaculture and establish a fisheries data bank. Baseline studies that should be undertaken include the following:

Frame Survey

a) The conduct of Frame Survey on the artisanal fishery should be an annual activity of the BNF. Frame Surveys would help determine the distribution of fishing effort and the structural aspects of the artisanal fishery; the total number of fishers and fisher assistants by nationality; the characteristics of fishing economic units (types and sizes of fishing canoes, motorized/non-motorized, number of crew per canoe, fishing gears employed per canoe); fishing status of fishers (full-time/part-time, other occupation); fishing habits (migratory or sedentary). The Frame Survey will identify fish landing sites with development potential. Also, the results of the Frame Survey can be used to develop a statistical data collection method for estimating monthly catch landings of artisanal fishers by species and by area/location (the PPS method).

Socio-economic studies

b) Socio-economic studies on fishing communities (Community/Household profiles, Poverty profiles, Vulnerabilities, Livelihoods security, economics of artisanal fishery, etc) are also important in terms of providing useful information for development planning purposes.

Aquaculture Production

c) In all the aquaculture sites visited during the assessment exercise, actual quantities of cultured fish produced were not obtained; it was not even possible to estimate the number of baskets of fish produced per pond/per village/per community. In collaboration with Farmer Cooperatives, local and international NGOs, extension staff of the BNF should commence collecting such data.

4.6 Sustainable Fisheries Conservation and Management

Liberia is presently lacking in scientific data and information on the status of fisheries resources as a direct result of the civil war during which period no scientific studies were undertaken and very little information was collected and analyzed. Without scientific data and information it is difficult for the fisheries administration to make informed decisions on issues such as the number of fishing licenses to be issued, determine sustainable levels, declare closed areas and seasons among other things. Faced with this situation of uncertainty about the state/status of the resources, the Government should apply the precautionary approach to sustainable fisheries management and introduce management actions/measures to ensure the long-term rational and sustainable use of fisheries and aquaculture resources. Government policy for sustainable fisheries management shall be consistent with the Code of Conduct for Responsible Fisheries. With technical support of FAO, Government should conduct awareness campaigns to sensitize fisher folk on the Code and the need to adopt the principles of responsible fisheries.

A co-management regime should be established for partnership between Government and private sector operators (artisanal and industrial) in the management of fisheries and aquaculture. Community involvement and participation in natural resources management have proved successful in the management of small-scale fisheries including MCS activities within artisanal fishing grounds in some West African countries (Gambia, Guinea Conakry). The success stories will be studied and adapted to the Liberian situation. The positive attributes of local communities (social cohesion, respect for community rules and regulations, affinity to the natural environment) are important management tools that are more likely to engage communities in natural resources management and development than the conventional top-down approach that has so far failed to produce the desired management outputs.

4.7 Development of Artisanal Fishery

Government is aware of the enormous potential of artisanal fishery to contribute to national socio-economic development through employment generation and poverty alleviation, national food security and improved nutrition, revenue and foreign exchange earnings for the country. Presently, the artisanal fishery (marine and inland) generate employment for more than 33,000 people in the production, processing, distribution and marketing chains and accounts for more than 60 % of total fish production all of which is consumed locally. However, artisanal fishery is basically underdeveloped; production methods and systems are outdated and processing technology is still rudimentary and unhygienic; distribution and marketing systems are not well established, and post harvest losses are very high.

The widely dispersed nature of artisanal fish landing sites and the old age tradition of fishers working in isolated family groupings make artisanal fishery management a very difficult undertaking. For the better management of artisanal fisheries, Government should establish

Community Fisheries Centres (CFC's) with requisite infrastructure including ice plants, chill and cold storage facilities, fish boxes, fish processing areas, storage facilities for processed products, mechanical workshops, boat building areas, individual lockers for safe keeping of fishing equipments, insulated/refrigerated vehicles for fish distribution and marketing. The establishment of CFC's should be started along the coastal areas targeting the bigger fish landing sites/communities and gradually move to the major sites/communities in the inland areas. International donor assistance and support is required and countries such as Japan, China, and Norway can be requested to assist. The African Development Bank, Islamic Development Bank and IFAD should also be requested to support the development effort.

Government should focus attention on building and strengthening the human resource capacities of the different fisheries economic operators (fishermen, fish processors and fish dealers) through training on issues relating to fishing, fish hygiene, fish processing and quality control in the artisanal fisheries with the objective of improving fishing methods and techniques, fish handling, processing and quality control standards and reducing post harvest losses. Reduction in post-harvest fisheries ultimately implies increase in supply of wholesome/ quality fish for local consumption. Also, reduction in post-harvest fisheries including discards and spoilage will significantly increase the incomes of the artisanal fisheries operators helping to alleviate poverty and also ensure household food security. Access to finance through credit schemes is crucial to artisanal fisheries development and credit schemes for artisanal economic operators, particularly women fisher folk, should be integral components of development projects and programmes.

4.8 Quality management programmes in post-harvest fisheries, value addition and export opportunities

Fisheries food chains are constantly changing to respond to changing international demands for quantity and quality of fisheries products. The international agreements on Sanitary and Phytosanitary standards and requirements for fish exports from developing countries to markets in the developed countries are becoming more and more stringent and complex and have significant cost implications. Fish safety and quality issues have both social and economic dimensions in the present day modern world. Some of the major export problems faced by developing countries are: access to the resources required to comply with SPS standards, scientific and technical expertise, appropriate technologies and skilled labour.

