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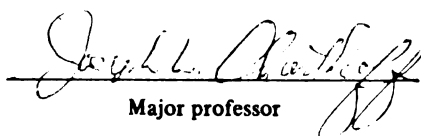
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**A STUDY OF COMMUNITY FORMATION AND RESOURCE USE IN A
CARIBBEAN AGRARIAN RESETTLEMENT: GREEN PARK, JAMAICA (1990-
1991) FROM AN ECOLOGICAL ANTHROPOLOGICAL PERSPECTIVE**

VOLUME 1

By

Susan L. Andreatta

A DISSERTATION

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Department of Anthropology

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Dr. Joseph Chartkoff, Advisor

ABSTRACT

A STUDY OF COMMUNITY FORMATION AND RESOURCE USE IN A CARIBBEAN AGRARIAN RESETTLEMENT: GREEN PARK, JAMAICA (1990- 1991) FROM AN ECOLOGICAL ANTHROPOLOGICAL PERSPECTIVE

By

Susan L. Andreatta

Green Park, Jamaica is a resettlement struggling to evolve into a functioning community. This study examines the processes of community formation and resource use in Green Park. A modified ecological anthropological perspective is employed to gain a historical and contemporary understanding of the agrarian system and related adaptive processes, beginning at the level of the resource users' households. This research is part of a larger research project, undertaken by the Jamaica Agriculture Research Programme and the Department of Forestry at Michigan State University, which is designed to introduce nitrogen fixing leguminous trees to be used as livestock fodder.

Green Park, formally an eighteenth century sugarcane plantation, is a resettlement established in a semi-arid tropical environment in 1959 by Kaiser Jamaica Bauxite Company. The resettlement is composed of resettlers, local migrants and circular migrants who vary in their degrees of access to resources, farming experience and knowledge, off-farm wage labor activities and length of time in using Green Park resources.

Following Thayer Scudder's four stage resettlement model of community

formation, the data analysis suggests Green Park oscillates between stage two and stage three. The immigration of circular migrants and local migrants to Green Park perpetuates the risk adverse conditions of stage two and the experimental and diversification conditions of stage three. Green Park will become a successful resettlement - Scudder's fourth stage - when Kaiser Bauxite turns over control of community decision making to the Green Park resource users and when second generation settlers take up residence.

This research contributes to understanding the processes of community formation and resource use. The transformations observed are having negative influences on the agrarian system. The increased partitions of land-space, the intensive use of small-size land plots, and the loss of export and domestic markets are contributing to soil erosion, deforestation and loss of species on hillsides and former sugarcane lands. The small-size plots support an increased number of mixed resource users (livestock owners, cultivators and charcoal burners) who supplement their household incomes with off-farm labor. If present trends continue, environmental degradation, inadequate access to land and other resources, and lack of local control make it unlikely that Green Park can complete the transition to a functioning resettlement community - Scudder's fourth stage - in the foreseeable future. Furthermore, any external development efforts which assume the existence of a functioning community are unlikely to produce any lasting positive effects.

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DEDICATION

With much love, gratitude and admiration, I dedicate this dissertation to my parents, Ellen and Geno Andreatta, who stood by me throughout the entire Ph.D. process.

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I begin by offering my deepest gratitude and respect to the citizens of Green Park, Jamaica, without whose support, participation and friendship this research would never have been completed. Many families warmly welcomed me into their homes and shared Jamaican experiences with me. Their ways and laughter will stay with me always.

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CHAPTER I

INTRODUCTION

1.1 Introduction

Resettlement schemes and subsequent community formations have been established in Africa, Asia, as well as Central and South America. Considerable research on resettlement has been conducted in these regions and a number of researchers have provided valuable insights into the resettlement processes found in Africa (Arnould 1990; Akwabi-Amayaw 1990; Scudder 1989 and 1991), southeast Asia (Scudder 1989 and 1991), and Central and South America (Collins 1989; Davis 1982; Moran 1989; Partridge 1989; Picchi 1991; C. Weil 1989). Not unlike other regions in the world, resettlement projects also have been established in the Caribbean region (Beckford 1987; Cowell 1987; LeFranc 1987; McBain 1987; Partridge 1989; Sachak 1987; Salmon 1987; Scudder 1989; USAID 1978). However, less is understood about such resettlement processes, community formation and resource use in plantation or former plantation societies in the Caribbean, because far less research has been conducted on this topic (Partridge 1989; Scudder 1989 and 1991; USAID 1978).

This research examines community formation on a former sugarcane plantation in Jamaica, specifically Green Park plantation, where empirical research is conducted to examine multiple issues including deforestation, soil erosion, cattle death, in and out

migration, and loss of markets. The processes of community formation are linked to cultural and environmental interactions over time. This research employs an integrative, ecological anthropological approach as its theoretical orientation which incorporates multiple levels and dimensions of analysis from functional systems ecology and humans systems ecology. Linkages between the resettlement and environmental resources are examined, beginning at the level of the household, moving to examine interactions within Green Park and concluding with interactions between a multinational corporation and the state. The emphasis of this research is to identify factors of the human adaptive processes in the Green Park agrarian resettlement that contribute to community formation and impact resource use. This integrated approach provides a more accurate understanding of the nature of Green Park and the adaptive behavior of its people in relation to their natural and social environment.

Community and village studies are traditional ethnographic units in anthropological analyses (Barrett 1984). However, in the Caribbean Trouillot (1992) notes the scarcity of monograph studies in the region. Trouillot contends, "this deficiency is not just a reflection of the politics of the guild; it is also a healthy sign that Caribbean ethnographers often realize that the story they were after does not end with their village" (Trouillot 1992:34). As a result, there is a paucity of community studies within the region (Rubenstein 1987; Trouillot 1992).

Prior research provides the following description of a traditional Caribbean community (Clarke 1957; Price 1988; Smith 1962 and 1965). A Caribbean community is characterized as a geographic locality sustained through kinship and socioeconomic networks (Clarke 1957; Cowell 1987; Price 1988; Smith 1962 and 1965). According to

Smith's research in Carriacou (1962), kinship and locality are the principle basis of community. Smith states "the community remains a distinct local unit where most of its members mate with and are related to one another" (Smith 1962:68).

In his work on "Community Organization in Rural Jamaica," Smith (1965) also characterizes Jamaican rural communities apart from other types of Jamaican settlements (urban, plantation, fishing village and government land settlements). Smith writes that in Jamaica, "rural communities are established in hill areas, where estate operations are marginal and the majority of the population is engaged in own-account farming on their small holdings or on plots acquired under tenancy" (Smith 1965:179). Accordingly, Smith finds the settlement pattern to be dispersed within the conditions of local land relief and land holdings, as such Smith characterizes Jamaican rural communities as geographically established and bound through kinship ties. Informal and formal associations and socioeconomic activities exist. In her work on the Jamaican family, Clarke (1957) identified three agrarian communities also based on location, kinship and economic opportunities and while examining the Jamaican family structure.

From his work on the island Bequia, St. Vincent, Price (1988) suggests a community is not only a recognized locality by its members, but is perpetuated by a sense of belonging (identity) and its socioeconomic exchanges. Price's research on Lower Bay, Bequia, contends Lower Bay is a community composed of three settlements - where Price defines a settlement as a cluster of households (Price 1988). According to Price (1988), the cluster of households form interdependent relationships of quality and structure, with conscious recognition of membership by the inhabitants of the settlements. These relationships are distinctive from relationships and identification with the social and

economic world outside the "community" (Price 1988). Moreover, Price contends economic activities in Lower Bay are organized around interdependent adaptive relationships among members of kinship and friendship networks that function across all three settlements.

In their research, Smith (1962 and 1965) and Price (1988) demonstrate that community integration operates on three levels. The first level of community integration is the household, the basic social and economic unit. The second level is the level of the lineage, the major structural agency of social control and processes for socializing its members. The third level for community integration is the community itself. According to Smith, the community, "is distinguished as a social group from like adjacent units by reference to locality, leadership, local endogamy and ritual organization" (Smith 1962:72).

In Chapters Five and Six of this dissertation characteristics of Caribbean communities are further compared and contrasted in the analysis of community formation and resource use in the Green Park resettlement.

1.2 Green Park Case Study

Green Park serves as a case study through which a resettlement of agrarian peoples, sponsored by a government agency, and the attendant resource use of these people is examined. Green Park is a recently established resettlement in rural Jamaica, put in place by Kaiser Jamaica Bauxite Mining Company. Green Park was not established by relocating an entire population from another community, but rather was founded by the resettlement of individual households from different communities. These people were originally from St. Ann Parish, Jamaica and were moved to a former sugarcane plantation

in Trelawny Parish, formerly known as Green Park Manor. More importantly, the composition of the present day resettlement is not of a population that is primarily composed of displaced households who lost their lands to the mining company, but is a mixed resettlement of households comprised of sponsored settlers and spontaneous voluntary settlers. Accordingly, Green Park has evolved from a single owner plantation, circa 1959 to an area of multiple owners who privately own and use parcels of land and other land based resources in the present time.

1.2.1 JARP-MSU Forestry Project History and Purpose

The Jamaican Agricultural Research Programme (JARP) in cooperation with Michigan State University Department (MSU) of Forestry is conducting an interdisciplinary agroforestry research project in Jamaica. The objectives of the collaborate research project are to gather information on establishing fodder trees from seed, based on data gathered concerning indigenous knowledge and agrarian practices among small-scale farmers in Jamaica. The goal of the JARP-MSU project is to combine sociocultural and biological data to develop appropriate silvo-pastoral management systems for livestock¹ owners in a resettlement.

The objectives of the JARP-MSU project are to: 1. examine the range of variation among agrarian systems that exist and persist in the resettlement; and 2. delineate constraints associated with the agrarian systems as identified by resource users. Understanding land and tree tenure and use, coupled with livestock management practices

¹ Livestock refers to cattle, goats, pigs, and chickens. However, for purposes of this paper and the research livestock refers to primarily cattle and when specified goats as well.

under uncertain economic and climatic conditions, contribute to an integrative analysis of the issues. Such an investigation may assist in interpreting similar social conditions, problems and/or limitations of small farmers elsewhere in Jamaica, and possibly in other communities of the West Indies possessing similar management practices and biophysical environmental conditions.

The investigative approach of the JARP-MSU agroforestry² project is relatively unique. The data collection for the agroforestry project has been conducted in multiple phases. Phase one examined the establishment techniques for direct seeding of fodder trees in Moneague, St. Ann Parish (Roshetko 1991). Simultaneously, indigenous knowledge of trees used in livestock management was collected in Green Park by a separate researcher (Morrison 1990). This dissertation presents research conducted in Green Park from phase two which was an examination of the existing agrarian systems. This is a local study on the sociocultural components of existing small-scale agrarian systems in a semi-arid area of Jamaica designed to identify the variation among resource using households. Considerable emphasis was placed on understanding land management³ within a resettlement by land-based resource users. This intensive study provides the foundation for the sociocultural component necessary to develop an alternative and

² Agroforestry is defined as "a land-use system that involves socially and ecological acceptable integration of trees with agricultural crops and/or animals, simultaneously or sequentially, so as to get increased total productivity of plant and animal in a sustainable manner from a unit of farm land, especially under conditions of low levels of technological inputs and marginal lands (P.K. Nair, ICRAF: In Ludgren, 1982).

³ "Land management consists of applying known or discovered skills to land use in such a way as to minimize or repair degradation and ensures that the capability of land is continued beyond the present crop or other activity, so as to be available for the next" (Blaikie and Brookfield, 1987:7-8).

sustainable agrosilvopastoral management system.

1.2.2 Dissertation Research Problem and Objectives

Specifically, two major research objectives are pursued in this study. First, applied research is conducted to examine the efficacy of Scudder's model of resettlement and community formation in the context of the dynamics of Green Park. Secondly, and perhaps more importantly, this work examines the historical formation of a resettlement and the ensuing post-resettlement adaptive processes. To facilitate meeting these objectives, the following processes are queried:

- 1) How do different settler groups adapt to Green Park through their use of resources?
- 2) What observable patterns exist in the way these settlers adapt to this environment?
- 3) How do these patterns vary as a function of being indigenous to this region or arriving from outside Green Park?
- 4) What are the ranges of success associated with the different settler groups in creating social networks in Green Park to facilitate the adaptive process?
- 5) What is the impact on the local agroecosystem vis-à-vis differential resource use experience, knowledge, age, gender and access to resources over time?⁴

This study analyzes the nature of Green Park as a social entity composed of households engaged in survival strategies and adaptation under conditions of environmental and economic distress. Specifically, this research and analysis focus on trees and livestock management practices, as well as, land and tree tenure and use, among small-scale Jamaican landholders in a resettlement located in a rainshadow region on the

⁴ An agroecosystem or agrarian systems is defined as "an ecosystem whose structure and function have been modified by people to produce food, fiber, or other products (Dover and Talbot 1987:32).

north coast. The Green Park study furthers our understanding of the nature of a resettlement as a social system, examines the processes and evolution of a resettlement, and contributes to existing bodies of knowledge. Moreover, this study of adaptive processes among varying members of a resettlement can contribute to policy and project design that are oriented toward resource enhancement or more effective means to enhance the viability of the population of resource users.

1.3 Resettlement Literature Review

Resettlement projects are common throughout the world and tend to be directed at the poor and landless farm households where development initiatives take place (Beckford 1987; Cernea 1991; Cowell 1987; McBain 1987; Moran 1989; Partridge 1989; Sachak 1987; Scudder 1989 and 1991; USAID 1978; C. Weil 1989). Frequently, many resettlement schemes are agriculturally oriented, yet resettlements have developed because of urban renewal programs, expanding tourism sectors, development of industrial estates, or from the construction of highways, dams, irrigation projects, or mining complexes (Beckford 1987; Cernea 1991; LeFranc 1987; Miranda et al. 1990; Moran 1989; Partridge 1989; Scudder 1989 and 1991; Winpenny 1991).

Resettlements involve the voluntary, involuntary, sponsored, or spontaneous movement of people (Akwabi-Amayaw 1990; Picchi 1991; Scudder 1991). Resettlement schemes are known to spring-up voluntarily on the edge of or in urban centers, including squatter settlements or shanty towns. Similar patterns occur elsewhere in the tropics in various frontier regions. The conquest of the tropical forest entails expansion of small-scale mixed farms, plantation agribusiness, and cattle ranches (Clay 1988; Denevan 1986;

Edelman 1985; Leonard 1987; Partridge 1989). Spontaneous unplanned resettlements also are known to develop around planned or induced resettlements; these include the plantation, cattle ranch and small-holder enterprises and serve as a major source of labor (Cummings 1990; Partridge 1989).

Some resettlements are controlled by state or multinational corporations with programs set up to subsidize housing in particular sites. Frequently, such resettlement programs involve the relocation of entire communities to planned resettlement sites, especially when natural resource extraction is the stimulus for relocation (Cernea 1991; Cowell 1987; Miranda et al. 1990; Moran 1989; Partridge 1989; Scudder 1989 and 1991; Winpenny 1991). Specific examples of resettlements are found in Tabasco, Mexico (for a commercialization of agricultural project) (Plan Chontalpa) (Dewey 1985), in Jamaica (where bauxite is extracted) (Beckford 1987; Cowell 1987; Girvan 1976; McBain 1987; Morrison 1991; USAID 1978), the Kariba dam project in Zambia and Zimbabwe (Scudder 1976) and hydroelectric dams along Brazil's Xingu river (Cummings 1990; Miranda et al. 1990; Partridge 1991; Winpenny 1991).

The literature on resettlement projects has tended to focus on how new communities are formed from aggregates of households and how the members of those households make production and other decisions vital to their well-being (Cowell 1987; Cernea 1991; Moran 1989; Partridge 1989; Scudder 1989; Weil, C. 1989). In addition, studies have examined how political economies at national and international levels influence the environment in which new communities are formed; this also involves decisions made to migrate to the new areas (Beckford 1987; Moran 1989; Partridge 1989; Scudder 1989). These resettlements have provided researchers with the opportunity to

examine the processes under which new production systems, communities and the belief systems come into existence and evolve in "problem-prone habitats" (Scudder 1991). However, as previously mentioned, similar extensive research has not been undertaken in the Caribbean.

According to Scudder (1989), an increasing number of investigators have dealt with the variability of household success, including emphasis on previous management experience, access to labor at critical times in the cycle of production activities, and the development cycle of the family. Yet, fewer studies have focused on the processes whereby such households integrate themselves into communities to compete in local and national arenas for scarce resources (Scudder 1989).

Issues of long-term cultural integration, environment and resource use have been raised in previous examinations of voluntary and involuntary resettlement programs (Cernea 1991; Moran 1989; Partridge 1989; Weil 1989). Resettlement programs have been among the least satisfactory type of development intervention (Cernea 1991). "Many of the problems have been traced to lack of appreciating the socioeconomic and cultural complexities involved in recreating human communities and building a viable productive base for them" (Cernea 1991:146). Many of the problems that plague the projects are related to different dynamics between indigenous or local patterns of production, external patterns of production, labor arrangements, and underlying social organization (Moran 1989; Scudder 1989 and 1991). An examination of different types of resettlements allows insight into these differing dynamics.

1.3.1 Resettlements Types

Resettlements have been classified to distinguish both the type of settler and the nature of the involvement of the sponsoring agency or agencies. One of the most important differences is that which exists between voluntary and involuntary resettlements.

According to Scudder, "the distinction between spontaneous and sponsored settlers refers to whether the settlers are self-recruited or respond to recruitment initiatives of a sponsoring agency. It has nothing to do with the reasons or motivation for leaving the original residence for a new resettlement area" (Scudder 1991:153). As such, Scudder (1991) identifies four types of resettlements: spontaneous resettlement with very little government or other assistance, spontaneous resettlement facilitated by government and other agencies, voluntary resettlement sponsored by government and other agencies and compulsory resettlement sponsored primarily by government agencies. Settlers sponsored by government or other agencies are involuntary and voluntary in nature.⁵

Voluntary, spontaneous resettlements are preferred by most potential settlers, since it implies greater household autonomy and less government interference in their economic decisions (Moran 1989). Voluntary settlers see an attraction in the new sites that makes them willing to tackle the risks and uncertainties of new environment (Cernea 1991). Voluntary resettlement also enables the settler household to participate in the decision-making process as to whether or not the household should relocate to a new area.

The evidence is generally that spontaneous settlers self-select for those with greater capital, education and willingness to face the difficulties of a new environment (frontier) -- and have a greater stability than sponsored settlers. However, their very autonomy has often been accompanied by government neglect

⁵ There are significant differences between settling people in old and new lands. In old lands, developers stay with existing societies; in new lands viable societies have to be formed from individually recruited families moved to unfamiliar locals (Scudder 1991).

for important aspects of marketing, services and other facilities that assure that their efforts can rise above the level of subsistence production. In short, spontaneous settlers need greater initial capital, a greater pool of labor resources, and favorable production conditions since they must provide many of their own road building, basic services and other infrastructure conditions (Moran 1989:22).

Sponsored-settlement programs can be voluntary or involuntary (Cernea 1991; Moran 1989; Partridge 1989; Scudder 1989 and 1991). Some sponsored-settlement programs tend to involve a pre-selection of settlers. Some programs develop formal screening criteria so that only the strong families, those likely to readjust and succeed, are selected for the program. Like spontaneous voluntary settlers, voluntary-sponsored settlers see an attraction in the new areas that makes them willing to resettle and face the demands and uncertainties of the new surroundings (Cernea 1991).

In contrast, involuntary resettlement is mandatory, and is generally a by-product of events, such as the construction of highways, extraction of minerals and major hydroelectric and irrigation systems (Scudder 1991). When people are involuntarily displaced, everybody must be resettled, including the old, the weak, the infirm and the incomplete family households. As such, involuntary settlers have no say in whether they move; the forcible expropriation of their land impels their relocation (Cernea 1991; Moran 1989; Partridge 1989; Scudder 1989, 1991).

1.3.2 Community Formation and Resource in a Resettlement

Community formation results from both spontaneous and sponsored settlement development projects (Scudder 1989). Based on nearly thirty years of research, Scudder contends diversification is necessary for the formation of viable communities. A wider range of backgrounds is obtained by recruiting some young and middle-aged couples with

non-farm skills and older couples with leadership skills in social, political and religious areas. In general, societies are specialized and are stratified by sex, age, occupation and status and benefit from this variation and specialization (Scudder 1991).

Evidence from different parts of the world suggests that spontaneous settlers usually make better farmers in less time and at lower financial cost than government-sponsored settlers (Partridge 1989; Scudder 1989 and 1991). Scudder finds that sponsored settlers are recruited from established communities according to a relatively narrow set of criteria and are required to follow a closely supervised agricultural development program, yet are less successful than spontaneous settlers (Scudder 1991). Despite impressive evidence that spontaneous settlers time and again make better farmers, Scudder contends government and other agencies rarely facilitate spontaneous settlements (Scudder 1991).

There is considerable evidence that indicates spontaneous settlers also have access to more resources than do the majority of government sponsored settlers, most of whom are poor and likely to be landless laborers or sharecroppers (Scudder 1991). Despite this advantage the evidence suggests that without government or external assistance, spontaneous settlement alone can hardly generate a process of integrated development (Scudder 1991). According to Scudder (1991)

Even though spontaneous settlers tend to be better capitalized, I am aware of no cases where settlers have been able to catalyze the type of relatively equitable, integrated area development that is associated with the most successful sponsored settlement -- an observation that suggests that 'success' requires a degree of sustainable external assistance (Scudder 1989:xiii).

As with poorly planned and implemented government sponsored resettlements, research indicates that the major disadvantages of spontaneous settlements are the lack of legal

access to land and secure land tenure, environmental degradation resulting from movement into marginal lands, a tendency for spontaneous settlers to displace the host population and relatively lower levels of productivity (Scudder 1991). Overall, the accumulated evidence suggests that a combination of sponsored and spontaneous settlers in the resettlement process rather than reliance on one type of resettlement at the exclusion of the other is more successful for community formation (Scudder 1991).

The main risk takers in the resettlement process are not government officials, but settler families migrating to these new areas. Settler families are the ones who must adapt to new and/or difficult areas and overcome a wide range of trials, if production goals are to be met. As such, voluntary settler families tend to be more open to innovation as is demonstrated in their willingness to leave their familiar home environment for a different one (Moran 1989; Scudder 1989 and 1991).

1.3.3 Four Stages to Resettlement Process: A Dynamic Model

Based on nearly thirty years of settlement research in Africa and Southeast Asia, one of Scudder's major contributions to the study of resettlements, is the development of a four-stage framework for the analysis of land resettlement. Scudder's research has examined, in large part, government-sponsored resettlement programs that benefit larger numbers of low income settlers without environmental degradation (Scudder 1991).

Scudder (1991) contends "most land resettlement schemes are planned and implemented as agricultural production schemes rather than as schemes designed to stimulate regional development through increased production, raising living standards and disposable income among the settler population, and non-farm employment generation" (Scudder 1991:150).

Scudder's approach provides both a typology and chronology for resettlements.

Specifically, Scudder identifies types of resettlements and explains the resettlement process - how resettlements evolve to communities.

Past research suggests households pass through a developmental sequence as they move away from the old environment and adapt to the new surroundings (Cernea 1991; Moran 1989; Scudder 1989 and 1991). Scudder (1989 and 1991) suggests that over time, most settlers will develop mixed production systems (on and off-farm) as a means to reduce risk rather than rely exclusively on the agricultural endeavors facilitated by projects (Scudder 1989 and 1991). A reliance on off-farm income sources should, in theory, be an asset to project planners seeking to stimulate regional development; in practice, however, multiple income source development frequently is left out of settlement planning models (Cernea 1991). Moreover, each stage of community formation is marked by distinct attitudes toward risk, innovation and receptiveness to new opportunities (Cernea 1991; Moran 1989; Scudder 1989 and 1991).

The initial stage in a resettlement program is a planning phase. During the planning stage, settler households are recruited, and the initial infrastructure is provided in the resettlement area. Following the planning stage -- which may involve feasibility research -- infrastructure is put in place, and the new arrivals settle as selected migrants. Recruitment of settlers mixes social objectives with production objectives by selecting settlers that meet resettlement objectives and will fulfill the role as future resettlement members.

The second stage is a period of transition where settlers are adapting to their new habitat; this new habitat includes their new neighbors viewed as strangers, the settlement

agency, and surrounding environment. The second stage, which tends to last between zero to five years is a further transitional period; this time is stressful and must come to an end before settler families can be expected to significantly increase their productivity (Scudder 1991). In some instances this transitional stage may last less than a year, yet frequently this may extend in the range of two and five years. (Moran 1989; Scudder 1991). "Timely governmental interventions can shorten the length of this difficult period of coping and transition, although it cannot be eliminated. Expectations that settlers will intensify their production from the very beginning are therefore unrealistic" (Scudder 1991:164).

Phase two begins when settlers are more reluctant to adopt technical innovations, and they seem to retrench to what they have known in earlier attempts to minimize risk (Moran 1989). During this period, settler households are more risk averse, and coping strategies tend to respond to stress by minimizing risks. Settlers in this phase tend to 'test the past' (Moran 1989). As such, settlers "attempt to reproduce the forms of agricultural production that they are familiar with in the new environment -- even when the environment is obviously different" (Moran 1989:26).

The third stage begins approximately five and ten years after the onset of resettlement and is crucial to economic and social development of the resettlement (Cernea 1991; Moran 1989; Partridge 1989 Scudder 1989 and 1991). The contrast between stage two and three is dramatic. The second stage is distinguished as a population of risk-averse settlers, whereas the third staged is depicted by a settled population ready to take risks characterized by experimentation (Cernea 1991; Moran 1989; Partridge 1989; Scudder 1989 and 1991). Since the same people are involved, an

important change has occurred (Scudder 1991). According to Scudder (1991) settlers that produced primarily for subsistence, as in stage two, act on a wider range of investment and diversification strategies in stage three to achieve higher levels of productivity on the family estate.

A tendency toward an increase in productivity and a rise in net incomes is characteristic in stage three (Moran 1989; Scudder 1991). Combined increases in income and productivity tend to augment farm employment, even among small holders who intensively cultivate and require outside labor for certain operations (Scudder 1991). Resettlement studies indicate, as net incomes rise, settler families begin to purchase new tools of production and consumption goods and services (Cernea 1991; Moran 1989; Partridge 1989; Scudder 1989 and 1991). The indirect benefits, accruing from an increase in purchasing power by small holders, have been underestimated in the past (Scudder 1991). Scudder finds, settlers incomes frequently direct the increased income toward education for their children, expansion or improvement on housing, and purchasing of household furnishings. These furnishings include better beds and mattresses, sewing machines, electronic equipment, bicycles and plows (Scudder 1991). As a result, these purchases can generate a new demand for non-farm employment in a range of commercial and service enterprises within the settlement regions (Scudder 1991).

Stage three also is characterized as a period when there is considerable land turnover (Moran 1989; Scudder 1991). According to Moran (1989) some farmers abandon farming in favor of service and industry employment in urban areas while others become farm workers and sell their land. This allows them to capitalize on the growing value of their farm, especially where some areas prove to be inappropriate for farming.

Careful government monitoring and intervention during stage three can help to identify difficulties that might cause severe problems and otherwise force households to return to a subsistence mode of production (Scudder 1991). Government agencies can assist settlers in a number of areas to foster successful community formation. Such programs can provide training and aid in building institutions, developing settler organizations to empower settlers to interact with ministries (health, education, agriculture). This aid also may contribute to more successful community formation and general well-being in the household (Scudder 1991).

Stage four begins when the settlers begin to actually incorporate into "their" new community and assimilate in their new environment. According to Scudder "a settlement cannot be considered a success until control of project activities has been handed over to the settlers and their local organizations; a second generation of settlers has started to take over; and the project is incorporated within the encompassing region" (Scudder 1991:167). In stage four, the government allows populations to take over all the functions of their new community, yet, there is still a tendency to maintain the area in a state of dependency. This process mirrors the tendency of centralizing states to control regions and deprive them of taxes and income they generate (Moran 1989).

These four stages of resettlement evolution illustrate the dynamism inherent in the human adaptive process. Whether resettlements are spontaneous, voluntary or involuntary, any area undergoing resettlement goes through several developmental stages. This adaptive process results from the changing needs of settlers and the changing complexity of the social and economic order of the resettlement (Cernea 1989; Moran 1989; Partridge 1989; Scudder 1989 and 1991). The similarities of these stages,

irrespective of whether the resettlement is spontaneous, voluntary or involuntary, suggests the importance of the process of adaptation in the new environment and the need to incorporate this process into the action taken by intervening agencies or governments (Cernea 1991; Moran 1989; Scudder 1991). Despite this common thread, Scudder (1991) points out that spontaneous and sponsored settlements may never reach the third stage of economic and social development but evolve directly from stage two to stage four. It is reaching this fourth stage in the resettlement process that leads to community - a "successful" resettlement (Cernea 1991; Moran 1989; Scudder 1989 and 1991).

1.3.4 Utility of Scudder's Stages in Researching Resettlement

Scudder purports, a successful resettlement process will create a diverse and stratified society complete with a new rural elite among both settlers and non-farm families. For example, as settlers adapt from the transition phase of stage two to the economic development and income increases of stage three, successful settlers can be expected to pursue more dynamic investment strategies (Scudder 1991). Scudder's research indicates that among some families that directed a proportion of their increased net incomes to educate their children, the children do not want to continue in agriculture as their parents. In addition, during the early years of settlement, it is not unusual for relatively large numbers of both spontaneous and government-sponsored settlers to leave a resettlement. These changes generally are a result of illness and/or indebtedness whereby households were unable to meet subsistence needs, and kinship ties were unable to support and sustain the households in the new localities (Scudder 1991).

According to many researchers, resettlement projects have not been overly

successful (Arnould 1990; Akwabi-Amayaw 1990; Beckford 1987; Cernea 1991; Collins 1989; Cowell 1987; Moran 1989; Partridge 1989; Picchi 1991; Scudder 1989 and 1991; C. Weil 1989). There are a number of reasons why most new land settlements do not live up to planning expectations. One major factor is that inadequate attention is paid to settler families and the communities in which they live (Scudder 1991).

This lack of support places more pressure on kinship ties for survival and research indicates that kinship ties facilitate the adaptive process (Cernea 1991; Cowell 1987; Moran 1989; Partridge 1989; Scudder 1989 and 1991). For example, "research in the Philippines emphasized the importance of kinship in speeding the adjustment of settler families in years immediately after arrival. This point has been broadened to include neighbors and co-ethnics of spontaneous settlers in Indonesia and in Nepal and spontaneous and sponsored settlers in Latin America" (Scudder 1991:157). The promotion of cooperation among settlers fosters the adaptive process as well, and this is observed when settler families assist other households in clearing lands, constructing houses, preparing and sowing fields, and the sharing of tools, labor and information (Moran 1989; Picchi 1991; Scudder 1991; Weil 1991).

Another reason contributing to the high costs and poor results of government-directed resettlements concerns the manner by which settlers are viewed by the agencies sponsoring the resettlement program. Moran (1989) contends government-directed resettlements tend to view settlers as tools in grander strategies, such as provided for national security, making payments on foreign debt, and avoiding land reform in areas currently settled. According to Moran (1989), the thrust of government policies tends to ignore the settlers' needs and their adaptive requirements at various stages of settlement.

If settlers' needs -- increases in net income, land tenure security, market availability and access to basic services -- are met, resettlement can bring about many positive benefits to a nation (Moran 1989).

Under certain conditions, resettlement can provide a means to achieve territorial and economic expansion and also provide some individuals with the opportunity to achieve social and economic mobility. Such individuals are able to raise their social and economic status if

a) they have previous management experience; b) they can convert their past experience into some initial capital sufficient to assure farming making; c) they are fortunate or knowledgeable enough to select reasonably good soils and crops to plant; d) they are fortunate enough to have weather conditions that are generally favorable in the early years; e) they can avoid major losses of work days due to disease; and f) they can obtain labor at critical times without major capital costs (Moran 1989:35).

Providing all these conditions hold, then a settler has a chance of making it and possibly becoming a community leader (Moran 1989). However, if one or more of these conditions does not hold, the chance of that settler remaining decreases with the severity or number of such constraints that are not present (Moran 1989). In most cases, those who do not persist are replaced by others ready to undertake the challenge of adapting to the new area. As such, survival and coping strategies (behavior and knowledge) will lead to adaptive solutions that enhance the well-being of some settlers; others may find their adaptations are non workable (maladaptive) in their newly settled area (Moran 1989) and success will prove allusive to them.

1.4 Resettlement Examples

Two examples -- both of a voluntary and involuntary nature -- are offered to illustrate the unsuccessful nature of government sponsored resettlements. The examples briefly describe the relocation of entire populations that were once adapted to a particular ecosystem and the effect relocation has had on the populations. The examples draw from the Ik in Africa and from the Plan Chontalpa project in Tobasco Mexico.

Turnbull's work among the Ik of the Kenya-Uganda escarpment in the Mountain People (1972) suggests the relocation process has been disruptive for the Ik population, with adaptive processes leading the Ik into becoming a dysfunctional cultural group (Turnbull 1972). The traditional subsistence strategies of the Ik have been replaced, and a number of their cultural traditions have been abandoned. Traditional Ik are nomadic hunters and gatherers; however, the relocation program forced them into a confined area to become sedentary rainfed horticulturists. The impact has reduced the number of Ik and those remaining are severely malnourished. Turnbull stated "the Ik were beyond saving as a society" (Turnbull 1972:284). Turnbull recommended to the Uganda government that the Ik be relocated again via a military force relocation program that would take them to different parts of sufficiently remote areas of Uganda so the surviving Ik would not be able to return nor increase in number. Turnbull also recommended that small numbers of Ik be kept together so that they might not band together, but assimilate to larger neighboring cultural groups further contributing to the demise of Ik culture (Turnbull 1972). Although the ethical issues of repeated forced relocation are very significant, this example does demonstrate the difficulty that some groups face when they move to environments that differ greatly from their original one.

Another resettlement example is found in Tobasco, Mexico. Dewey (1985) reports on Plan Chontalpa, (an agricultural commercialization program), and the nutritional impact the program has had on infants and young children. Plan Chontalpa incorporated a new form of land use that had a profound impact on the production system (Dewey 1985). Dewey contends that the abilities of families to produce their own food has been reduced by the ecological changes generated by the agricultural and resettlement program. As a result, vast areas of forests were cut down to create cattle pastures, fields for sugarcane and other crops. This deforestation created problems for subsistence production and resettlement into the densely populated sectors (Dewey 1985). As such, "changes in land structure and ecological changes resulting from deforestation, drainage and resettlement have reduced the ability of families to produce their own food" (Dewey 1985:175). Plan Chontalpa has resulted in a transformation of a population of mostly subsistence peasant families to a population that is almost completely dependent on wage labor (Dewey 1985). Dewey demonstrates in her social impact study that resettlement of a community to another ecosystem, coupled with agrarian transformations, has led to increased malnutrition among infants and young children (Dewey 1985).

As these examples suggest, resettlement poses risks for the effected population. All too often, these schemes move an intact population with an effective subsistence into an area of different ecology where prior knowledge and practices are less appropriate. It breaks up exiting social, economic and political relationships important for adequate adaptation without replacing them with effective new ones. As a consequence, resettled populations often suffer in terms of population level, disease, malnutrition, life span and self-sufficiency.

1.5 Organization of the Dissertation Chapters

Throughout the text of this dissertation, the researcher gives voice to Jamaicans. The manner in which Jamaicans convey their information is represented in the text. It is felt that Jamaican voices need to be heard, both here and in future publications for the sake of equity and to maintain authenticity in this document.⁶

Chapter One is written to provide background with respect to the study area, the research problem and the approach taken in this work. Chapter Two provides the theoretical orientation for the dissertation, derived from ecological anthropology. Chapter Three discusses the methods employed in the data collection process during the time spent in the field, as well as methods used in data analysis while at Michigan State University. Background information located in Chapter Four provides a historical context for the Green Park resettlement. A general history of the plantation system, sugar production, and subsequent expansion into mineral extraction and tourism is presented for Jamaica and to Jamaica's political and economic development is discussed. A more specific discussion of Green Park's historical evolution, from that of a sugarcane plantation to a resettlement by the bauxite industry, follows; this sets the stage for the resettlement examined in this research.

Chapter Five is divided into multiple sections. First, the chapter briefly describes the natural environment of Jamaica and Green Park, delineating some basic climatic conditions, topographic and soil characteristics found in Green Park. Second, the chapter

⁶ The researcher offers a disclaimer to the presentation. Jamaican voice is presented in Jamaican dialect, patois as it is commonly referred to among Jamaicans. In no way is this meant to reduce the importance, but rather to retain the meaning as true to form.

provides a description of contemporary Green Park resettlement, focusing on the social organization, demographic characteristics and occupations of the resource users. Third, the discussion integrates the natural and human systems to more fully detail and examine the agrarian system of Green Park.

Chapter Six provides an integrated ecological anthropological analysis to test Scudder's resettlement model for Green Park and to evaluate its applicability for understanding the adaptive processes of Green Park. Specifically, the analysis focuses on the resettlement process, community formation, and resource use. Considerable attention is given to the resettlement and the resulting transformation of a sugarcane plantation to a rural resettlement of small-scale agriculturalists and wage laborers. Lastly, an alternative resettlement model is presented, challenging Scudder's resettlement chronology.

Chapter Seven serves to highlight salient contributions made to anthropology from this research. Recommendations for future research topics gleaned from this analysis are offered to facilitate further understanding of a Caribbean resettlement model. In addition, the discussion will explore subtleties of resettlement strategies, as well as examine implications of this research on future policy development and implementation.

CHAPTER II

ECOLOGICAL ANTHROPOLOGY

2.1 Introduction

This research requires a theoretical framework that actively includes the historical context of a geographical locality (Bartolmé 1989; Bennett 1969; Scudder 1989 and 1991) to examine a resettlement process, community formation and resource use in a former Caribbean sugarcane plantation. This research draws from ecological anthropological theory, specifically from functional ecosystems ecology and human systems ecology. Moreover, this particular integrative approach contributes to a more accurate understanding of the nature of Green Park, Jamaica and the adaptive behavior of its resource users in relation to their natural and social environments.

2.2 Theoretical Orientation in Review: Ecological Anthropology

In the last century, a number of approaches have contributed to the development of ecological perspective(s) in anthropology (Adams, R.N. 1977; Bennett 1969 and 1976; Ellen 1989; Hardesty 1977; Harris 1974; Micklin 1985; Moran 1987, 1990; Picchi 1991; Rappaport 1971; Steward 1955; White 1971; Vayda and McCay 1975; Young 1991). Today, ecological anthropology is a multi-disciplinary approach used to understand the dynamic relationship between humans and their social and natural environments (Hardesty 1979). A range of cultural ecological perspectives is part of the ecological anthropology

literature, yet, some approaches used to examine cultural and environmental adaptive processes are not fully adequate for all research problems (Ellen 1989; Lees and Bates 1990; Micklin 1985; Vayda and McCay 1975; Young 1991). Approaches that have examined the interaction between humans and their relationship to their natural environment include: environmental determinism (Ellen 1989; Hardesty 1977), anthropogeography (Ellen 1989; Hardesty 1977), possibilism (Ellen 1989; Hardesty 1977), Stewardian cultural ecology (Steward 1955), functionalist human ecology or ecosystem ecology (Harris 1974; Dover and Talbot 1987; Netting 1986; Rappaport 1971; White 1971), human systems ecology (Bennett 1969; Smith and Reeves 1989) and political ecology (Blaikie and Brookfield 1987; Bryant 1992; Gorz 1980; Redclift 1984 and 1987). This author terms this mixture an "integrated ecological anthropological" perspective which is used in this dissertation. A brief history of ecological anthropology follows to identify several orientations and to demonstrate the strengths and limitations for each orientation contributing to the modified approach used for this research.

Several terms related to ecological anthropology are defined briefly. First, the term "environment" -- generally incorporated via the "ecological" dimension of this approach includes both social and biophysical conditions external to the unit being examined. Simply, the natural environment refers to

all conditions and events external to the unit being observed (organism or population) that 'directly impinge upon it to affect its mode of life at any time throughout its life cycle as ordered by the demands of the ontogeny of the organism (population) or as ordered by another condition of the organisms (population) that alters its environmental demands' (Mason and Langenbiem 1950:332 in Micklin 1985:53).

The natural environment includes the biophysical components of an environment, such as climate, weather, topography, plants and animals, soil quality and fertility, and other non-

human organisms. A distinction is made between episode and everyday environmental changes. Episodic changes include flooding, drought and similar disasters, whereas everyday changes include soil erosion, salinization, deforestation and various forms of pollution (Bryant 1992). As such, everyday forms of environmental change are derived from a gradual and cumulative impact on human communities that may go unrecognized for a period of time (Blaikie and Brookfield 1987). Episodic environmental change occurs independent of human interaction, yet its impact is not benign to social communities (Bryant 1992).

The social environment is the human organization of family, co-workers, rivals, social, economic and political institutions that define opportunities and constraints. Changes in the social environment include alterations in the structure (network of relationships) and function (roles of members in the networks) of the organization. Changes in the biophysical environment include increasing, depleting, sustaining natural resources (land, plant, animals, trees, water etc.) and the context in which they are found. Overall, the 'environment' is looked upon as process and not form. In this sense, the environment is a result of a set of relationships between the physical space, natural resources and a constantly changing pattern of economical forces (Redclift 1987).

Cultural ecology has come to mean many things to anthropologists. Culture is the pattern of behavior learned by humans as members of a social group. Culture is symbolic, shared by members of a social group, and passed on from one generation to another. Therefore, cultural ecology is the study of relationships between culture and environment.

The central and most relevant concept of cultural ecology is adaptation. Adaptation is the process by which a population establishes a means of existing and

surviving in a specific environment. In other words, it is a process of coping with environmental uncertainty and change rather than an end state of homeostatic perfection (Bennett in Smith and Reeves 1989). This is a continual process, for environments are not static, nor are other people's relationship to them.

Among human populations, adaptation is both biological and cultural (Jordan and Kaups 1989; McElroy and Townsend 1985). Biological adaptation includes genetic and physiological responses to a variety of stimuli and differential effects (McElroy and Townsend 1985). Cultural adaptation (behavior) serves to facilitate long-term successful, non-genetic human adaptation to social and natural environmental changes (Jordan and Kaups 1989; McElroy and Townsend 1985; Moran 1989). Cultural practices or strategies can be either adaptive or maladaptive. An adaptive strategy is based on culturally transmitted, or learned behavior that permits a population to become viable and to reproduce in its natural environment (Jordan and Kaups 1989). However, not all learned cultural behaviors are adaptive. Maladaptive strategies are learned behaviors that can lead to the extinction of populations or cultures, since humans' cultural and reproductive histories tend to coincide (Jordan and Kaups 1989; Moran 1989). Therefore, the thrust of ecological anthropological inquiry is to distinguish more adequately those features of social organization and cultural values that are closely related to the human use of the environment (Netting 1986).

Ecological theory has been used to examine adaptive behavior to further understand evolutionary processes. Investigations of this sort focus on the ways in which organisms (humans) respond to changes in material conditions that effect their lives and the consequences of these responses (Lees and Bates 1990). Smith and Reeves suggest

"parallels can be drawn from this type of 'cultural selection' and Darwinian natural selection" (Smith and Reeves 1989:7). For example,

individuals living in a society produce new variants of behavior, some of which are more effective than the others in withstanding environmental selection, and these new variants survive while the less well adapted tend to disappear. The pool of human behavior changes, much as the gene pool changes, as adaptation to the environment progresses; and an innovative form of human behavior, which originates in one or more members of the group is analogous to a biological mutation (Smith and Reeves 1989:7)

Clearly, this perspective of adaptation has evolved as an outgrowth of the post-Darwinian research on natural selection. Yet, it is recognized that even in the same or similar environments there are variations to adaptive strategies used for survival. These differences are attributed to cultural desires, wants, and goals. As such, adaptation is viewed as "any cultural response, or open-ended process of modification, which copes with the conditions for existence by selectively reproducing and extending them" (Hardesty 1977:22).

Moreover, a fundamental precept to evolutionary theory, as it is used in ecological theory, is the observation that members of populations are not uniform in their behavior but rather diverse in their means of coping with environmental crises. For example,

a specific environmental event or a change in material circumstances (such as a change in rainfall pattern or the opening of a new migration route), will elicit different responses from, and have different repercussions for, individual members of the affected group. In many respects it is best to regard even a major change in environmental circumstances from a neutral perspective since each event can be construed as a 'problem' or an 'opportunity' depending on who are involved and what happens to them (Lees and Bates 1990:262).

Accordingly, significant material changes usually result in some members of the groups becoming materially more stressed, while others less so. The research will investigate why and how this happens, and identify the most and least vulnerable members of the group

with respect to a particular event. Focusing on a specific event (e.g., resettlement) can indicate who coped successfully who failed to do so and why (Lees and Bates 1990).

Evolutionary theory calls for some explicit measure of success or adequacy in coping. The Darwinian measure of reproductive fitness while basic to evolutionary theory, and indeed to theory in ecology, has limited immediate utility for most ecological anthropologists whose interests lie in relatively short-term behavioral change. More general and readily verifiable indicators, such as nutritional adequacy, health, and material well-being are ways to measure successful responses or coping strategies. These indicators are directly or indirectly related to measures of Darwinian fitness in most instances, and they are easier to observe in the short run (Lees and Bates 1990).

2.3 History of Ecological Thought in Anthropological Theory

2.3.1 Functional Human Ecology or Ecosystems Analysis

Functionalist human ecology, also known as systems ecology or ecosystems analysis and variations thereof, emerged in the 1960s-1970s. Functionalist human ecology arose out of Stewardian cultural ecology, possibilism and cybernetic reasoning to examine the complexities of human-environment relations in small-scale populations (Ellen 1989; Lees and Bates 1990; Smith and Reeves 1989; Young 1991). In the functional ecosystems approach, ecosystems become the new analytical and comparative spatial units (Ellen 1989). The ecosystem is the assemblage of associated species of living organisms in a non-living physical environment and the structure and functional relationships among them (Micklin 1985). "An underlying assumption is that the unit of analysis constitutes a

system of interdependent relationships, such that change in one component of the system will necessarily lead to change or adjustments in others" (Micklin 1985:57).

Natural systems are open systems; that is they are to some extent influenced by surrounding systems. Borrowing from cybernetics, ecosystems are types of general systems, "such that they are open systems with processes tending toward a harmonious and coordinated steady state" (Ellen 1989:177). However, in functional ecosystem ecology, natural systems are simplified and treated as closed systems, that is without reference to related systems (Campbell, B. 1983).

Feedback loops are fundamental characteristics of systems models for they highlight the interdependent relationships of the system. "Researchers agree that systems models more closely approximate the realities of the biophysical world and the social world than do linear causal models" (Young 1991:35). In anthropology, the human and natural environmental web of interrelationships are the subject of functional ecosystem ecological theory. Attention is, therefore, focused on collective and integrative causes, mechanisms, and consequences of adaptive responses to environmental constraints and changes (Micklin 1985).

Functional ecosystems ecology approaches have borrowed heavily from biological ecology, as a result, cultural factors get lost in the shuffle (Dover and Talbot 1987; Ellen 1989; Hardesty 1977; Lees and Bates 1990; Netting 1986; Picchi 1991; Young 1991). Biological ecologists study aspects of "the distribution, abundance, interactions of organisms in space and time, the interrelationships between organisms and the physical environment, and the flows of energy and material through ecosystems (Dover and Talbot 1987). As such, humans' cultural practices are not an integral part of the biological

ecological systems perspective (Dover and Talbot 1987).

Anthropological ecologists that employ a functional ecosystems perspective incorporate the nature of transactions or exchanges of energy⁷, matter⁸ and, more recently, information⁹ among human beings and their natural environment into their investigations by drawing from both anthropology and biology. The transfer of energy, matter and/or information within the system is quantified in measurable units to understand and rationalize the structure and function within the system and to justify human behavior -- at this point, human behavior must be adaptive (Lees and Bates 1990).

Human behavior -- what people do to direct the flow of energy -- has been the emphasis of a number of anthropological functional ecosystems studies (Harris 1974; Moran 1990; Rappaport 1971; Vayda 1971; White 1971; Young 1991). Energy has been examined in terms of determining nutrient levels and flow directions (Lee 1969; Rappaport 1972), raising or lowering plant and animal population densities, removing biomass from the ecosystem as harvesting crops, and directing (or arresting) the course of ecosystem evolution (DeWalt 1982; Dewey 1982; Dover and Talbot 1987; Edelman 1985).

Cultural practices are observed empirically to qualify the processes by which human and natural systems are interacting and resulting patterns of (mal)adaptive

⁷ The term energy is defined as the capacity to do work, and is measured in the flow, input and output, of kilo-calories used or needed in the system (Ellen 1989). Principle sources of energy can be in the forms of animal and people power, fire, wind, water, and fossil fuels. Energy flow is defined as "the trophic structure, biotic diversity and material cycles (i.e., exchange of materials between living and non-living parts)...." (Odum 1971:8 in Micklin 1985:54).

⁸ The term matter is defined as anything that has mass or weight and occupies space (Ellen 1989). Unlike energy, matter can be re-used and moves through a system in cycles (Ellen 1989).

⁹ Information is considered here as the knowledge passed on through communication, such as culture influencing the decision-making processes.

behavior. Netting (1986) cautions

A continuing danger confronting cultural ecology is the tendency among some anthropologists to see it as reductionist calorie counting, mindless number crunching, or vulgar materialism. A symbolic or structural conception of culture as meaningful order is often contrasted to culture as a means of meeting biological needs or as trivial epiphenomenon of economic action and practical reason (Netting 1986:100-101).

As such, biological concepts of ecology are not always appropriate surrogates for cultural adaptive behaviors (Lees and Bates 1990; Young 1991).

Another concept that functional ecological anthropology borrowed from biological ecology is the notion of carrying capacity (Lees and Bates 1990; Netting 1986). Carrying capacity is a theoretical limit to population, which has been demonstrated in laboratory populations (i.e., rodents) (Micklin 1985). As such, its precise applicability to the real world is unknown. However, with out a threat being posed to the viability of the system, Lees and Bates contend that "the concept of carrying capacity is anthropocentrically redefined in a way that places it beyond empirical measurement; it is defined as the level of human activities that can be sustained indefinitely without damage to the system" (Lees and Bates 1990:249). Some analysts contend the environment imposes some upper limit for any population and the dynamics of populations at or near the carrying differ from those well below it. The carrying capacity suggests that "as populations increase in number over time, they often begin to saturate the available habitable space, use up the food supply or otherwise crowd each other out" (Dover and Talbot 1987:26).

2.3.1a Feedback Systems

Functional ecosystems analysts have tended to emphasize the adaptive processes in the system that contribute to maintaining the system in equilibrium or homeostasis (Vayda

and McCay 1975; Young 1991). As such, much of the ecosystem research examines dynamic processes in closed systems by focusing on internal regulation through a negative feedback process. Negative feedback refers to the adaptive processes in the system that contribute to maintaining the system in equilibrium or homeostasis, where equilibrium occurs when a system is in balance with its environment (Hardesty 1977). "Homeostasis serves to regulate a system, by maintaining the state of variables included in it within a range or ranges which permit the continued existence of the system" (Rappaport 1971 in Ellen 1989:181). The inherent assumption is the environment's carrying capacity sets limits on how large a population or community can grow. After a period of adjustment to a new environment an ecological unit will approach and ultimately remain at the upper limit. The ecological balance can be upset by changes in the environment or in the population, but self correction occurs through negative feedback processes (Micklin 1985). An example serves to illustrate the point. "Human overuse of an essential environmental resource, such as locally available protein, water or topsoil, may not result in some mitigating response, such as the reduction of the local human population, but rather in intensification of efforts to acquire the resource from alternative sources" (Lees and Bates 1990:249).

Fewer analyses have attempted to examine open systems which depend on positive feedback systems for its dynamism and change processes (Ellen 1989; Young 1991). Positive feedback is "the cumulative effect of processes in applying the deviations of a system in a particular direction away from a pre-existing goal" (Ellen 1989:195). Anthropologist Ellen suggests that "human populations and their various social arrangements and cultural regularities are in a constant state of flux, coping with new

environmental problems by 'disturbing' rather than maintaining systems" (Ellen 1989:195).

Ellen contends that, homeostasis, in effect, reduces all change to mechanical oscillations and endless repetition, ignoring historical change and the question of origin. Thus, functional analyses have a tendency to play down dysfunction by approaching the analysis from a closed system perspective, negating imbalance, dynamism and history (Ellen 1989; Netting 1986).

The functional ecosystems perspective suggests that the flows of materials, energy and information are the fundamental processes necessary to maintain a balance within an ecosystem. However, as Lees and Bates state, "we might look for evidence of self-regulation, but not find it" (Lees and Bates 1990:249). In human systems, relationships are often not restricted in any meaningful sense but undergo continuous change (Lees and Bates 1990). As such, material, energy and information are the resources without which no population can survive; their relative abundance ultimately influences the carrying capacity of any environment for a given species (Lees and Bates 1990; Micklin 1985).

2.3.1b Functional Systems Ecology Methods

The methods of systems analysis are used primarily to define the boundaries and environment of a system and, secondly to model its complexity in such a way that system behavior can be studied and a process examined (Hardesty 1977). The functional approach provides a synchronic view of culture (a "snap shot" perspective). In addition, the functional perspective tends to picture society as a constantly adjusting yet stable system that is regulated internally. Hence, this approach views behavior and environmental traits as part of a single integrated system which are affected by other

components of the system. Each trait or behavior has a function contributing to the maintenance of the system (Ellen 1989).

Structure, function, maintenance and alteration between human beings and their natural environment have been the focus of a number of anthropological ecosystemic research endeavors. Fieldwork has tended to be conducted in isolated, non-modern, homogenous communities, which facilitates a holistic ecosystems approach. Functional ecosystems ecology tends to assume homogeneity and cohesiveness within the population adapting to a particular ecosystem (Bennett 1969; Ellen 1989; Young 1991). Similar cultural practices and learned behaviors would be shared through membership and kinship linkages. As such, a human population has and conveys indigenous knowledge of their environment to other members of the sub-population. Enculturation practices contribute and/or facilitate adaptive processes towards maintaining equilibrium in an integrated human and natural environmental system (Ellen 1989). Thus, functionalist anthropologists have been able to identify, integrate and provide an explanation for some cultural practices. According to Smith and Reeves,

The functionalist human ecologists have excelled at arguing how seemingly non-rational practices - warfare, pig sacrifices, potlatching, the ritual sanctification of cows, human sacrifice - have positive (usually unrecognized) consequences in that they regulate population density, the availability of protein in the diet, the redistribution of food from areas of surplus to areas of shortages and so on (Smith and Reeves 1989:7).

These practices are thought to operate as means of maintaining the system within the limits of its carrying capacity. As such, culture is the mediating factor between a population and its environment. As Lees and Bates point out, ecosystemic approaches attempted to offer a means of modeling material transfers and flows of energy among populations, yet they did not address the questions as to why relationships were organized

as they were, or how people responded when these relationships change (Lees and Bates 1990).

The functional ecosystems approach has contributed to expanding ecological anthropology. The ecosystems approach has provided new techniques and information, enabling researchers to modify and correct notions concerning unfamiliar subsistence systems (Ellen 1989). Ecological anthropology has gone from being a linear approach examining causality to a systems perspective emphasizing a network of feedback relationships. Functional ecosystems anthropologists stress the necessity for holism and focus on specific relationships between human populations and features of their environment (Ellen 1989). Field and Burch (1991) contend such theorists did not ask 'what' aspects of the physical and biological environment were important determinants of human social systems and processes. Accordingly, such ecosystems theorists did not deny the internal and ideal aspects of human behavior, but rather raised equal importance to the external and material aspects affecting observed behavior regularities (Field and Burch 1991). However, such anthropologists converted sociological variables into the traditional biological ecology concerns of matter, energy and/or information (Ellen 1989; Young 1991).

2.3.1c Weakness of Functional Ecosystems Approach

Despite its utility to problems at hand, the functional ecosystems approach is not without its weaknesses. A number of criticisms of the systems ecological approach have been launched of late of functionalist human ecology (ecosystems ecology) (Ellen 1989; Lees and Bates 1990; Moran 1990 Young 1991). First, critics suggest functionalist

human ecology remains environmentally deterministic, where the cultural system is held passive to the environmental system. "Since variant behaviors produced by human beings as members of social groups are selected by the environment and only some become dominant others tend to disappear" (Smith and Reeves 1989:8). As a result, change awaits the activating force of environmental necessity.

Second, the approach has been criticized for its emphasis on factors maintaining stability or equilibrium within the system, to the neglect of factors contributing to accelerated change that may lead to the disequilibrium or dysfunction within the system (Ellen 1989). Here homeostasis is thought to be too simple a concept to account for the complexity of learning, adaptation and dynamic processes in human social systems (Ellen 1989). Netting states "homeostatic equilibrium models used to describe the complex cybernetic operations of feed-back and self-regulation are now seen as restricting our understanding of structural change and evolution responding to natural selection" (Netting 1986:102).

Third, the tools of ecological modeling enable systems ecologists to describe an ecosystem under current and known conditions. A number of functional human ecologists have tended to rely on sophisticated quantitative measures of energy flow, which were then related to features in the society and culture. However, we are reminded that how a system functions does not make it adaptive (Ellen 1989). More importantly it is not sufficient to simply say things change. For example, "it is not necessary to determine whether a population is changing, but to determine how and at what rate" (Ellen 1989:195), as well as why a population is changing.

Ecosystems ecologists attempted to predict human behavior from the knowledge

of the structural and functional relations in a system. A number of difficulties are encountered in trying to predict the future based on structural configurations and emergent functional relations (Moran 1990). In this regard, the approach falls short. For example, "the logical fallacy of demonstrating that certain practices have effects and the assuming that this is their purpose, either in the conscious minds of sentient human beings or in terms of some evolutionary dynamic" (Ellen 1989:193). This fallacy is related to functionalism which places an emphasis on demonstrating how things work rather than explaining why they came about or why they persist. As such, a functionalist approach does not provide a diachronic (long-term) causal explanation (Ellen 1989).

Forth, the perspective is criticized for borrowing too heavily from biological ecology. Specifically, critics of the functional ecosystems approach contend imposing biological terminology to understand culture, and cultural change is not always appropriate nor adequate (Ellen 1989; Lees and Bates 1990; Moran 1990; Young 1991). Netting states "indeed the entire concept of the ecosystem though seen as heuristically useful, is now criticized as reifying the system as if it were a biological organism, overemphasizing stability at the expense of structural change through time, and lacking clear criteria for boundary definition" (Netting 1986:102). Clearly, this is seen in borrowing the concept of carrying capacity. For example, carrying capacity addresses limits of population size in a particular ecosystem; it does not take into account social organization, cultural variation, resource use and resource replacement over time.

2.3.2 Human Systems Ecology

Human systems ecology emerged in the 1970s and evolved from the functional

ecosystems perspective. Human systems ecology is an interdisciplinary and integrative approach that interfaces systematically with political economy, human adaptation and sociocultural regions to examine the dialectic between human beings and their natural and social environments (Bennett 1989). Human systems ecology approaches causality from a multi-directional and highly interdisciplinary perspective (Smith and Reeves 1989).

One of the leading proponents of this approach is anthropologist John Bennett. Smith and Reeves contend Bennett has been able "to drive his theoretical interests beyond the narrow concerns of human micro-adaptation to consider how physical environments and social institutions interact and affect human decision making" (Smith and Reeves 1989:1). As such, one is able to incorporate levels of decision making at multiple levels (household, community, state, global) within an analysis of large ecosystem or smaller subsystem. According to Bennett (1976), human systems ecology examines relationships between the physical environment (earth, climate, other species and natural resources), energy, goods, social organization (differentiation, interaction, power, ritual) "formal controls" (law, regulations), "presses" (values, needs and goals), technology (tools, machines), and human biology (physiology, and genes). Ecological processes are represented by a number of functional relationships among these categories.

Two concepts which are significant to the conceptual framework of human systems ecology are socionatural systems and adaptive dynamics. "'Socionatural system' is Bennett's term for a distinct form of human adaptation to complex biophysical and institutional hierarchies" (Smith and Reeves 1989:11). Specifically, when applied, "the concept of the socionatural implies a system in which diverse human groups have adapted in patterned ways to plant, animal and environmental resources, to one another, to

hierarchical market and administrative forces and to pressure groups and other forms of quasi-organized social and political unrests" (Bennett 1989:X). Bennett uses his concept of 'adaptive dynamics' to further explore socionatural systems (Young 1991). The term adaptive dynamics is defined as "the purposeful decisions and actions of humans interacting with and having consequences for varied and changing ecosystems" (Young 1991:44). Bennett asserts that adaptation or adaptive behavior refers to coping mechanisms, the result of human decision making or ways of dealing with people and resources in order to attain goals and solve problems (Bennett 1969). He argues that human behavior is goal-oriented and thus must not be dealt with passively (Bennett 1969, 1976, 1989).

Human systems ecology has been applied to regional analyses of modern complex societies. The region is defined as an interdependent set of communities and suborganizations which humans develop in adapting to temporal-spatial conditions which originate in the institutional, and the biophysical environment (Bennett 1969). The region is the unit for scientific study, for the region is considered a heterogeneous and dynamic unit relative to a community which is considered more homogeneous and static (Bennett 1976; Smith and Reeves 1989). Bennett (1969) contends that a community study is too restrictive an arena for understanding the complex biophysical system, institutional hierarchies and historical processes on local populations.

The human systems ecological approach places emphasis on the physical environment, yet, cultural considerations underlie the human ecological relationship with nature, both directly and indirectly. Specifically, Bennett examines the physical environment from which human populations "extract subsistence... that are transformed

symbolically into 'natural resources' which are then used to produce or transform energy" (Bennett 1976:258). However, the environment is not viewed as a determining factor of ecological conditions or processes; it is a variable. As such the environment becomes a resource, a stimulus, a constraint, an information bank, and a source of uncertainty. The exact nature of environment depends upon will the culture or other circumstances influencing and participating in the system (Bennett 1976).

Adaptation is an important concept in Bennett's human systems ecological approach. "Adaptation (coping, adjustment) refers to the patterns and rules of social adjustment and change in behavior by individuals and groups in the course of realizing goals or simply maintaining status quo..." (Bennett 1969:269). Adaptive strategies consist of behavior aimed at maintaining, modifying, changing external circumstances in attempts to meet some goal. Thus, human systems ecology attempts to unravel what people individually and collectively realize in terms of extracting resources from the environment (social and biophysical) and regulating their use (Bennett 1969). As such, adaptive processes merit synchronic and diachronic analyses (Bennett 1969).

Human systems ecology operates under the assumption of multi-directional and multi-level causal feedback loops. "This dialectic or systems perspective is integral to Bennett's concept of the socionatural" (Smith and Reeves 1989:9). The elements have an interdependent relationship; hence, at any given time, one part of the system can be a cause of changes in other parts of the system, and they all fit together as a network or pattern of events (Young 1991). In addition, Bennett is interested in the dynamic interaction of human values, perceived needs, and goals, with the material conditions; these values, needs and goals are mediated by technology and social organization (Smith

and Reeves 1989). When human systems ecology is applied in a development context (i.e., planned change endeavors) it refers to the "problems of social and economic change analyzed with a broad-gauge attack on the whole picture: the resources, the local population, its culture and social system and external forces and constraints" (Bennett 1989:X).

2.3.2a Weakness of Human Systems Ecology

Human systems ecology, like its theoretical predecessors, also has its weakness, limitations and deficiencies. First, the approach is criticized for its eclecticism by borrowing from other sciences to research a problem. As such it has been dubbed "atheoretical" (Young 1991). Second, human systems ecology has been criticized for identifying and concentrating on the elements that maintain a dynamic system in equilibrium or homeostasis, rather than what keeps the system creating, reproducing and transforming. Bennett (1989) recognizes this trend, yet suggests this should not be viewed as a limitation when dealing with human systems. Bennett states, "if the human use of the physical environment is to be brought into some kind of balance, both human and physical factors must be conceived as a single system, i.e., a system in which human needs are satisfied and the yield of the resource is maintained" (Bennett 1989:20). However, he acknowledges that at present, this is not the case, "human needs come first, and only then adjustments are made in resource practices which may reduce exploitation in use" (Bennett 1989:290).

Third, human systems ecology has been criticized for its "regional" emphasis. It has been suggested that linking macro and micro systems results in a mixing of the two

systems, which some argue are inherently unique and separate systems (Moran 1989).

Moran contends,

while we should all aspire to the integration between macro-micro level explanations, this integration cannot be achieved by mixing levels between data gathering and the interpretational stages. Synthesis can only result from preliminary separation of micro and macro analyses. Only after the level-specific processes have been interpreted can we hope for a reinterpretation of the levels (Moran 1989:280).

Moran (1989) is suggesting here that micro and macro spheres should be kept as isolates until all facets of each level are known, yet, this assumes there is no change at either level over time. Otherwise no integrative analysis can take place, for each sphere will be constantly changing.

Although Moran's micro-macro concept is valid, regional analyses do not necessarily imply mish-mashing micro and macro spheres together, proponents of a regional analysis, as portrayed by Bennett, emphasize there is a dialectical relationship between the global, regional and multi-local systems (Bennett 1969; 1976; Blaikie and Brookfield 1987; Bryant 1992; Campbell and Olson 1991a, 1991b; Redclift 1987; C. Smith 1984 a, b, and c). Decision making processes are operating at all levels; they do not operate in vacuum nor in independent isolated systems. In fact, it is argued that to understand the expansion of a global economy and subsequent cultural and environmental transformations, one needs to examine the interaction between the global, regional and local arenas (Bennett 1969, 1976; Bryant 1992; Campbell and Olson 1991a, 1991b; Redclift 1987; C. Smith 1984c). The reciprocal is equally true. Specifically, to understand the local processes related to agrarian and sociocultural transformations and subsequent environmental transitions, one needs to appreciate how the components of the system fit together and articulate in a larger framework (Blaikie and Brookfield 1987;

Redclift 1987).

An example serves to illustrate the related linkages between national and local levels. Environmental changes over time have resulted from interrelated processes of global, national and local capitalism - commodization of resources. In fact, rising concern has been directed towards the linkages between international aid, and socio-ecological disruption, and transnational corporations (TNCs); more recently linkages also have been explored between national corporations, the state and environment (Bryant 1992). The role corporations play in environmental transformations needs to be understood in relation to other contextual sources (state, policies, and interstate relations), as well as the location-specific dimensions of environmental change (Bryant 1992).

A number of researchers contend the structure of the international economy is partly responsible for the worsening conditions of local environments, in particular those located in the Third-World (Arnould 1990; Beckford 1972 and 1987; Cernea 1991; Girvan 1991; Redclift 1987).¹⁰ Moreover, "capitalist development creates and/or cements peasant and worker dependency upon foreign capital inputs and markets. The implicit aim of so much development policy is to control local populations rather than stimulate localized decision-making for sustained rural development" (Arnould 1990:340). Moreover,

the pressures to achieve more economic growth, oriented to external demands in a period of indebtedness, had served to deepen the crisis affecting the local economy in many rural areas. Instead of sustainable development of their resources, especially those controlled by women, the strategies of survival forced upon rural households have led to over intensive cultivation, the depletion of capital stocks (including animals) and migrating patterns designed to increase cash income (Redclift 1987:78).

¹⁰ It is documented that "tropical rainforests are destroyed primarily for economic reasons and although it is important that there is a growing awareness of the ecological problems produced, such awareness alone cannot be expected to turn the tide. Only radical changes in structural policies can do that" (Redclift 1987:76).

Thus, the biophysical environment in a global economy becomes an internationalized environment, one which serves economic and political interests far removed from a specific location (Redclift 1987).

In addition, Bennett's regional emphasis is critiqued from another perspective. Bennett (1969) examined four homogeneous cultural groups coexisting in the northern plains region of the Continental United States, (Hutterites, ranchers, farmers and Native Americans). Bennett contrasts these four groups in terms of their current strategies for converting the natural environment into resources of subsistence and profit and how they have adapted historically to their terrain, national economy, and each other. Bennett contends that a regional analysis, provides a comparative perspective that captures heterogeneity and dynamism in a manner that a community based study does not. Although this perspective is valuable, the notion of heterogeneity and dynamism found only in the level of a region is challenged in this dissertation. For example, some regions can be more homogeneous than others, while some communities can be equally more heterogeneous than other communities or regions.

The previous ecological perspectives presented above have certain limitations that affect their applicability to research of resettlement, community formation and resource use study in Green Park. Some of the limitations include: 1) earlier perspectives are deterministic and non-systemic in their analysis and lack feedback loops; and 2) the approaches are static and synchronic in their orientation, and do not incorporate history or change over time in the analysis. Moreover, those ecological approaches which incorporate a systems perspectives frequently focus on what maintained a system in equilibrium or homeostasis within an isolated homogenous community or region in an

effort to compensate for static and isolated approaches. Accordingly, limitations of these ecological approaches include the assumption of homeostasis, the inability to incorporate change or perturbations into ecological models, a preoccupation with caloric or protein gram counting, the fallacy of functionalism, and the neglect of social underpinnings or particular modes of production (Lees and Bates 1990).

To understand the Green Park situation more effectively an approach is needed that will share the strengths of various approaches, but escape the limitations. In addition, this study needs to include a clearer articulation between sociocultural, environment, political, and economic dimensions to further understand location specific and event-focused transformations.

2.4 An Integrated Ecological Anthropological Perspective

Ecological anthropological theory is useful in the analysis of behavioral responses to events as it sheds light on evolutionary processes. Several modifications are recognized to overcome the limitations of existing theory with an ecological anthropological perspective, and this revised approach helps answer the research questions dealing with resettlement processes, community formation and resource use. First, an integrated ecological anthropological approach is proposed, for it combines elements of functional ecosystems ecology and human systems ecology. This theoretical perspective is employed to test Scudder's resettlement community formation model for Green Park. This particular orientation enables the researcher to examine sociocultural and environmental relationships; in particular, what processes are involved in migrant households' adaptive behaviors to an agrarian system located in a resettlement? The emphasis is on the

interaction between society -- reflecting economic, social and political process -- and the physical environment (Campbell and Olson 1991a and 1991b).¹¹

Second, the unit of analysis for this theoretical orientation is the household (Wilk 1990). The migration of a household to a new environment forces change in members' adaptive strategies (Jordan and Kaups 1989). The orientation is directed to examining household adaptive behaviors or coping mechanisms, including factors related to decision making and choice in survival strategies within farming cycles and life cycles over time.

Third, linkages from the household to other socioeconomic and political institutions internal and external to the resettlement are highlighted. The dialectical relationships between households, resettlement, and the state are central to developing an understanding of differential adaptive strategies within the resettlement. An approach which integrates household, resettlement, regional and national levels reflects the multi-level and multi-directional nature of how related variables interact. Yet, the point of departure is location-specific not regional, and is centered in the household and not the state.

Fourth, a number of ecological anthropological perspectives in the past have assumed and taken a "closed systems" approach to examining the ecological relationships of small-scale social formations in isolated communities. This study deviates from a closed systems community approach and suggests that an open systems approach offers a better approximation of reality. This research is an investigation of an "open system" of settlement that is examined in the context of acting and reacting to a larger system.

¹¹ Campbell and Olson contend, "population and technology are considered secondary order variables and are contingent upon other more basic issues determined by the interaction between political, social, economic and environmental variables" (Campbell and Olson 1991b:8).

Migration patterns, as well as external social, economic and political ties, are some factors which contribute to the open nature of the resettlement.

Fifth, previous approaches have tended to place emphasis on what maintains a system in homeostatic equilibrium. In this analysis, the researcher identifies and examines the motivating factors of change and the resulting adaptations or maladaptations that are contributing to the social formation of a community from a resettlement. It is suggested that the socionatural system is constantly changing reflecting the inherent dynamism of the internal and external forces influencing the system. Thus, the emphasis is on positive feedback -- processes which contribute to accelerate change. These processes in turn can lead to dysfunction or disequilibrium of the system.

Sixth, elements of the functional ecosystems orientation still pervade this ecological perspective. There is no need to throw the baby out with the bath water. One needs to understand how the system is structured and working in its present state to understand how it changed from its historical form. In turn, this can help us to understand where past and current states may lead to future transformations. The future is derived from an accumulation of experiences and stimuli for change from both the human and environmental systems. To paraphrase Braudel (1979), Is not the present a reflection of the past which survives and provides the key to understanding the future. Thus, a multi-level and long-term perspective is necessary to explain adaptive processes in an historical context. In addition, a diachronic approach is not static, for it provides analysis for processual change.

Adaptation among agrarian households, whose productive activities were or are intimately related to natural resources, is influenced by domestic, national and international

markets (socio-economic institutions) and political institutions. Thus, identifying the factors driving the agrarian system are of interest in explaining processes of change and adaptation in a resettlement.

2.4.1 Applying the Integrated Ecological Anthropological Perspective

The manner in which this integrated ecological anthropological perspective is made operational is to examine factors associated with the processes of resettlement transformation, community formation and impact on resources used over time (Blaikie and Brookfield 1987; Campbell and Olson 1991a and 1991b). Interactions between sociocultural, economic, political, and physical environmental factors occur at local, national and international levels and are influenced by dynamic internal and external forces. The interactions are not limited to one level, and as such create a multi-dimensional and multi-level feedback system over time. These factors are integrated into the analysis of Green Park's resettlement, community formation and resource use.