Among the development policy objectives for the fisheries sub-sector of Liberia is the exportation of fish and fishery products from which Government can generate revenue and foreign exchange earnings. But presently, the reality on the ground in Liberia is that food (fish) standards and quality are quite low and the fisheries value chain is very basic/rudimentary, informal, unregulated and does not comply with the international agreements on Sanitary and Phytosanitary standards and requirements. The fisheries value chain should be able to assure fish quality and safety from primary production to final consumption. As a country that is keen to develop its fisheries for both domestic consumption and export, it is very important to the Government that fishers, fish handlers and processors in Liberia implement quality control (QC) programmes and good manufacturing practices to ensure food fish product safety and quality that meet the international standards and requirements. Fish quality and safety should be addressed across the entire value chain. Value addition will significantly increase the profitability of the fisheries sub-sector. It is also important that the relevant Government institutions are capable and have the requisite human, financial and technical resources to ensure compliance with the agreed international

standards and requirements. To achieve this will require institutional strengthening and capacity building at the level of public institutions and also in the private sector (artisanal and industrial operators: fishers, processors and fish dealers).

The BNF is the competent Government authority to regulate the fishing industry and ensure compliance to standards and regulations. Government should strengthen the BNF through the recruitment of highly trained nationals and the training of staff of the BNF in the relevant disciplines (fish microbiology; fish inspection, quality assurance and control; fish processing technology etc.). Other Government agencies working with the food industry such as the Department of Health, Department of Livestock Services, Department of Veterinary Services can also benefit from the training programmes. Government will also implement capacity building training programmes for artisanal operators in basic food hygiene, environmental health and sanitation, improved fish handling and processing methods and techniques, and on the importance of icing, chilling, freezing, drying and smoking to preserve fish and maintain quality and shelf-life of products. With support of development partners, the Government should implement capacity building programmes in industrial fisheries particularly in fish factory operations and will conduct training programmes on quality control, fish inspection and quality assurance, Quality Management Programmes and on HACCP based systems. With the support of INFOPECHE in Abidjan, Cote D'Ivoire and the Common Fund for Commodities in Amsterdam, Holland, the Government should implement training programmes in the development and promotion of value added fish and fishery products. Liberian fish and fishery products should be exhibited at international fish fairs and exhibitions to attract international buyers and sellers. Also, the Government should support the proposal to build a Regional Training Centre for Fish Quality Assurance in Monrovia. The proposed Centre will be a component of the E.U funded Post Harvest Project on Strengthening Fishery Products Health Conditions in ACP/OCT countries. The Centre in Monrovia will be of tremendous advantage to the fishing industry in many respects: capacity building, quality assurance and control etc.

For the long-term, the Government should introduce an Eco-labeling scheme for fish and fishery products as a valuable instrument for the integration of environmental requirements into the management of fisheries. Eco-labeling would be an economic incentive for the fisheries sub-sector to act in a more sustainable way and contribute to the sustainability of the fisheries resources and provide for an adequate level of protection of the ecosystem.

4.9 Promote sub-regional, regional and international cooperation in fisheries management

Liberia should accede to international fisheries agreements, conventions and protocols as an essential foundation for partnership and sub-regional and regional cooperation in sustainable fisheries management. As reflected in Statement of Policy Intent for Agriculture, 2006, the Government of Liberia will collaborate with the neighbouring countries for the setting up of a sub-regional fisheries commission for Benin, Cote D'Ivoire, Ghana, Togo, Nigeria and Liberia for sustainable fisheries management that would also eventually assist Liberia in addressing monitoring, control and surveillance problems in its coastal waters. Participation in the activities of the Guinean Current Large Marine Ecosystem (GCLME) project is very useful in terms of ecosystem-based management of fisheries and natural resources.

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ANNEX 1**INVESTMENT PROPOSAL****CAAS-Lib. Fisheries Sub-sector Investment Proposal**

Name of Project	Development of Artisanal Fisheries.
Institutional Responsibility	Ministry of Agriculture and National Bureau of Fisheries.
Aim(s) of Project	The aim of the project is to increase fish production levels in artisanal fisheries to contribute to national food security and poverty reduction. The objective of the period is to develop artisanal fisheries so as to enhance the sustainable utilization of the fisheries resources of the country for increased fish production and improved livelihoods in artisanal fishing communities.
Description of Main Activities	<p>The project will be implemented in the Counties of Maryland, Grand Kru, Sinoe, Rivercess, Grand Bassa and Cape Mount.</p> <p>The goal of the artisanal fisheries development component is to restore artisanal fishing activity to a sustainable level by providing fishing inputs and training 3643 fishers, fishmongers and fish processors. The project will benefit some 21,858 direct beneficiaries, including returnees (ex-combatant youths and women, fishmongers and fish processors).</p> <p>The main activities to be undertaken under the project include the following:</p> <p>1) <u>Selection of beneficiaries</u> Assessments will be carried out in the selected Counties for the identification and selection of beneficiary groups for the distribution of inputs, and communities for the construction of fish smoking units (kilns).</p> <p>2) <u>Training of fishers and fish processors</u> Previous interventions have provided training for trainers in various artisanal fishing communities in gear repairs and maintenance, small-scale business management, fish processing and the role and importance of CBOs. Two (2) trainers will be identified in each community and given refresher TOT training. A total of 232 trainers will be trained to serve as trainers in the training of 3643 fishers, fishmongers and processors in their various communities. The training of fishers will be community-based, continuous, and spread over the duration of the project, with one consolidated training for trainers annually. Other community members will be identified and trained in boat construction, repairs and maintenance, and repair of outboard engines. Each community will have a team of trainers comprising of three (3) persons who will be empowered to facilitate community training to coincide with each level of project implementation. Fish processors and fishmongers will be trained in improved methods of fish processing and preservation and in small-scale business and marketing. A total of 2000 processors and fishmongers, comprising mainly widows, ex-combatants and returnees, will also benefit from the training.</p> <p>3) <u>Procurement and distribution of inputs</u> The aim is to increase fish production through increased fishing effort by providing fishing inputs including nets of various mesh sizes, ropes, floats, outboard engines etc. to be distributed to about 200 fishing groups.</p> <p>4) <u>Promoting the use of larger fishing canoes by local fishers</u> A consultant will be hired to conduct the training of trainers in boat building and maintenance. Four persons per County will be trained and upon completion of the training, the 24 trainers will be equipped to return to their communities where boat building workshops will be established for training and maintenance purposes. The workshops will be managed by local fisher associations under the supervision of the Ministry of Agriculture through the Bureau of National Fisheries.</p>