A brief example taken from the research on Green Park, Jamaica is offered to illustrate the articulation of sociocultural, economic, political and physical environmental factors. For example, "an environmental change can influence economic outcomes and political decisions can alter social conditions (Campbell and Olson 1991a). Green Park is a resettlement site that was established by a multi-national corporation, which contributes to Jamaica's national economy through the sale of bauxite. Green Park resource users are intertwined with Jamaica's domestic and export agricultural markets which influence resource use in Green Park. As a result available markets affect land use patterns, cultivation and regularity of marketing crops (supply and demand); also seasonality and

topography influence the crops produced in Green Park.

Temporal considerations need to be considered when examining patterns of interaction for resettlement, community formation and resource use. Frequently, time has been conceptualized as linear to illustrate the connectedness of events. Rather than a single line approach to time, Campbell and Olson cleverly introduce the "braided strand" to intertwine multi-dimensional and multi-level factors in an analysis (Campbell and Olson 1991a and b). Conceptualizing a braided strand of time enables the researcher to address the human life cycle (i.e., age, health of individuals, family members etc.), the farm cycle (i.e., seasonality, successive land use patterns) and history (local, regional, state or global) in conjunction with episodic events. Field and Burch point out, "resource cycles themselves are associated with the ebb and flow of community life, population and institutional structure" (Field and Burch 1991:35).

Time operates differently across dimensions and levels. Braudel (1979) divides time into long cycles and short cycles. Campbell and Olson note, "the concept of time is one which changes from issue to issue and from one set of interactions to another" (Campbell and Olson 1991a:302). The complexity of temporal dimensions increase once the natural environment is added to the conceptual framework (Campbell and Olson 1991a). As such, there are time lags between cause and effect (Campbell and Olson 1991a). For example, "political decisions and economic action may have instantaneous effects but social change may take a generation, and environmental processes may take hundreds of years" (Campbell and Olson 1991a:302).

The literature suggests that long-term and short-term biophysical and sociocultural changes, degradations and exploitations vary are processual. To examine those historical

processes in Green Park, one must use an integrated approach that identifies which factors have impacted the adaptive process and how and why this impact has occurred. The history of Green Park -- as a sugarcane plantation interacting in the local, national and international economies with present-day small-scale resource users -- incorporates long and short-term farming and life cycles. Seasonality, boom and bust economic cycles, and climatic uncertainties are incorporated into the adaptive strategies with which households in their respective agrarian systems must contend. Explicitly examining the role of time contributes to understanding the complexity of Green Park, and its community formation and resource use.

Decision making practices and empowerment are salient factors that play active roles in change (human agency). As such, the control over environmental resources contributes to social power (Adams, R. N. 1975). Power refers to the ability or capacity to control, to act, or to practice, as well as the right or ability to dominate or rule others. Vertical and horizontal dyadic interactions take place between households, regions, and states and within each of these scales (Campbell and Olson 1991a). Thus, "the exercise of power is felt in the interaction between groups with different status, access to resources, and influences within and between societies" (Campbell and Olson 1991a:302). As such, power and decision making influence the direction of interaction between social, political and economic forces at local, national and international levels (Campbell and Olson 1991a).

Power transcends levels of interaction. For example, the state serves as a power broker in terms of regulating policy and access to resources between groups within a society. In fact, "the state tends to lend its power to dominant groups and classes, and

thus may reinforce the tendency for accumulation by these dominant groups and marginalization of the losers through such actions as taxation, food policy, land tenure policy and the allocation of resources" (Blaikie and Brookfield 1987:21). Thus, unequal access to power and decision-making contribute to unequal access to resources, and expose resource users to environmental changes which foster the marginalization of these groups and classes. The disparate subjugation to environmental changes is related to divisions of political and economic processes.

Power relations are a part of inter- and intra-household dynamics. Household power relations are observed between age groups, gender, kinship ties (Barrett 1984; Wilk 1990). Frequently, differential power relations within the household are expressed in terms of who has access and control of resources and can influence household survival and coping strategies (Argawal 1986; Redclift 1987). Agrarian social strategies are organized around the household or the community to ensure access to resources and investments. "The strategies adopted do not necessarily succeed in ensuring adequate livelihoods, but they are designed to reduce risk to those livelihoods" (Redclift 1987:154).

In addition, traditional knowledge frequently is devalued and overlooked in the environmental literature (Redclift 1987). "This is partly because of the way such knowledge is recorded in the cultures of native peoples. Without knowledge of the culture a people possesses one is unlikely to be aware of their knowledge of their environment" (Redclift 1987:151). However, indigenous knowledge is linked to the strategies which the culture has devised for coping with risks and uncertainties. Generally, such strategies, to some degree, take into consideration, environmental conditions, potential pest infestation, climatic and economic uncertainty.

Recognizing the dialectic between environmental and social change provides a context in which land-base resource use, misuse and overuse is discussed (Bryant 1992). However, other sources of environmental change are neglected with economic reductionism. For example,

By equating social action with capitalist development, it not only neglects ecological factors, but also devalues the role and the importance of state and interstate forces. Hence, it impoverishes understanding the complex interaction of contextual sources which together, but in differentiated and often contradictory ways, relate to and are affected by environmental change (Bryant 1992:14).

As such, economic reductionism tends to "exclude from serious consideration those 'without' power - peasants and other socially-disadvantaged groups. As with the environment and the state, the role of peasants is dismissed as analytically insignificant. And yet, such premises are ill-found- those 'without' power are not always as incapable of resistance as reductionist accounts might imply" (Bryant 1992:14).

Such top-down approaches perpetuate processes that contribute to environmental degradation and social marginalization (Bryant 1992). According to Redclift, the management of the international environment can only be successful if it is fully recognized that the environmental concerns cannot be divorced from development policies. These developmental policies are also linked to the development of market economies and commodity production (Redclift 1987). The interdependent processes of the political and economic systems to environmental resources serve to undermine traditional resource uses and the ecological systems on which they depend (Argawal 1986; Redclift 1987; Timberlake 1985).

2.4.1a Specific Resources Examined: Land and Tree Tenure and Use

Tenure and use patterns are particularly relevant in understanding resource use in agrarian systems and their transformation (Clarke 1957; Edwards 1961; Leonard 1987; Satchell 1990). The system of land tenure operating in an agrarian system is central to the social, economic and political development of a society. Land tenure is fundamental "especially since tenure influences the pressure placed on natural resources, the structure of the labor market, urbanization and migration streams, and levels of social and political stability (Satchell 1990).

Land tenure has been broadly defined, and a number of examples are offered to demonstrate this. Land tenure has been defined as a "bundle of rights" with at least three dimensions: people, time and space (Riddle 1987). In addition, "land tenure has been described as a complex set of relationships between humans, their various rights in the use of land and the behavior characteristics which directly result from these rights" (Satchell 1990:17). Land tenure also refers to the terms by which lands are held, such as owned, leased, rented, borrowed, squatted on family or non-family lands (Satchell 1990).

Land rights, whether formally or informally understood and enforced, assume many forms, embody many factors, and differ cross-culturally. In addition, land rights may be communal, flexible, negotiable or "written in stone". Land tenure and land use patterns are not static (Clarke 1957; deCera 1987; Dove 1988; Fortmann 1985). Land tenure rights that contribute to how lands are used are a result of human interaction; this in turn reflects and gives form to social relationships that are established.

Land use is defined as the manner and intended purpose for which lands are being used. For example, are lands designated to be used for agricultural or residential

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Land managers may find themselves responding to changes in their social, political and economic circumstances quite independently of changing in the intrinsic properties of the land which they employ. They may be denied access to common resources, or be forced to grow crops by land lords, market or social demands, or by the state. They have to find a strategy with which to meet such pressures, and do this on land which itself changes in nature (Blaikie and Brookfield 1987:3).

Thus, both tenure and use are known to be dynamic, responding to political whims, often perpetuating the status quo, and adapting to environmental, economic and sociocultural changes (Besson 1987; Brierley 1987; Fortmann 1985; deCera 1987; Dove 1988; Westoby 1985).

Interestingly, regional interpretation of land tenure and land use are common in the literature. Frequently, such writers state "the land tenure system for Africa", "Asia" or "Latin America" is.... These approaches tend to gloss over the local cultural nuances of land tenure and land use systems, which may in fact be directly affected by micro-climatic conditions, cultural variation or state policy. Other researchers have found that upon disaggregation at the household level, land tenure and land use are markedly complex and at times different from that of tree tenure and tree use (Fortmann 1985; Riddle 1987).

Tree tenure and tree use, like land tenure and land use, are equally complex. Tree tenure is defined as the terms under which trees are held, be they in the formal or informal. Trees could be owned, leased, or rented through a contract or verbal agreement, and all these arrangements are rooted in cultural practices (Fortmann 1985; Riddle 1987). Tree use is defined as the purpose and manner in which trees are used. Trees may be cultivated for specific purposes and they may be harvested from naturally occurring stands. Both cultivated and natural standing tree uses are culturally defined (Fortmann 1985; Riddle

1987). For example, planted trees that produce cash crops (i.e., coffee) may be men's domain, whereas gathering fuel wood from natural standing tree sources may be women's domain.

There is a distinction made, however, between tree and land tenure and tree and land use. Based on her work in Africa, Fortmann clearly states there are rights to plant, use, inherit, and dispose of trees (Fortmann 1985). In certain contexts, land and tree rights are delegated accordingly to the state, groups, households, and individuals within households (Fortmann 1985). The nature of the tree, its uses(s) and the land tenure system affect who has what rights (Fortmann 1985). Empirical evidence suggests Jamaican farmers traditionally distinguish between land and tree rights (Blaut and Blaut 1973; Morrison 1991). The matrix of land and tree relationships get more complicated when communal land, private property and open lands, and the use of lands and trees for subsistence versus commercial purposes are compared (Argawal 1986; Fortmann 1985; French 1986).

Inequalities in land/tree ownership and usufruct rights are believed to be related closely to inequalities in the availability and use of tree products by the household (Argawal 1986; Fortmann 1985; Murray 1980, 1987, 1988; Redclift 1984). Specific questions arise regarding access to trees and other resources. Who has access to land and trees and under what constraints and for what purposes? It is owners, renters, collective, cooperatives, squatters etc.? How are rights transferred to future generations, i.e., through inheritance to kin or non-kin, through sale, trade, membership or relocation programs? How are seasonal variations in farming productions accounted? Lastly, what structures, policies, or ideologies work to support or undermine those "use" rights

(Fortmann 1985; French 1986; Hardin 1968; Murray 1980, 1987, 1988; Redclift 1984; Riddle 1987)? The scarcity of tree products is not experienced as a crisis by everyone and this latter question examines this.

Although tree scarcity is recognized as a Third World crisis, it is more acute in some regions than in others, especially for those who inhabit the semi-arid and tropical zones. Moreover, within these stressed ecological zones and elsewhere, the problem is more severely endured by the households that are economically and socially underprivileged. For example, households more dependent on woodfuel or charcoal as an energy source and households that are dependent on tree foliage as alternative sources for fodder and forage for livestock are among the most vulnerable households (Agarwal 1986; Beckford and Witter 1982; Burch, 1984; Hills 1988; Murray 1980, 1987, 1988; Redclift 1984). Access to such fuels and fodders frequently depend on village or community kinship networks and social affiliations (Agarwal 1986; Brierley 1987; Hills 1988; Murray 1980, 1987, 1988).

Animal owners in some rural sectors of developing nations are known to feed their livestock (cattle and goats) tree fodder (Agarwal 1986; CARDI 1986, 1987, 1988; Clay 1988; Denevan 1986; NFTA 1985, 1989). Specifically, Jamaican animal owners, who may or may not be land owners, raise grass fed livestock. However, on occasion, these people will feed their cattle and goats tree fodder (Jamaica Livestock Association 1983; Morrison 1991; Watts 1987).

Land tenure and land use patterns are very much aligned with politics and economics, and therefore, are subjected to regular modification. This dynamic generates another form of land tenure or land use insecurity (Campbell, D. 1991; Murray 1987), and

some researchers suggest insecure land rights and tenancy have major overtones for land use (Brierley 1987; Leonard 1987). As such, lack of secure rights to land is identified as a root of the problem for unequal distribution of resources or the misuse of available resources (Edelman 1985; Leonard 1987). It has been argued "that small farmers, already at or near subsistence levels are reluctant to make any capital or labor investments to improve the lands they cultivate in cases where tenure is uncertain" (Leonard 1987:108). The implication is small farmers are less likely to invest in land for the long-term or preserve available resources on lands that are not theirs. Therefore, defining and securing user rights to land are thought to be the solutions to "mismanaging" (poorly managing) natural resources (French 1986).

However, is insecure land tenure the origin of the problem in management of resources used or is the problem linked to other micro and macro forces? The answer may not lie in formally identifying rights to land or designing policy for identified rights if they are non-existent or in the process of being rewritten. For example, how do resettlement transformation and community formation impact land and tree tenure and land and tree use over time? Historically, having freedom and space permitted smaller farmers to relocate or expand to cultivate new areas when the former became unproductive. Expansion or shifting cultivation was practiced as an appropriate response or viable alternative to tired soils, resource depletion, or population increases (Leonard 1987; Clay 1988).

Shifting cultivation or slash and burn require low capital inputs (Leonard 1987; Clay 1988). Such a system enabled the small scale farmer to concentrate his/her agricultural production on the immediate future, yet not necessarily for future generations.

In times when land space is a premium and expansion to other areas is not possible or fallow periods are reduced, shifting cultivators find themselves without the necessary capital or technical information to modify practices, and thus are left with a process of degrading and declining both natural and human resources (Leonard 1987; Clay 1988).

In addition, plantation farmers and cattle ranchers and extensive and intensive hacendados who have had the means (capital) to reduce the rate of deforestation, (i.e., adapt an agroforestry approach) or other resource depletions on a large scale, are not doing so currently and have not done so historically (Edelman 1985). In fact, intensive farming practices for plantation farmers and ranchers have been towards increasing landholdings for ranching and cultivars to increase capital earnings and not as readily to sustain the forested or wood areas (Riddle 1987; Shane 1986). Certain areas of Brazil and Central America are exemplary of this process (Edelman 1985; Picchi 1991).

Some researchers suggest the size of the land holdings influences the type of crops planted more than the form of tenancy (Brierley 1987; Clay 1988; deCera 1987; Leonard 1987). In Latin America and the Caribbean, those with more land (large landholders) tend to dedicate it to sugar cane, forestry or grazing (deCera 1987; Edwards 1961). Those with smaller land holdings are producers of short cycle crops, such as rice, cacao, coffee, tobacco, roots and tubers (Brierley 1987; Edwards 1961). According to deCera (1987), a small farmer's basic needs are immediate; therefore, they cultivate short cycle crops. To wait around to harvest a tree or harvest from a tree will not feed them nor their families in the interim. "The peasants' strategy is to plant now and plant crops whose cycles will be as short as possible. The pragmatism of the capitalist and the farmer argues against an ecologically optimal use of nature" (deCera 1987:310). Those who stress tenancy, would

contend the process is similar and farmers are responding pragmatically with land use and insecure tenure rights. Why should a farmer plant tree crops (fruit bearing or lumber) if he or she does not know if they will be there to reap the benefits (deCera 1987)?

This study, therefore, draws from ecological anthropology to examine community formation and resource use in a resettlement by employing Scudder's four stage community transformation model (Chapter One). The articulation of political, social, economic and environmental factors are discussed from a historical and contemporary context to illustrate a dynamic system and account for some processual changes over time. The unit of analysis begins at the level of the household, while regional, national and international levels are highlighted as they influence households' survival and coping strategies in the Green Park resettlement.

2.4.2 Data Requirements for an Integrated Ecological Anthropological Perspective

Information and data concerning the relationship between local household needs, exchange relationships, local knowledge and use of natural resources as a part of survival strategies are pivotal to understanding the development of coping mechanisms to internal and external forces of change in agroecosystems. Houses that may look the same in terms of social structure (i.e., numbers of people and their relationship to each other) may actually prove to have quite different economic structures when examined in greater detail. The complexity of a diachronic, multi-level and multi-directional ecological anthropological analysis facilitates an explanation of adaptive processes between social and natural systems.

Individual household units evolve differently based on diverse sets of relations

between their natural environment and sociocultural, political, economic institutions.

Obtaining data on how households adapt to a multitude of internal and external pressures and the implications for the resettlement with the allocation of diminishing and scarce resources is essential to this approach. The data gathered for this research include data on resettlement structure, resident status, kinship, farming practices, land, labor, capital, trees, communication networks, occupation and marketing arrangements. Data on kinship relations within the resettlement, resource users knowledge of resources and their use in their agrarian practices will provide an internal comparative base to examine and analyze variation found among Green Park resource users.

The history of the agrarian resettlement is explored to understand processes of adaptation and resource use over time. Differential access and use may be related to variation in farming experience. Data are obtained on: changes in landholding size, land use, land tenure, as well as market availability and use of markets, livestock inventory, type of occupation(s), years of experience, type of agrarian practices, and household size. These data are examined to determine their relation to the historical development of the resettlement and its resource users.

The case of the Green Park settlers provides an example of how an integrative ecological anthropological approach can be used to assess the effects of relocation and altering resource exploitation patterns. It also avoids a narrow preoccupation with energy inputs and outputs by focusing attention on the complex network of relationships that exists between parts of the ecosystem, that is between the Green Park resettlement and the region in which it is located. The resettlement examined is not restricted to geographical barriers, but rather resettlement affiliation. A homogeneous isolated community is not

examined. Specifically, this modified ecological anthropological approach tests Scudder's model for resettlement and community formation, differential resource use and change, and explore further why cows and trees have come to be a part of some agrarian systems in Green Park, Jamaica. Therefore, this study is location specific, event focused and the dynamics emphasized are on the resettlement process.

CHAPTER III

METHODS

3.1 Site Selection

In conjunction with Green Park livestock owners, Ministry of Agriculture - Falmouth, the Jamaica Agricultural Research Programme (JARP) and Michigan State University's (MSU) Department of Forestry researchers selected Green Park as the study area for a pilot agroforestry project. Specifically, Green Park was selected for its semi-arid environment where livestock owners struggle with livestock management during the seasonal dry periods. Farming in the north coastal region of Trelawny Parish, Jamaica is characterized by many problems related to farm size, marginal terrain, the availability and affordability of labor, market uncertainty and a prolonged annual dry season (Blustain and LeFranc 1983). In this respect, Green Park is typical of other Caribbean dry system farming regions. Resource users (both men and women) in these environments are forced to adjust their farming practices to inherent problems to this type of region.

The scope and objectives of the JARP-MSU project were designed in the department of Forestry at Michigan State University with input and funding provided by JARP. JARP is a non-governmental organization whose research interests are oriented toward small-scale agricultural producers and is partially funded by the United States Agency for International Development. Research staff for the agroforestry project included faculty members from the MSU's Department of Forestry and students from

MSU's Department of Forestry and Anthropology. Forestry students who were part of phase one planted and monitored tree growth in St. Ann and examined tree use on-farm at Green Park. Phase two of the pilot project was conducted by Susan Andreatta -- hereafter referred to as this researcher -- who is from Michigan State University's Department of Anthropology and focused on the entire agrosilvopastoral system. MSU Forestry students presently are involved in on-farm tree trials in phase three of the pilot project.

3.2 Data Collection

This researcher used several methods and approaches concurrently to collect data on several discreet elements within the agroforestry system between September 1990 - September 1991. These empirical observations and first hand accounts have led to generalizations concerning the adaptation and resource management of resource users in an agrarian context.

The major participants of the study are individuals who use the resources of Green Park residents, whether they reside in Green Park or not. In addition, many informants do not consider themselves as farmers. These people are collectively referred to as Green Park resource users or simply resource users. The primary resource user is the informant who contends he or she is responsible for the majority of the household's farm-related activities (i.e., time spent in cultivating and/or rearing livestock).

Elements of scale, space, time, and power are examined concerning the reliance of Green Park resource users on multiple survival strategies to cope with uncertain conditions. A variety of information and data were collected on internal and external factors which limit or constrain households' adaptive strategies to Green Park's agrarian

system; these include market fluctuations, population change, climatic variation and unpredictability, political elections and policy changes, and transportation inefficiencies. Adaptive strategies are evaluated by access, use and management of natural resources, off-farm occupation, and the internal resettlement relations. Research of farming practices which incorporate seasonality of cropping cycles, daily routines, ages of resource users, laborers and household members, also includes adaptive strategies related to cultural use of time – planning for the future or immediate situations. Sensitivity to time and resource users' approach to time are incorporated in everyday life and agrarian management practices; clearly, time is culturally rooted.¹²

A variety of data and information were collected on cultivation, livestock, and access to land-based resources. Multiple methods were used to obtain qualitative and quantitative data, incorporating a strategy that provided a check on the information and data received. Data were solicited for the following variables: land (tenure, size and use), labor (wage labor, family labor, frequency and tasks), livestock (number and type), trees (species type for fruit and fodder trees, location, and use), markets (crops, livestock, fruit sold and frequency of marketing, location of where products are sold and means of getting goods to market), access to agricultural information (technology, inputs, markets etc.), technology used in farming (inputs, tools used), and information on natural environmental factors (climate, seasonal variation, soils, erosion, access to water,) political, and economic factors that influence farming practices over time.

¹² Jamaicans do not act hurriedly and are not easily rushed. There are expressions in patois which reflect this cultural understanding of time. Some of the expression are "so it goes", "me soon come", "no problem" and "take time". Each expression does have a relative context in which it is used although it is not elaborated in this text.

The data collected are rich in qualitative, as well as quantitative information. Such qualitative data augment the presentation and value of the quantitative data uncovered. The combined methods helped examine real behaviors versus ideal behaviors, specifically what people say they do versus what they actually do. Each method (survey, opened ended discussion, oral history, etc.) is discussed in turn.

3.3 Ethnographic Approach

Traditional ethnographic anthropological field methods were used. The field season consisted of spending thirteen months residing in the resettlement with a Jamaican family and establishing multiple relationships and friendships. Living in the area for an entire year offered a synchronic perspective for seasonal variation, and residing with a Jamaican family further expedited the acculturation process within the resettlement, and Jamaica in general. In addition, further explanation on daily activities, men's and women's roles, division of labor, men's and women's domain in farming, knowledge of farming and access to farming information, and food preparation techniques were freely exchanged and observed within the resettlement. The host family and many others graciously accepted this researcher into their homes, and this acceptance was crucial to timely and accurate gathering of data.

The first three months in the field were devoted to observing and comparing agrarian practices in Green Park to other Jamaican communities. In Green Park, it was of particular interest to ascertain who and who does not farm, and what local agrarian practices were related to specific crops cultivated and/or animals reared in an annual cycle. In addition, information was gathered on distribution of cultigens, livestock practices, and

marketing practices.

This ethnographic field approach allows the researcher to distinguish emic and etic perspectives. Researchers, who traditionally are outsiders, impose categories and classifications on their work to better understand and conceptualize phenomena. In anthropology, the process of imposing outside categories or labels on subjects or symbols of study is referred to as the etic approach. The etic approach – the observer-oriented or outsider mode of understanding – provides an analysis of the society from an exterior, scientific point of view (Barrett 1984). "Here we typically want to determine the basic architecture of a social system, the systematic relationships between its parts, and the normative principles that underlie social action and belief" (Barrett 1984:151).

In contrast to the etic perspective is the emic perspective, an actor-oriented or insider mode approach. The emic perspective aspires to understand local cultural categories of thought and to know how the culture group divides their social and natural universe. The anthropologist tries to peer inside the culture to determine, to the best of her/his ability, how that world appears from the cultural group's perspective (Barrett 1984). As such, the etic (observer-oriented) and emic (actor-oriented) approaches differ. For example, the etic perspective tends to probe deeper into the structure of the society than is necessary for those who merely live in it (Barrett 1984). The etic and emic perspectives are not inclusive, yet together provide further insights into understanding a people and their culture.

3.4 Survey Questionnaire

A formal survey tool was generated in Jamaica, after spending time both inside and outside the resettlement. The survey focuses primarily on the agricultural and forestry system for the resettlement, and the objective was to survey a range of resource users' agrosilvopastoral practices. Specifically, this approach provided information on differences and similarities of the manner in which resource users utilize labor, markets and natural resources. The intent is to provide a more detailed understanding of existing resource users' practices and how such practices were derived. In addition, the survey served as a means of introduction to meet resource users.

The survey design is based on empirical observations and the generous input from a research assistant (a resident of the resettlement). Language differences and interpretations between American English and Jamaican patois had to be reconciled between the researcher, resource users and the research assistant. The assistant provided invaluable cultural and linguistic assistance to the wording of the survey and its implementation.

The survey tool was used to quantify and standardize responses concerning the present and past agrarian practices and experiences. The survey was pre-tested for clarity and comprehension among several resource users before being administered throughout the resettlement. Reorganization of some questions and changes in wording yielded a new survey tool which was then utilized throughout the remainder of the year (from January to September 1991).

The sample size for the survey was based on resettlement size, resource user availability and cooperation. Since Green Park is a small resettlement, it was decided to

interview the entire resettlement population of resource users with a formal survey questionnaire. Thus, a population is interviewed not a sample. Analyses frequently cite numbers and percentages. Readers should bear in mind this is a population and inferences are not made from this population since it is not a sample. Time and cooperation were some of the researcher's constraints in getting all the interviews completed, which determined the priority with which people were interviewed.

In 1990-1991, Green Park was a resettlement with a population of approximately 400 within nearly 90 inhabited households. The survey was administered to seventy-one (75.8%) Green Park's resource users of which sixty (84.5%) currently reside in Green Park. Approximately ten (14.08%) households who reside in Green Park declined to be interviewed, and lack of time and interest, and suspicion of the researcher were the reasons offered for not participating in the interview process. The remaining resource users (9.4%) were not interviewed because they were in the area or in Jamaica when the data were being collected. The quantitative data analysis is based on the seventy-one interviews conducted. The research assistant was a resident from the resettlement that accompanied the researcher on many of the interviews, serving as guide and interpreter when necessary, for both researcher and informant.

3.4.1 Design of the Questionnaire

In designing the questionnaire, this researcher, with the assistance of the literature on Caribbean farming, identified the salient farm and household characteristics to adequately identify and differentiate patterns of agrarian practices. The formal survey employed to quantify data on agricultural participation and management practices is

detailed in Appendix 1.

A variety of questions was designed to gather information on resettlement structure, agrarian practices, and linkages beyond Green Park. Demographic data were collected on household composition, age and sex, resident status, length of time using resources in Green Park, residence (or resource use) before work in Green Park, and experience in farming prior to Green Park.

Internal household composition of Green Park's resource users and external consanguinial and affinal kinship relations were examined. It was of particular interest to determine if a second generation had established residence in Green Park or if kin relations from the former area of residence voluntarily took up residence in Green Park.

Green Park resource users were questioned on their crop cultivations. Some crop cultivation questions focused on: types and timing of crops planted; crop marketing frequencies (regularly sold, only surplus sold, or raised for primarily household consumption); forms of labor used in the cultivating process (family or hired); inputs used (such as fertilizers, water, plows, and insecticides); and previous experiences in farming before Green Park. Questions on land size, use and tenure were asked on each plot of land used by a Green Park resource user. The researcher had access to the original Kaiser map of 1959 that lays out the dimensions for the individual plots located in Green Park (Map 3).

Specific facets of labor as a resource were examined. Questions were asked separately of when family labor was used for crops and livestock and when wage-labor was hired for crops and livestock. Inquiry was made into how frequently labor (hired and family) was used and for what farm related tasks. An open ended questioning approach

was use to elicit what labor problems Green Park resource users encountered and how they may or may not have influenced their farming practices.

Survey questions focused on availability and regularity of labor used in farming. Such questions quantified the number of working adults in the household, use of family or hired labor on farm, and tractor use in cultivation. The use of a tractor and purchased inputs (pesticides, feeds, fertilizers) were the only indicators of agricultural capital that were used. The only questions which were asked of income were on the regular sources income. Was the primary informant involved in off-farm employment activities and frequency of such paid work? Did a household receive a pension from Jamaica or abroad? Did they receive assistance from the Jamaican government, from children in Jamaica, or from abroad? More direct information on actual income earnings was not obtainable. During the pre-test phase, income earning proved to be extremely sensitive information and consequently deleted from the final survey questionnaire.

A number of questions were asked of Green Park resource users concerning their occupation(s). Resource users were asked what they considered to be their primary, secondary, and tertiary occupations. Resource users with spouses where asked what were the spouse's primary and secondary occupations. This was only asked if spouses were not present at the time of the interviews. Resource users were asked at which occupation they spend the most time, which activity they perceived provided the household the most income, and if the activity was their activity or their spouse's.

The survey also took an inventory of tree species. Fruit trees species grown were enumerated and these fruit tree questions examined: number of species planted, location of trees planted, care given to trees (water, insecticides, fertilizers -- natural or commercial

and other traditional remedies or care techniques used for tree establishment and maintenance), and marketing frequency of fruit (fruits sold, shared, or used primarily for home consumption). In addition, a number of questions related to non-fruit bearing trees were asked and enumerated.

An inventory of livestock also was recorded. Livestock enumeration included cattle, goats, pigs, and poultry (including common fowl, chickens, and turkeys). Among cattle and goat owners, questions on rearing practices and marketing of animals were pursued more in depth. In terms of rearing, the researcher posed several questions. How many years rearing were involved? Did they arrive with livestock (in particular cattle or goats)? How much time is allocated to animals? Did they use family or hire additional labor and for what tasks? What was the frequency and time of year for various animal husbandry practices, (i.e., vaccinations, spraying, slaughter)? What inputs were used for livestock (such as the purchase of vaccines for cattle, acaricides, feed, fencing, wire posts, and rope for tethering)? In terms of marketing the researcher asked the respondents other questions. Why did they rear livestock? When was livestock sold? What was the frequency of sale and purpose of sale? Data on minimum and maximum numbers of herd and flock sizes were not obtained.

Open ended questions also were part of the survey questionnaire. Resource users were asked to recall information on changes in their crop production and livestock management over time, and especially, since residing or using lands in Green Park. In addition, general questions were asked of changes in social organization, resettlement structure, tree densities, land use, and how politics and economics influenced their farming practices.

3.4.2 Implementation of the Questionnaire

The implementation of the formal questionnaire varied. For the most part it ranged from one hour to two hours, depending on length of responses or staying on track with questions. All interviews were conducted on-farm at the convenience of resource users. The formal survey interviewing process, in terms of reaching many Green Park resource users, took considerable time to complete. Nearly the entire year was necessary to attain the 71 completed interviews. Time was lost due to repeatedly canceled interviews, rainy days, conference meetings and poor health (of the researcher or informants); in some cases, rescheduling was required. Toward the end of the field season, rescheduling became more of the norm, causing a problem in attaining the desired amount of completed interviews.

The initial thirty interviews were completed in less than three months, however, the remaining interviews were more difficult to complete. In fact, the final interview was conducted the night before the researcher's departure from the area. Reasons for the resource users not participating included: 1) The researcher was perceived as not providing anything of use to all resource users; 2) The Green Park resource users have been over studied; 3) Green Park resource users have more important priorities for household survival than participating in an interview and/or; 4) Previous projects that have entered their country or their resettlement have not elevated their position.

3.5 Qualitative Methods

Besides the quantitative data gathered, qualitative data were obtained utilizing participant and casual observation techniques. Participant and casual observation

techniques are two common anthropological methods employed to obtain qualitative data (Barrett 1984). These methods were ongoing throughout the field work experience.

Participant observation refers to observations made while participating in the activity, whereas, casual observation is observing and not engaging in the ongoing activity. As mentioned, data collected from observations contributed to the design and wording of the survey instrument. These techniques enabled the researcher to identify variation in farming management practices and resource utilization.

3.5.1 Specific Participant and Casual Observations

3.5.1a Crops

To understand crop cultivation, the researcher observed and assisted in planting, reaping and marketing of cultivations among resource users. Discussions were held during each activity. A wide range of information was obtained by experiencing and sharing in these activities. Information was gathered on why certain practices were carried out and who made such decisions; how practices had changed from years past or from where resource users once cultivated; and what factors contributed to their perception of change. For example, information was freely exchanged on the impact droughts had on crops, and resulting difficulties of getting a crop to market or harvesting a crop before it spoiled. Working among men and/or women provided additional ethnographic information on divisions of labor and access to resources.

3.5.1b Livestock

Participant and casual observation with livestock owners were made nearly on a day-to-day basis to examine the tropical livestock management system. At regular intervals, the researcher's participation included moving cows from pasture to pasture, taking animals to water, corralling cattle for vaccinating programs, partaking in goat and cow slaughters, collecting cane ban (green sugar cane tops), and tethering goats and cattle. Participating in these activities provided opportunities to gather information on general livestock husbandry practices, related decision making practices, and on how the rearers actually cared for their animals. Discussions were held on current management practices, how practices change seasonally and how they had changed over the years, and if resource users had always reared livestock and why.

3.5.1c Charcoal Producing Activities

In addition, casual observations of charcoal production were made. Interviews were conducted with coal burners who burn coal as a means of income generation, clear lands from re-growth, or increase land space for cultivations or pasture. It was necessary to learn which trees were selected for harvest in charcoal production and the regularity with which coal is produced. Discussions emerged on where trees were harvested, from whose land the trees were taken, tools used in production (i.e., chainsaw or machete), to whom burners would sell their bags of coal, and at what rate.

3.5.1d Location and Nature of Interaction

Numerous hours were spent each week on resource users' farms, in ruinate fields or wooded areas, at their homes, or at the public trough. The public trough provided a forum to meet informally and irregularly with twelve livestock owners who watered their livestock at the trough; on some days informal discussions would take place among several livestock owners who regularly watered their cattle at the local trough. Hours were spent listening to a wide range of stories and experiences. On other days, the researcher and assistant might come upon someone working in their fields or with their animals and be willing to converse for a while. Still, there were days when the assistant and researcher saw few or no people working the fields or tending to their animals.

Informal discussions also took place among resource users at bus stops, rum shops, and dry good stores. For this researcher these informal discussions provided numerous insights into everyday life in Green Park, and strengthened many friendships.

In addition, the researcher spent a number of hours weekly at the local Falmouth Produce Market. Marketing (shopping or selling) weekly allowed this researcher to monitor prices received at the market, crop availability (seasonality) and the regularity of those marketing. On a monthly basis, if not more frequently, the researcher spent time with agricultural extension agents, also located in Falmouth. Agricultural extension agents provided their perspectives on farming in Green Park and other areas, commented on access to markets, and provided field trips to other farming districts. The older agricultural extension agents commented on their perceptions of change in farming for the immediate area.

3.5.2 Oral Histories

Many days and hours were spent with resource users collecting additional non-survey information through established oral history techniques (Barrett 1984; Crane and Angrosino 1984). From these frequent lengthy and repeated open-ended interviews a number of case studies emerged. A concerted effort was made to obtain oral histories from a variety of resource users, drawing from men and women, single or dual headed households, and livestock owners and non-livestock owners. However, receptiveness to the researcher and interest in sharing personal household history were the two main criteria that determined the selection of oral histories participants. Oral histories provided data on the variation of resource access and use. Were people dependent on such resources for survival or on off-farm income activities? What was the seasonality of activities? How did life cycles and farm cycles vary overtime?

3.5.3 Library and Archival Research

In addition to the ethnographic data collected, archival information was gathered, and research was conducted in several libraries located in Kingston, Jamaica. This secondary information was obtained at the Institute of Jamaica Natural History Division, Ministry of Agriculture Library, University of the West Indies - Mona Campus, Ministry of Agriculture Data Bank and Evaluation Division, and the National Library. The secondary information was gathered on trends in agriculture, tourism and bauxite production. Climatic data and conditions for the Green Park area, relative to other parts of the island, also were collected.

Archival records and newspapers were useful to give first hand accounts. In

particular, historical data were obtained on the Green Park sugarcane plantation prior to the sale to Kaiser bauxite and of the Green Park resettlement scheme designed by Kaiser. The data provide a historical context for this research.

3.5.4 Open Ended Interviews

In addition to those interviews conducted via formal surveys and in participant and casual observation, a number of specialists were interviewed. Officials at Kaiser Jamaica Bauxite Company were contacted, in particular those officials who were part of the resettlement program for Green Park. Information on the resettlement and history of the area was obtained from several Kaiser administrators. People from the local Ministry of Agriculture located in Falmouth were interviewed to gain a perspective on agricultural extension in the Parish and Green Park. Several people from the Ministry of Agriculture in Kingston were contacted who provided a national perspective for Jamaica's agricultural sector. Interviews were conducted with the Ministry of Animal Health veterinary assistant and researchers at Bodels Research Station in Old Harbor, Jamaica. In addition, the researcher traveled with the veterinary assistant throughout the Trelawny parish to observe other livestock management practices under varying environmental conditions. Collectively, these specialists provided information on animal health and livestock management practices in semi-arid conditions.

3.6 Missing Data

Data collection was selective and focused on activities related to agrarian production in the agrosilvopastoral system in Green Park. Not all desired data were

obtained and new areas of potential data have emerged since data collection in the field. At the local level, data from expropriated households in St. Ann (from thirty years ago) who elected not to relocate or not to use resources in Green Park were never intended to be part of the research design. Data on Kaiser's selection criteria for St. Ann households to be expropriated were not obtained nor were they part of the original research design. Interest is tailored to present day resource users and their corresponding cultural and environmental adaptation to Green Park. However, data on who is currently renting or leasing lands and from whom lands were being rented or leased were not available from many of the resource users. In addition, data on who purchased lands from whom were not collected.

This investigation is linked to an evaluation of a resettlement as a pilot-study for an agroforestry development project. This study is not a comparative analysis. Consequently, systematic data collection from an established or older community with similar biophysical characteristics was not carried out. Also, systematic data collection on other resettlements was not pursued. A regional biophysical and community structure comparison was not the intended goal.

Local responses within Green Park to policy and activity that occurred at the national level were examined; accordingly this is a local study. For this reason, actual time series aggregated production figures for agriculture, bauxite and tourism that have contributed to Jamaica's national economy for the last fifty years were not obtained. Certain secondary sources were used, but this information was of an ancillary nature.

3.7 Data Compilation and Pre-Processing

Data handling was completed by the researcher in Green Park Jamaica. Subsequent to each interview, the data were entered into a laptop computer. Quatro Pro, a database management software, was used to generate a spreadsheet of cases and variables to be analyzed later. Recording and entering data immediately were crucial to assure data collection was as complete as possible. Following the field season in Jamaica, the researcher returned to Michigan State University to conduct the data analysis, where quantitative data were ultimately exported into a statistical software, SPSS, (Statistical Package for Social Science).

3.8 Data Analysis

Two types of quantitative data were collected in the survey, nominal and ratio. A nominal level measurement is utilized to evaluate distinct categories of data where each value serves as a label and is without numerical valuation, (i.e., last area lived in - "Granville", "Falmouth or "Kingston"). Ratio level measurement is utilized when each observation has a separate value for the phenomenon being measured, and differences between adjacent observations on the scale can vary (Johnson, 1984). Frequencies were calculated on the nominal and ratio data, and these frequencies are used to describe variation found in Green Park among the resources users.

Qualitative information from informal discussions and formal interviews contributed to identifying emic and etic categories of resource users. For example, "resource users" is an etic term. Many of those using lands or other resources in Green Park specifically state they are not farmers and do not refer to themselves as farmers.

Hence the term farmer is not used in this text.

Resource users are identified by others or themselves by their occupation - an emic distinction. For example, resource users say "him be a teacher, she be a nurse, him be a mason, me be a carpenter" or in a few cases "me be a farmer." If a resource user owns cattle, he is referred to as a livestock or cattle owner in conversation. If she cultivates, she is a cultivator. If he turns wood into charcoal, he is a coalburner. However, a mason can own livestock, but tends to refer to himself as a "mason who owns cattle" - the skilled labor becomes the identifier. These categories are fluid and context specific, for some resource users are cultivators, livestock owners, coalburners, skilled, or semi-skilled wage laborers. The literature also refers to such individuals with more than one occupation in terms of "occupational multiplicity" (Goldsmith 1983; Blustain and LeFranc 1983).

A second emic category that emerged from the interview process and from informal discussions concerns the manner in which people describe the origin of people or "where they came from." Specifically, resource users that were relocated from St. Ann identify themselves as "resettlers from St. Ann." These "resettlers" identify other Jamaicans who moved into Green Park from neighboring communities as "Jamaicans," but refer to those resource users returning from overseas as "foreign" "dem from Canada, dem from America or dem from England - dem not from here." "Jamaicans" (non-resettlers and those not returning from overseas) refer to those who were relocated as "dem St. Ann people," "dem de Green Park resettlers" or in context "me buy from de resettlers selling out". Those resource users returning from being abroad are identified by the "Jamaicans" in context - "dem not like us, dem left Jamaica". Lastly, resource users returning from a long period overseas identify themselves differently from the other resource users. These

resource users' identities are aligned with the country from which they left (specifically, America, Canada, or England).

It is from the above emic categories (actor-oriented or insider perspectives) that the researcher developed etic categories. The etic category of "resettler" refers to those who were relocated from St. Ann Parish. "Local migrants" refers to Jamaicans who are not St. Ann resettlers and are not returning from overseas. "Circular migrants" are Jamaicans who left Jamaica a number of years ago and who have returned to reside (perhaps retire) in Jamaica. In addition, the terms cultivators, livestock owner and coalburner have been employed.

Nominally, Green Park serves as an emic identifier to denote resource use membership in Green Park, both internally and externally. For example, an outsider or insider could refer to an individual as one who rears livestock in Green Park, (identity to a locality). Yet, that same individual could also rear or cultivate in another locality as well. The term "Green Park resource user" is used as both an emic and etic identifier for those interviewed who use resources and/or reside in Green Park.

Social organization and resettlement structure were examined by identifying internal affinal, consanguinal, and fictive kinship networks, as well as access to farm related networks (information, markets, labor and technology). Evaluating the internal networks provides insight into resettlement linkages, community formation, and resource use.

Adaptive processes of resettlement were examined with a variety of data. Comparisons were made between circular migrants, local migrants and resettlers; between long-term and short-term resource users; between full-time and part-time farmers,

livestock owners, cultivators and charcoal burners; and between single and dual headed households. The comparisons helped to identify variations in resource use, differential access to resources, and practices of long-term farming.

Social relationships at a local level were examined to determine impacts of regional and national factors. Regionally, linkages between households and other communities were identified in terms of reciprocal exchanges between fictive, affinal, and consanguinal kin; church brothers and sisters; and co-workers. Access to farm related information and sharing of farm products and labor were examined. Identifying the external ties between residents in St. Ann and other communities in Jamaica contributes to understanding Green Park's community formation and resource use. Local social relationships also were examined to see how institutional changes due to national policies impacted this local situation. Evaluations of how national policies have affected Green Park resource users historically were examined via Green Park resource users' adaptive response to: 1. access to markets (domestic and export), 2. support for agricultural activities (subsidies, prices, agricultural extension support), 3. participation in farmers organizations, and 4. multi-national corporations access to resources.

Lastly, history is incorporated into much of the data analysis to provide a context within which to study social change. This facilitates an explanation of adaptation in Green Park, the impact on this adaptation on community formation, and natural environmental change. Specifically, how have the processes, elements, and individuals involved interacted and changed over time? An historical view of these elements allows such an explanation.

CHAPTER PRIVATE IV

HISTORY

4.1 Introduction

Research into the historical formation of a colonial plantation society and its transformation to a sovereign nation establishes the context in which Green Park rests. Moreover, this historical approach illustrates political, economic, sociocultural and environmental linkages that both Green Park and the whole of Jamaica have developed and maintained both before and after resettlement construction. With this historical background, one can begin to compare Scudder's four stages of resettlement processes; the variation found among Green Park resettlement households; the factors that have contributed to change, resource use and management within the Green Park agrarian system, and the collective impact over time on the biophysical environment and community formation of the resettlement.

Chapter four is divided into three sections. The first section is a brief overview of Caribbean history, within which the plantation system¹³ has been an important element. More than four hundred years of a plantation economy¹⁴ have contributed to the

¹³ Beckford defines the plantation system "as the totality of institutional arrangements surrounding the production and marketing of plantation crops" (Beckford 1972:8).

¹⁴ "A plantation economy is the term applied to those countries of the world where the internal and external dimensions of the plantation system dominate the country's economic and social and political structure and its relations with the rest of the world" (Beckford 1972: 10).

development of the Caribbean region (Beckford 1972; Beckford and Witter 1982; Edie 1991; Parry, Sherlock and Manigot 1987; Thomas 1988). Highlighting several significant historical transformations -- from the time of the Spanish conquest through European-slave plantation economy to the present-day plantation-capitalist economy -- sets the stage for presenting excerpts of Jamaica's political and economic history. Salient linkages between the metropolis and colonies are delineated. The second section of chapter four focuses on Jamaica's history and contemporary context. Lastly, the history of Green Park, Jamaica is presented. This narrowing of scope from a supra-national to a local or extra-local view provides contextual background and the opportunity to examine Green Park from its days as a sugarcane plantation to the present resettlement configuration. The purpose of this overview is to demonstrate the longevity of political, social and economic ties the Caribbean has maintained in the world system and how such linkages are manifested at the local level of resource use. Clearly, multi-directional and multi-dimensional relationships are woven into the historical background of Green Park.

4.2 European Context

Since Columbus' arrival to the region in the fifteenth century, the Caribbean has been integrated politically and economically into the world system through colonization and implementation of a plantation economy (Beckford 1972; Bush 1990; Edie 1991; Gaspar 1985; Mintz 1985; Parry, Sherlock and Manigot 1987; Thomas 1988; Williams 1970). Spain had been the first European nation to seize and colonize the Carib and Arawak Amerindian populated islands. In time, France and England saw the wealth that Spain was extracting from the region. Initially, French and English pirates (or buccaneers)

preyed upon Spanish ships as they returned to Europe loaded with tropical cargo. Later, the British and French governments and other European countries sent armies to fight against the Spanish colonist and capture territories for themselves. Britain defeated the Spanish armada in 1588, ending Spain's navel supremacy (Gardner 1873; Parry, Sherlock and Manigot 1987; Williams 1970). Over the next century, Britain and France took possession of a number of islands, and the Spanish monopoly of the Caribbean disappeared. In fact, "England fought the most, conquered the most colonies, imported the most slaves (to her own colonies and in absolute numbers, in her own bottoms) and went furthest and fastest in creating a plantation system" (Mintz 1985:38).

4.2.1 Plantation System

The colonization process contributed to the rise of the plantation system in the New World. Beckford states that colonization served "to bring territory and people under new and more stringent forms of control" (Beckford 1972:30). In addition, the new territories were considered a resource base for the European countries and became "frontiers" for further economic development; yet, it was political control over the new areas that was to become paramount (Beckford 1972). The early settlers took over and actually transformed the subsistence economy of the Indigenous population (Williams 1970). The subsistence economy lacked domesticated animals and was based on the production of corn, potatoes and cassava, from the last of which they made a sort of bread. In addition, the Indigenous people cultivated tobacco, cotton and tropical fruits, such as pineapples and bananas. The early Spanish colonists expanded these crops and added to them livestock and crops introduced from Spain (Williams 1970). On his second

voyage to the Caribbean in 1493, Columbus brought with him livestock, vegetables, wheat, barely, citrus and other plants and introduced sugarcane from the Canary Islands (Williams 1970); this latter crop took on great importance for subsequent political and economic elements in Jamaica.

Early Caribbean settlers attempted to compete in the world market by cultivating cotton, tobacco and indigo and selling these crops to Europe. However, for a number of reasons, such as quality of the commodity, these colonists were not successful as plantation cultivators of cotton and tobacco and turned to sugarcane. According to Mintz,

In the Great Antilles (Cuba, Puerto Rico and Jamaica) Spanish settlers eventually brought in sugarcane, the methods for its cultivation, the technology of water- and animal powered mills, enslaved labor, and the process for grinding, boiling and fabricating sugars and molasses from extracted juice, as well as for distilling rum from the molasses (Mintz 1985:34).

By the early sixteenth century Hispaniola (present day Haiti and the Dominican Republic) became the cradle of the Caribbean sugar economy, and this cradle gradually spread to Jamaica, Puerto Rico and Cuba (Williams 1970; Beckford 1972; Parry, Sherlock and Manigot 1987). In 1523 there were thirty sugar mills in Jamaica; five years later there were ten in Puerto Rico and Hispaniola had between forty and fifty sugar mills (Williams 1970). At that time, the most important product of the Caribbean plantation system was sugar, which remained the principal product for centuries. Nonetheless, a number of other commodities, such as coffee, chocolate (cacao), nutmeg, and coconut were cultivated on some plantations.

A double triangular trade network emerged in the seventeenth century between

Europe, Africa and the Caribbean islands (Beckford 1970; Mintz 1985; Sherlock, Parry and Manigot 1987; Thomas 1988; Williams 1970; Wolf 1984). The first triangle began with European ships which purchased slaves from African chieftains and other traders in exchange for manufactured goods (weapons, metals and fabrics). The ships then sailed across the Atlantic Ocean to Caribbean Sea where they sold human cargo to the plantation owners. Completing the triangle, the ships then returned to Europe carrying sugar, rum and other tropical products for sale to European merchants. In addition, European ships sailed to the Caribbean islands to supply the plantocracy (plantation owners) with imported food stuffs, furniture, spices, and cloth, some of which had its origin from the Orient. The second triangle was between New England, Africa and the West Indies. According to Mintz "from New England went rum to Africa, whence slaves to the West Indies, whence molasses back to New England (with which to make rum)" (Mintz 1985:43).¹⁵ These trade networks were maintained in the British West Indies until Emancipation (1838).

Plantations are characterized as economic units producing one or two agricultural commodities for sale with the use of a large number of unskilled and skilled laborers whose activities are closely monitored (Beckford 1972; Mintz 1985; Parry, Sherlock and Manigot 1987). Mintz describes the plantation as "a synthesis of field and factory, of skilled workers and unskilled, and the strictness of scheduling together gave an industrial (military) cast to plantation enterprises" (Mintz 1985:52). However, Beckford views the

¹⁵ The maturation of this second triangle put the New England colonies on a political collision course with Britain, but the underlying problems were economic, taking on political import precisely because they brought divergent economic interest into confrontation (Mintz 1985:43).

plantation as a social system¹⁶ in the territory in which it is located (the internal dimension); he also sees the plantation as an economic system both in the territory of its location and in the wider world community (the external dimensions). Perhaps of greatest importance, Beckford contends, is that the external and internal dimensions are interrelated (Beckford 1972). Similar to Mintz (1985), Beckford identifies certain characteristics of plantations: "generally they cover large areas, numerous unskilled workers are involved, decision making is highly centralized, the pattern of management organization is authoritarian, and workers and decision makers are separated by social and cultural differences ... Authority and control are inherent in the plantation system" (Beckford 1972:53).

A plantation society is a plural society, as the plantation society is composed of different ethnic and cultural groups that are brought together in the realm of economic activity (Beckford 1972). "In a plural society the community tends to be organized for production rather than for social life" (Beckford 1972:81). A plantation community is described as an internally rigid system of social stratification, and the white European stock owners or managers occupy the upper level. Those occupying the middle are skilled personnel who are culturally mixed, and at the bottom of the hierarchy are the unskilled laborers who are considered culturally different by those in the other strata (Beckford 1972; Hoetink 1985). According to Beckford,

there is virtually no mobility in either direction within this system of stratification and every aspect of life on the plantation reflects the social structure.... The plantation work does not alone determine the social

¹⁶ By "system" we simply mean a set of relations governing the components parts that make up the whole. In any such network of relations there is a coming together of the component parts at some point and for some common purpose (Beckford 1972:10).

structure. For those living on the plantation, the institution is not just a place of work; it is a their whole life (Beckford, 1972:54).

As such, the social organization of a plantation community is pluralistic rather than homogeneous in its composition. However, a resulting sense of community is not always the norm.

According to Wagley (1961 in Beckford 1972) slavery and the plantation economy contributed to the lack of a strong and well-defined local community in the Caribbean region. Wagley points out that the decimation of the indigenous population in the region precluded any possible aboriginal basis for local community life. In addition, the transferred population of African slaves from many tribes and nations were unable under conditions of slavery to form communities. While paternalism and common residence often united the slaves of a particular plantation into a neighborhood, they were unable to develop to a full community life (Wagley 1961 in Beckford 1972). Even after abolition of slavery the plantation system continued to exert an influence unfavorable on the development of a strong and cohesive local community.

4.2.2 Labor Force

Aside from land, a significant component of a plantation is its labor force. Over the centuries, the plantation labor force has gone through several transformations. A number of these changes are related to the plantocracies' access to labor, which in turn have resulted in labor shortages or unrests (Bakan 1990; Beckford 1972; Beckford and Witter 1982; Manley 1991a; Parry, Sherlock and Manigot 1987; Thomas 1988; Williams 1970). From the onset, the initial agricultural production processes and European diseases

contributed to the demise of the indigenous population (Williams 1970). In addition,

Williams points out:

Very little effort was made to enslave the indigenous population though we have accounts of Barbados that speak of Indian slaves imported from the Spanish islands and the mainland, the men to be used as hunters and the women as domestic servants. But the Indian supply, inadequate and unsuitable for the Spaniards in the sixteenth century could hardly have satisfied the English and the French in the seventeenth century (Williams 1970:95).

Europeans turned to Europe for white labor to supplement the growing need of a labor force in their new territories. Europeans supplied their labor force both voluntarily and involuntarily with indentured servants, convicts, malefactors and, deported religious and political non-conformists (Williams 1970). The end of the seventeenth century brought an end to the system of white labor, for it became too expensive to maintain. The shift in labor system coincided with earlier settlers not competing successfully in the world market with cotton and tobacco and increasing their participation with sugar (Beckford 1972; Parry, Sherlock and Manigot 1987; Williams 1970).

The precedent set of kidnapping whites laid the foundation for kidnapping Africans (Williams 1970), and the seventeenth century saw the beginnings of the system of black labor. Williams (1970) notes the sugar industry became increasingly an undertaking for the large capitalist and continued to depend increasingly upon black labor.

The sugar plantation required three times the number of Negroes and livestock needed on a plantation producing crops other than sugar. For sugar cultivation one slave was required for every two acres, as compared with one slave to thirty or forty acres of a corn and one slave to five or ten acres of cotton (Williams 1970:124).

By the eighteenth century all the islands imported and used African slaves on their plantations. As such, an estimated five million African had been abducted between the

seventeenth and nineteenth centuries (Williams 1970).

Upon arrival to the Caribbean islands, slaves were sold according to their age, health, and sex, and most slaves were immediately put to work on the plantations. Men, women and children were forced to work under arduous and brutal conditions (Bakan 1990; Beckford 1972; Bush 1990; Goveia 1965; Gaspar 1985; Sheridan 1974). Slaves worked from dawn until dusk, planting, cutting cane, or performing other plantation related tasks. On some plantations on a number of the islands, slaves were permitted to grow their own food on small plots, supplementing what the owners did and did not provide (Bakan 1990; Bush 1990; Goveia 1965). Nonetheless treatment of most slaves by planters and managers was ruthless. Inhumane punishments (flogging, branding, loss of body parts, and/or death) were served and frequently dispensed.

In her research Bush (1990) that fertility among women was affected by the harsh conditions with which the women had to contend. In addition, there was a high death rate among the slave population. Consequently, it became cheaper for the plantocracy to replace their labor through the purchase of more slaves than rely on the reproductive capacity of their female slaves. However, this gruesome assessment of economic efficiency eventually changed when it became prohibitively costly and illegal to purchase slaves, pre- and post-Emancipation (Bakan 1990; Beckford 1972; Bush 1990; Goveia 1965; Gaspar 1985; Sheridan 1974).

4.2.3 Slave Resistance

Since the introduction of slavery into the Caribbean at the beginning of the sixteenth century, slaves have displayed resistance to their conditions and treatment.

Some slaves individually reacted by running away, killing their masters, and destroying property. Others collectively engaged in armed uprisings on plantations in the form of revolts or rebellions (Bakan 1990; Beckford 1972; Bush 1990; Parry, Sherlock and Manigot 1987; Williams 1970). According to Beckford, the brutality and inhumanity of slavery forced the slaves into a total rejection of the plantation. Those that revolted laid the foundation for subsequent political and social change (Beckford 1972). Revolts leading to plantations being burned as early as 1522 on Hispaniola (Williams 1970). Revolts were crushed by the colonial militias, but this did not deter slaves who had no other way of fighting for their freedom. The frequency of uprisings reached its zenith in the eighteenth century when slave population was at its highest (Bakan 1990; Beckford 1972; Parry, Sherlock and Manigot 1987; Williams 1970).¹⁷

Rather than take to arms, some slaves escaped the harsh conditions of plantation life by fleeing to remote areas and establishing "free communities" (Bakan 1990; Beckford 1972; Bush 1990; Williams 1970). These escaped slaves, called 'Maroons' (from the Spanish word, cimarron, meaning wild), were quite successful at avoiding recapture (Williams 1970).¹⁸ Today, Maroon populations are found in Martinique and Jamaica in

¹⁷ The list includes major revolts and the territories where they occurred (Williams 1970:194-195).

1733 St. Johns	1746 Jamaica	1761 Suriname
1734 Jamaica	1752 Martinique	1765 Jamaica
1736 Antigua	1760 Jamaica	1769 Jamaica
1737 Guadeloupe	1761 Nevis	1769 Jamaica
		1776 Jamaica, Montserrat

¹⁸ "By the middle of the sixteenth century the Maroons in Hispaniola were estimated to number seven thousand where as the white male population barely exceeded one thousand" (Williams 1970:67).

viable communities (Bakan 1990; Bush 1990; Williams 1970).

4.2.4 Plantocracy and Sugar Profits

In contrast to the miserable existence of the slaves, many Anglo-European plantation owners lived in luxury. Great houses dominated the plantations and scattered the countryside. The plantation owners tended to grow sugarcane for export, using their sugar earnings to import many of their material goods and food items (Beckford 1972; Mintz 1985; Parry, Sherlock and Manigot 1987; Williams 1970; Wright 1966). However, not all plantations were prosperous, according to Mintz (1985), who notes that plantations were speculative enterprises. "While some sugar plantations eventuated in enormous profits for fortunate investors, bankruptcies were common; some of the most daring plantation entrepreneurs ended their days in debtor's prison" (Mintz 1985:44).

Sugar -- the "white gold" -- brought some riches to Caribbean planters and industrialists who refined it and sold the products in Europe (Mintz 1985). The colonies became vital to the economies of European countries.¹⁹ ²⁰ They provided raw materials which could not be found in Europe, and they, in turn, bought manufactured goods back from the European producers. Despite this flow of riches from the colonies to the empire, the colonial system was based on a two-way trade (Williams 1970). Many colonists in the late eighteenth century resented the system, in particular the monopoly that European

¹⁹ "The rise of capitalism in the late eighteenth century involved the destruction of economic systems that preceded it - notably European feudalism - and the creation of a system of world trade... The Caribbean plantations were a vital part of the process, providing both important commodities for European consumption and important markets for production" (Mintz 1985:55).

²⁰ Slave labor is a contrary form of labor power to be associated with the capitalist mode of production.

governments held over their colonies. A Jamaican sugar producer, for example, had to sell to a British refiner, even if a Dutch refiner was prepared to pay more. Local planters rebelled against such controls and demanded greater independence for the colonies.²¹ This was the beginning of Caribbean nationalism, the idea that the colonies should become self-governing nations (Bakan 1990; Beckford 1972).

The profits from sugar went partly to the planters. Many planters however, left the island and returned to Europe with their fortunes, new status and access to power. Profits also went to European capitalists who refined and sold the sugar and who exported other goods to the Caribbean colonies. Governments took their share of the profits through various forms of taxation. These huge profits and transfer of political power helped to fund and guide Europe's economic development; it was sugar that largely financed Europe's Industrial Revolution (Mintz 1985). The great advance of the eighteenth and nineteenth centuries - the growth of factories and mass production, railways, ports and roads - was chiefly made possible by the colonial system and by the sweat of slaves (Beckford and Witter 1982; Mintz 1985; Williams 1970).

Despite the wealth sugar produced, the Caribbean itself remained extremely poor (Beckford 1972). Initially, the planters shipped in some technology such as machinery for crushing the cane, but otherwise they rarely introduced modern techniques. Slave labor and animal traction were the primary labor sources until the nineteenth century (Higman 1988). Mintz contends, from the seventeenth to the middle nineteenth century,

²¹ "The sugar war in the Caribbean was paralleled by a war between metropolitan countries for the control of the world sugar market..... The metropolitan struggle for the world sugar market was of decisive significance for the Caribbean economy - it encouraged monoculture" (Williams 1970:116).

technological changes in production (from field to factory) were relatively minor. The enlarged market for sugar from the British West Indies islands was satisfied "by a steady extension of production rather than by sharp increases in yields per acre of land, ton of cane, or productivity per worker" (Mintz 1985:36).

The plantations utilized only the most fertile lands in the islands to cultivate sugarcane. Other crops were not cultivated in large acreage as non-sugar crops would have taken up valuable space in the plantation (Williams 1970). However, by the eighteenth century a number of the Europeans in the islands began plans for economic diversification. The French made plans to cultivate tea, coffee, pepper, nutmeg, cinnamon, cassia, olives and onions; the British in Jamaica expanded to include cocoa, annatto, indigo and coffee production; and the Dutch in Guiana focused on rice, coffee, tobacco, medicines, saw mills and livestock (Williams 1970).

By the beginning of the nineteenth century sugar production had passed its peak, and the colonial economies were on the decline (Beckford 1972; Mintz 1985; Parry, Sherlock and Manigot 1987; Williams 1970). The colonies were producing too much sugar, causing prices to drop. Competition increased from within the Caribbean, (from Mexico, Brazil, Paraguay, and the Pacific coast of South America) and with the introduction of beet sugar in Europe. Concurrently, a movement was growing in Europe to abolish the slave trade, arguing that slavery was morally unacceptable and could not be tolerated by the Christian societies of Europe (Beckford 1972; Williams 1970). Powerful though these arguments were, they were perhaps less important than the economic grounds for abolishing slavery. Many Europeans had realized that slavery was not only inhumane, but also fundamentally inefficient. The planters contended it would be less

expensive to pay wages to free laborers than to keep them as slaves, for the planters would not have to feed and house their work force. The planters also believed that laborers would work harder for wages than slaves under captivity, particularly if they were paid accordingly to the amount they produced. For both economic and humanitarian reasons, slavery was abolished in 1838 in the British colonies and 1843 in those colonies ruled by France. Mintz states, "the planter classes sought to recreate pre-emancipation conditions - to replace the disciplines of slavery with the discipline of hunger" (Mintz 1985:70). Accordingly, the end of the plantation slave economies transformed the Caribbean into wage-labor plantation economies (Williams 1970), an effect that had tremendous importance to the development of latter political economies in the region.

4.3 Post-Emancipation

Upon Emancipation, ex-slaves gave rise to wage laborers and the Jamaican proletariat, and simultaneously accentuated the demand for land to support their independent existence (Beckford and Witter 1982). At first the new system of wage labor proved more profitable to plantation owners than the slave system. Productivity increased, and sugar continued to flow in huge quantities to Europe. Gradually some British colonies, such as Jamaica and Trinidad, began to produce other crops and materials for export, whereas others like Barbados and St. Vincent cultivated primarily sugarcane. The planters that were unwilling to introduce new methods and technology slowly fell behind other large islands in the Caribbean, such as Cuba and Puerto Rico, that were rapidly modernizing their sugar industries (Beckford 1972; Williams 1970). According to Williams (1970), superior technology and cultivation techniques were, to a large extent,

responsible for the development of the cane industry outside of the Caribbean. The British colonies did not have railways or big factories that other producers had built to increase output. In addition, Britain no longer required as much sugar from the Caribbean and did not want to pay for the modernizations.²² Consequently, the British West Indies did not modify their production systems, but many sold their plantations to international companies or went bankrupt (Bakan 1990; Beckford 1972; Williams 1970).

Emancipation in the British West Indies posed another problem - one of access to a labor source (Beckford 1972; Beckford and Witter 1982; Thomas 1988; Williams 1970). The British turned to India, Syria, Turkey and China for their labor supply to supplement the loss from the abolition of slavery. The new labor force was brought over as indentured servants, similar to the early European laborers who were recruited.

A number of plantations were no longer owned by individual planters as they had been during the eighteenth and nineteenth centuries. Many had been taken over by foreign companies, such as the British-owned Tate and Lyle that employed large numbers of workers in their fields and factories (Beckford 1972; Edie 1991; Thomas 1988; Williams 1970). These companies, because of their wealth and power, could buy up the best and most fertile land in any area, forcing small holders and independent farmers into less fertile regions of the islands. Much of the remaining best land was owned by absentee landlords, and often left unattended.

²² The full extent of British West Indian backwardness can be appreciated when it is realized that the average yield per factory in Cuba in 1894 was more than ten times the average in the British West Indies. For example, British West Indian exports in 1894 required 1,046 factories to produce what Cuba produced in 100 factories, and exports produced in 140 Jamaican factories could have been produced in eight Cuban factories (Williams 1970:369).

Where possible, former slaves sought opportunities as independent of the plantation as possible (Beckford 1972). Some former slaves became small-holder producers taking land of whatever quality was available to establish subsistence plots and market surpluses (Beckford 1972). "The success with which the ex-slaves managed to establish small-farms depended in large measure on the availability of land" (Beckford 1972). Hence, smallholder farmers traditionally have played an important part in West Indian agriculture (Beckford and Witter 1982; Jamaica's Farmer Guide 1988; LeFranc 1983).

By the 1930's, the Caribbean colonies were no longer an important source of wealth. The islands had thousands of acres in sugarcane that nobody really wanted to buy and had no industries to produce goods which local people wanted. The islands had primarily exported a single crop and had failed to develop other sorts of large-scale agriculture that would have helped them to diversify their production. According to Beckford,

how resources are used in any society will influence the welfare of people who live in it in important ways. The stock of resources at any point in time, and addition to this stock overtime, are a constraint on the capacity of the society to produce the goods and services desired by consumers (Beckford 1972:154).

As such, Caribbean development had been geared toward other nations' needs, not their own, and now the colonial powers no longer needed them (Williams 1970).

Discouraged from the lack of development and employment opportunities, many Caribbeans left the region (Boyd 1988; Edie 1991; Thomas 1988). During the last years of the nineteenth century, thousands had moved from island to island within the region in search of work. For example, "the Panama canal which was built between 1881 and 1914

employed some 83,000 workers, mostly who were from the English speaking Caribbean" (Ferguson 1990:17). In addition, the expanding banana and sugar trade in Cuba, the Dominican Republic and Central America attracted many West Indians from the British and French colonies who sought to escape poverty at home. Between 1951 and 1960 over 200,000 people from the Caribbean migrated to the United States; many never returned to the Caribbean. Between 1960 and 1962 an estimated 168,000 people left for Britain and most decided to stay. Beckford states:

In spite of attempts by the government to provide assistance to small-holders in recent decades, incremental agricultural resources tend to flow towards the plantation sector and the smallholders increasingly have been forced to seek possibilities for advancement through migration and/or wage work on plantations. Thus, the situation has reverted to very much the same pattern that existed just after Emancipation (Beckford 1972:23).

This mass migration acted as a safety valve in the colonies, reducing the number of unemployed (Boyd 1988; Thomas 1988). Yet, it also took from the Caribbean many workers, skilled and unskilled, who might otherwise have contributed to the region's development (Boyd 1988; Thomas 1988).

4.3.1 National Protest

After more than a hundred and fifty years and the abolition of slavery in the European-ruled Caribbean territories, conditions for the majority of people have not improved (Beckford 1972; Beckford and Witter 1982; Edie 1991; Sunshine 1985; Thomas 1988). Nearly all the regions' poor people are either subsistence farmers, growing barely enough food to feed their families, or are wage laborers in the plantations (Beckford 1972; Beckford and Witter 1982; Edie 1991; LeFranc 1983; Sunshine 1985). Since sugarcane

cultivation is highly seasonal laborers would work on plantations at harvest times and on their small-holdings the rest of the year. In addition, some farmers squat on the fringes of the big estates or on "Crown Lands," lands that belonged to the colonial government, lands usually unused and unproductive. The situation became worse with collapse of the international banking and trading system that accompanied the Great Depression; this led to a drastic fall in world commodity prices. Many of the Caribbean territories were almost entirely dependent upon sugar as their principal export (Beckford 1972). As the value of sugar on the world market plunged, the plantations reduced the number of workers employed, and poverty spread (Beckford 1972; Beckford and Witter 1982; Edie 1991; LeFranc 1983; Sunshine 1985; Thomas 1988).

A number of laborers joined trade unions during this period of economic uncertainty, bringing together not only agricultural workers but others such as dockers and transport workers (Bakan 1990; Edie 1991; Manley 1991a). Another symptom of the deepening crisis and the peoples' response was the growth of nationalism (Bakan 1990; Beckford 1972; Edie 1991; Manley 1991; Thomas 1988; Williams 1970). Among plantation owners a kind of nationalism first existed in the preceding two centuries because this class resented the monopoly trade that European governments forced upon the colonies. According to Beckford,

plantations were a major target in the independence struggle of many colonial peoples. As a result of this hegemony of scarce land in some places and the depressingly low levels of wages and living conditions everywhere, the pressures that they created on the peoples of plantation economies gave rise to a peasant movements and labor unions (Beckford 1972:4).

It was the poor of the towns and countrysides who began to think that independence from

European powers and their economic domination would improve their lives (Bakan 1990; Beckford 1972; Edie 1991; Manley 1991; Thomas 1988; Williams 1970).

4.3.2 Independence

In the larger British territories the majority of the people wanted full independence, as they wished to break free from the system of colonial dependence and choose their own national leaders and policies (Bakan 1990; Edie 1991). There was a belief among some that the Caribbean territories, even when officially independent, should remain linked economically and politically to their European rulers and to other major powers (preserving the status quo). Others, however, favored a more decisive break from these colonial ties and argued that the Caribbean territories should be truly independent (Beckford 1972; Beckford and Witter 1982; Edie 1991; Sunshine 1985).

During the 1960's and 1970's many of the British colonies became politically independent nation states, yet, the independence won by the Caribbean islands was far from complete. Although they were, in theory, in control of their own development, they had to contend with a powerful neighbor (the United States) and its hostility toward communism, or anything it regarded as such, within its own 'backyard' (Beckford 1972). Yet, the United States was the home of companies that wanted to control the way Caribbean nations developed their economies (Beckford 1972; Boyd 1988; Girvan 1978; Henry 1985; Sunshine 1985; Thomas 1988). Historically, Caribbean economies had always been geared toward exporting a few commodities and importing most other goods; they were extremely dependent upon foreign markets and suppliers. Political independence was, therefore, not a guarantee of economic independence (Bakan 1990;

Beckford 1972; Edie 1991; Henry 1985; Stone 1989; Sunshine 1985; Thomas 1988).

The newly independent Caribbean States faced a dilemma. The new nations were supposedly able to choose their own governments, design policies, and trade with whichever countries they wished. Was this real independence? In reality, their options were limited. These Caribbean nations could either remain formally tied to Britain (and many recognized this by joining the British Commonwealth) or they could look to the United States for trade and investments within their economies (Bakan 1990; Boyd 1988; Edie 1991; Sunshine 1985; Thomas 1988). From the outset, the new Caribbean nations were dependent upon both more powerful foreign countries and their own traditional exports. They could not become self-sufficient overnight, but many economic experts insisted that they should start working toward a greater degree of economic independence.

The United States replaced Britain as the major outside influence in countries, such as Jamaica, Trinidad and Barbados. Although Jamaica, Trinidad and Barbados remained members of the British Commonwealth, they became increasingly dependent upon the United States for trade and financial aid (Beckford 1972; Beckford and Witter 1982; Boyd 1988; Edie 1991; Girvan 1978; Sunshine 1985; Thomas 1988).

Emerging from three centuries of colonialism, the independent Caribbean islands had to decide what path to development they wished to follow (Edie 1991; Sunshine 1985; Thomas 1988). This path of development depended to a large extent upon which resources they had, how they planned to utilize them and to whom they wanted to sell the final product. Some countries were more fortunate than others, as they had particular natural resources that were valuable in the international market. Oil had been discovered in Trinidad in 1907, whereas Jamaica, Haiti, Guyana and the Dominican Republic and

Surinam had been mining bauxite since the 1950's (Beckford 1972; Edie 1991; Manley 1990; Sunshine 1985; Thomas 1988). Other countries did not possess these obvious advantages but had others. All of the islands have year-round warm climates which made them suitable for tourism; they have largely agricultural economies based on fertile land; and they have large numbers of potential workers. These advantages attracted foreign-based companies to do business with the newly independent Caribbean states (Sunshine 1985; Thomas 1988).