	<p>5) <u>Construction of fish smoking units and storage facilities</u> 116 smoke houses will be constructed in selected communities using skilled labour recruited from selected beneficiary communities. The design and dimensions of the smoke houses will be determined by community demands and requirements.</p> <p>6) <u>Provision of Micro-credit</u> A revolving loan fund scheme will be set up through the Agricultural Development and Cooperative Bank to assist fisher folk increase their production and expand their businesses. The loan scheme will not exceed \$1500/fishing group, and \$200/processor, and will benefit 200 fishing groups and 2000 fish processors and fishmongers. The selection criteria will include: Group organization; Credible and transparent account/book keeping system and; Good and consistent production levels.</p> <p>7) <u>Provision of fish storage and preservation facilities</u> Fishers will be encouraged to carry cool boxes with ice, fitted onto canoes, to help preserve their catch prior to landing. Mini cold storage facilities of 6 tons capacity will be provided in selected project communities. The cold storage facilities will be managed by a committee of fishers and processors association under the direct supervision of the Project Implementing Committee. Beneficiary communities will be selected based on level of production, community organization, a record and financial system that will ensure the maintenance of the cold store, and market access. 8 mini-cold storages will be established, with some 30,000 fishmongers and processors expected to benefit.</p> <p>8) <u>Monitoring and Evaluation</u> The project implementation committee in collaboration with the Ministry of Agriculture and donor representatives will develop a detailed Monitoring and Evaluation Plan. Close monitoring of project activities will be continuous throughout the duration of the project. However, it is expected that there will be annual evaluation of project performance.</p>
Expected Result(s)	The expected outputs are as follows: 200 groups in 116 communities selected; 232 fishers and processors trained as trainers; 3643 fishers and processors trained in respective disciplines; fishing inputs provided to 200 groups; 24 fishers trained in boat building and 6 workshops established; 8 mini- cold storage facilities established, and 116 fish smoking kilns constructed.
Impact on Food Security, Poverty Reduction & Economic Development	The Project is directly linked to CAADP Pillar 5 (Increasing Food Supply and Reducing Hunger with a complementary link to CAADP Pillars 3 and 4 (Land and Water Management; Development of Agricultural Research, Technological dissemination and adoption and sustainable development of livestock, fisheries and forestry resources).
Period of Execution	The Project will be implemented from January 2008 to December 2010.
Estimated Cost	US\$ 2 045 155

Name of Project	Small-Scale Aquaculture Development
Institutional Responsibility	Ministry of Agriculture and National Bureau of Fisheries.
Aim(s) of Project	The aim of the project is to increase fish production levels in small-scale aquaculture to contribute to national food security and poverty reduction. The objective of the period is to develop small-scale aquaculture so as to enhance the sustainable utilization of the water resources of the country for increased fish production and improved livelihoods in rural and peri-urban communities.
Description of Main Activities	<p>The project will be implemented in the Counties of Lofa, Grand Gedeh and River Gee. The project will bring into aquaculture production, 50 ha of swamps through the provision of tools, materials, fingerlings and training. These include 10.3 ha of ponds to be rehabilitated and 39.7 ha of new ponds to be developed. Three (3) hatcheries and 1 research facility will be rehabilitated. The main activities are as follows:</p> <p>1) <u>Site survey and selection</u> Surveys will be carried out in each County to verify swamp location and size, soil quality, water regimes, land tenure, vegetation, community enthusiasm and organization, before final selection for implementation. The surveys will assist in determining the magnitude of development work to be accomplished. The rehabilitation/development work is expected to involve land preparation, construction of dams and water control structures, and fishponds.</p> <p>2) <u>Training of aquaculture technicians</u> Aquaculture technicians who have received training in basic aquaculture techniques will be identified in project communities and given refresher training. They will be responsible for the training of 20 farmers/site. Each of the 100 technicians, chosen from amongst farmers or community, will be assigned/site, and training will be scheduled to coincide with the level of pond development activities at each site. The training will focus on pond construction and management; water quality; stock management and post harvest management and marketing.</p> <p>3) <u>Pond rehabilitation and development</u> Fishponds will be rehabilitated and developed using very simple technology. Gravity-fed irrigation system will be developed to sustain annual aquaculture production. Manual labour will be used as much as possible, utilizing mainly ex-combatant youths and women. The activity will require 3,500 man-day/ha of labour for land preparation and soil movements to construct 200m³ of bund/ha. Fishponds with average size of 400m² will be developed under community initiative. Communities will be supplied pond construction tools and materials including: wheelbarrows, shovels, tools for site preparation and PVC material. Pond construction activities involve soil excavation, movement and compaction following specified designs and measurements. All bunds will have a minimum width of 3 meters with a minimum height of 1.3 meters. This will allow a minimum water depth of 1 meter in the pond for stocking. Ponds will have 1-2 percent bottom slope, and a bund slope of at least 1:1:1 ratio of slope: crest: slope. Ponds will be stocked at a density of 2 fish/m² of pond water surface area. Fingerlings and fertilizers (576kg/ha/yr) will also be provided to farmers, on loan basis for the first year and the loan will be repaid before or at harvest time. Semi-intensive culture system will be encouraged initially until supplementary feed is available, for ease of management by farmers.</p> <p>4) <u>Farmer training</u> Training will be site specific and carried out by trained field technicians under the supervision of extension officers. 20 farmers will be trained per site constituting 1000 farmers. Field training will be an on-going activity through out the duration of the project, with one intensive training a year to consolidate farmer's skills and knowledge in culture techniques.</p>