Since the Second World War, the world's economy has been increasingly dominated by the activities of transnational corporations (TNC's) (Beckford 1987; Edie 1991; Girvan 1978, 1991; Sunshine 1985; Thomas 1988). A TNC is a firm which produces its goods or services outside its country of origin and therefore, operates in a number of foreign countries (i.e., Coca-Cola, Ford, Barclay's Bank, Tate and Lyle, and Geest for sugar and bananas). Caribbean governments and business communities contend they need the TNC's for their national economies. The governments planned to tax the TNC's on their activities and profits, and businessmen looked forward to jobs as local agents or representatives of the TNC's (Beckford 1972 and 1987; Edie 1991; Girvan 1978; LeFranc 1987; Sunshine 1985). The governments enabled the TNC's to extract resources or to set up factories; in exchange, employment would be created locally, and the TNC's would pay a fair price for the resources that they used. The TNC's interest was not the welfare of the countries in which wished to do business; their first priority was making profits which could be sent back to the United States or Europe. The interests of the poor were by no means the same as those of the TNC's and their local agents (Beckford 1972; Edie 1991; Girvan 1978; LeFranc 1987; Sunshine 1985). As a result,

every one of these development strategies, whether in agriculture, industry, banking, new technology, or the extraction of natural resources, has strengthened the power and influence of the TNC's within the region and increased the region's dependence upon them (Beckford 1972; Beckford and Witter 1982; Girvan 1978; Edie 1991; Sunshine 1985).

4.4 Jamaica's History

Jamaica's political, social and economic history has been inextricably connected with the development of an international system. According to a number of Caribbeanists, Jamaica's history is that of an economically dependent nation whose development, or lack of it, has been influenced by the interest of capitalist expansion by imperial powers (Bakan 1990; Beckford 1972 and 1987; Beckford and Witter 1982; Edie 1991; Girvan 1978; Manley 1990; Sunshine 1985; Thomas 1988). The history of the pressures for international production manifests itself on Jamaica's class structure and to the access of resources (land, labor, capital and markets) (Bakan 1990; Beckford 1972; Beckford and Witter 1982; Edie 1991; Girvan 1978; Manley 1990; Sunshine 1985). A general description of the social structure and makeup will be helpful in examining this history.

4.4.1 Jamaica's Social Makeup

Jamaica is a Caribbean island of slightly more than 44,000 square miles and is subdivided into three counties: Cornwall, Middlesex and Surrey. The three counties are further divided into thirteen Parishes. The county of Surrey includes the parishes of St. Thomas, Portland, metropolitan Kingston, and St. Andrew. The county of Middlesex includes the southern parishes of St. Catherine, Clarendon, Manchester, and the northern of St. Mary and St. Ann. The county of Cornwall includes five parishes: St. Elizabeth,

Westmoreland, Hanover, St. James and Trelawny.

Jamaica supports a population of approximately 2.5 million inhabitants (Bakan 1990; Edie 1991). Jamaica's population would be higher if it were not for the considerable and continuous out migration of Jamaicans, yet, between 1961-1982 over half a million people have migrated to the United States, United Kingdom and Canada in search of employment abroad (Boyd 1988; Edie 1991). Boyd refers to the out-migration as an "economic-safety valve" (Boyd, 1988:13). The above number represents one quarter of Jamaica's population and comprises a number of unskilled and skilled workers who otherwise might have contributed to the development of Jamaica and the region (Boyd 1988; Sunshine 1985; Edie 1991).

The society is stratified along racial and class lines, stemming from the plantation slavery system (Edie 1991). "The majority of the population are descendants of African slaves, forced to leave their villages some two hundred years ago to labor on Jamaican plantations for white masters. In contemporary Jamaica, the legacy of slavery is still very much a part of popular consciousness" (Bakan 1990:3). This is reflected in the arts, music and everyday life (Bakan 1990; Beckford and Witter 1982; Campbell, H. 1987).

4.4.2 Jamaica Political Structure

As discussed previously, Jamaica was formerly a Spanish colony, with Spain ruling for one and a half centuries. On May 3rd, 1655, Jamaica became an English colony when the English defeated the Spanish at point of Caguaya, now known as Port Royal (Gardner 1783). The English take over began a new era of colonization (Beckford and Witter 1982). Jamaica became a sovereign nation by receiving its independence from England in

1962. Since independence Jamaica's government is based on a system of parliamentary democracy, and Jamaica remains a British Commonwealth with a constitutional monarchy (Edie 1991). The Queen of England is the titular head of state, and the queen remains empowered to appoint Jamaica's governor general who serves as her local representative (Zach et al. 1988). Real power remains vested in the prime minister who is an elected leader Jamaicans vote his/her party into power (Zach et al. 1988). In order to understand how political power is wielded by narrow political entities, a detailed understanding of the branches of government that operate in Jamaica is needed.

Jamaica has a bicameral parliament that is divided into the House of Representatives and Senate. The sixty members of the House of Representatives are freely elected by a plurality of voters from the fourteen parishes (Zach et al. 1988). Today, the two party system is represented by the Peoples National Party (PNP) and the Jamaica Labor Party (JLP),²³ and each party is known to have strong loyalists. Party affiliations are known to divide communities and even lead to bloodshed (Bakan 1990; Edie 1991; Manley 1991).

There are fourteen parish councils that are elected every three years. Each of the fourteen parishes elects a council to attend to matters of local government. The Parish Council is primarily responsible for responding to local needs and interests within the boundaries of parishes. According to McBain:

The unit of local government, the Parish Council, is theoretically the ultimate

²³ "In the post-war period both JLP and PNP governments actively encouraged the penetration of foreign capital in the local economy in an "industrialization by invitation" program. This policy provided incentives to attract foreign capitals to establish manufacturing activities (i.e., tax-free holidays, duty-free imports or raw materials, accelerated depreciation allowances and site rental in industrial states)" (Edie 1991:33).

authority at the community level. However, Parish Councils have no efficient mechanisms for resolving agricultural problems in the communities. Yet, the main representative organization of small farmers is the Jamaican Agricultural Society (JAS). However, the ability of the JAS to influence government policy in the interests of the small-farming community has been constrained by at least four factors: lack of autonomy, blanket nature of structure, middle class orientation and party politics (McBain 1987:162-161).

As in the past, Jamaica's political system remains intricately linked to the economic system, locally, regionally and internationally. Jamaica's prime ministers and politicians have played an active role in this economic system. A relatively recent example is provided to illustrate the complexity of the multilevel political and economic linkages. In the early 1980's, President Reagan of the United States announced that Jamaica would become a model for Caribbean development. According to Sunshine (1985), under the supervision of the United States Agency for International Development (USAID) and the International Monetary Fund (IMF), Prime Minister Seaga (who took office in 1980) was to restructure the island's economy. This meant removing government restraints on the private sector and going all out to attract foreign investment that could produce for export (Sunshine 1985). The United States and multilateral lenders poured money into Jamaica and granted many other special favors, including purchasing \$67 million worth of Jamaican bauxite to add to the US stockpiles (Sunshine 1985). The initial results of the first two years were positive; economic growth). However, by mid-1982 there was a down turn in economic growth (Boyd 1988; Edie 1991; Sunshine 1985). Corporations that entered Jamaica included Eastern Airlines, Gulf and Western, Hilton International, Exxon and ALCOA. "With the exception of Control Data, no large corporations were putting money into Jamaica" (Sunshine 1985:153). By December 1982 Seaga borrowed US\$ 1.086 billion from multilateral lending agencies (Sunshine 1985). These political and

economic decisions had major implications for Jamaicans (Boyd 1988; Edie 1991; Sunshine 1985; Thomas 1988).^{24, 25}

4.4.3 Jamaican Politics and Economics

4.4.3a Politics and Economics of Jamaica's Agriculture

Historically, Jamaica's agriculture is at the foundation of Jamaica's political and economic systems (Bakan 1990; Beckford 1972; Beckford and Witter 1982; Boyd 1988; Edie 1991; Mintz 1985; Parry, Sherlock and Manigot 1987; Satchell 1990; Williams 1970). Jamaica has had a long "bitter-sweet" history of producing sugar, bananas, coffee, spices and a number of other tropical fruits and plants for local and international markets (Beckford and Witter 1982).

For over two hundred years (until Emancipation in 1834) Jamaica was a slave plantation society specializing in the production of sugar for export to England.²⁶ Sugarcane production was and remains linked to an international market economy. A number of items (slaves, sugar, rum and tropical fruits) were traded between Europe,

²⁴ "The IMF immediately came through with US \$698 million in loans for the new government, and the World Bank lent US \$133 million. Seaga, in fact borrowed more money in his first two years than Jamaica had in the entire previous decade" (Sunshine 1985:152).

²⁵ "Buoyed by foreign aid and loans, the economy resumed positive growth of two percent in 1981 after seven years of negative growth. A total of 116 new investment projects worth US \$243 million were reported in 1981 and 1982" (Sunshine 1985:153).

²⁶ According to Higman, a Jamaican historian, "the planter-historian Bryan Edwards observed in the 1790s that it was almost impossible to find in Jamaica a block of even 300 unclear acres that was more or less uniform in soil and topography. This area approximated the amount of cane land required for a medium-sized estate. The extension of settlement into the interior inevitably resulted in an increase in the overall size of estates in the their internal topographical diversity" (Higman 1988:9).

North American colonies and later States, among other Caribbean islands and Africa (Beckford 1972; Gardner 1873; Mintz 1985; Parry, Sherlock and Manigot 1987; Williams 1970). This intricately woven trade network has been sustained to present times; however, commodities, political and economic systems have been considerably modified. Today, Jamaica is a member of the Caribbean Common Market (CARICOM), whose trade members are former Common Wealth colonies in the Western Caribbean and include Belize (Central America) and Guyana (South America).

Trelawny Parish, where Green Park is located, occupies 352 square miles and extends from the Cockpit Country to the north coast between St. Ann and St. James parishes (Regional Research Centre 1970). Trelawny Parish lies in "the sugar belt" of Jamaica where sugarcane is traditionally cultivated (Cowell 1987). Rum and sugar continue to be the main products of Trelawny. Two sugar factories continue to operate, Long Pond Sugar Estate (a government owned sugar factory) and Hamden Sugar Estate, (a privately own sugar estate).

In addition to the pre-eminence of sugar in the region's economy, livestock rearing (cattle) played a role in the plantation system. Livestock were used in the sugar production process as draft animals. Historian Gardner (1873), who wrote on the transition period between Spanish and English rule of Jamaica, states,

As soon as the government of the island was established on a firm basis, attention was drawn to the excellent quality of pasturage, and cattle soon received a proper share of attention from the early settlers, who were not long in discovering that they not only thrive better, but were larger than in the plantations of North America (Gardner 1873:79).

In addition, Gardner (1873) quotes Modyford, a Jamaican plantation owner and chief justice who states "the interior forests were undisturbed, and rain was consequently far

more abundant than now, the low land pastures must have conveyed the impression of inexhaustible fertility" (Gardner 1873:79).

In the British West Indies, the decline of the sugar plantation economy after Emancipation (1838) resulted in a corresponding decline in the need for draft animals. The pen-keeping industry was reorganized, responding to economic conditions.²⁷ In addition, some nineteenth century cultivators expanded to banana production, indicating another response to the decline in the sugar industry. The cultivation of bananas helped to diversify the economy. Banana production, unlike sugarcane, was amenable to small-scale hill side production, required far less labor, and fit well into the mixed cropping strategies of subsistence producers. As a result, small-scale land holders could seize the opportunity to produce for the market, and this is observed in the twentieth century (Beckford and Witter 1982). However, since Emancipation, Jamaican small-holders and landless have not managed to secure very much of the country's agricultural resources (Beckford 1972; Beckford and Witter 1982; Edie 1991). "What little they have achieved can hardly be maintained in the face of continuing shift competition from the plantations" (Beckford and

²⁷ "In 1883 over 14,600 cattle were slaughtered in the island resulting in a substantial decrease in the importation of salted fish and meat. Cattle was not reared only for the local market, but also for export. During the 1870s Jamaica had a vibrant trade in cattle with Cuba. The continued expansion of the penkeeping industry during the late 19th century signaled the further diversification of the economic activities of the estate owners. With continued unprofitability of sugar production some planters transferred their estates into cattle pens as a means of surviving the economic crisis in the plantation economy. Sugar planters were not the only ones expanding the penkeeping industry. Penkeepers themselves were also expanding the area they held under pasture land through purchases of large as well as small acreages securing their holdings. Between 1869 and 1990, the area under Guinea Grass and common grass increased from 381,997 acres to 515,916 indicating that during this period the pen-keeping industry was expanding greatly. St. Ann, St. James, Hanover and Trelawny on the north coast and Westmoreland, St. Elizabeth, Manchester and St. Catherine in the south were the leading livestock producing parishes (Satchell 1990:49).

Witter 1982:23).

The agricultural sector continues to contribute to the national economy, although its contribution has been on the decline since the late 1980's (Boyd 1988; Edie 1991; Sachak 1987; Sunshine 1985; Thomas 1988). According to the Planning Institute of Jamaica (1990), the agricultural sector grew by J\$30.9 million between 1973-1978 (expressed in 1974 prices). However, in response to Jamaica's ailing bauxite sector, Prime Minister Seaga opened Jamaica to imports of agricultural products. "The decision had a negative impact on Jamaica's domestic production. Farmers suffered losses from sudden inflows of cheap foreign onions, potatoes, red beans and vegetables. Domestic agriculture declined eighteen percent in 1982" (Sunshine 1985:153). Although the agricultural sector employs approximately thirty percent of the labor force, this sector continues to fluctuate on a declining trend; accordingly, 1987's Gross Domestic Product (GDP) is less than that of 1978 (Planning Institute of Jamaica 1990). The Planning Institutes shows

that the sector has, in recent times, performed far below potential, despite a structural adjustment programme intended to improve performance. This trend has been accompanied by increasing dependence on imported food. Also, productivity is extremely low, so farm income and the standard of living in farming communities, especially of small farmers, is below acceptable levels (Planning Institutes of Jamaica 1990:64).

In spite of efforts to improve the agricultural sector and generate incentives for producers, this remains inadequate in generating sufficient foreign exchange for balance of payments, generating greater employment opportunities, and producing sufficiently for domestic consumption (Boyd 1988; Edie 1991; Planning Institute of Jamaica 1990).

In 1982 Beckford and Witter pointed out one of the key problems of Jamaica's inadequate agricultural sector performance. Put simply, Jamaica produces what it does

not consume directly, and Jamaica consumes what it does not produce (Beckford and Witter 1982). Jamaica's historical production and export of sugar, rum, coffee and ornamental flowers and its importation of rice, corn, wheat, dairy products (cheese and butter) and canned goods contribute to this dilemma (Boyd 1988; Edie 1991; Planning Institute of Jamaica 1990). In addition, incremental agricultural resource assistance tends to flow toward the plantation sector, and the small holder has been forced to seek possibilities for advancement (or survival) through migration and/or wage work on plantations. The situation is reverting to conditions that existed just after Emancipation (Beckford and Witter 1982; Boyd 1988). The Planning Institute of Jamaica (1990) contends the continued poor performance of the domestic food crop sector is a result of severe cutbacks in the Ministry of Agriculture's support services. These actions have negatively influenced the domestic food production and resource management (Planning Institute of Jamaica 1990).

4.4.3b Changes to Traditional Agricultural Economy

Since World-War II, Jamaica's economy has increasingly diversified between agriculture, bauxite-alumina, tourism, and manufacturing industries that respond to the international political and economic influences (Bakan 1990; Beckford 1987; Boyd 1988; Edie 1991; Ferguson 1990; Manley 1991). This postwar period brought North-American-based TNC's to Jamaica, and these TNC's set up manufacturing subsidiaries in joint ventures with the state or private sector (Beckford 1987; Edie 1991).²⁸ The TNCs

²⁸ Familiar names which set up operations in Jamaica include: Aluminum Company of America (ALCOA), Aluminum Company of Canada (ALCAN), Kaiser and Reynold Metals - bauxite industries, Firestone, Exxon, Colgate, Palmolive, DelMonte, Bata Shoes, Sheraton, Hilton, First

maintained "tight" relations with the state in order to attain cheap labor and resources (Cowell 1987; Edie 1991; Sachak 1987). In the 1950's "the agriculture, forestry and fishing sectors contributed thirty percent to GDP, falling to 6.7 percent in 1970. By 1970, the mining sectors contributed 12.6 percent and manufacturing 15.7 percent" (Edie 1991:79). Before and after independence in 1962, the Jamaican economy had expanded, based on bauxite and its flourishing tourist industry as major generators for foreign exchange (Ferguson 1990:35). The major growth sectors do not include agriculture and provide very few jobs (Bakan 1990). In fact, since the 1950's, the deteriorating economic situation was instrumental in promoting rapid rates of rural-urban migration and external migration (Beckford and Witter 1982). In fact, land sales provided the wherewithal for some Jamaicans to go abroad (Beckford and Witter 1982).

The new growth sectors (particularly bauxite, tourism and manufacturing industries) of the postwar period have been effectively penetrated by foreign capital and have become a part of the international capitalist system, with its asymmetrical distribution of power and resources (Beckford 1987; Edie 1991; Thomas 1988). Once again,

the economics of developing nations became important as raw resource producers, particularly of minerals, (such as bauxite and industrial metals). It is within this context that Jamaica became locked into a dependent relationship with powerful governments, TNC's and financial institutions of the advanced capitalist countries (Edie 1991:34).

The bauxite and tourism sectors served to deprive small holders of large acreages of land, thereby heightening the existence of land hunger (Beckford and Witter 1982; Cowell

1987; Salmon 1987) and perpetuating a problem of chronic unemployment (Edie 1991).

According to Sachak

Bauxite mining in Jamaica competes with agriculture - mostly small-scale agriculture - for land. This would not be detrimental to small-scale agriculture if improvements and growth in agriculture could keep pace with the diminishing quantity of land available for farming due to its diversion into mining. However, this historic and present social and economic conditions are such that for the majority of small-scale agriculturalists, livelihood remains mainly a function of land size (Sachak 1987:95)

Tourism has assumed a critical role in Jamaica's economy (Boyd 1988; Gleaner 1990; Sunshine 1985). Tourism began in 1892 and was limited largely to the rich, the old and the few who wanted to escape the cold winters of England and north America (Gleaner 1990). The tourist industry began to prosper in Jamaica after World War I and after improved methods of transportation made it easier for people to access the country. "In 1920's the number of tourists visiting the island probably did not exceed a few thousand. By 1938 the figure had risen to 64,000 ... and in 1982 it exceeded 600,000" (Gleaner 1990:45). The tourist industry today is replacing agriculture, (in particular sugar), as the major source of foreign currency. However, tourism's pivotal role is attributed to the decline in the bauxite/alumina industry (Boyd 1988; Edie 1991; Ferguson 1990).

Nonetheless, tourism has its share of unstable and uncertain economic cycles. According to Boyd, "in 1983, the number of visitors and visitor expenditures was reported to have increased by 16.8% and 18.2%, respectively. Yet, cash receipts by the Bank of Jamaica from the tourism sector declined by 34.3% in 1983 compared to 1982" (Boyd 1988:57). Such inconstant times and cash returns are carried into the 1990's (Edie 1991; Ferguson 1990).

4.4.3c Bauxite's Special Role in Post-Agricultural Changes

In the late 1940's, large deposits of good quality bauxite were discovered in Jamaica (Manley 1991). (Bauxite ore is the raw material from which aluminum is ultimately derived.) In 1952, mining for bauxite began, and the discovery of Bauxite transformed Jamaica's economy from one dominated by agriculture to one more diversified (Beckford 1987; Edie 1991; Ferguson 1990; Girvan 1976; Sachak 1987). The bauxite industry purchased more than 600,000 acres of Jamaica's farmland for its mining operations (Edie 1991; Salmon 1987).

Jamaica's bauxite policy is dominated by transnational corporations whose local subsidiaries were not immediately nationalized (Beckford 1987; Girvan 1978; Sachak 1987). Kaiser Bauxite, (originally one of the two American corporations) and a Canadian corporation secured mining rights in Jamaica in the early 1950s (Manley 1991:114). The terms by which TNC's involved in bauxite entered Jamaica were inconsistent with national interest, as foreign investors had one hundred percent control over the bauxite industry until 1974 (Edie 1991; Sachek 1987). According to Edie,

The bauxite sector remained almost like an enclave, better integrated with the external world than with the local economy. Machinery and equipment necessary for mining came exclusively from Western industrialization countries. Managerial and technical employers were drawn mainly from the TNC host country, not from the local population. A relatively small work force of skilled and unskilled labor was created, well paid by local standards. This led to small pockets of a 'labor aristocracy' among a much broader mass of poor and unemployed workers. As the bauxite sector was capital intensive, it could employ only a small sector of the work force (Edie 1991:22).

By 1968, TNC's involved in bauxite production were the largest single source of taxes paid to the Jamaican government (Edie 1991). According to Edie (1991), a close

relationship between JLP and PNP political leaders and the bauxite companies ensured the latter's dominance in matters of policy pertaining to bauxite during 1950-1972 period (Edie 1991). Under Prime Minister Michael Manley, negotiations were underway in 1974 for the government to take over the majority of ownership of the mining operations and increase taxes levied on bauxite companies (Edie 1991).

Bauxite's role in the Jamaican economy has been unstable, responding to world demand and price (Sachak 1987). Jamaica's reliance on bauxite earnings had an unfavorable impact on Jamaica's economy in the 1980's, for Jamaica has suffered a reduction in bauxite exports (Edie 1991). Since 1980 the bauxite/alumina industry has experienced a rapid decline; the figures would have been worse were it not for the essentially politically motivated decision by the United States (under president Reagan) to add to its already high stockpile from Jamaican exports. According to Boyd, "there is a continuing decline in exports of bauxite/alumina whose level was US \$423.8 million in 1983, a reduction of 18.0% of the 1982 figure. In fact, this 1983 figure was fifty-six percent of the 1981 figure" (Boyd 1988:54). According to the Planning Institute of Jamaica, bauxite output fell in 1983 to its lowest level in twenty years, employment was further reduced, and foreign exchange receipts declined by Thirty-five percent, the third successive annual decline (Boyd 1988). The above instability of bauxite has driven the downward trend of Jamaican economy in the 1980's.²⁹ The source of seventy percent of Jamaica's foreign exchange is from bauxite (Sunshine 1985), and bauxite/alumina

²⁹ "In 1980 after a world recession, the aluminium multinationals gradually pulled out of the Caribbean. Jamaica had produced 11.9 million tons of raw bauxite in 1980, but this dropped to 7.7 million tons by 1983" (Sunshine 1983:153). In addition, Reynold Metals closed down operation in 1984 as did ALCOA in 1985 (Sunshine 1985).

continuously has accounted for sixty percent of merchandise imports since 1969 increasing Jamaica's debt to US\$3.5 billion by 1987 (Boyd 1988).

In his study of economic management, income distribution and poverty analysis, Economist Boyd summarizes Jamaica's economic situation. He states, "that economic policies over the 1970's and 1980's have served to worsen the conditions for the poor in Jamaica. The situation appears to be one of almost continual decline from 1972, and especially from 1975" (Boyd 1988:156). According to Boyd, Jamaica's policy in 1985 was in response to the International Monetary Fund's (IMF) restructuring program. "The government policy was to remove the subsidies in basic items, which along with the devaluation, effected sharp rises in many basic food and non-food items of particular significance to the poor, such as flour, cornmeal, chicken backs, wings and kerosene" (Boyd 1988:107). These same subsidies were removed again, and the currency was devalued in the 1991 IMF restructuring program of Jamaica's debt.³⁰

4.4.3d Longer Term Impacts of Changes on Political and Economic Sectors, and Quality of Life

Boyd's analysis suggests that macro-economic decline was accompanied by micro-economic decline at the level of the individual (Boyd 1988). In fact, the impact of the relative decline of the smallholder and landless has had extensive effects on the Jamaican economy. Small-holders are the main source of domestic food supplies, and the relatively

³⁰ During the field season from September 1990 to September 1991 the exchange rate went from J\$6.00 to US\$1.00 to J\$14.00 to US\$1.00. During this same time chicken went from J\$7.00/lb. to J\$15.00, canned sardines went from J\$2.50 to J\$6.00, hard dough bread went from J\$6.00 to J\$14.00, a one way bus ride from Montego Bay to Kingston went from J\$27.50 to J\$45.00.

slow growth of food supplies associated with the decline of smallholder producers have contributed to increased food imports and rising food prices (Beckford and Witter 1982). In addition, there have been changes in the structure of the labor force. Higglering has become an increasing means to make a living as more people entered the informal sector (Boyd 1988).³¹ Boyd contends that,

the economic adjustment policies of 1980's based on a deflating economy, massive devaluations tax increases, and government expenditure cuts have had considerable stagflationary effects. The impact on the poor has also been considerable, decline in public service on every front, health, education, housing, water, and increasing costs for what exists. The government has sought to mitigate these effects by its welfare program (Food Aid Program). This food intervention program has been weak and fraught with administrative and financial problems (Boyd 1988:157).

In all, the situation of the vulnerable groups (young and aged) has undergone long-run deterioration, and the deterioration has persisted (Boyd 1988; Edie 1991; Thomas 1988). However, as Beckford and Witter point out, "anyone who doubts the managerial capacities of Jamaicans need only ask themselves how, in these times of severe hardship, poor people are able to find food for their children and shoes and bus fares to send them to school- surely a miracle of domestic household management" (Beckford and Witter 1982:111).

Jamaica has had a history of economic, political and social struggles. In the late 1960s rising discontent took many forms. "There was the spontaneous breakdown of the social life, antisocial behavior - crime, hustling and corruption in government grew"

³¹ Higglering is the sale of agricultural products in local markets by non-producers of those agricultural products. Generally, higgleres are women who go directly to farms to purchase and carry goods to sell at the market or are women who purchase the goods at the market gate from farmers who do not want to take the time to sell in the market.

(Beckford and Witter 1982:75). There was rise of radical nationalist and socialist political groups, particularly among middle class intelligencia (Beckford and Witter 1982; Campbell, H. 1987). According to Beckford and Witter Rastafari were resisting cultural oppression of the African that sanctioned the economic exploitation of black workers. This resulted in dramatic growth of the Rastafari and the culture of the Dread (Beckford and Witter 1982).

Today's national struggles are burdened with increasing national debt, high inflation, currency devaluation, unequal economic distribution of resources, fluctuating import and export demands and price, high under and unemployment rates, and continued social unrest. The years between 1983-1987 have seen a significant worsening of social and economic conditions for most Jamaicans (Boyd 1988; Edie 1991; Sunshine 1985).

According to Sunshine,

The underlying point for Jamaicans is that Seaga's government brought a lot of suffering to wage-laborers, the producing class. The most far-reaching contradictions of all is between the disparate conditions in the Caribbean and the Reagan administration's blind attempt to apply ideological solutions to the problem. Three billion dollars in debt and on the brink of social explosion, Jamaica is dramatic proof that Reaganomics and the IMF are not salvations for the region's economics. The miracle has turned into a lesson in despair and a warning for the entire Caribbean (Sunshine 1985:157).

Moreover, Boyd (1988) contends that whatever the long-term benefits may be, the short- and medium-term effects have been a significant increase in personal hardship for the majority of the population.

This continued hardship prevails for the majority of Jamaicans into the 1990's. Today, more than half the population, fifty-seven percent, are considered poor (Edie 1991:17). Perhaps the greatest pressure has been felt by the rural poor (small-holders and

landless): pressure from plantations, from mining, and from tourism. All are competing with the rural poor for the limited land base resources that Jamaica possesses. The rural poor managed to maintain a subsistence level when competition was not intense and when new opportunities arose. The relative decline of the rural poor has in turn impacted Jamaica's economy. A number of the small holders and landless wage laborers are the main sources for providing the domestic food supply found in local markets. Changes in ability of the small holders and landless to produce for the market have contributed to an increase in food imports and raising food prices (Edie 1991).

4.5 The Rise of Green Park

4.5.1 Historical Background

As previously stated, Green Park was a sugarcane plantation located near the north coast in Trelawny Parish. The land was first titled to George Sinclair in 1640.³² Since Sinclair's death the Green Park lands were transferred to several landowners. In 1674, 742 plantation acres and 124 slaves eventually were bequeathed to William Atherton and Holmes (who resided in England) in 1674 (Fremmer n.d.). Born in England in 1642, William Atherton had been a merchant residing in Kingston, Jamaica prior to constructing the great house, known as Green Park Manor (Fremmer n.d. Wright 1966).

Atherton became the full owner of the plantation in 1679 and began to acquire more acreage and slaves to increase production. According to Higman (1988), a map produced by Stevenson and Smith in 1811 illustrates 481 of the estate's 1315 total acres to

³² According to Fremmer, Green Park plantation is named after a park located near Buckingham place in Britain (Fremmer no date).

be in sugarcane. Green Park was known to be a successful sugarcane plantation that was slightly larger than the norm (Higman 1988; Fremmer n.d.)

Similar to other sugarcane plantations, Green Park not only grew sugarcane but also reared cattle to aide in cane production (Higman 1988; Fremmer n.d.). As indicated earlier, cattle served both as beasts of burden in a variety of capacities in sugarcane cultivation and as trade food items for sailing merchants, who used beef to sustain them while at sea. As a plantation system, Green Park reared cattle and cultivated cane, and also had its own factory to process cane into rum, molasses and sugar (Fremmer n.d.). By the time of emancipation (1838) the estate was producing 400 hogsheads (tons) of sugar and 200 puncheons of rum per year with 559 slaves and 22 indentured servants (Higman 1988; Fremmer n.d.). In fact, Higman suggests that Green Park was becoming a "rum estate" (Higman 1988:148-149).

Originally, Green Park had processed the sugarcane using animal-powered mills and wind driven mills.³³ By 1849 the animals had been replaced by a steam-powered mill that was operated until 1880 by burning cane trash (Higman 1988; Fremmer n.d.). In 1854 there were 108 steam-mills in Jamaica, seventeen of them in Trelawny Parish, but by 1880 Green Park's steam-mill stood alone. Despite the changes in power resources, the basic production processes of cane products were not altered (Higman 1988:148). In addition, Higman finds that there was no increase in hogshead of sugar produced with the shift to steam-powered-mills, although the quantity of puncheons of rum increased from

³³ Two animal-powered-mills and one wind-mill are demarcated on the Stevenson and Smith map. In addition, as of 1990-1991 the structure of the wind-mill is still present in the community, although the blades are no longer present. The remains of the animal-powered-mills also are present.

105 to 210 in the same time.

The period between 1776 and 1803 were prosperous years for plantation owners throughout Jamaica. "These were the boom years when the price of sugar reached its zenith, and when so many squires made their fortunes in sweet gold" (Fremmer 1974:72). Green Park was a profitable sugarcane plantation during this period as well, which is reflected in Atherton's ability to expand and maintain the Green Park plantation.

The increase in sugar price enabled Atherton to purchase 336 additional acres for sugarcane production in 1773 and increase the slave holdings to 548 by 1803 (Fremmer n.d.). In addition, Atherton continued: to expand and remodel the Great House; to maintain three large buildings located near the Great House for cane processing and storage (including a boiling house and curing houses); to increase accommodations for cattle and black smiths; and to construct a manager's house, a hot house (hospital) and additional quarters in the slave village for the increasing number of slaves and indenture servants. There were a total of thirty-five houses (slave quarters houses) located 340 feet from the house (Fremmer 1974:72).³⁴ Located behind the manager's house ("bush house"), are three cisterns used as water catchments for domestic use.³⁵ These additions to the plantation reflect the success of the plantation during the prosperous era of sugar production (Fremmer 1974).

Over the years, Green Park passed through a number of managers and owners.

³⁴ This plantation "village" is similar to other Jamaican plantation estates recorded (see Gardner 1873). In 1990-1991 ten buildings remain standing and the three cisterns are present but cracked.

³⁵ Green Park is not located near a natural water source. There are no lakes, or rivers located in the immediate area. Therefore, house water is stored in cisterns.

Atherton passed away in 1803 while in England, leaving his estate to his sons. Fremmer reports that in 1920 the low international sugar prices affected many plantation owners in Jamaica, and almost bankrupted Wooliscroft, Green Park's owner at the time.

Wooliscroft borrowed money and cane to keep the rum and sugar factory operating. In the end, Wooliscroft turned the cane and cattle estate over to Farquharson, the primary person from whom Wooliscroft borrowed money and cane to keep the factory in operation. Farquharson sold the estate in 1948 to Moss, who closed the sugar processing (rum) factory in 1954 and subsequently sold the plantation to Kaiser Bauxite Mining Company in 1959.

According to both Fremmer and several former employees of the Green Park estate, Moss did not sell the estate because of low sugar yields. Moss apparently sold because of repeated mechanical breakdowns, union demands and falling sugar prices on the world market (Fremmer n.d.). Several former employees under Moss, state,

Green Park was in cane right up to de hills in 1959. Several hundred people, manual workers, were employed to cut and process de cane. De man (plantation owner) didn't feed de workers at dat time (later years) dey just paid dem wages. Moss sold it because it keep breakin down, he didn't need de money, he a big man. Him sold and moved to Canada (A compilation of former employees speaking on former days when the plantation was in operation - Fieldnotes 1990-1991).

Perhaps as important as Green Park's historical viability is its present potential. Today, Green Park is still capable of producing high yields, (in tonnage and sucrose content), when sugarcane is planted. In fact, one resource user harvested eleven tons from his two acres that he sold to a neighboring sugar processing factory. This resource user contends he could have had higher yields had he harvested sooner and if the sugar

truck that came to haul away the green cane arrived soon after the cane was cut. The researcher observed the truck arriving one week after the cutting of the cane.

In 1959, Kaiser Jamaica Bauxite Company purchased the struggling sugarcane estate, and Green Park plantation was transformed with the sale of the property. The working mechanical parts of the sugar factory were sold in 1959 to Long Pond Sugarcane Estate and Hamden Sugar Estate, both of which are cane processing factories in operation during 1990-1991 field season. The remains of the plantation house and the manager's (busha) house currently are occupied by squatters and families, the latter of whom are paying rent to present-day land owners. In addition, Kaiser Bauxite Mining Company subdivided the entire plantation into small plots which were used for resettlement purposes. (This resettlement is discussed in Chapters Five and Six of this dissertation.) Mr. Ray Fremmer purchased the Greet House in 1962 and reports the last cane from the Green Park "plantation" was harvested in 1963 (Fremmer n.d.). (Mr. Fremmer was murdered while in his Great House in July, 1990.)

Thus, for more than two hundred years Green Park was a viable sugarcane plantation, producing for an export market linked to the triangular trade network between Africa, North America, and Europe. Green Park operated its production and processing through a recycling of resources. For example, cattle were used for traction to pull loaded cane carts, to operate the animal-powered mills, to fertilize cane fields, and as a source of protein for human consumption. Cane trash (dried cane tops) was burned to generate steam for processing. Capital was earned from the sale of sugarcane, and its by-products were reinvested into Green Park through the purchase of more acreage and slaves, and the maintenance of edifices in the village.

At its zenith the Green Park plantation supported approximately seven hundred people, and these included between slaves and families, indentured servants and families, owner and family, and their attorney. Like other Jamaican sugarcane estates, Green Park sustained its population (in varying degrees) on imported food stuffs, garden plot provisions and local trade (Bush 1990; Fremmer n.d.). However, this is not to suggest that Green Park was a closed system.

Although Green Park was primarily involved in the production of a single export commodity, the international economic trade network and political colonial ties negate the notion of a closed system. This study argues the Green Park agroecosystem existed and exists as an open system dependent on energy recycling and investment from local, national and international levels. The multi-level and multi-directional processes involved in the related resource management endured for at least two hundred years, until the international price of sugar bottomed out. Despite this historic viability, Green Park's current agricultural viability is challenged through economic, political, biophysical and social transformations; these transformations are the subject of the resettlement analysis in Chapter Six.

4.5.2 Green Park as a Resettlement³⁶

The transformation of Green Park agrarian system began with the purchase of the

³⁶ Cowell who conducted extensive field research in Kaiser, Alcoa and Alcan resettlements between 1998 and 1982, states that "Re-settlement was born from the staunch refusal of small settlers to sell their land. Their logic was unassailable. Many refused to consider the value of their land in terms of money. They had inherited the land, worked it for their entire lives and schooled their children. It had provided for their needs and continued to do so. Furthermore, experience had taught them that it was by no means certain that they would acquire a suitable piece of land elsewhere after sale" (Cowell 1987:198).

plantation by Kaiser Bauxite Mining Company.³⁷ Kaiser Jamaica Bauxite Company acquired the Green Park plantation in 1959 to develop a resettlement community³⁸ for residents whom they would be displacing from other agricultural regions in the process of obtaining bauxite ore.³⁹ As Fremmer states, "the green grass low land, the cane land, will now be owned by the descendants of those who used to cut the cane but never dared to dream they would own it" (Fremmer 1963). As Fremmer points out, in effect then the estate is no longer a sugarcane estate like others that merely lose their factory and change ownership, one estate owner to another; in this case hundreds of people will own what was formerly owned by one man (Fremmer 1963). In fact, Kaiser had intended to create a

³⁷ According to Cowell, as late as the 1970s the role of government had changed with regards to the bauxite industry. Cowell contends, "government had laid down the law which legally bound the land-holder to remove himself from his land so that the company could mine it. The company, backed by its knowledge, its expertise, its financial power, and its battery of lawyers was allowed to indulge in 'free' negotiations with the individual peasant... In addition it was Kaiser that pioneered the resettlement scheme" (Cowell 1987:200-201).