	<p>5) <u>Intensify aquaculture research</u> Research aimed at introducing indigenous fish species for culture will be prioritized. Developing local species of Tilapia and catfish for culture will be a major research focus. There is also need to develop/or adopt technologies that are cost effective and will ensure maximum benefits and profits.</p> <p>6) <u>Establishment of a feed mill</u> Supplementary feeding is a major constraint to sustainable aquaculture development. A complete hammer mill with pellet mill will be established at CARI where feed for livestock, fish, poultry, etc will be produced for distribution nationwide. The mill will also be used by CARI for developing new feed formulae for enhancing livestock production. The facility will also provide a market outlet for maize producer, as it will constitute a major feed ingredient. The brewery waste and by-catch of the shrimp industry will also be utilized. The by-product of other agricultural sectors, i.e., oil cakes from palm kernel, coconut and groundnut, and rice bran will be utilized as feed ingredient. However, micronutrients and other ingredients, which cannot be sourced locally, will have to be imported. Technicians will have to be trained to operate and maintain the mill which will be self-sustaining as feed produced will be sold.</p> <p>7) <u>Provision of micro credit facility</u> Micro-credit will be provided to farmers in cash or kind (fingerling, feed, fertilizer, etc) to improve their production capacities at 5 % interest rate. The loan scheme will be revolving, and 100 farmers' groups are expected to benefit. The criteria for selection for loan will include: adequate level of production, consistency in farming and record, and transparent and credible record system.</p>
Expected Result(s)	The Project is expected to benefit 1000 fish farmers in 100 communities; 24 aquaculture extension officers and 100 field technicians trained; 50 ha (1200 ponds of 400m ²) developed; 3000 assorted tools and materials provided to 100 groups; 0.5 million fingerlings stocked; 28.8 tons of fertilizer supplied to farmers; 1 complete fish meal established. There will be 6000 direct beneficiaries comprising mainly youths, women, ex-combatants and returnee farmers.
Impact on Food Security, Poverty Reduction & Economic Development	The Project is directly linked to CAADP Pillar 5 (Increasing Food Supply and Reducing Hunger with a complementary link to CAADP Pillars 3 and 4 (Land and Water Management; Development of Agricultural Research, Technological dissemination and adoption and sustainable development of livestock, fisheries and forestry resources).
Period of Execution	The Project will be implemented from January 2008 to December 2010.
Estimated Cost	US\$ 1 091 355.

Name of Project	Enhancing National Capacity for Sustainable Fishery Sector Management.
Institutional Responsibility	Ministry of Agriculture, BNF and CARI.
Purpose(s) of the Project	The main purpose of the project is to improve the institutional capacity of the Bureau of National Fisheries (BNF) and the legal environments to enable it effectively monitor and manage the fisheries resources on a sustainable basis. The other purpose is to introduce and consolidate a co-management arrangement between the Government and the private sector in the artisanal fishery sub-sector.
Description of Main Activities	<p>The project has two components: Capacity Building and Institutional Strengthening and, Project Management. The main activities of the two components are as follows:</p> <p><i>Capacity Building and Institutional Strengthening</i></p> <p>1) <u>Rehabilitation of the BNF Headquarters and Fisheries Research Facilities</u> The office facility of the BNF will be rehabilitated and equipped; including a fisheries biology laboratory. The office will be used as a command centre of the project implementation committee, and for the monitoring, regulating and control of fishery activities. The office will also be the coordinating centre for fisheries research and extension, and for all fisheries related activities within the country. Three (3) fish hatcheries at Douyee town, Gbegbedu and Klay will be rehabilitated to ensure the adequate supply of fingerlings for the stocking of farmers' ponds. Production and office/training facilities will be rehabilitated using youths, including ex-combatants and women to provide the labour. Fish transport and office equipment will be supplied to the hatcheries. The hatcheries will be used as farmer training centres, and for research and extension. The fisheries research facility at CARI will be rehabilitated to initiate the development of indigenous species for culture. Required equipment and logistics, including office and laboratory equipment, data collection materials, vehicles and motorbikes to support research and extension will be acquired to enhance the BNF operation and performance.</p> <p>2) <u>Research and Training</u> Personnel of the BNF will be selected for training in such areas as fish biology, fisheries statistics and management, fish health and quality, monitoring, fisheries economics etc. The training will improve staff performance, build staff confidence to carry out research, and make data collection and analysis more efficient and reliable. Six (6) staff of the BNF will be trained at M.Sc level in specialized courses in fisheries and aquaculture, and these will serve as trainers for fisheries and aquaculture extension officers throughout the country. Research will be focus on cataloguing the major fish species in Liberian waters, particularly inland, and a study of their biology so as to enhance their ecological management.</p> <p>3) <u>Strengthening legal capacity</u> A new fishery monitoring and regulatory law will be drafted and enacted into law to strengthen the management capability of the BNF. The law will be circulated among the various stakeholders of the fisheries sector to create adequate awareness for its enforcement. A fisheries management plan will also be developed in line with the Government agricultural development policy. The fishing areas will be demarcated to reduce/eliminate conflicts between artisanal and industrial fishing vessels. The new law will reserve the three (3) nautical mile inshore zone for the sole exploitation of the artisanal fishery, and will be rigorously enforced so as to sustain artisanal fishing activities.</p> <p>4) <u>Set-up a Monitoring and Regulatory System (MRS)</u> A Monitoring and Regulatory System will be set up, using local fishers to monitor and report industrial fishing vessels intruding in artisanal fishing areas. A team of fishers will be trained and equipped with hand compasses, GPS, and VHF radios. In addition, fisheries monitors (Observers) will be trained and assigned aboard all licensed industrial</p>