³⁸ According to Cowell, "the Jamaican Bauxite Institute, created in 1974 as a government institution, brought a clearly articulated policy outlook to bear on the basic bauxite/peasant relationship. The JBI was firm in its resolve that the bauxite ore must be exploited and, thus, the people must move off the land. However, it was not enough for the JBI that the peasant be given a 'fair deal'. Rather, it was necessary that in all areas the dislocation and inconvenience should be minimal. Consequently, the type of settlement promoted is community in its orientation rather than aimed at the individual. Ideally, a community should be re-settled intact, and should suffer as little dislocation as possible. In other words, neither its social nor economic structure should be unduly violated and, as a general rule, the community should be in no way worse off than it was before (Cowell, 1987:207).

³⁹ In 1978 bauxite companies turned over to the Government substantial amounts of land to utilize under Project Land Lease (PLL), land which was to be returned for mining. "As of May 1978 about 24,588 acres had been turned over to PLL, of which 37 percent are considered arable. The summary of Reynolds Company operations is instructive of the general situation. Total ownership is 59,000 acres, of which 28,000 (47 percent) is tenanted, 1,170 is timber (2 percent) and 2,917 (5 percent) is to PLL. Kaiser Company buys much of its land from small farmers, and it has established several planned resettlement communities.... Alcan has 4,600 tenants on its leased lands, farming some 17,000 acres (3.7 acres per tenant) and the length of the lease averages five to seven years" (USAID 1978:74).

residential township in the area now referred to as Limeskill⁴⁰ and a farming region in the sites located in Green Park proper. However, in 1990-1991 those residing in Green Park are found not only in Limeskill, but are residing and are using resources throughout the former sugar cane lands and in the forested hillsides.

By the mid-1970's, the Green Park resettlement had become known for its abundance of pumpkin cultivation, a large cash crop for the resource users (Brooks 1990-1991). In fact, under the Right Honorable Mr. Michael Manley (PNP) (1972-1980), the Agricultural Marketing Cooperative (AMC) trucks that were operated by the government used to come to Green Park to purchase large quantities of pumpkin for the export market. According to a number of longtime Green Park resource users, several times a week the trucks would haul away nearly fifty thousand pounds of pumpkin per trip. Yet, these same long time Green Park resource users contend that soon after the Seaga government came to power (1980), the trucks no longer came (Fieldnotes 1990-1991).

A number of Green Park resource users report they were not forewarned of the impending transition, learning of this only when they witnessed acres of pumpkin spoil in their fields (Fieldnotes 1990-1991). According to one long time resident, "when one situation mashed up we have to turn to something else, for you have to eat and drink." This same cultivator once employed labor regularly to assist in the cultivation process. Now he no longer can afford to hire any labor, for he has had to scale down the farming as a result of loss of the export markets in which to sell larger quantities of produce.

⁴⁰ According to Green Park informants and empirical evidence, Limeskill named after a lime kiln, located in an area in Green Park that was used to burn limestone into lime ash to be used as a "fertilizer" for the Green Park sugar estate.

Another resettler adds, "cetch crop (cash crop) fields are scaled down. Me used to plant plenty pumpkin, peas and corn, but the previous government mashed it up. We used to sell to the AMC. De previous government just cut it out so now we have de livestock alone." This same resettler lost some of his lands to pay off a farm loan debt at the same time, for crops rotted on the land with no place to sell them. A number of resource users who once cultivated acres of pumpkin and other cash crops no longer are cultivating the same acreage; some have turned to livestock rearing and others are engaging in off-farm income to supplement their scaled down farms.

In 1991, a truck from a Kingston market came for the first time in many years, and a series of problems ensued. First, Green Park resource users never planned for a truck, and there were insufficient people growing pumpkin to meet the quota demanded by the truck operator. Second, the quality was not there, due to insufficient time and insufficient pumpkin from which to make selections for purchase. As a result, those who agreed to sell to the truck driver and subsequently loaded pumpkin onto the truck, received less than the initial agreement. The truck driver contended he could pay less per pound because the agreed upon quota were not met. Each producer sold a larger quantity than s/he would have been able to get to and sell at Falmouth at any one time, but did so at less than the going rate from the Falmouth market (From Fieldnotes 1990-1991). The impact of this change in access to markets mandated at the national level, is another piece of evidence that demonstrates the linkages of agricultural practices in Green Park with economic and political forces outside the region.

Green Park resource users who have been present between ten and thirty years, contend they have altered their cropping strategies dramatically because of structural

adjustments made in the market system while Seaga ruled Jamaica (1980-1989). When the Mr. Seaga came into power as a member of the Jamaica Labor Party (JLP), major transformations in agriculture took place throughout Jamaica, as well as in Green Park, regardless of party affiliation. For a variety of reasons the Seaga government (JLP) placed more emphasis on non-agricultural activities to generate foreign exchange for Jamaica (Edie 1991; Manley 1990; Sunshine 1985). Less emphasis and support were provided for the plantation owners and even less for the small-scale farmers (Edie 1991). Under Seaga in 1980, small scale banana production for the export market was eliminated with the closing of the Montego Bay port (Brooks 1990-1991 and a number of Green Park resource users). In addition, the loss of the green corn market in Montego Bay -- due to the government contentions that the corn trash (husks) was unsightly and contributed to a health hazard -- affected the Green Park resource users that depended on these markets.

As mentioned, Green Park is a young resettlement composed of migrants, from long-term residents to more recent arrivals. Thus, Green Park does not have a history of supporting a single political party. Yet the changes in agricultural policy have transformed Green Park whether or not they possessed a history of being supporters of the Jamaican Labor Party (JLP) or the Peoples National Party (PNP).

Since the export market disappeared in the 1980's, many resource users retain their land even though they have reduced the number of acres in crops. Many Green Park resource users have moved into livestock production (cattle), while some have allowed their lands to lie fallow. In such cases where lands have been left to lie fallow, the years of non-use are transforming the lands into dense ruinate plots (Fieldnotes 1990-1991). Other individuals were forced to sell off lands, whereas others were able to rent or lease land for

use as residences and for cultivation and pasture so as to maintain a modicum source of income.

4.6 Conclusion

The plantation system has a long history in the Caribbean. For nearly four hundred years the plantation system has influenced the social organization, political and economic systems and use of resources -- locally, nationally, and internationally. A brief historical overview of the Caribbean plantation slave system and the emergence of the Caribbean nations-states operating in a capitalist system have been presented, and a description of the sugarcane plantation system provided. The literature suggests plantation communities are not homogeneous, but pluralistic. Even after Emancipation, the plantation system continued to exert influence unfavorable to the development of strong cohesive local communities. As such, the internal dyadic relations (vertical and horizontal) and intra-community relations are known to be tense and reactionary.

The discussion turned to the integration of transnational corporations into the political and economic sectors of the Caribbean region with emphasis placed on Jamaica. In Jamaica, tourism and bauxite industries have been heavily influenced by the transnational corporations. There have been close relationships between the state and TNC's for tax benefits, jobs, labor, and resources.

The literature suggests the region is developing in part because of the particular historical relationship it has cultivated in the operation of the larger world system. Some salient linkages between the metropole and former colonies were delineated for the Caribbean West Indies, for Jamaica and for the Green Park resource users. According to

Beckford,

the inescapable conclusion is that the plantation system, as a type of economic and social organization creates the following social diseconomies: (1) persistent and expanding unemployment; (2) relatively low levels of national income; (3) a most unequal distribution of what little income is produced; (4) gross underutilization of land; and (5) extreme underconsumption generally. Underconsumption is perhaps most acutely reflected in a wide spread occurrence of protein malnutrition in the very presence of abundant agricultural resources (Beckford 1972:177).

This overview demonstrates the longevity of political, social and economic linkages the Caribbean region has maintained with respect to the world system and how such interactions affect local level resource use over time. In addition, transformations in the plantation system influence the organization of the social, political, and economic systems. Nonetheless, small holders and landless people continue to struggle to have adequate access to resources (land, labor, capital, and markets).

Political and economic systems are intricately integrated into the lives of Jamaicans at multiple levels and from multiple directions. This historical background, albeit brief, provides the context in which to examine Green Park from an integrated ecological anthropological perspective. The interrelationship between components of the political, economic, social, and environmental systems is discussed over time. The contextual background provides an opportunity to examine Green Park from its days as a sugarcane plantation to the present resettlement configuration. In particular, the researcher will compare Scudder's four stage resettlement sequence for community formation from the level of the household. It is these processes of resettlement, community formation, resource use, and impact over time that are analyzed in Chapters Five and Six.

CHAPTER V
BIOPHYSICAL AND SOCIOCULTURAL BACKGROUND TO
DRY SYSTEM FARMING IN GREEN PARK FOR
1990-1991

5.1 Introduction

This contemporary biophysical and sociocultural description of Green Park (1990-1991) sets the stage for an integrated ecological anthropological analysis of Green Park's resettlement process and its impact on community formation and resource use relating to the existing agrarian systems. First, Chapter Five describes the biophysical attributes of Green Park and offers a brief comparison to the attributes found in Jamaica. The structure of the biophysical system is characterized by the topography, climate, soils, and temperatures. Second, the chapter describes the contemporary social structure of the human system for Green Park. Social components (social organization, kinship, household composition, length of time in Green Park) and economic components (farm and non-farm income earning activities -occupations) are identified to characterize the structure and function of the local relationships among resource users. Lastly, these human and biophysical systems are integrated to begin the analysis of the adaptation of Green Park resource users to the exiting agrarian system.

5.2 Attributes of the Biophysical System within Green Park

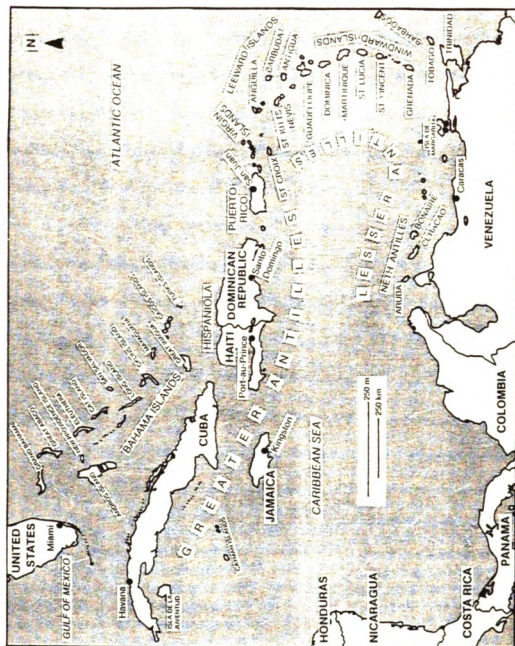
5.2.1 Geography and Topography

Jamaica is the third largest island of the Greater Antilles and is located south of Florida at latitude 18 degrees north of the Equator, and east of Panama (Map 1.).

Jamaica's total land area is approximately 44,200 square miles (slightly smaller than the North American state of Connecticut) (Zach et al. 1988). From Morant Point to Negril (east to west) the island spans 146 miles and is 51 miles across at its greatest width (Zach et al. 1988).

Jamaica has tremendous diversity in its topography, accompanying vegetation, and regional micro-climates (Kapos 1986; Zach et al 1988; Satchell 1990). The terrain includes mountains, plateaus and plains, and Jamaica is well known for its beaches, especially along the north coast. Toward the interior, Jamaica is dominated by rugged highlands and is dissected deeply by erosional valleys and gullies (Satchell 1990). More than half of Jamaica hovers over 1,000 feet above the Caribbean Sea and 40 square miles rise above the 5,000 feet level. The highest points are the Blue Mountains that consist of a chain of peaks over 6,000 feet, and the highest peak is Blue Mountain Peak, 7,402 feet in elevation, just 10 miles from the coastal plain of East Kingston.

The interior of the island is composed of a high and varied plateaus, which occupies nearly two-thirds of the island (Satchell 1990). "The limestone hills and plateaux seldom exceed 3,000 feet in elevation and occur at two main levels, a higher level between 1,000 and 2,000 feet and a lower level between 600 and 900 feet" (Satchell 1990:36).



Map 1. Jamaica in the Caribbean

The higher regions of the plateaux interior have a characteristic topography known as karst or cockpit topography. Karst topography is created by intense solution of limestone and water (Satchell 1990). There are no surface streams; therefore, drainage is underground (Satchell 1990). The region is difficult to traverse because of its numerous sinkholes and dense forests.⁴¹ These high plateaux formations are found at the Don Figueroa Mountains that lie in the middle of the island in Mandiville, the Cockpit Country that lies southeast of Montego Bay in St. James Parish. This regions is known as one of the regions in which the Maroons inhabited.

The coastal plains are characterized by alluvial sands, gravel and loam. The alluvial plains located on north side of the island are almost two miles wide and similarly the south side of the island east of Kingston (Satchell 1990). Low lands are found in the interior of the island as well. Frequently, such low lands lie in flat bottom valleys occurring in the limestone area. Valley floors tend to be composed of alluvium and clay (Satchell 1990).

As mentioned previously, Trelawny Parish itself is divided into Lower and Upper

⁴¹ Historian W.J. Gardner, writing in A history of Jamaica from Its Discovery By Christopher Columbus to the Present Time (1873), describes getting to the north coast. "The statements early writers render it possible to form a fair idea of the general aspect of the island.... The whole north side of the island was nearly deserted. The ruins of Seville were commonly reported to be haunted by the ghosts of the old cavaliers. A small plantation, developed into a fine sugar estate by a Captain Hemming after the conquest, and still bearing the name Seville, was the only cultivated spot for many miles. There was also the little port of Manteca or Montego Bay. The Indians had long been exterminated, their villages had mostly been situated within sight of the sea, if not on the coast. But very far up the hills approachable then only from the north, may be seen in the parish of Manchester traces of one of their last retreats. The sites of their villages are now covered by a luxuriant growth of ferns. These places, known as fern ground are from twenty to eighty acres in extent, and all around are magnificent forest trees. No better proof of the utter desolation of this side of the island toward the close of the Spanish occupation can be given the fact, that when their forces retired to it to make a final stand, the English troops had to be sent round by sea; there was no road across the island which could be used for such a purpose" (Gardner, 1873:15-16).

regions, and Green Park, Jamaica is located in Lower Trelawny Parish. It is approximately 30 miles east of Montego Bay and between four and six miles south of the northern coastal town of Falmouth, the Trelawny Parish capital (Latitude 18° 27'N, Longitude 77° 42'W). The Green Park resettlement lies along the main thoroughfare leading from Falmouth to the Cockpit Country of Upper Trelawny.

5.2.1a Geography and Topography of Green Park

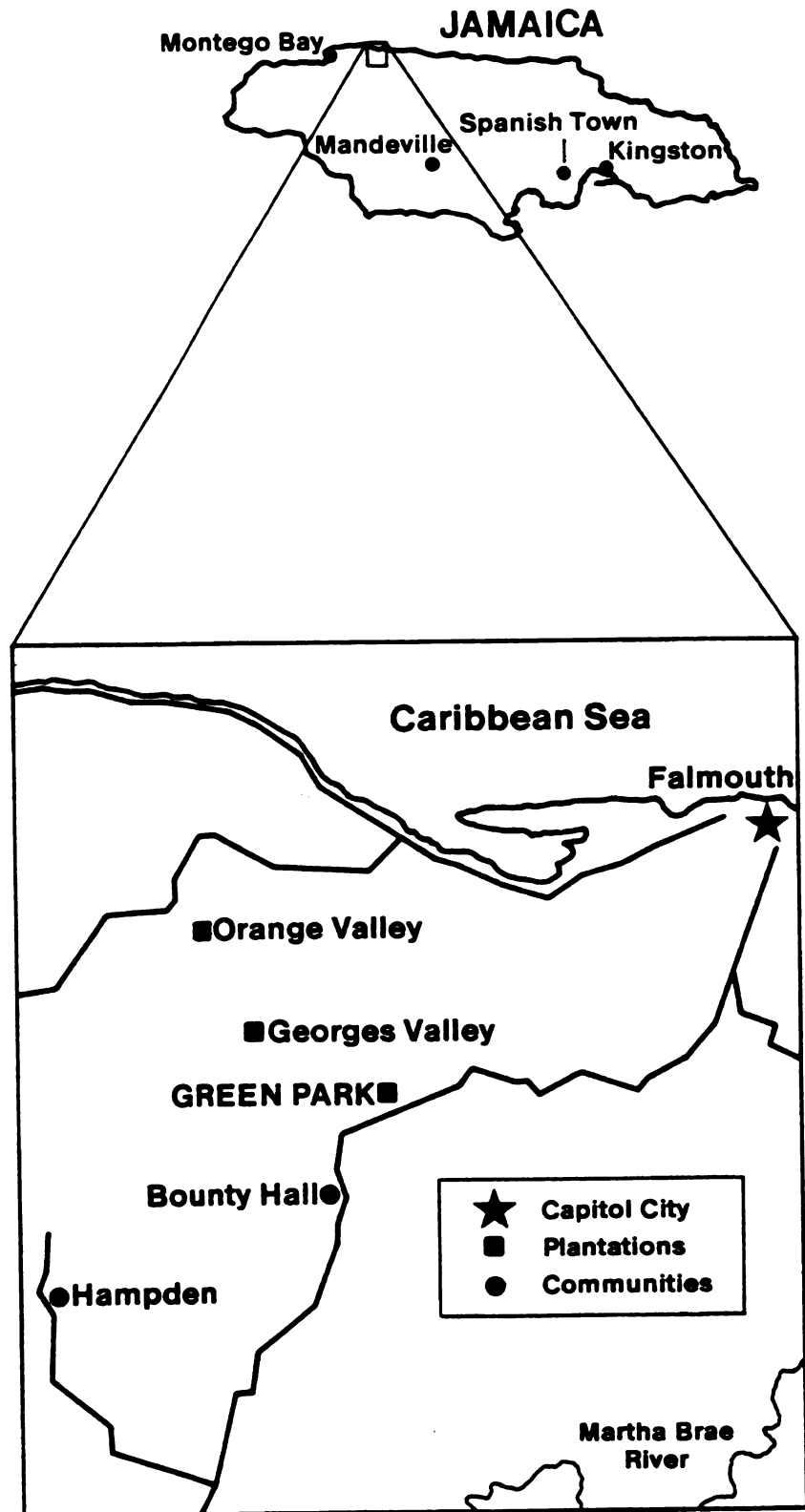
Green Park is located in a shallow, rolling valley (Map 2.) and has a mixture of plateaux and coastal plain characteristics and karstic topography. The valley floor is composed of limestone, alluvium and some residual clay (Regional Research Centre 1970). Kaiser has partitioned Green Park valley into three areas, although all three areas formerly comprised the Green Park plantation (Woodhouse 1991). Two areas are residential and locally referred to as Hammersmith and Limeskill, and one is predominantly farming and referred to as Green Park Proper. Resource users collectively consider these three adjacent areas as Green Park. In addition, there are no perennial rivers in the area. The Martha Brae River, the closest river, flows nearly three miles away and water is pumped and piped from both the Martha Brae River and Montego Bay to service Green Park, primarily for domestic use.

Green Park has several natural boundaries. Surrounding Green Park are undulating limestone hills, rising 225-750 feet in elevation, alternating with depressions. The north of the resettlement is bounded by a sloping, disturbed limestone forest (Kapos 1986). East of the resettlement lies an adjacent residential community known as Granville, and a commercial chicken and cattle farm known as Carrick Foyal. The south of Green

Park rests another hill and Bounty Hall village. The west of Green Park lies an adjacent commercial beef and horse training ranch known as Orange Valley. Orange Valley, Carrick Foyal and Bounty Hall were formally large sugar plantation estates that have since been transformed.

5.2.2 Soils

Bonny Gate Stony Loam is the most common soil type in Trelawny Parish and Green Park (Regional Research Centre 1970), and typically, is mildly alkaline with a pH between 7.4-8.0 (Regional Research Centre 1970). The availability of iron, magnesium, nitrogen, phosphorous, and potassium are generally low (Hewitt 1964). Bonny Gate Stony Loam is characterized as having a brown or reddish surface material overlying hard limestone (Hewitt 1964). Depth and fertility of the brown material vary between the flatter lands of the valley and the hillsides surrounding the valley. The nearby surrounding forested hillsides are primarily Bonny Gate Stony Loam with shallow topsoil. The hillsides are permeated with limestone and have very thin poorly drained surface soils (Kapos 1986). Forested hillsides slope over twenty degrees and drainage is extremely rapid (Regional Research Centre 1970). The water table lies at considerable depth, for the moisture supplying capacity is very low, and bedrock is between one and twelve feet deep (Regional Research Centre 1970). Kapos contends that clearing of these dry limestone forests for agricultural use will increase erosion and exacerbate the inherent scarcity of moisture and nutrients (Kapos 1986:57).



Map 2. Green Park located on the north coast.

Based on this researcher's empirical observation in Green Park, forested hillsides have not been managed to support their long-term use. On numerous occasions throughout the field season, Green Park livestock owners and cultivators recounted removing trees to increase pasturage or area for cultivation, and coal burners continued to remove trees to make coal. As a result, the hillsides reflect losses of trees where soils are shallow, stony, steep and erodible; soil loss also plays a role in tree loss on exposed limestone slopes where not even grasses are able to penetrate (Fieldnotes 1990-1991).

The valley area of Green Park -- with a slope of 2-5 degrees -- was the predominant location for sugarcane production in the plantation area (Regional Research Centre 1970). These former sugarcane lands have areas with deeper soil than the forested hillsides, with consistencies resembling residual clay. Traditionally, sugarcane is not cultivated on limestone hillsides, but rather on flatter deeper soiled lands. More recently, these former sugarcane lands are being converted for pasture, residential, and cash and permanent crop use.

Empirical observation confirms that many of these gently sloping flatland areas within the valley have erosion problems. Topsoil and subsoil have been lost on former sugarcane lands. As such, many of these lands have flat rock and limestone cobblestones heavily distributed about the surface of the field plots. For example, the flatland immediately in front of the plantation "Great House" has no topsoil remaining; only a limestone exposed courtyard remains (Fieldnotes 1990-1991).

5.2.3 Climate

Jamaica has a very diverse and variable climate, encompassing semi-arid and heavy rainfall areas. Climatic variation in Jamaica, such as temperatures and rainfall, is dependent on altitude and seasonal variation. Rainfall is year-round with the mean average approximately seventy-eight inches. Yet, the rainfall range varies, from three hundred inches in the Blue Mountains, to less than thirty inches in parts of the southern coast and twenty-two inches in Trelawny (Satchell 1990).

This variation possesses a distinct regional pattern, marked by two rainy seasons and two dry seasons (Satchell 1990). Traditionally, the heaviest rains are between September and November, and begin again between April and June. From November to March strong tradewinds and heavy rains bring cooler temperatures and sporadic rains, which may last less than a week (Regional Research Centre 1970). Hurricanes can strike almost any time between June and October, but are most common between August and September. The most recent hurricane was hurricane Gilbert, a "breeze" as it is referred to locally, occurred in September of 1989, and damaged or destroyed homes, chicken-coops, fence lines, and trees in Green Park.

Rainfall limits productivity in many parts of the tropics, and both excesses and deficits create problems, often in the same location. "Much tropical rain falls in storms: 10 to 15 percent of rainy days where the heaviest storms contribute fully half the rainfall, so most ecosystems cannot make full use of the water when it comes. And due to continually high temperatures, evapotranspiration rates are high as well. The net result is high water deficits in many tropical agricultural areas" (Dover and Talbot 1987:9). This is equally true for Jamaica, as well as for Green Park.

Local topography and prevailing tradewinds⁴² cause a distinct rainshadow affect in certain areas (on the leeward side), resulting in localized droughts (prolonged dry periods) during the dry season (Satchell 1990:37). On the windward side of the island, in Portland and St. Thomas parishes, tradewinds bring nearly two hundred inches of rain annually (Zach et al. 1988). However, on the leeward side and in a rainshadow less rains prevail (Zach et al. 1988).

Temperature variation coincides with seasonal variation. Minimum temperatures can vary between sixty-four and seventy-two degrees Fahrenheit, and maximum temperatures vary between eighty-two and ninety degrees Fahrenheit in the coastal areas; Green Park experiences this variation. The temperature drops between sixty and seventy in the higher mountain elevations, and the peaks of the Blue Mountains have been known to fall below fifty degrees Fahrenheit (Regional Research Centre 1970).

5.2.3a Green Park's Climate

Green Park lies on the leeward side of the valley and in a rainshadow. Temperatures average ninety degrees Fahrenheit during the dry season and seventy degrees in the rainy season. As such, its location and topography influence the rainfall pattern. The annual rainfall in Green Park is more than thirty inches less than the normal annual rainfall average for Jamaica, making Green Park prone to protracted drought like

⁴² Tradewinds are phenomena related to the rainfall patterns in the Western Caribbean. When moisture-bearing tradewinds come upon a mountain range they are forced to rise; condensation takes place and the rain which results are relief rainfall (Gleaner 1990). "The wind deposits its moisture on the windward side of the mountains and descends as dry wind on the leeward side of the mountains" (Gleaner 1990:17). This dry area is known as a rainshadow.

conditions between January and August. Perhaps of greeter impact, Green Park is known to experience more than six months of the year where the monthly rainfall average falls below four inches (Regional Research Centre 1970).⁴³

During the field season of September 1990 to September 1991 rains fell from Green Park in late September until mid-December, and November rainfall occurred nearly every day. Approximately a half inch to an inch of precipitation fell on many of those rain days. In fact, there was a three day period in early December where relatively continuous rains fell on already saturated lands. These rains caused serious flooding in some areas of Green Park, to the extent water flooded house floors. The research assistant and other families who have been residents in Green Park for close to twenty years insisted never had their house floors flooded before these rains. By December 31, 1990 the rains came to an abrupt halt for Green Park. Spring showers came toward the middle of May with two with up to six inches of precipitation occurring in a two and a half day period. No rains had fallen before those May rains; therefore, much of Green Park was quite parched and dusty. From June to September brief and scattered showers or sprinkles were few and far between, a second dry period.

⁴³ This is a historic rainfall pattern for Green Park. Between 1870 and 1960 rainfall data were collected at neighboring adjacent Orange Valley Plantation (Table 1.). The ninety years of rainfall data indicate similar trends to the current situation (Regional Research Centre 1970).

Table 1. Orange Valley Rainfall Data from 1870-1960

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept	Oct	Nov	Dec	TOT.
3.92	2.27	2.05	2.09	4.25	2.81	1.59	2.45	3.62	5.20	6.17	5.22	45.03

(Source: Regional Research Centre 1970)

5.3 Sociocultural System Attributes for Green Park

5.3.1 Demographics

Green Park in 1990-1991 had approximately ninety inhabited dwellings with an estimated population size approaching four hundred inhabitants. Among the seventy-one households interviewed, 77.5% have a male as the primary livestock caretaker and/or cultivator; in some cases, they are widowers or single; and twenty two point five percent of household had female primary livestock caretakers and/or cultivators; sometimes they are widows or single.

The average age of Jamaica's agrarian population is approximately sixty years of age (LeFranc 1983). Similar to this overall Jamaican agrarian population, the average age of Green Park primary resource users and their spouses' is fifty-eight years of age; the range is from twenty-four to seventy-seven years of age. Among the seventy-one primary resource users, nearly fifty-nine percent are equal to or older than fifty-six years of age, whereas approximately forty-one percent are below fifty years of age; and not even ten percent are between twenty-four and thirty-nine years of age. Clearly, resource users in Green Park are a relatively elderly population (Table 2).

Table 2. Grouped Ages of Primary Resource Users

Age	Resource User Frequency	Percent
24 TO 39	7	9.9%
40 TO 55	22	31.0%
56 TO 71	29	40.8%
72 <	13	18.3%
Total	71	100 %

5.3.2 Social Organization and Resident Status

Resettlers and non-resettlers compose the social organization of the Green Park resettlement. The etic categories generated from the survey process and ethnographic approach characterizes resource users as "resettlers, local migrants and circular migrants." These categories are derived from resource users' discussion of themselves and of others within the resettlement as discussed in Chapter Three.

The initial inhabitants of the resettlement are families that were relocated from St. Ann's Parish and are defined as "resettlers." From the seventy-one households interviewed, currently fourteen (19.7%) Green Park resource users are "resettlers." The average number of years resettlers have been using resources in Green Park is twenty-one years, ranging from nine to twenty-nine years. The average number of years residing elsewhere prior to Green Park is 40.5 years. Of the fourteen resettler households (19.7%), twelve of the primary resource users are men (85.7%) and two (14.2%) are women. In addition, eight of these male resource users reside in dual-adult households

(both male and female present, married or cohabiting); the other four (28.6%) are single adult headed households (single or widowed). In both cases where women are the primary resource users, these are single headed households (widows). From these statistics, it is apparent that this resettler population is fairly old (Table 3), having arrived in Green Park fairly late in life, yet has spent a good deal of their later years in Green Park.

Table 3. Resettler: Sex and Age Range of Primary Resource User (Frequency and Percent)

Age Range	24-39	40-55	56-71	72<	Total
Male	0% (0)	28.6% (4)	28.6% (4)	28.6% (4)	85.8% (12)
Female	0% (0)	0% (0)	14.2% (2)	0% (0)	14.2% (2)
Total	0% (0)	28.6% (4)	42.8% (6)	28.6% (4)	100% (14)

In the last thirty years, the composition of people using resources in Green Park has changed to include non-resettlers as part of its settlement. Since the onset of the resettlement, lands have transferred between various owners and resources users. Not all resettlers who originally purchased lands in Green Park stayed in Green Park. Resettler families who received land as compensation for lands appropriated by Kaiser, in time, sold Green Park land(s) to new comers (migrants), as well as to existing residents interested in expanding their Green Park landholdings. A Kaiser official, employed for over twenty years as a property and leasing supervisor stated, that "after awhile some of settlers resold part or all of their lands in small bits, others subdivided to relatives for building houses.

Thus, this is how Green Park became so thickly populated and will continue to develop with modern architectural beauty" (Woodhouse 1991). A non-resettler resource user who purchased lands from a resettler stated,

People from St. Ann not interested in cane, for dis place is dry. So plenty of dem sell out de land. Dem wanted to plant coco, coffee, banana, food stuffs - tings dem used to plant not de cane. Dem naw use to plant'n like dis (From Fieldnotes 1990-1991).

During informal and formal interviews, this sentiment was echoed by a number of non-resettler and settler resource users.

Through a combined emic and etic approach, these new comers who voluntarily acquired land in Green Park after the initial resettlement process are identified as "local migrants." These local migrants are non-resettlers, but resource users and/or residents who, on their own accord, relocated to Green Park from seven different parishes and twenty-five different communities, ranging from across the island to the extreme east, west or south, to just up the road a piece.

In 1990-1991 there are forty-seven households from the seventy-one interviewed (66.2%) which comprise Green Park's local migrant subgroup of resource users. Of these forty-seven local migrant households, ten (twenty-one percent) are only resource users and do not reside in Green Park. Among the local migrant subgroup the average length of time using resources in Green Park is 14.6 years, ranging from several months to twenty-six years. The length of time prior to arriving in Green Park (i.e., gaining experience elsewhere) is approximately forty-one years.

There has been continuous movement of local migrants into Green Park. As such, the local migrant etic category has been further subdivided into temporal etic categories

based upon local migrants' arrival and resource use in Green Park. The subgroup categories are "Before", "Since 1970", "Since 1975" and "Since 1985". These temporal categories coincide with Scudder's chronological resettlement sequence and with Jamaican political and economic transformations. These local migrant subgroups are discussed collectively among all Green Park resource users in Chapter Five to provide a general descriptive understanding of adaptive agrarian practices of Green Park resource users. However, the subgroups are analyzed individually in Chapter Six to assess Scudder's model for resettlement transformation and community formation.

From those interviewed, local migrant primary resource users consist of thirty-seven men (seventy-nine percent) and ten women (twenty-one percent). Thirty-four (seventy-two percent) of the male primary resource user households form part of dual-adult households (both adult men and women are married or cohabiting) and three households (6.3%) are headed by widowers or single males. Among the female primary resource user households, four (8.5%) form part of dual-adult households, five households (10.6%) have a single head of household and one person (2.1%) said that her spouse is employed abroad (overseas). Approximately, 29.8% of the local migrants are between forty and fifty-five years of age and 40.4% are between fifty-six and seventy-one years of age (Table 4). This subgroup, similar to Green Park resettlers, is mostly male and older, and these people predominantly live in dual adult households.

**Table 4. Local Migrant: Sex and Age Range of Primary Resource User
(Frequency and Percent)**

Age Range	24-39	40-55	56-71	72<	Total
Male	12.8% (6)	23.4% (11)	29.8% (14)	12.8% (6)	78.6% (37)
Female	2.1% (1)	6.4% (3)	10.6% (5)	2.1% (1)	21.2% (10)
Total	14.9% (7)	29.8% (14)	40.4% (19)	14.9% (7)	100% (47)

In addition to resettlers and local migrants is a third resource user subgroup who purchased land in Green Park. This third subgroup is the "circular migrants", an etic category. Circular migrants are Jamaicans who left Jamaica a number of years ago to work abroad and now are retired and residing in Jamaica. These circular migrants are returning from England, American, and Canada, after being employed a number of years overseas. The recent phenomenon for Green Park is the increasing number of circular migrants returning with savings and pensions to take up residence as retirees in the resettlement.

Among the resource users interviewed in Green Park, ten (14.08%) households are circular migrants. The average number of years using resources in Green Park is 5.4 years, ranging from several months to fourteen years. The average length of time overseas is 23.5 years and all circular migrants resided in urban environments while abroad. The age range is from forty to seventy-seven for both male and female resource users, with more than fifty percent between fifty-six and seventy-one years of age and seventy percent

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greater than fifty-six years of age (Table 5).

Although the number of people among the circular migrant subgroup is small, the impact they bring to the region is considerable. As Table 5 reveals, these circular migrants tend to be in their middle age to later years, and a majority are male. Given their command of resources well above that of other subgroups, their entry and residences in Green Park has the potential to change facets of Green Park's political economy.

**Table 5. Circular Migrant: Sex and Age Range of Primary Resource User
(Frequency and Percent)**

Age Range	24-39	40-55	56-71	72<	Total
Male	0%	20.0% (2)	30.0% (3)	20.0% (2)	70.0% (7)
Female	0%	10.0% (1)	20.0% (2)	0%	30.0% (3)
Total	0%	30.0% (3)	50.0% (5)	20.0% (2)	100% (10)

The social organization and resident status of the resettlement illustrate that Green Park does not have a long history. Collectively, among those households interviewed, the range of time residing and/or using resources in Green Park is from twenty-nine years to several months. Not surprisingly, there is a marked difference in the length of time for using resources in Green Park among the three subgroups. The data reflect that resettlers, on average, have been using resources in Green Park the longest amount of time, while circular migrants have been using resources the shortest amount of time. Clearly, the

nature of these newcomers to Green Park contributes to the resettlement's newness and youthfulness. This is a key factor that is further analyzed in Chapter Six.

In summary, the data from the three subgroups, (resettlers, local migrants and circular migrants), indicate that the primary resource users are relatively old, a common characteristic among Jamaican farmers as noted by LeFranc (1983). Appendix 2 summarizes primary resource users' sex, age range and resident status for Green Park's resource using population in Table 17. The largest percentage of primary resource users are males over age fifty-six from the local migrant subgroup and Table 18 summarizes the variation between resident status, marital (partner) status and primary resource users' sex. The data indicated the majority of primary resource users are males in dual-adult households among resettler and local migrant households, while single adult households are the norm among circular migrant households.

5.3.3 Household composition

The basic socioeconomic unit within the level of a community [or resettlement] is the household (Price 1988; Smith 1965). The household is "a group which shares a common dwelling place, eating and sleeping together as a unit, and cooperates in the provisioning of household needs by complementary or group activities, the latter typically involving the exploitation of certain common resources, notably land" (Smith 1965:180). Caribbean households consist of familial members, affinal and consanguinal kin relations (Clarke 1957). As such, not all households are composed of just nuclear families (parents and offspring). In fact, this research indicates that over fifty percent of familial household compositions include grandchildren that reside with the primary resource user (and

spouse). In addition, Table 19 in Appendix 2 illustrates a range of familial (non-nuclear familial relations) and non-familial people contributing to the Green Park resource users' household composition and table 20 represents number of sons and daughters still residing at home.

Household size is defined by the members who make up the household composition (Clarke 1957; Smith 1965). The average household size among Green Park's resource users is 4.5 household members, ranging from one to thirteen occupants. However, the data indicate there is a variation in household size between the resettlers, local migrants and circular migrants. The average household size among resettlers is actually 5.3 members per household. Among local migrants the average household size is 4.5 members per household, whereas among circular migrants the average household size is 2.3 members per household (See Appendix 2 Tables 32, 36, 40, 44, 48 and 52). In Green Park, variability is present in household composition. Most of the households have neither sons or daughters residing at home; however grandchildren frequently reside with their grandparents. Those that have direct offspring residing at the house tend to only have one present.

In addition, close to thirty-four percent of the families interviewed mentioned they currently had children residing in England, America and/or Canada. There was only one case where an informant reported that the spouse was aboard during the field season. Frequently, this relationship contributes to the hidden economy, the transfer of material items and/or cash remittances, to island relatives. This researcher observed remittances to be in form of clothing and material goods. On a number of occasions, Green Park resource users informally recounted of receiving money, and other articles from family members

and friends abroad.

5.3.4 Kinship

As previously mentioned in Chapter One, the literature indicates that geographical locality and kinship are the important components to defining a Caribbean community (Clarke 1957; Cowell 1987; Craton 1987; Momsen 1987; Price 1988; Rubenstein 1987; Smith 1962 and 1965). According to Craton, who has worked extensively in the Bahamas, "the sense of community, reinforced by actual and fictive kinship, of an attachment to a particular location, amounted to a communal proprietorship" (Craton 1987:93-94). As such, a sense of community is aided by isolation, common ethnicity and ever-tightening kinship ties (Craton 1987). A Caribbean community, therefore, is composed of succeeding generations of kin groups that reside in a locality.

The importance of kinship relations extends to related distribution of resources (Momsen 1987; Craton 1987; Price 1988; Smith 1962 and 1965). Caribbean communities are not necessarily endogamous or closed systems, however, kinship relations contribute to the social organization, integration and socioeconomic networks (Cowell 1987; Craton 1987; Price 1988; Rubenstein 1987; Smith 1962 and 1965). From studies on established communities in the Bahamas Craton (1987) finds that the transmission of land is through kinship ties -- from generation to generation -- and the allocation of land is according to need. Similar findings are discussed on Carricou by Smith (1962), St. Vincent by Rubenstein (1987) and Jamaica by Besson (1987), Momsen (1987) and Smith (1965).

According to Smith (1962) kinship also provides communities with a system of status and role allocation. "Since a community contains several distinct families, the

specific behavioral roles of kinfolk cannot be generalized throughout the community uniformly. Membership in one family entails some exclusion from another" (Smith 1962:82). In his work in Carricou, Smith (1962) found those families with the largest membership and greatest local continuity carried the most weight in community affairs, but such tendencies were affected by differences in the reproductive rates of family lines, by differing sex distributions of their adult members, and by their differing migration and mating histories (Smith 1962). Local leadership development is a key factor in community formation in Scudder's model and is discussed further in Chapter Six.

Population movement in established rural Caribbean communities tends to attract little in-migration, but does generate substantial out-migration (Edwards 1961; Rubenstein 1987). Immigrants to a community may displace original families and effect the process of inheritance and sale of the initial holdings, for kinship plays a role in the distribution of land between kins people. When this transformation occurs the change in community composition has important implications for mobility of residents (Smith 1965).

Community out-migration is of two forms: relatively long-term relocation within the island or overseas, and short-term seasonal flows of people to sugar producing and/or tourist sector areas (Mintz 1985; Smith 1962, 1965; USAID 1978). As previously discussed in Chapter Four, a similar pattern of migration is documented for Jamaica (Boyd 1988; Edie 1991; Smith 1965).

Green Park varies in population movement patterns from those of established communities. Both in- and out-migration have been part and parcel of the Green Park resettlement process for nearly thirty years. Among resettlers, six households (46.2%) report to have kin in Green Park, whereas among local migrants nine (19.2%) have kin

ties, and among circular migrants two (20.0%) have kin relations in Green Park. In total, there are eighteen households from those interviewed (25.3%) that have kinship ties in Green Park at the present time. This suggests that to date the majority of households do not share affinal nor consanguinial kinship relations. Green Park's population movement continues to be a movement of strangers into Green Park. Clearly, this continual population movement influences the distribution of land, the settlement pattern and social organization among Green Park's resource users. Resource use among these various subgroups occurs in these agrarian systems and is further explored in Chapter Six.

5.3.5 Occupation

According to Smith (1965) frequently there is little wage-employment available in rural Jamaican agrarian communities except in agriculture and domestic work. As such, agricultural employment tends to be the norm in rural areas for occupation and access to money (Goldstein 1983; LeFranc 1983). Traditionally, small-scale farm production tends to be oriented towards provisioning commodities for household subsistence as well as for exchange (Comitas 1973; Smith 1965). However, alternatives are sought when household demands cannot be met by farm production (USAID 1978). Details concerning the nature and mix of these alternatives provides insight into various coping strategies employed by resource users in Green Park.

A range of occupations is reported by Green Park resource users. The data indicate that approximately forty-two percent of primary resource users consider their primary occupation to be that of "farming. "Close to thirty-one percent of the resource users consider their primary occupation to be wage-labor activity, whereas, seventeen

percent claim to be self-employed in non-farming related activities. Ten percent state they are retired, either from farming, as former civil servants or from work overseas (Table 21).

In addition, data on resource users' primary secondary and tertiary occupations were gathered, as well as data on spouses (Appendix 2 Tables 21 and 22). Approximately forty-four percent work at home as homemakers, thirty-seven percent are involved in wage-labor activities, ten percent are self-employed producers, eight percent state they are farmers, and one percent claims be to a homemaker and farmer simultaneously.

Formal surveying and informal discussions over the course of the field season reveal that not everyone claims s/he farms in Green Park, and as such, do not call him or herself a farmer.⁴⁴ However, the combined data on primary, secondary, and tertiary occupations of those interviewed indicate that most primary resource users (approximately eighty percent) engaged in some form of cultivation and/or animal rearing activities. Those not farming are involved in non-farming wage labor activities to support their household. Empirical observation and formal interviews with primary resource users involved in wage earning and petty-commodity production activities indicate that such resource users engage in management practices that enable them to tend to their animals before and after work, with more extensive labor devoted to their own farms on the weekends, providing such activities do not conflict with religious obligations, marketing and health related activities.

The primary source of cash income or monetary assistance varies among Green

⁴⁴ The term Green Park resource users is employed throughout the text because the majority of those using lands or other resources in Green Park specifically state they are not farmers and do not refer to themselves as farmers.

Park resource using households. Approximately thirty-eight percent report their primary income source is from wage labor, from the primary resource user in the household, from their spouse, or from their combined earned wages (off-farm and farm related). In addition, approximately twenty-eight percent receive pensions from Jamaica, England, American and Canada. Roughly, sixteen percent report monetary support is received from their children, whereas eleven percent replied they are full-time farmers and did not have any off-farm income sources. Seven percent earn a living from being self-employed, producing hand made goods (wicker items, baked goods, tailoring) or independently operating a store (rum shop and/or dry goods shop). Therefore, a distinction is made between source of cash income and primary occupation by those interviewed.

Full and part-time farming activities are compared among resettler households, local migrant households and circular migrant households (Tables 6, 7, and 8). Both resettler and local migrant households rely to a good degree on mixed economic strategies — on and off-farm activities — for survival, with resettlers more on subsistence farming. A good portion of resettler households (28.6%) rely solely on full time farming. Clearly, resettlers are much more involved in agricultural activities whereas, seventy percent of local migrants are involved in non-farming activities. Circular migrants differ from the two previous categories considerably, mostly due to their perception of themselves as "hobby" farmers (fifty percent of those surveyed) and their receipt of pension resources from overseas (eighty percent of those surveyed).

Table 6. Resettler Economic Activities

Farming Economic Activities	Male	Female	Total
off-farm wage labor only	7.1% (1)	0%	7.1% (1)
household farming no marketing	21.6% (3)	0%	21.5% (3)
farming/ marketing	28.6% (4)	7.1% (1)	35.7% (5)
farming marketing off-farm income	28.6% (4)	7.1% (1)	35.7% (5)
no farming/ no off-farm income	0%	0%	0%
total	85.6% (12)	14.4% (2)	100% (14)

Table 7. Local Migrant Economic Farming Activities

Economic-Farming Activities	Male	Female	Total
off-farm wage labor only	2.1% (1)	6.4% (3)	8.5% (4)
household farming no marketing	12.8% (6)	4.3% (2)	17.1% (8)
farming/ marketing	10.6% (5)	2.1% (1)	12.7% (6)
farming marketing off-farm income	23.4% (11)	6.4% (3)	29.8% (14)
no farming no off-farm income	0%	0%	0%
household farming off-farm income no marketing	23.4% (11)	8.5% (4)	31.9% (15)
total	72.3% (34)	27.7% (13)	100% (47)

Table 8. Circular Migrant Economic FarmingActivities

Economic Farming Activities	Male	Female	Total
off-farm wage labor only	10.0% (1)	0%	10.0% (1)
household farming "hobby farming" no marketing	30.0% (3)	20.0% (2)	50.0% (5)
farming/ marketing	10.0% (1)	0%	10.0% (1)
farming marketing off-farm income	20.0% (2)	0%	20.0% (2)
no farming no off-farm income	0%	10.0% (1)	10.0% (1)
total	70.0% (7)	30.0% (3)	100% (10)

Interestingly, the source of cash income varies slightly from what resource users contend is their primary occupation. According to a study conducted by USAID in Jamaica (1978), "off-farm work is an important enterprise on many farms, when entered into it is because of lack of alternatives" (USAID 1978:96). The majority of households in Green Park are supported by off-farm activities. Clearly, many resource users currently are not relying solely on the land for their income or subsistence. Wage earning activities, pensions, and self-employment contribute to the household's survival strategies. Thus, occupational multiplicity leads to variation in spreading risks and coping strategies to meet household demands (food, shelter, school fees, clothing, health, farm, utilities, loans, etc.).

Although a high percentage of Green Park resource users are involved in agriculture, an equally high percentage are involved in wage-labor activities to support their households. The reasons why Green Park resource users are involved in wage-labor is discussed in greater detail in Chapter Six.

5.4 Land Tenure, Size and Use

The relationship between resource users and land is important in identifying resource user variation. Current agricultural practices are examined in relation to land tenure, plot size and land use and will be further analyzed in Chapter Six to further explore the adaptive process and those of community formation among subgroups in Green Park.

5.4.1 Land Tenure and Plot Size

The majority of resource users (approximately seventy percent) purchased their initial land holdings from either Kaiser Jamaica Bauxite Co., from resettlers, or from someone who had previously purchased it from Kaiser or a settler. The remainder of resource users in Green Park utilized family lands, leased or borrowed with permission, squatted or were caretakers for absentee landlords. Edwards (1961) points out, "the possession of land in a country where the population is growing rapidly and price levels are rising makes land a good investment ('land does not spoil'), even if it cannot be developed because of lack of complementary resources" (Edwards 1961:94).⁴⁵

⁴⁵ Currently, these former sugar cane lands sell between J\$30,000 to J\$100,000 Jamaican dollars (the exchange rate was at US\$1.00 to J\$10.00 at the time of inquiry) (From Fieldnotes 1990-1991).

By 1990-1991, land tenure in Green Park remains mixed, and clearly all resource users do not own the property they occupy or use. The relationship between plot size and land tenure is detailed in Table 9. The data on land tenure per plot used indicate 56.1% (115) of the plots are owned by resources users. Approximately twenty-five percent of the plots currently are costing the resource users regular user fees for use of the lands, whereas 18.6% of the plots are used at no costs. The plots which are "free" are lands on which the resource users are squatting, using with permission from the owner or serving as caretakers for absentee landlords.

In addition, Kaiser retains ownership of a number of plots and acreage throughout Green Park, although the majority of the plots are located on the forested hillside. From resource users surveyed who admitted to renting or leasing plots directly from Kaiser, it is determined that Kaiser owns approximately 11.7% of the 204 plots accounted for in the survey (one hundred and eighteen acres). Given not all resources divulged from whom they rent or lease their plots of land, the actual numbers are potentially higher. In addition, a Kaiser supervisor in charge of property and leasing for Green Park, reported that Kaiser donated four adjacent plots of approximately eighty acres to Jamaica's Department of Forestry (Woodhouse 1991 personal communication). Although Kaiser still does play a role in land tenure within Green Park, data are inconclusive as to the exact nature of this role.

Table 9. Land Tenure per plot by Land Size per plot

Tenure \ Plot\ Size \	Pay Own	To Use Lease	Land Rent	No Squat	Pay Borrow	To Use Family	Land Care Taker	Total
0.1 < 0.5	7.8% (16)	1.9% (4)	1.4% (3)	0.4% (1)	1.0% (2)	1.4% (3)	1.0% (2)	15.2% (31)
0.6 < 1.0	5.4% (11)	0.4% (1)		1.0% (2)	0.4% (1)			7.4% (15)
1.1 < 2.0	7.4% (15)	3.4% (7)	1.4% (3)	0.4% (1)	1.4% (3)			14.2% (29)
2.1 < 3.0	6.4% (13)	1.0% (2)		0.4% (1)	0.4% (1)			8.3% (17)
3.1 < 4.0	11.3% (23)	4.4% (9)	0.4% (1)		4.4% (9)	0.4% (1)		21.1% (43)
4.1 < 5.0	14.7% (30)	6.7% (14)	1.0% (2)	1.4% (3)	1.0% (2)	0.4% (1)		25.5% (52)
5.1 <	3.4% (7)	2.4% (5)		0.4% (1)		1.4% (3)	0.4% (1)	8.3% (17)
Total	56.1% (115)	20.2% (42)	4.2% (9)	4.0% (9)	8.6% (18)	3.6% (8)	1.4% (3)	100% (204)

5.4.2 Plot Size and Land Uses

As previously stated in Chapter Four, Green Park originally was an open-field sugarcane plantation. The increasing purchase of plots of land have partitioned the open fields into contiguous and discontinuous plots, with multiple owners. Approximately fifty-six percent of the land holdings are fragmented into individually discontinuous plots which are fenced off. Both multiple continuous and discontinuous plots are used per household, ranging from one to fifteen plots per resource user. Overall, the disaggregated data

indicate that the average plot size is small (2.3 acres per plot), the plots are geographically scattered, the total acreage used per household is small and varies between resource users⁴⁶ and their production activities.

Multiple land uses and intercropping are traditional agricultural strategies among Jamaican small farmers (Edwards 1961; LeFranc 1983; USAID 1978). Similar practices are observed in Green Park. Formal survey results, empirical observations and discussions with resource users identify thirty-four land use combinations (Appendix 2 Table 23). Nearly thirty-six percent of the plots are cleared and used as pure pasture stands, whereas an additional twenty-seven percent are pasture lands used in combination with other land uses. The details of this latter combination of resource use are outlined in Table 23; the key is that resource users in Green Park clearly are using a creative mix of multiple strategies in obtaining a living from these lands, much of which are in pasture, crops, ruinate or wooded uses. "Ruinate is a local term applied to land covered in weed-growths, sometimes including shrubs and small trees - usually land which was previously cultivated" (Edwards 1961:31).

Table 10 details an aggregated range of land uses per plot; across plot size the predominant land use is for pasture and lands in combination with pasture.⁴⁷ In addition, the most frequent average plot size (forty seven percent) is between 3.1 and 5 acres and

⁴⁶ By 1990-1991 the median for the total acreage used per household is approximately 9.5 acres for the 71 resource users, ranging from 0.10 acre to 74 acres. When the average is calculated separately for 1990-1991's cattle owners (n=46), the average total acreage used is approximately 13 acres. However, this aggregated figure is inflated with the larger cattle owners and land owners included in the calculation.

⁴⁷ Land uses per plot are defined as: pasture, pasture combination, garden crops -field crops - (excluding pasture & garden), ruinate - (excluding pasture, garden & field) other - (excluding pasture, garden ruinate & ruinate).

thirty-two percent of the plots between 3.1 and 5.0 acres are used for pasture. The plots that are between 3.1 and 5.0 acres in size are more likely to be owned by the Green Park resource users (Table 9). The plot size is important in land use selection, for the data suggest there is a relationship to land size and land use. Specifically, in Green Park larger plots are used for pasture whereas smaller plots are used in crops.

Not all Green Park resource users limit their land use to Green Park plots; thirty-one percent of Green Park resource users have access to lands outside of Green Park that they use to cultivate and/or rear livestock. For example, one resource user has twelve head of cattle and only four acres of pasture in Green Park. However, this resource user has access to one-hundred and thirty acres of family land across the main road of Green Park in a neighboring community. His cattle feeding ratio appears over herd for Green Park, but in practice he is not.

Overall, Green Park resources users are relatively an elderly population, on average they are over fifty years of age (Table 11). Some variation exists between subgroups (resettlers, local and circular migrants) as noted in previous sections; whereas no variation exists between the age of livestock and non-livestock owners. The average age for the Green Park resource users is fifty-eight years of age. Among the goat owner population (n=33) the average age is 57.5 years and among the cattle owners (n=46) it is 59.3 years of age.

Table 10. Plots Size By Land Uses

Land Use Plot Size	Pasture	Pasture Combined	House Crops	Field Crops	Ruinate	Other	Total
0.1 < 0.5	1.0% (2)	8.6% (17)	3.0% (6)	1.5% (3)	1.0% (2)	0.5% (1)	15.6% (31)
0.6 < 1.0	2.0% (4)	3.0% (6)	0.5% (1)		0.5% (1)		6.0% (12)
1.1 < 2.0	2.5% (5)	4.5% (9)	4.0% (8)	1.0% (2)	0.5% (1)	1.5% (3)	14.0% (28)
2.1 < 3.0	2.0% (4)	1.0% (2)	3.5% (7)	0.5% (1)		1.0% (2)	8.0% (16)
3.1 < 4.0	12.2% (24)	2.5% (5)	4.5% (9)			2.5% (5)	21.7% (43)
4.1 < 5.0	12.2% (24)	5.0% (10)	5.5% (11)	1.0% (2)	0.5% (1)	1.0% (2)	25.2% (50)
5.1 <	3.5% (7)	2.0% (4)	1.5% (3)	1.0% (2)	0.5% (1)		8.5% (17)
Total	35.4 (70)	26.6 (53)	21.5% (45)	5.0% (10)	3.0% (6)	6.5% (13)	100% (197)

Table 11. Primary Resource Users Grouped Age and by Total Acres of Land Used

\ Age* \ Acres Used **\	24 TO 39 Years	40 TO 55 Years	56 TO 71 Years	72 Years and Over	Total
0.1 < 4.9	8.5% (6)	8.5% (6)	18.3% (13)	8.4% (6)	43.7% (31)
5.0 < 9.9	1.4% (1)	9.9% (7)	9.9% (7)	2.8% (2)	24.0% (17)
10.0 < 15.9		4.2% (3)	8.5% (6)	4.2% (3)	16.9% (12)
16.0 < 19.9		2.8% (2)		1.4% (1)	4.2% (3)
20.0 <		5.6% (4)	4.2% (3)	1.4% (1)	11.2% (8)
Total	9.9% (7)	31.0% (22)	40.9% (29)	18.2% (13)	100% (71)

* Acres used by household

** Age of Primary agriculturalist per household

5.5 Small Holder Resource Users in Green Park

A considerable amount of research has been conducted on small-scale farmers in Jamaica and the Caribbean. The literature on Jamaican small-scale farmers suggests farmers who cultivate less than five acres are "small-scale" farmers. The Department of Statistics defines the holder or farmer as "that person (or persons) who is financially responsible for the operation of the farm; who takes the profit or bears the losses directly resulting from the farming operations."⁴⁸ The holder may own the land or be a tenant, be

⁴⁸ Borrowing from the Jamaican definition of a "farmer", the term resource user reflects the individual(s) who takes primary responsibility for the operation of the farm.

paying or non-paying. A holder may be a single individual, a government agency, a private company or any such corporation or institution" (Department of Statistics 1978-1979:ii). Important in this discussion, therefore, is that small holders in Green Park are farmers, irrespective of whether or not they call themselves farmers according to the Department of Statistics Census of Agriculture.

According to the Jamaica Farmer's Guide (1990) (a small handbook cultivators of any size may purchase at any book store to answer some question related to vegetable and fruit crops), "the ideal small-scale farm should include programs for medium and/or long-term crop production and short-term cash crops and livestock production enterprises (JAS 1990:129). In fact, the Department of Statistics Census of Agriculture (1978-1979) defines the "farm" as,

all the land forming a holding, which is situated in a single parish. Minimum criteria for a farm where an agricultural enterprise having one or more of the following: (a) one square of cultivation, (b) twelve economic trees (e.g., citrus, mangos, breadfruit), (c) one head of cattle, (d) two heads of pig, goat or sheep, (e) one dozen poultry including ducks, turkey's etc., (f) six bee hive cultures or (g) one dozen rabbits (Department of Statistics 1978-1979:ii).⁴⁹

Therefore, from the minimum criteria set forth by the Department of Statistics all Green Park resource users have a "farm".

By the above definitions, Green Park resource users are not unlike other small-scale farmers⁵⁰ in that they tend to integrate their farming with cultivation (garden, permanent or cash crops), livestock production (goats, cattle, pigs and fowl) and in some

⁴⁹ One square equals one tenth of an acre.

⁵⁰ A small farm is one who cultivates on approximately five acres or less.

cases with charcoal production. In addition, farm activities are integrated with and tailored to off-farm activities, and this integration is not homogeneous from small holder to small holder. These small-scale farming characteristics are analyzed in greater detail in Chapter Six.

5.5.1 Agricultural Adaptive Strategies in Green Park

Micro-environments, cultural practices, economics and politics play central roles in how lands may or may not be used in Green Park. The natural environment, tool technology, cultivation and livestock husbandry practices of resource users interact with each other and impact the manner in which subgroup populations are modifying and adapting their agricultural practices.

As discussed earlier in this chapter, climatic and topographic conditions, soil types, and soil fertility provide the environment in which resource users adapt and modify their surroundings. In particular, Green Park's natural and economic conditions contribute to farming techniques that rely primarily on rain-fed agriculture practices. Water is a constraint with which all Green Park resource users must contend. Pumped water is prohibitively costly in Jamaica as are agricultural irrigation systems for most Green Park resource users; the majority rely on dry-system rainfed farming techniques.⁵¹

In dry-system farming, crop selection and production correspond to the frequency and amount of precipitation and length of growing a season. Empirical observation

⁵¹ All households have water tanks (cement cisterns) on the premise. Some households rely on the water tanks for storage for domestic consumption, while others have piped potable water. Water trucks are used by those who run out of cistern water and have no other water sources.

reveals that Green Park resource users adapt their farming practices to the seasonal rainfall (traditionally between October - December and again between April and June), or face the loss of crop, time and cash. In fact, nearly, thirty-eight percent of the resource users interviewed said they add water to their garden crops during the dry seasons using a hose and/or a bucket to draw from their domestic water supply. "Wash water" (secondary use water) from kitchens and bathrooms frequently is piped to the closest crops and fruit bearing trees.

Field crops are not irrigated, for the water rate is prohibitively costly for all cultivators in the area. Only one household, which also happens to be where this researcher resided, is set up for a drip-line irrigation system that is used only in their garden crop cultivation. The household owner complained regularly because of the cost, and house water became rationed to compensate for the high water expenses incurred in the drip-line irrigation system (Fieldnotes 1990-1991).

In 1990-1991, 81.6% (fifty-eight resource users) planted a house (kitchen) garden or cultivated field plots. The majority report they plant in the fall, with the heavier, more reliable rains, while a minority state they plant again in the spring. According to resource users' survey responses the decline in spring planting from fall planting is related to the risks inherent with the unreliable arrival, amount and duration of spring rains. Those not planting in the spring contend the rains are too unreliable and planting is "dear" (costly) (Fieldnotes 1990-1991).

5.5.2 Farming Technology

Agrarian practices in Green Park are based on low input and rain-fed agricultural techniques (Brooks 1990-1991 personal communication). Land preparation is accomplished mechanically and manually in Green Park. Manual preparations include slash and burn agriculture, a predominant means of preparing new lands or clearing lands from annual vegetative re-growth. This includes land that has lain fallow for a period of time and has been invaded by pioneering species. Approximately forty-four percent report hiring a tractor and driver to plow and prepare lands. Those using the tractor plow contend they are constrained by tractor availability, (i.e., the limited number of plows frequently used in other farming communities, breakdowns and lack of spare parts for repairs, and costs for use (labor and petrol)).⁵² Resource users interested in the tractor plow, those that have access to a relatively "large" piece of land, generally an acre or more that is in need of "cleaning" for crops or pasture. Smaller pieces of land are prepared manually, aided by a machete, hoe, fork and mattock.

Over half of those surveyed do not use a tractor plow to prepare their plots of land. Some constraints identified through the formal survey reveal why resource users select not to hire out the mechanized tractor. These constraints include: a lack of money to pay for the hire of the tractor, a lack of a real extent within which a plow would be necessary, land that is too stony for a plow, lands currently not being cultivated, and/or lands already in pasture. According to a seventy-four year old resettler, "In Green Park some lands are bedder to plant dan odders, if de land is level and look rich (not brittle and

⁵² At the time of data collection three passes with the tractor (plow, harrow and row) on one acre of land cost \$800.00 J (this was when the exchange rate was at \$10.00 J to \$1.00 US).

sandy like) den you know its bedder and you can take de plow to prepare de lands or take a hoe and beat it" (Fieldnotes 1990-1991). This sentiment reflects a number of resource users' perspective gathered from participant and casual observations throughout the field season. Although donkeys and cattle (including the Indian Zebu stock) are available in Green Park, no one considers using animals as means of traction by which to pull a plow. When asked, resource users repeatedly responded by saying "dat would be digressin" or expressing similar sentiments (Fieldnotes 1990-1991).

Hand tool methods for cultivation, rather than mechanized methods, are more common for Green Park's resource users. The most frequently mentioned manual tools used in cultivating crops include: the machete (97.0%), hoe (82.0%), fork (66.0%), mattock (52.0%), and a hose (32.0%). In addition to these hand tools used to prepare lands and maintain soils, fertilizers are used by fifty-eight percent of the cultivators. However, a wide range exists in the type of fertilizer being spread on crops.

Approximately forty-four percent of the resource users use cow manure on their plots while the balance of these that apply fertilizer, use a combination of animal manure (from manure from cattle, chicken, and goats). The variation of fertilizer used is related to the type and amount of livestock reared by the resource user. Those without livestock and without the means to purchase inputs may rely on the ash that result is from burning the annual re-growth. They may also use their lands intensively and with no inputs.

Taken in sum, farm tool technology used primarily in Green Park does not indicate an overly mechanized system of production. Methods are oriented toward manual tool use that are labor intensive and constrained by the climatic conditions, topography, soil type, land space, time and capital. These low-input agricultural practices are further

explored in Chapter Six.

5.5.3 Cultivation in Green Park

Cultivation in Green Park is categorized into three groups: permanent or standing, semi-perennial, and short-term or cash cropping. These crop categories mature at different rates and differ in the duration of their productive lives. Permanent crops refer to "standing crops" that are grown for long-term use. Permanent crops tend to take a few years to mature (i.e., produce harvestable fruits), but will produce regularly for number of successive years. Examples of permanent crops include sugarcane, fruit bearing trees, and lumber trees.

The lower fields of Green Park, denuded of their primary forest, have been under cultivation for over two centuries. On Green Park's flat deep soiled areas, sugarcane was once cultivated on a large scale, covering nearly one thousand acres at its zenith (Fremmer n.d.). Sugarcane is a relatively drought resistant crop that is planted and harvested annually (Adams 1972). Multiple ratoons are cultivated on the same lands from five to nine consecutive years; accordingly sugarcane is considered a "permanent crop" by Jamaicans (Jamaica's Farmer Guide 1988). The formal survey indicates that in 1990-1991, Green Park resource users were cultivating a total of approximately twelve acres in sugarcane on the flatlands that once supported nearly a thousand acres. This land use transformation is further explored in Chapter Six.

The low, undulating, limestone hills that lie to the north of Green Park remain more densely wooded than the lower former sugarcane fields. These hillsides carry an open secondary woodland comprising some of the common more or lesser deciduous trees

of the warm low lands (Regional Research Centre 1970).⁵³ Table 29 and List 2 are more extensive lists of trees identified in Green Park. However, these forested areas have been classified as severely disturbed dry limestone vegetation (Kapos 1986). The hillsides serve as a primary source for tree products, as well as for potential lands for cultivation and livestock pastures.⁵⁴ A number of the above trees are harvested and used as dead fence posts, yam stakes and/or made into charcoal. In some cases these trees and their by-products are for household use, in others they are sold to generate income to meet household demands. Therefore, those trees are directly and indirectly related to farming.

5.5.3a Fruit Bearing Trees

Fruit bearing trees also are a part of many agrarian systems in Green Park, and these are planted in plantations, orchards or around the house (Appendices 2; Tables 24 and 25). Many fruit trees are reaped for home consumption (food) and for sale in the

⁵³ Some species identified are: logwood (Haematoxylum campechianum), red birch (Bursera simaruba), brazelitto (Peltophorum linnaei), in addition to cedar (Cedrela odorata), cotton tree (Ceiba pentandra), breadnut (Brosiumum alicastrum), bullet (Bumelia spp.) bitter damson (Simarouba glauca), fiddlewood (Citharexylum spp.), nasberry bullet (Manikara zopota) and pimento trees (Pimenta diorca, syn. P. officialis), and many smaller woody plants such as burn nose (Daphnopsis spp.), and members of Euphorbiceae and Mimosaceae family (Regional Research Centre 1970, Kapos, V. 1986; Adams C.D. 1972)

⁵⁴ According to Zach et al. "The only native fruits at the time of Columbus' arrival were guava, pineapple, the sweetsop and possibly the star apple. Virtually everything that blooms today was imported either by the hands of humans or the droppings of birds" (Zach et al. 1988:22). Historically, Europeans removed timber from the plains, savannas and some mountain slopes for cultivation and settlements (Gardner 1873; Watts 1987; Zach et al. 1988). The Europeans introduced sugarcane, bananas and citrus in the sixteenth and seventeenth centuries. Spanish merchants and traders brought coconuts from Malaysians in the seventeenth century. The ackee fruit that is a staple food for many Jamaican breakfasts arrived on slave ships from West Africa in 1778 (Zach et al. 1988). Native plants which are now standing crops or lumber trees include mahogany, fustic, lignum vitae, pimento and mahoe, as well as Santa Maria, cedar, bullet wood, break axe, Spanish elm and ebony (Gardner 1873; Zach et al. 1988).

market or to "passerbys" and provide a means to diversify the range of crops available. Fruit trees that require higher rainfall and/or cooler climates do not grow well in Green Park's semi-arid tropical conditions (i.e., coffee, peach). Among Green Park resource users one hundred percent report they have fruit trees at their residence where "wash water" is available for the trees. However, since many resource users are using lands previously owned or used, many had fruit bearing trees established at the time of acquisition. As such, the majority of resource users (fifty-eight percent) report that they are not planting permanent crops.

There are seven fruit trees most frequently established at the residence. Table 24 indicates the frequencies with which fruit trees types are located at the house, trees serving as sources for food and drink. As such, these fruit bearing trees become part of the household's coping strategy. For example, there are citrus trees (i.e., oranges and mangos) whose fruits are used as food or in drinks. Ackee, a food tree, is the base of Jamaica's national dish, "ackee and salt fish" (the salt fish is now imported). Breadfruit, a food tree, is boiled or fried and frequently is served with the ackee and salt fish. Bananas are a food tree. Depending on the species bananas are eaten ripe, or are boiled green and served like other starchy tubers or are put into soups.

Besides the fruit trees planted around resource users' residences, fruit trees also were planted in fields as "standing crops" (Table 25). All trees established in field plots are planted on lands owned by the resource user. There are eleven types of fruit trees planted in the fields. However, three fruit trees (mango, orange, coconut) are established more frequently in orchards, whereas the less frequently grown trees were not planted in large quantities (i.e., a few trees planted on the plot). Mango, orange and coconut trees

have been selected by resource users as trees for they have the potential of growing well in the area, and because the market demand is there for the fruit. As such, this is another adaptive strategy among the resource users.

5.5.3b Other Tree Uses

Although trees are not always planted as a permanent crop, trees have additional roles within the agrarian system. Hence, fruit bearing trees are not the only important trees used in the household, on the farm or otherwise. A number of resource users stated informally, "all trees are important, because dey serve different purposes." Trees also are part of living fences, used to establish boundaries for plot use, and pen in or out animals. Trees serve many other less obvious roles as a form of wind breaks, or in holding soils, retarding evapotranspiration rates (leaving grasses greener under tree canopies), and providing shade for both humans and animals alike.

Stealing ripened fruits is the most frequently mentioned problem related to fruit trees. In addition, disease is a problem for coconut and mango trees. Land space is a problem for some who have little to no land. The dry season is difficult for some trees, in particular the breadfruit which tends to loose its fruit prematurely or not bear if not receiving sufficient water and thus benefit from the wash waters.

In addition, trees are harvested and used in charcoal production. Making charcoal in Green Park has been a long standing enterprise. Frequently, charcoal production is integrated within the agrarian system as a source of capital and/or fuel. On some occasions the charcoal burner cuts and burns on other peoples' lands, and on other occasions the burner cuts and transports the wood to burn on his or her lands. Many of those who burn

coal, burn in the wooded hillsides and are doing so without the permission of the landowner. In fact, some charcoal makers are known and were observed to have stolen other people's dead fence posts to use as wood to burn into charcoal.

5.5.3c Semi-Permanent, Short-Term and Cash Crops

The second major category of crops that are important in Green Park are semi-perennial crops, crops that mature in one year. The root crops can be saved to be reused to produce a following year's crop. Hence, semi-perennial crops are referred to as semi-permanent and include roots and tubers, such as yam, cassava, sweet potato and white potato. A subset of semi-perennials are short-term crops, quick crops that mature in several months and produce a single crop. Short-term crops include: vegetable crops - corn, callaloo, Chinese cabbage (popchow) pumpkin and legumes - cowpeas, red peas, and vita peas. Short-term and semi-permanent crops frequently are referred to as cash crops ("catch crops") and are grown from home consumption and/or to generate income in field plots or garden plots as garden crops. Garden crops, (grown in the "kitchen garden"), refer to those crops grown close to the house and on a much smaller scale from field cash crops. Frequently, garden crops are intercropped and include vegetables, legumes, roots and tubers, herbs and spices and frequently are short-term crops.

Several factors influence what crops are grow by whom, and what regions, and these factors may be social, physical, economic or a combination of these. A number of resource users who cultivate commented throughout the field season that certain crops fare better in the semi-arid conditions prevalent in Green Park, and also taste different. According to these Green Park resource users, one or two yam varieties are cultivated in

Green Park, whereas other yam varieties are said to be better tasting and "more fit" if cultivated at higher and cooler altitudes. Several resource users commented they grow only food crops knowing that tobacco pays a higher rate per pound, while others recognized they have to grow their own food, "for it's too costly to buy each week," and still others grow only what the land will support.

A general list of crops cultivated in Green Park that demonstrates the variety of permanent (excluding trees), semi-permanent and short-term crops is found in Table 26. There are five crops identified from the formal survey that the majority of Green Park resource users plant which include: pumpkin, different variety of peas (red peas, vita peas, Jerusalem peas, white and red cowpeas), corn, sweet potato and cassava. In part, crops are selected for what grow in the environment given the length of the growing season, precipitation, as well as other human factors which are explored further in this chapter and Chapter Six.

A number of planting problems were identified in the formal survey and informally repeated throughout the field season by resource users. These problems include on: the lack of a water source during the protracted dry time, receiving unpredictable and less spring rains, presence of worms, and loss of the export market and transport to local markets. Comments made by the resource users also reflect changes in cultivating strategies responding to changes in Jamaican politics and economics. Resettlers comment on the loss of the export markets⁵⁵ and on their discord with labor unions and other

⁵⁵ Loss of markets include the closing of the government's Agricultural Marketing Cooperative (AMC) which exported agricultural commodities, the banana industry being directed towards the east coast with the subsequent closing of the Montego Bay agricultural export ports and loss.

problems related to sugarcane production. These latter problems are facets of complex coping strategies and are further discussed in Chapters Four and Six.

5.5.4 Livestock in Green Park

According to Ministry of Agriculture extension agents - Falmouth, extension agents, Green Park resource users and the literature livestock rearing is another important part of farming. Not surprisingly, cattle, goats, pigs and poultry were raised in Green Park. In 1990-1991, cattle and goat rearing are the more predominant livestock production activities found in Green Park and have had a relatively long history as being part of the agrarian practices in Green Park. Of the seventy-one primary resource users interviewed, seventy-six percent rear beef cattle and/or goats of which eleven percent are women and eighty-nine percent are men. From those seventy-one primary resource users interviewed, approximately thirty-one percent are currently just cattle owners, while close to eleven percent of the livestock owners rear just goats, and roughly, thirty-four percent rear both cattle and goats. In 1990-1991, among those interviewed there are forty-six cattle owners (sixty-four percent) who are rearing cattle.³⁶ Over time, the total number of cattle among Green Park resource users has increased as has the number of owners and the average herd size. Among the seventy-one resource users interviewed there are three hundred fifty-seven head in Green Park. In addition to cattle, eighteen resource users brought with them goats.