	<p>fishing vessels to monitor their activities while at the same time conduct some basic biological sampling and take statistics of their catches. A patrol boat will be acquired (from bilateral cooperation with the Peoples Republic of China) and a core of national from the Navy will be trained to man the patrol boat. The patrol boat will be used for monitoring, control and surveillance activities within the EEZ (Exclusive Economic Zone) to regulate industrial fishing activities prevent poaching and illegal transhipments in the high seas. A central communication unit will be established at the headquarters of the BNF to coordinate information from the field.</p> <p>Project Management</p> <p>1) <u>Project Implementation Unit</u></p> <p>The BNF was established as the technical arm of the Ministry of Agriculture responsible for management and development of fisheries and aquaculture in Liberia and it is supervised by a Deputy Minister. A Project Implementation Unit will be established under the Directorate of the BNF to oversee the implementation of all fisheries and aquaculture and will be assisted by a project coordinating committee.</p> <p>2) <u>Private Sector Management</u></p> <p>Artisanal fisheries and aquaculture projects will be run largely by fishers' and farmers' associations, in a co-management arrangement with the Government. Similarly, they will undertake monitoring, surveillance and protection of the demarcated fishing areas, manage cold storage and fish processing units, maintain boat building workshops, and fish hatcheries and feed mill.</p> <p>3) <u>Technical Assistance</u></p> <p>For the effective implementation of the outlined in the Investment Proposal (Artisanal Fisheries Development Project and Small-Scale Aquaculture Development Project), short-term technical assistance will be required for the following areas:</p> <ul style="list-style-type: none"> • 1 Fisheries and Aquaculture Consultant • 1 Financial Comptroller • 1 Project Manager • 1 Surveyor (specialized in soil and fringe surveys) <p>In addition, the following experts will be required:</p> <ul style="list-style-type: none"> • 1 expert in feed technology for 3 months • 1 expert in boat building for 6 months • 1 mechanical engineer (outboard engine) for 1.5 months • 1 expert in community development for 3 months <p>4) <u>Monitoring and Evaluation</u></p> <p>The project implementation committee in collaboration with the Ministry of Agriculture and donor representatives will develop a detailed Monitoring and Evaluation Plan. Close monitoring of activities of projects will be continuous throughout the duration of the projects. However, it is expected that there will be annual evaluation of the performances of the projects.</p>
Expected Results	<ul style="list-style-type: none"> • The BNF is strengthened. • BNF headquarters rehabilitated and equipped. • Fisheries laboratory established. • 3 Fish hatcheries rehabilitated. • New fisheries legislation enacted and enforced. • Monitoring and Regulatory System set up. • Patrol boat acquired. • Project Implementation Unit established under BNF. • Co-management arrangement between Government and private sector realized. • Technical assistance personnel attached to projects. • Monitoring and Evaluation Plan developed.

Impact on Food Security, Poverty Reduction & Economic Development	The project is linked to CAADP Pillars 3 and 4 (Land and Water Management; Development of Agricultural Research, Technological dissemination and adoption and sustainable development of livestock, fisheries and forestry resources).
Period of Execution	The Project will be implemented from January 2008 to December 2010.
Estimated Cost	Capacity Building and Institutional Strengthening Component- US\$ 2 183 500. (excluding the patrol boat valued at US\$ 4 million). Project Management Component: US\$ 1 029 140. Grand Total: US\$ 3 212 460.

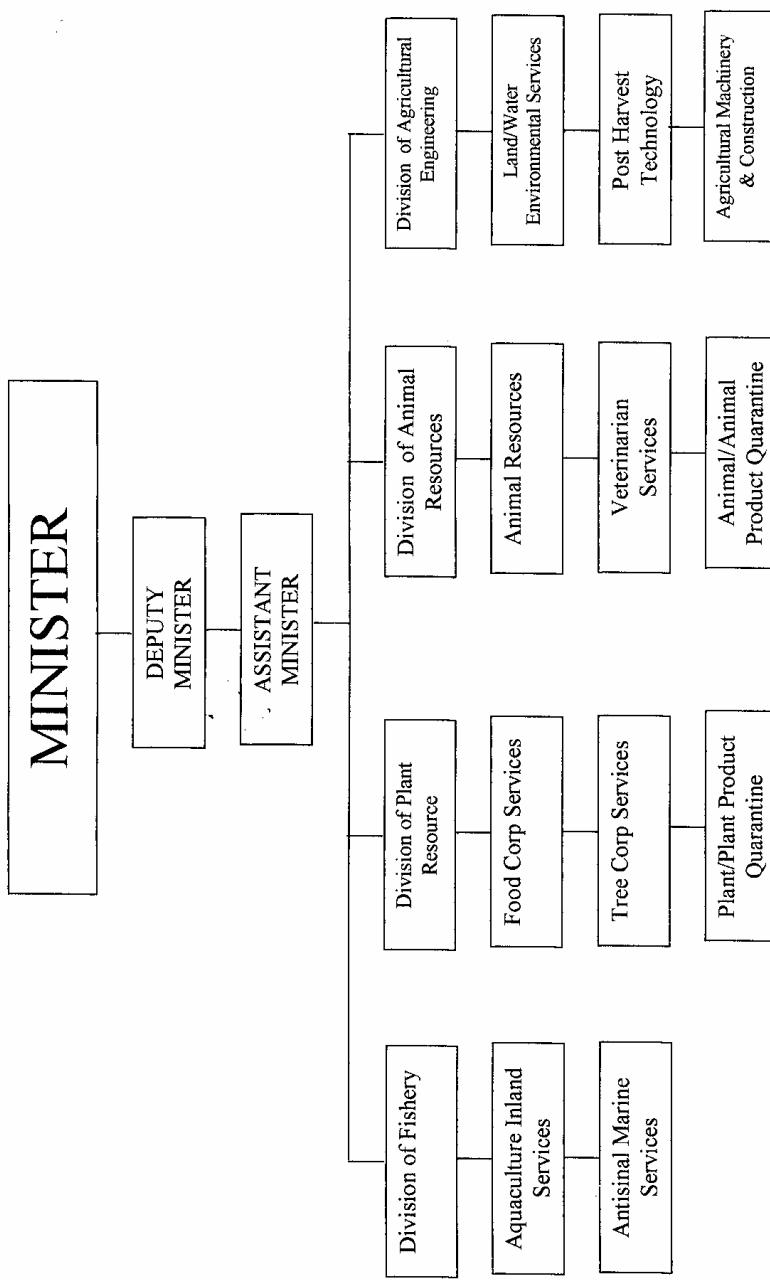
ANNEX 2**PERSON MET**

Dr. J. Christopher TOE - Minister of Agriculture
 Mr. James B. LOGAN - Deputy Minister of Agriculture.
 Mr. Emmet MEZIA - Assistant Minister of Agriculture, Planning & Development
 Mr. Solomon Hedd. WILLIAMS - Assistant Minister, Technical Services.
 Mr. Joseph G. MUSAH - Coordinator of Planning & Policy, Ministry of Agriculture.
 Mr. J. Hilary MASON - Adviser, Minister of Agriculture
 Dr. Winfred N.O. HAMMOND- FAO Resident Representative, Liberia..
 Dr. Dunstan S.C. SPENCER - Team Leader, CAAS-LIB.
 Dr. Othello Brandy- National Project Coordinator.
 Mr. T.E.C. PALMER - Senior Policy/Programme Officer, FAO Regional Office for Africa.
 Mr. Chet AESCHLIMAN - Rural Finance and Marketing Officer, FAO Regional Office for Africa.
 Mr. Zakary RHISSA - Livestock Specialist, FAO Regional Office for Africa.
 Mr. Sampson AGOZDA - International Consultant (Land and Water Resources).
 Dr. Peter SMITH - International Consultant (Institutions).
 Mr. Michael CONNOLLY - International Consultant (Land and Water Resources).
 Dr. Ponniah ANANDA - (International Consultant, Agricultural Research).
 Dr. Joseph Sam SESAY - Civil Affairs Officer, UNMIL.
 Mr. Isaac Flowers-Coordinator, National Bureau of Fisheries, Ministry of Agriculture (MOA).
 Mr. Yevewuo SUBAH - Deputy Coordinator, National Bureau of Fisheries, (MOA).
 Mr. Momoh N. JOHNSON - Statistician, National Bureau of Fisheries, (MOA).
 Mr. Eric B.C./ KEKULA - Extension staff, National Bureau of Fisheries, (MOA).
 Mr. Denis J. HYNES - Country Representative, Africare, Liberia.
 Mr. Bai Rogers - Agric Coordinator, Africare, Liberia.
 Dr. Yves FERMON - Fish Biologist, ASUR (French NGO).
 Ms. Claire GSEGNER, Fish Farming Specialist, ASUR.
 Mr. Thomas GAYFLOWA - Coordinator, Catalyst Incorporated (local NGO).
 Mr. Michael SHI- General Manager, Ma-Sanja Fishing Company.
 Mr. Abdallah HAMDAN - General Manager, Sham Incorporated (Fishing CO.)
 Mr. Francis TAY - Head Fisherman, Popo Beach, Monrovia.
 Mr. Gabriel SAGBAH - President, United Fisherman Cooperative Society, Popo Beach No. 4, Monrovia.
 Mr. Joseph BLAMOH - Head Fisherman, Kru Beach, West Point.
 Mr. Yarkpazuo KORVAH - Farm Manager, Cuttington University.
 Mr. John MENNEU - Fish Pond Attendant, Memyen Village, Nimba County.
 Mr. Jackson WHALEAH - Spokesman, Kpodo Farmers Cooperative Society, Zayeglay Village, Nimba County.
 Mr. Wheye GONLE - Village Head, Gneukpanlah Village Development Committee, Nimba County.
 Mr. Zogbay WIMBEH - Fish Pond Attendant, Gneukpanlah Village, Nimba County.
 Mr. Oliver VANNE - Fish Pond Attendant, Gneukpanlah Village, Nimba County.
 Mr. Adnan Monsour - Manager, West African Enterprise, Tubmanburg
 Mr. Sando Kplor - Head fisherman, Jornii Town, Cape Mount
 Mr. Abdoulai Seidi - Migrant Fisherman, Robertsport

Mr. Joseph Dortu - Head fisherman, Kru town, Robertsport
Mr. Alex Appleton - President, Robertsport Fishing Development Union
Ms. Cecelia Doryen - Head Processor, Robertsport
Mr. Boimah Sombai - Fisherman, Farlie, Cape Mount,
Mr. Miatta Sonii - Processor, Farlie, Cape Mount
Mr. Armah Parker - Fisherman, Mandoe, Cape Mount
Mr. J. Konah McCauley - Commissioner, Marshall City, Margibi County
Ms. Cecelia Bestman- Kru - Governor, Marshall City
Mr. Solomon Dadzie-Fanti - Governor, Marshall City
Mr. Kweku Aku-Fanti - Head Fisherman, Marshall City
Mr. Borbor Nappy- Kru Head Fisherman
Ms. Cecelia Gweh - Head processor, Port Beach, Buchanan, Grand Bassa
Mr. Dweh Pupo - Fisherman, Port Beach, Buchanan
Mr. Mathew Puo - Fisherman, Kroc Beach, Buchanan
Mr. Andrew Nketsiah - Fanti Governor, Bassa
Mr. Kwamena Mensah - Fanti chief Fisherman, Bassa
Mr. Comfort Nketsiah - Head Processor, Fanti Town, Buchanan
Mr. Abbas Nasser - Manager, African Fisheries, Buchanan
Ms. Julliet Cassel - Superintendent, Grand Bassa
Mr. C. Tero Coker - County Coordinator, Kpan-Kpan Gbo, Inc.
Mr. Varney Corneh - Program Coordinator, Concern World Wide
Mr. Emmanuel Yarkpazua - Agriculture Coordinator, Lutheran World Service
Mr. Augustus Varney - Agriculture Coordinator, Samaritan Purse
Mr. Solomon Tucker - Fisheries Inspector, Grand Bassa
Mr. James Zayzay-Co - Chairman, National Investment commission
Mr. Getee Sulunteh - Agriculture Coordinator, Bong County
Mr. J. Boimah Konto - Fish farmer, Bong County
Mr. Joseph Pope - Fish Farmer, Bong County
Mr. Belle Dumbar - Fish Farmer, Montserrado County
Mr. David Wiles - Director, GCLME Project, EPA
Ms. Yvonne Clinton - Deputy Director, Operations, Bureau of Maritimes
Mr. David Mendeh - Director, BUCCUBAH, Buchanan, Bassa.
Mr. Macon Tubman - Agriculture Assistant, LCIP

ANNEX 3

**ORGANIZATIONAL STRUCTURE DEPARTMENT OF TECHNICAL SUPPORT SERVICES
MINISTRY OF AGRICULTURE**



ANNEX 4**FISHERIES SECTOR REVIEW – ARTISANAL FISHERIES**

Artisanal Fisheries A

County	No. of fishing communities	No. of fishers	Processor/monger	No. of Liberian	Migrant	Total
Bassa	18	2,748.00	6,037.00	1,785.00	7,000.00	8,785.00
Rivercess	12	817.00	753.00	1,255.00	315.00	1,570.00
Sinoe	30	1,452.00	938.00	2,040.00	350.00	2,390.00
Maryland	8	508.00	646.00	654.00	500.00	1,154.00
Montserrado	13	4,230.00	6,574.00	7,804.00	3,000.00	10,804.00
Grand Kru	35	964.00	1,119.00	1,883.00	200.00	2,083.00
Bomi	4	298.00	261.00	331.00	228.00	559.00
Cape Mount	14	1,799.00	842.00	1,950.00	691.00	2,641.00
Margibi	5	398.00	1,200.00	1,050.00	548.00	1,598.00
Bong	3	167.00	124.00	285.00	6.00	291.00
Lofa	4	36.00	36.00	72.00	-	72.00
Nimba	6	230.00	326.00	556.00	-	556.00
Grand Gedeh	2	62.00	216.00	278.00	-	278.00
Gbarpolu	2	72.00	158.00	230.00	-	230.00
River Gee	2	47.00	63.00	110.00	-	110.00
Total	158	13,828.00	19,293.00	20,283.00	2,838.00	33,121.00

Source: Bureau of National Fisheries (BNF) 2006.

Artisanal Fisheries B

County	% Liberian	% Migrant	No. of Canoe	No. of canoe with Motor	% Motorization	Large (12-18 man)	Fleet structure medium (3-5 man)	Small (1-2 man)	No. of cold stores	Freezing capacity (ton)	Catch (ton) 2004-05
Bassa	20.32	79.68	581.00	90.00	15.49	40.00	50.00	2.00	2.00	48.00	2,304.00
Rivercess	79.94	20.06	500.00	30.00	6.00	6.00	12.00	-	-	-	345.60
Sinoe	85.36	14.64	211.00	20.00	9.48	10.00	25.00	-	-	-	526.70
Maryland	56.67	43.33	204.00	13.00	6.37	8.00	51.00	-	-	-	439.95
Montserrado	72.23	27.77	638.00	43.00	6.74	21.00	135.00	32.00	32.00	26,000.00	1,127.00
Grand Kru	90.40	9.60	515.00	7.00	1.36	5.00	8.00	-	-	-	312.40
Bomi	59.21	40.79	163.00	28.00	17.18	12.00	16.00	2.00	2.00	48.00	739.30
Cape Mount	73.84	26.16	483.00	21.00	4.35	21.00	33.00	-	-	-	1,095.20
Margibi	65.71	34.29	178.00	22.00	12.36	14.00	15.00	6.00	6.00	150.00	869.73
Bong	97.94	2.06	-	-	-	-	-	4.00	4.00	96.00	2.10
Lofa	100.00	-	-	-	-	-	-	2.00	2.00	48.00	1.80
Nimba	100.00	-	-	-	-	-	-	5.00	5.00	20.00	3.70
Grand Gedeh	100.00	-	-	-	-	-	-	1.00	1.00	24.00	2.00
Gbarpolu	100.00	-	-	-	-	-	-	-	-	-	2.80
River Gee	100.00	-	-	-	-	-	-	-	-	-	1.20
Total	80.11	19.89	3,473.00	274.00	7.89	137.00	345.00	54.00	54.00	26,534.00	7,773.48

Source: Bureau of National Fisheries (BNF) 2006.

ANNEX 5

LIST OF LICENSED INDUSTRIAL FISHING VESSELS (Source: Bureau of National Fisheries 2006)

Boat name	Boat #	GRT	Cold Store capacity (ton)	Catch(ton) 2004	Catch(ton) 2005	No of employee	# of Liberian	# of migrants	Type of Fishing
Greecoland		159	300			10	10	0	Trawl fishing
Soroya	1	180	1000			13	10	3	Trawl fishing
Soroya	2	180	0			20	20	12	Trawl fishing
Jeogin	15	97.35	2000			325	25	300	Paired
Jeogin	16	97.35	350			14	8	6	Trawling Paired
Heibei*	803	125	350			140	70	70	Shrimping
Yuanyu*	10	150	0			32	18	16	Shrimping
Honglin	23	166	105			8	8	0	Paired
Honglin	24	166	0			0	0	0	Trawling Paired
Haida	5	116	0			0	0	0	Trawling Paired
Haida	6	116	0			0	0	0	Paired
Haida	7	120	4000			36	30	6	Trawling Paired
Haida	8	120	1500			24	20	4	Trawling Paired
Haida	9	120	1000			38	32	6	Trawling Paired
Haida	10	120	2000			22	16	6	Trawling Paired
Tania		221	500			11	8	3	Fish trawling
Seta	70	214	0			0	0	0	Fish trawling
Tae Woong	607	201.5	0			0	0	0	Fish trawling

Boat name	Boat #	GRT	Cold Store capacity (ton)	Catch(ton) 2004	Catch(ton) 2005	No of employee	# of Liberian	# of migrants	Type of Fishing
Cidadea de olhao		124.16	0			0	0	0	Fish trawling
Medna		235	0			0	0	0	Fish trawling
Ocean		225	0			0	0	0	Fish trawling
Twin Port City	101	91	0			0	0	0	Paired Trawling
Twin Port City	102	91	0			0	0	0	Paired Trawling
Twin Port City	103	91	0			0	0	0	Paired Trawling
Twin Port City	104	91	0			0	0	0	Paired Trawling
Global	7	97.35	0			0	0	0	Fish Trawling
Beverina		112	0			0	0	0	Fish Trawling
Guoji	801	148	0			0	0	0	Paired Trawling
Guoji	802	148	0			0	0	0	Paired Trawling
Total	29	4122.71	13105	1502.74	2806.811	693	275	432	

Source: (Bureau of National Fisheries 9BNF) 2006.

ANNEX 6**FISH FARMERS**

County	District	# of Community	# of fish farmers		# of Ponds	Area(Ha)	Production (ton)/2004
			male	female			
Bong	Suakoko	27.00	320.00	80.00	65.00	5.61	
	Zota	6.00	184.00	46.00	10.00	0.40	
	Panta	7.00	172.00	43.00	15.00	0.60	
	Kpaii	2.00	43.00	11.00	8.00	0.32	
	Jorquelleh	8.00	81.00	20.00	17.00	0.68	
	Kokoya	4.00	78.00	19.00	5.00	0.09	
Sub-Total	6	54.00	878.00	219.00	120.00	7.70	
Nimba	Saniquellie Mahn	6.00	234.00	58.00	25.00	0.83	
	Saclepea Mahn	9.00	330.00	72.00	29.00	1.02	
	Gbelegeh	7.00	206.00	51.00	17.00	0.60	
	Zoegeh	13.00	271.00	68.00	36.00	1.44	
	Tapita	10.00	186.00	46.00	35.00	1.75	
	Sub-Total	5	45.00	1,227.00	295.00	142.00	5.64
Lofa	Zorzor	3.00	58.00	14.00	12.00	0.36	
	Salayea	5.00	98.00	24.00	15.00	0.75	
	Voinjama	17.00	170.00	42.00	67.00	1.00	
	Kolahun	7.00	68.00	17.00	30.00	0.35	
	Foya	2.00	2.00	-	5.00	0.01	
	Sub-Total	5	34.00	396.00	97.00	129.00	2.47
Bomi	Klay	6.00	157.00	39.00	20.00	0.68	
Margibi	Todee	2.00	40.00	10.00	7.00	0.24	
	Kakata	1.00	20.00	5.00	6.00	0.20	
	Careysburg	2.00	3.00	1.00	18.00	0.38	
	Johnsonville	1.00	5.00	1.00	1.00	0.00	
	Sub-Total	5	12.00	225.00	56.00	52.00	1.50
Grand Gedeh	Tchien	8.00	135.00	33.00	30.00	1.38	
Maryland	Keleway	1.00	5.00	1.00	1.00	0.00	
	Harper	1.00	3.00	1.00	1.00	0.00	
	Keluway	4.00	8.00	2.00	4.00	0.16	
Sub-Total	4	14.00	151.00	37.00	6.00	0.16	
Grand Total	25	159.00	2,877.00	704.00	449.00	17.47	38.81

Source: Bureau of National Fisheries 2006.