³⁶ This is not to suggest that more Green Park resource users were not formerly cattle owners. In fact, there are at least three cases, of which the researcher is aware, where informants have sold off their herd from the time the previous researcher interviewed them until this researcher interviewed them. The time difference would have been with- in fifteen months.

In 1990-1991, among those interviewed there are thirty-three goat owners (forty-six percent). The total number of goats among those interviewed is two hundred five. Over time, the number of goats and goat owners has increased, however the average flock size has decreased. Livestock are penned/fenced in and/or tethered in fields or are found along the roadside. The changes in livestock rearing patterns are further analyzed in Chapter Six with reference to agrarian practices and resettlement transformations.

In the Caribbean, as well as Green Park, cattle are predominantly grass fed through direct grazing. According to extension agents and the literature, the recommended practice is to have one acre of pasture to one head of cattle (CARDI 1986, 1987, and 1988; Personal communication with Agricultural extension agents at Bodels research station and Ministry of Agriculture - Falmouth and veterinary assistants). "In drier regions of the Caribbean, 'improved pastures' will carry about 2 to 2.5 adult cows per hectare (0.8 to 1 cow per acre) on a year-round basis" (CARDI 1986). The one-to-one cattle to pasture feeding ratio is more difficult to maintain and support cattle weight during the dry season and on lesser quality non-improved grass varieties (CARDI 1986, 1987, and 1988).⁵⁷

According to Green Park livestock owners, cattle feed on grasses that survive in rough pastures and under dry conditions. Four grasses are more frequently grown and grazed by livestock owner. The grasses more frequently established by cattle owners reflect the percentage of livestock owners having a particular species on any number of

⁵⁷ There is an interest among the cattle and goat owners to increase tree fodder use, especially to be used during the dry season when there is little to no pasture to maintain animal weight. Many of the livestock owners are over-herd in their cattle-to-pasture feeding ratio. There is annual loss of cattle because of the shortage of pasture.

their plots. These grasses include: seymour (Andropogon pertusus) (58.3%), African star (Cynodon spp.) (21.9%), guinea grass (Panicum maximum) (15.6%), and napier grass (Pennisetum purpureum) (4.2%). Para (Panicum purpureum) and bracharia (Bracharia spp.) other grasses are mentioned, but each is not grown in sufficient quantities to be a regular and reliable feed source.

Of these above grasses, African star grass is the only improved grass variety in Green Park. African star grass came to Green Park in the middle 1970s via one of the livestock owners, an early local migrant, who had picked stolons on his travels in other parts of Jamaica. This resource user shared some stolons with other livestock owners. In 1990-1991, forty-six resource users (64.8%) have planted African star with a range of success.⁵⁸

In the dry seasons (February through April and again between June and September), alternatives to grass feed sources are sought to supplement the diminishing grass supply. During this period, one hundred percent of the livestock owners still rely primarily on direct grazing of their pasture (however dry or low grasses may be).

Livestock owners compensate for the lack of animal feed by drawing from multiple feed alternatives. These alternatives include cutting and carrying grass and tree fodder to the

⁵⁸ Cattle owners were asked if they planted and used napier grass to feed cattle. Approximately 77.7% replied that they did not because it is not as drought resistant as African star; thus they preferred the African star grass. Livestock owners contend napier grass has to be cut and carried to the animal, for direct grazing on napier grass will kill it. They commented that the cut and carry process is too much work so they don't plant it. The insight gleaned from this discussion is related to the amount of labor or time a cattle owner is willing to put towards the animals. This insight needs careful consideration when selecting alternative feed sources. In particular, the information needs to be addressed when selecting future nitrogen fixing leguminous tree species to be integrated into the current livestock rearing practices.

animals, gathering cane ban⁵⁹, relying on government subsidy and feed animals miscellaneous crops.

Cattle owners and extension agents contend herd size is limited to how much land is in pasture or can be put to pasture. Maintaining animal weight under dry conditions is a very difficult task if other activities listed above are not carried out. During the driest time of the season, between February and April, many cows were calving, adding to the stress on both calf and cow.⁶⁰ As cattle owners increase their herd size, access to pasture land and grass are real concerns, especially during the annual dry season. According to resource users, during the annual dry season -- which has been known to last two to three months and upwards of ten months -- families and livestock both suffer.

Empirical observation reveals that goat owners engage in management practices that require low-input of resources (such as land, feed, time, labor, cash and equipment). Goat owners and caretakers of small flocks of goats tether the animals in the morning and return the goats to the household in the evening for safe keeping. In cases where several goats are reared, goats are tethered to feed sources, mainly tall grasses and bush. Frequently, goats are tethered along roadsides or on ruinate lands that are not owned, leased or rented by the goat owner. According to goat owners and caretakers tending larger flocks, to save time, only the females are tethered in fields or dense bush on owned,

⁵⁹ This researcher and livestock owners organized with the Ministry of Agriculture - Falmouth to use the Ministry of Agriculture's truck to transport twenty livestock owners to collect cane ban (green cane tops) from cane fields around Long Pound and Hamden Sugar Estates where green cane was cut. Five trips were made between April and May. In 1990-1991, fifteen animals died of starvation and the year before twenty-nine perished (Morrison, 1990). The reduction in cattle death is attributed to resource users collecting cane ban five times.

⁶⁰ This stressful condition is supported by Dr. Gary Ruegsagger, an animal husbandry specialist at Bodels Research Station, Old Harbour Jamaica.

leased or rented field plots, for the males do not stray from the females. For protection these larger flocks are penned up at night near the house or in pens located in the fields. All of these coping behaviors reflect creative management practices that are less intensive as regards to resource use.

Limited management information and data were collected on poultry (chickens, turkeys, common fowl) and pigs.⁶¹ In 1990-1991, there were thirty-seven households (fifty-two percent) with chickens, and the size of flocks varied widely. Resource users claim more households raised chickens, and more chickens per household were raised, before hurricane Gilbert blew away many coops and flocks in 1989. However, by 1990-1991, rising costs of imported bagged poultry feed and a reduction in the price received per pound on the local market for a chicken has made the enterprise unprofitable for the small scale producer.⁶² Thus, those who once raised chickens for the market now raise just a few chickens for home consumption, eggs or do not raise at all.

Pig rearing has gone through boom and bust oscillations, and had been profitable at one time, nearly ten years ago.⁶³ Many Jamaicans, not just those in Green Park, began

⁶¹ Since the project's goal is to design alternative cattle and tree management program(s), more extensive research was directed to current cattle management practices followed by goat rearing than other livestock management activities (poultry and pigs) in Green Park.

⁶² From September 1990 to September 1991 the price per fifty pound bag of chicken feed went from JS\$45.00 (exchange rate at JS\$6.00 to US\$1.00) to JS\$110.00 (exchange rate at JS\$13.00 to US\$1.00) with wages remaining relatively constant. The price per pound of chicken went from JS\$7.00 per pound to JS\$14.50 in that same time frame (same exchange rates respectively). The costs for raising twenty-four chicks to reach a marketable weight in eight weeks, which generally is close to four pounds, could not be met by the market price received by small farmer.

⁶³ Evidence of the large pig industry boom and bust cycles are the rusting biogas converters on some of the resource users properties. Minimally forty pigs are necessary to operate a biogas converter. A number of these former large pig owners went into debt when the pork market fell.

to rear pigs at this time. As a result, production flooded the market, and market price per pound did not cover production costs. Production in Green Park was limited and variable. Like chickens, a similar trend is found among pig rearers in terms of feed prices and producer price per pound not being sufficient to cover costs for production. Those who currently rear pigs use the animals as a living garbage disposal. They feed them unsold pumpkin, other spoiling crops or food scraps and do not have to rely heavily on purchased feed concentrates. Both pig and chicken production in Green Park reveal how linkages to market forces and structures have an impact on local coping and other resource use strategies, a point to be expanded on in Chapter Six.

5.6 Labor as a General Resource

An assumption frequently made by researchers and extension agents is that small-scale resource users normally have access to family labor as a means to lower the cost of production and minimize labor problems (LeFranc 1983). In addition, Manley (1991) suggests labor, be it family or the ability to hire, is equal to capital. However, the data indicate that Green Park lacks a sufficient pool of family labor from which the resource users may draw. Recall, from all households interviewed, the average household size is 4.5 members ranging from one to fifteen occupants, (although household size does vary among subgroups --resettlers, local and circular migrants).

The survey results indicate when primary resource users seek labor to assist in cultivating or rearing livestock, the family is one of the major sources of labor (in 37.6% of the families surveyed), followed by other Green Park residents. According to resource users, wages are not paid to family members, but are paid in kind (food, education,

clothing etc.). However, hired labor is employed by 50.7% of the resource users and not without difficulties. According to those that do and do not hire, a range of problems present themselves in terms of access, affordability and reliability. Roughly 22.5% report "me hire but de workers only wanna de money, dey don wanna work." Close to 18.3% report they hire, but costs are high; most times they can't afford to hire as in the past.⁶⁴ Lastly, 7.0% say it is difficult to find workers, and they must look outside Green Park to find people to work. Those not hiring (49.3%) cite a number of reasons for not employing labor which include: loss of markets diminishes need for labor, loss of land space, reduced farming by older resource users, inadequate land space with which to farm large scale, a lack of desire to farm, or a move towards cattle production with a lower labor requirement.

5.6.1 Labor Use in Crop Cultivation

Family labor frequently is used to assist in land preparation, planting, weeding, spraying and reaping, depending on the crop cultivated and the season. Table 27 illustrates the range of family labor used in crop production. Cash, permanent and garden crops cultivated in Green Park vary in their labor requirements. Once established, most of the permanent crops can grow for considerable periods with little labor and productivity not be appreciably impaired. Short-term cash and garden crops require more frequent

⁶⁴ Agricultural day labor wages fluctuated during the course of the 1990-1991 field season. Wage rates started at j\$40.00 per day, (the exchange rate at US\$1.00 to J\$6.00). Toward the end of the field season, wage rates ranged from J\$50.00-\$65.00 per day (the exchange rate was US\$1.00 to j\$14.00).

attention (Edwards 1961). During the cropping cycle family labor is used in garden, cash and permanent crop production by sixty-nine percent of the seventy-one households interviewed, while thirty-one percent do not use family labor. Approximately twenty-six percent of the resource users contend s/he cultivates the land themselves and eighteen percent say they are aided by a son. The use of family labor does not preclude the use of wage labor.

There is a clear division of labor observed in crop cultivation among households that have both male and female adults sharing in agricultural activities. A distinction is made between field crops and house crops (garden and kitchen crops). Field crops tend to be primarily men's domain. Households that have crops in fields located away from the house were observed to have male relatives and hired male laborers working on the plots. Only on rare occasions were women observed to be working on the field crops. In such cases where women were working in the field plots to aid in avoiding crop losses from threatening climatic conditions, the women were accompanied by other family members. As such, there is a trend towards crop selection and acreage planted (as noted earlier) which are related to plots used and whose work domain it is to tend to the crops.

Most Green Park resource users interviewed have garden plots located along their houses. In cases where female adults and older female relatives are present, garden crops are their responsibility. Garden crop plots are integrated with food crops, spices and fruit bearing trees. In households where both male and female adults are present, men are observed to contribute labor to the garden cultivation; however, this may or may not be men's primary domain. The frequency with which men contribute labor depends on if they have additional field plots to cultivate or rear livestock, or if they are engaged in non-farm

wage labor activities.

Formal survey results indicate hired labor is not solicited for garden crops among households with both male and female adults present. In cases where only a female adult is present and no male adult or male relative is present, male labor is hired as a coping strategy. In these instances, all of the women are elderly widows. Women hired to aid in garden crop cultivation were never reported nor observed during the field season. In only one case was a female relative hired to pick cowpeas while the male owner continued in his off-farm wage labor; even in this case, she did not work alone.

Sons, daughters, and grandchildren contribute labor to crop cultivation. Briefly, children assisted around their own schedules because of commitments to school, off-farm employment, childcare of younger siblings and actual age of the child. Frequently, young males were observed to contribute labor in both field and house crop cultivation plots, whereas young women were observed to be contributing their labor to the house gardens and domestic tasks.

The division of labor in cultivation appears to be related to the location of the plot. Plots not adjacent to the house are not regularly women's work domains. In all cases, be it field plots or garden plots, the sense of production at the household level is based on what the household can manage (produce, distribute and consume). Tremendous variation is related to the variation found in land size, need or ability to hire labor, household size and available labor, the market price and access to the market. Further coping strategies are explored in Chapter Six.

Among Green Park resource users who cultivate crops and who use wage laborers (fifty-five percent hire labor) do not hire a regular basis. Nearly thirty-five percent state

they hire irregularly, (less than twelve times for the year), nine percent state they hire regularly, (more than twelve times for the year), and fourteen percent contend they employ someone several days a week or more. Laborers are frequently hired to clear the lands with the plow (65.5%) and to aide in weeding (10.3%). These tasks for which laborers are hired coincide with cropping cycles and seasonal variation. Table 28 indicates the tasks resource users frequently employ labor.

Edwards (1961), in his comparative socioeconomic analysis of twenty-seven small scale farming systems in varying regions throughout Jamaica, found that tree crops are important components to the farm enterprise. In addition, Edwards (1961) contends once tree crops are established, the labor required can be less than other forms of cropping.

Edwards writes,

planting tree crops may seem surprising in view of the farmers' poverty and their tendency to concentrate on investments which yield their returns in the short run. The choice of tree enterprises reflects certain traits in the farmers: their foresight, their concern about security in their old age when they cannot work hard, and their willingness to wait for returns when they are able to do so. The burden of waiting is somewhat lightened by the customary practice of planting the tree with other crops which have to be cultivated and so 'carry' the trees; by planting only a few trees at a time; and by the knowledge that once well established the trees will require little labour. The comparatively low labour requirements of tree crops are particularly attractive under the conditions of shortage of labour available to individual farmer (Edwards 1961:105).

Although these observations for tree labor requirements were made a number of years ago, they apply to empirical observations made of Green Park in 1990-1991. The sociocultural interaction of trees as part of the Green Park agrarian systems suggests that upon maturity, trees located near the house provide the household with food and can be more closely monitored from fruit stealers. The data indicate that the majority of

households that have been established for some time have a number fruit trees located around their house. In addition, repeated informal discussions reveal that fruit trees planted by the newer Green Park arrivals have tended to be planted for future use on owned land at the household. In cases where resource users are renting or leasing their house, the existing fruit bearing trees had been previously established by prior land owners.

In addition, tree establishment for livestock is found on owned lands, whereas several tree species are planted as living fences or property corner markers. These species include Gliricidia sepium (the common name is quick stick or grow stick) and Erythrina spp. (the common names are never die or immortal). However, these species and a number of others are identified in Green Park, also serve as fodder for cattle and goats (Table 29). According to all livestock owners, none of these "fodder trees" are purposely established as a source of livestock feed. Rather, resource users who utilize fodder trees collect leaves, pods and seed from trees scattered in their fields or from the hillsides and rely on natural regeneration for propagation.⁶⁵

5.6.2 Labor in Cattle and Goat Production

A division of labor exists between men and women in managing cattle and goats with a higher proportion of men tending to cattle than women. The data indicate about

⁶⁵ In addition, there is one exception where a livestock owner regularly coppices the Gliricidia sepium in his fence line. This resource user did not plant the trees; his father-in law did nearly twenty years ago. This livestock owner contends he does not like living trees in the fence line, for he claims when the trees "bush out" he cannot see his cows and someone will steal them (Fieldnotes 1990-1991).

sixty percent of the time it is the male owner who tends to the animals, whereas, five percent of the time it is the female owner. Both family labor and wage labor are used in livestock rearing for cattle and goats, yet many women said they were afraid of cattle (and lizards). This is confirmed by empirical observation and informal discussions with many women who froze in their tracks or ran away from cattle, in particular as cattle were herded to be watered at the trough (Fieldnotes 1990-1991). There are several exceptions to rearing cattle practices, where women are the primary caretakers of the cattle; these women are also widows whose spouses had once reared cattle. Goats, ruminants considerably smaller than cattle, are observed to be managed by men, women and children (Table 30). Clearly, there is a trend for livestock owners to be the primary animal caretaker, which influences livestock management practices.

The majority of Green Park livestock owners do not employ wage labor to assist in their livestock management, in particular cattle rearing. Of the seventy-one households interviewed, fifty-six percent of the primary resource users report that they do not hire although they rear livestock. Of those who have livestock, twenty percent hire labor to assist in livestock rearing at some point of the year, and all hired labor were men. When wage laborers are employed to tend to the livestock they are hired for several tasks. For example, laborers are hired to clear pastures from re-growth (slash and burn agriculture, and machete), aid providing feed and move animals to water and repair the fence line (Table 31). Many of these activities, specifically, fence mending, clearing pastures, gathering tree fodder or cutting and carrying grass for cattle, occur in the dry season, when there is little crop cultivation. Therefore, livestock labor and maintenance requirements are coordinated with cultivation practices and seasonality among resource

users that are both cultivators and livestock owners.

Green Park livestock owners spend approximately two hours a day with their cattle and/or goats. Daily activities include taking the animals to water, moving them to new feeding areas as needed, and either tethering in new locations with fresher feed sources or rotating to another pasture plot. The more intensive dry times require more labor input and time, for during the dry season livestock owners spend time on cutting and carrying fodder to animals and taking animals to water more frequently. This dry period occurs when few or no crops are being cultivated. According to one seventy-seven year old livestock owner,

If you have de land to produce cane or food you start to make money quicker, fe you have to wait on a de cow longer dan you have to wait for de other crops. You also have to spend more time wid the cow. Wid de cane you just plant and harvest was not a successful cane producer-he torched the field in disgust (a number of years ago after the last harvest). Wid de cow you have to be wid them every day, you have to service de cow, give dem water and worm dem. Don't have so much work wid de farming business anymore. Just carry on for your honest bread so dat you don't have to steal (Fieldnotes 1990-1991).

5.7 Marketing Agricultural Products

The agrarian systems in Green Park are not only differentiated by what and how much of crop is cultivated or livestock reared, but how the products are disposed of (i.e., in home consumption or sold in markets). This marketing of agricultural products reveals much about cultural and social intentions of resource users in Green Park with their resource base; it also reveals much about their coping and adaptive behavior. A number of resources users in Green Park cultivate crops, raise livestock, reap fruit from trees, and/or burn coal; however, not everyone grows, burns or rears with the intent to sell. In some cases, crops are cultivated primarily for home consumption, as are some livestock

(chickens and goats). Among resource users there is a marked variation in production activities, varying in what is produced and what is sold (Table 12). Table 12 identifies the number of households producing crops, fruit bearing trees, livestock and charcoal and the number of those same commodities which they sell at local markets at the time the research was being conducted. The percentages refer to the number of households producing and marketing the commodities. In fact, among the resource users in Green Park, there are twenty-three various combinations of production and marketing activities. Yet, twenty five percent of resource users in Green Park produce three commodities and sell only one of the three produced; this behavior is most common among coping strategy by those in Green Park and serves as a means to spread risk. In addition, a good share of this group are rearing livestock to sell along with their crops and fruit produced. This is the most predominant production and distribution combination among all the resource users. This adaptive process, moving towards livestock rearing, is further explored in Chapter Six and is related to Scudder's model of community formation and resource use.

The data indicate that there exists a wide variety of marketing strategies. In addition, a trend appears for multiple products produced and marketing strategies as an adaptive strategy for household survival. Resource users suggest the price received at the market is only one factor for producing and selling a commodity. Moreover, government announcements over the radio revealed controlled market prices per commodity, frequently, did not meet the input costs on the part of the small-scale producer.⁶⁶ The

⁶⁶ Increasing inflation and rapidly increasing exchange rates effected the farm gate prices for chicken, pig, calaloo, cabbage and tomatoes. The farm gate price did not meet the input costs for the small-scale producer who did not have access to bagged feed concentrates or chemical inputs whole-sale nor in large quantities to reduce some of the input costs.

formal survey and repeated informal discussions with a number of resource users revealed (not) having a export market in which to sell agricultural products is an important constraint for Green Park resource users. Green Park resource users' export market outlet and demand, from a not so distant past, were said to be larger (more to sell and the trucks came to the cultivator) than the local markets of the past and present (See Chapter Four). The agrarian strategies respond to input price, labor costs and availability, risk aversion behavior and market prices. All of these factors interact to effect production, resource use and market behavior. More importantly, this all reflects adaptation and coping strategies among Green Park resource users.

Table 12. Production and Marketing Activities per Household

Production & Marketing Activity	Commodity Produced and Sold	Number of Households Participating	Percent
<u>Not Selling</u> Production 1	Crops _____ Fruit _____ Livestock _____ Burn Charcoal _____	_____0_____ _____9_____ _____0_____ _____0_____	12.7% (9)
Production 2	Livestock Trees	4	5.6% (4)
<u>Selling</u> Production 1 Sell 1	Crop _____ Fruit _____ Livestock _____ Charcoal _____	_____0_____ _____0_____ _____6_____ _____0_____	8.5% (6)
Production 2 Sell 1	Fruit <u>Sell Livestock</u> Crop <u>Sell Charcoal</u> Fruit <u>Sell Charcoal</u>	_____7_____ _____2_____ _____1_____	14.1% (10)
Production 2 Sell 2	Sell Crops & <u>Livestock</u> Sell Crops & <u>Charcoal</u> Sell Fruit & <u>Livestock</u> Sell Crop & <u>Livestock</u>	_____2_____ _____1_____ _____2_____ _____3_____	11.2% (8)
Production 3 Sell 1	Crop Fruit <u>Sell Livestock</u> Crop Fruit <u>Sell Charcoal</u> Fruit Charcoal <u>Sell Livestock</u>	_____16_____ _____1_____ _____1_____	25.4% (18)

Table 12 Continued

Production & Marketing Activity	Commodity Produced and Sold	Number of Households Participating	Percent
Production 3 Sell 2	Fruit / Sell Crop Livestock	1	1.4% (1)
Production 3 Sell 3	Sell crop, Fruit Livestock	1	1.4% (1)
Production 4 Sell 1	Crop, Fruit, Charcoal (clear) Sell Livestock	5	7.0% (5)
Production 4 Sell 3	Charcoal (clear) Sell Crop, Fruit & Livestock	6	8.5% (6)
Production 4 Sell 4	Sell Fruit, Crop Livestock & Charcoal	3	4.2% (3)
Total			100% (71)

5.7.1 Marketing Crops

In 1990-1991 all products cultivated in Green Park that vended are sold in the local markets. The majority of those who sell in a market sell at Falmouth's market on Fridays and Saturdays. Minor exceptions are noted for those who sell at Bounty Hall and Montego Bay markets. The scale of production is small and access to the export markets is not readily available to the Green Park resource users.

A number of resource users indicate they produce to sell, or produce for home consumption and vend their surplus. The resource users sell by: 1. taking goods to the market and selling goods themselves in a stall (booth), 2. selling to a higgler to sell at the

local market, 3. selling from their home, and/or 4. selling in the field as often happens with green corn or cattle. Yet, households that sell at the local markets use their products to meet household demands before selling the remainder, and the majority do not market anything at all. However, as noted, there are exceptions. A range of comments was expressed related to prices received for crops cultivated during the 1990-1991 field season.

Resource users that cultivate to sell regularly raise an additional salient problem, specifically access to transportation. Transportation to the Falmouth market (or any other market) is limited to several privately owned taxis and cars, and a number of public buses and vans. Taxis, vans and buses travel more than fifteen miles carrying folks and their parcels to Falmouth with marketers and consumers vying for space. Producers and higglers are limited by available transport space and costs incurred to carry goods to market. In fact, forty-three percent report transportation is a problem, where fourteen percent claim it is not for they own their own vehicle. However, fifty-three percent contend transport now influences how much they grow, for there are less transport and markets available in present times than in years past, a topic further explored in Chapter Six.

5.7.2 Marketing Livestock

Most Green Park resource users that rear cattle and goats raise with the intent to sell at some point in the animal's life cycle. Cattle and goats tend to serve more as a bank account, or personal loan -- a quick means to capital with no interest, (a Jamaican bank loan in 1991 had a thirty-three percent interest rate) -- than as a regular commodity for

sale. While cattle and goats serve as a source of "quick cash" that can be liquidated upon demand, crops are ruled by their biological cycles.

Conversely, the marketing of cattle coincides to the animal's life cycle and household needs. Cattle owners tended to rear a cow for four to five years, or until she's calved at least four times. If land space and/or grass are available the cattle owner will continue to raise the heifers and sell off the bullkins (male calves). Bullkins are generally the first to be sold, especially under hard times (economic, climatic, or otherwise), whereas, heifers are kept for stocking the herd and replacing the older cows. According to a livestock owner, "when we have a lovely heifer we don't jump to sell it" (Fieldnotes 1990-1991).

Butchers from Green Park, Falmouth, Bounty Hall, Kingston, and Upper Trelawny regularly frequent the area. Any livestock owner ready to sell has no difficulty in locating a butcher to whom to sell. Generally, the dissensions that occur are over the price paid for live weight or dress weight, the fifth quarter (tail, one to four hooves, some of the hide), and if the owner is paid at the time of sale or "little by little"- installments. Livestock owners feel they are being taken advantage of, especially when they know the price per cut that is charged at the local markets.

5.7.3 Marketing of Charcoal

Charcoal burning in Green Park is a means to generate income and clear fields. A charcoal burner tends to combine burning among other occupational activities. Some rear livestock and/or cultivate, as well as do other farm related wage labor activities (mend fences, market etc.). As such, charcoal burning is an adaptive behavior to augment

household income, as well as aids to clear pasture and crop lands from re-growth or to clean up ruinate lands. Those who burn charcoal for an income do so to clear ruinate lands or to clear wooded hillsides. In some instances charcoal burners are hired to clear the lands. S/he can be paid in charcoal and/or a wage for clearing. They may have to give a percentage of bags of coal to the land owner. In other cases charcoal burners fell trees and burn without permission of land owners.

Transportation plays an important role in marketing of coal, similar to the role played in marketing of crops and livestock. The coal burner must make the coal available to the carrier by bagging the coal in fifty pound sugar sacks and putting the sacks along the roadsides for pickup. In addition, the coal burner must pay a transport fee per bag to transport to a market center, which is frequently, Falmouth or Montego Bay.

Coal production varies among the burners. For example, coal is burned almost monthly by those for whom coal is a major or regular source of capital. Others burn less frequently, but this may be on a larger scale. Charcoal making was observed on several occasions where the coal kiln built produced over a hundred bags at a time. These large scale productions came at times to meet household demands, such as school fees, holidays, and/or pay over due bills. Charcoal making is further analyzed among resettlers, local and circular migrants in Chapter Six.

Spreading risk and coping strategies are found not only in occupational choices to generate income, but also in strategies to stretch fuel resources, be they wood, coal or cash for fuel. For example, food preparation coping strategies are found. A number of households use a variety of fuel sources in meal preparation be they kerosene, gas, electricity, wood or coal. Approximately 66.2% of the resource users rely on coal and use

of the coal pot to cook their foods. In addition, 66.2% report using wood, whereas 32.4% use kerosene stoves, 40.8% gas and 4.2% use electricity to cook their foods. These figures represent multiple uses of fuel sources in meal preparation, further evidence of multiple coping strategies.

Many explanations are offered by resource users for the use of multiple fuel sources. The primary reason is to minimize the cost. For those able to collect wood, wood is more economical because they said it is "free." Resource users are burning coal, on their property or felling trees from other resource user's lands with or without permission, both as a means to generate income and/or have a source of cooking fuel. In other instances gas is preferred because it takes less time to cook foods and does not blacken the pots. Those who use gas predominantly use it for breakfast preparation - quick and soft foods, as well as for emergencies, such as when other sources run out. Hard foods, such as rice and peas, soups, dog food, and other foods that are considered to take a longer time to cook, are prepared on coal or wood fires, for it is thought to be more economical. As such, households tend to select a fuel source based on available cash resources, time and preference.

During the field season cooking gas prices increased up in October 1990. The price for a fifty and one-hundred pound gas tank doubled, going from J\$100.00 in October for a hundred-pound gas tank to J\$325.00 for the same tank. Resource users report using less gas following the price increase, commenting that it is easier to save a few Js to purchase a tin of coal or collect the wood than it is to fill a tank. In addition, during the Persian Gulf War "crisis" an unplanned fuel shortage developed. No kerosene was delivered to Falmouth for several weeks; thus, Green Park resource users were not able to

replenish their kerosene. The kerosene shortage stimulated Green Park resource users to seek out alternate sources, and the majority turned to coal and wood (Fieldnotes 1990-1991).⁶⁷

5.8 Summary

Green Park's natural environmental system is dynamic and fluctuates with and without human intervention. The discussion included a brief description of topography, soils and climate for Green Park relative to Jamaica. The soil conditions and types, vegetation, climatic conditions and varied topography provide micro-environments with which Green Park resource users must contend, use and manage. Climatic changes naturally contribute to the dynamism in the form of seasonal variation (droughts, rainfall patterns and hurricanes). Such naturally occurring episodic conditions influence soil conditions, tree, crop and livestock selection and management. As such, species adapt to semi-arid conditions located in a rainshadow of Jamaica. Some species vary in their tolerance to dry conditions, topography and altitude (i.e., breadfruit, coffee, yams, and sugarcane). Such characteristics contribute to the inherent constraints, as well as advantages for the area. Further discussions of livestock and tree and crop cultivation practices and use over time are found in Chapter Six.

The social organization of the Green Park resettlement is of interest for many reasons. The data presented suggest Green Park to be a young heterogeneous resettlement with small size households that support an older population and few young

⁶⁷ Panic purchasing of rice, beans, sugar and flour also occurred.

people, primarily grandchildren. In addition, it is observed that the resettlement is composed of non-farmers, wage earners, charcoal burners, livestock owners, cultivators, fishermen and those who combine a number of these production activities. Some households rely on land based resources in their subsistence practices, whereas others rely more on off-farm activities to sustain their households. In addition, Green Park's resource users contend they are not primarily farmers, although a high percentage do cultivate and/or rear livestock for their households.

The analysis of cultivation and rearing practices found resource users in Green Park are adapting to dry-system farming. Few families subsist by farming and marketing of farm products alone. Many resource users, are part-time farmers with most of their time and income generated from an off-farm activity. Other residents are full-time farmers who cultivate and/or raise livestock (cow, goat, pig and fowl) to sell. Overall, Green Park resource users are smallholders constrained by land space, markets and climatic conditions.

A variety of crops are cultivated in Green Park. Tubers and other root crops (pumpkin, sweet potato and yam), and quick growing crops (cowpeas, corn, beans and callaloo) are the more predominant crops cultivated, for they are best adapted to tropical semi-arid environments and current market opportunities. Slash and burn agriculture and mechanized tractors are used in land preparations, however manual technology is the predominant method in farming.

A variety of trees are established and used in Green Park. The majority of fruit bearing trees are established on plots of land along the house. A minority of fruit bearing trees are established in field plots away from the house. All of the fruit bearing trees are

planted on lands that are owned. This holds true for trees established as living fences in livestock pastures as well; they are planted on land which are owned.

A range of livestock rearing practices, species, herd and flock size is present in Green Park. Over time, the total cattle and goat population has increased, yet herd and flock size vary among subgroup populations. The largest percentage of land uses is for pasture. In addition, some livestock owners tether their animals, whereas others are penned. Some livestock survive on purchased feeds, whereas others rely on the natural environment. Animal owners are aware of pasture type and tree species to supplement and/or use as alternate feed substitutes for their goats and cattle.

A variety of labor needs and constraints are identified among the Green Park resource users. The variation that is found is related to crop production and livestock rearing, as well as sex, available family labor, size of agrarian activities and ability to hire. In addition, it was pointed out that labor use follows seasonality. Labor demands are higher among those who are cropping more, for they need lands prepared, seeds sowed or crops harvested. Labor demands are less for those who are not cropping, but tend rely more on livestock rearing or trees bearing fruit.

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**A STUDY OF COMMUNITY FORMATION AND RESOURCE USE IN A
CARIBBEAN AGRARIAN RESETTLEMENT: GREEN PARK, JAMAICA (1990-
1991) FROM AN ECOLOGICAL ANTHROPOLOGICAL PERSPECTIVE**

VOLUME 2

By

Susan L. Andreatta

A DISSERTATION

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Michigan State University
in partial fulfillment of the requirements
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Dr. Joseph Chartkoff, Advisor

CHAPTER VI

RESETTLEMENT ADAPTATION, AGRICULTURAL PRACTICES AND RESOURCE USE

6.1 Introduction

An integrated ecological anthropological perspective is employed to test Scudder's community formation developmental sequence for an agrarian resettlement, known as Green Park. As previously mentioned in Chapter Two, this analysis of an agrarian resettlement is a location specific and event focused research endeavor. This analysis provides the context in which Green Park sits historically and furthers the understanding of household settlement variation; this information is useful to programmers, project and policy designers.

Chapter Six is subdivided into several sections. First, Green Park is examined using Scudder's four stage resettlement evaluation. The resettlement process forms the foundation upon which different subgroups adapt to their new environments. Disaggregating the various subgroups (resettlers, local migrants and circular migrants) over time permits a more thorough and detailed analysis for the Green Park resettlement. Infrastructure, social organization (resident status, occupation, kinship and leadership) and agrarian strategies contribute to the evaluation of Green Park as a community. Second, Chapter Six examines the process of community formation, the transformations Green Park resource users have undergone in their adaptive agricultural approaches and the

factors contributing to these transformations. Lastly, Chapter Six examines Green Park resource users' perceptions of agricultural change and subsequent impact on their land-base resources.

6.1.1 Scudder's Four Stage Resettlement Evaluation

As discussed in Chapter One, Scudder's four stage resettlement process of community formation is useful for organizing this analysis (Scudder 1989, 1991). Stage one is characterized by the initial planning of the resettlement where plans are designed, criteria are identified for resettler selection, and infrastructure is installed. Stage one terminates with the voluntary or involuntary settlement of new households into the new habitat. Frequently, the new habitat differs in its natural setting (vegetation, topography, climate, and soils) from resettlers' previous surroundings; this new environment requires a period of adjustment.

Stage two is characterized as a period of transition where households are settling into their new environments and drawing from past agrarian experiences and knowledge to sustain their households. As such, Scudder refers to stage two of the resettlement process as the "trial and error" phase where households at this time are risk adverse and likely to engage in practices that minimize stress and risk for the household (Moran 1989; Partridge 1989; Scudder 1989 and 1991). Previous resettlement studies find this phase to last between zero and five years, yet the time may be reduced with outside support (guidance, information, access to resources (markets, transportation, bank loans etc.) (Moran 1989; Partridge 1989; Scudder 1989 and 1991). Stage two is explored in Chapter Six in much greater detail and in the context of each subgroup (resettlers, local migrants and circular

migrants) adaptive process.

Stage three of the resettlement process is characterized by experimentation of the resettler subgroup, primarily the earlier resettlers who have had time to observe their own outcomes to farming practices and other activities. Stage three of Scudder's resettlement process begins between five and ten years after the establishment of the resettlement (Moran 1989; Scudder 1989 and 1991). During this experimental phase the emphasis is toward market production (and profits) rather than subsistence, which is generally characteristic of phase two (Scudder 1989 and 1991). During this phase profits are reinvested in the farm (such as in animals, land and tools), in the household (transforming a wood house into a brick house) or household members (providing for education, clothing, electronic things or other items) (Scudder 1991). However, studies have demonstrated that not everyone is successful during phase three (Moran 1989; Scudder 1989 and 1991). Scudder and Moran identify kinship relations as a factor contributing to household success and community formation in the resettlement process; however, internal and external kinship ties may not be sufficient to support some households through uncertain times. Scudder also has found that lack of household success, characteristic of phase three, is associated with considerable property turnover in the resettlement; a number of households may lose their property due to a variety of natural and unforeseen circumstances. These may include incurred debt resulting from poor health, low market prices, failed crops, or death of livestock due to climate or other natural disasters.

According to past research on resettlements, during phase three more successful resource users tend to become local leaders and head organizations that contribute to local

institution building within the resettlement (Moran 1989; Partridge 1989; Scudder 1989, 1991). According to Scudder and Moran, developing local organizations helps to empower the resettlement to gain access to information, and resources (i.e., bank loans and credit), and strengthens resettlement member ties and responsibility to the resettlement and resource use. Stage three is elaborated in Chapter Six in the context of resettler, local migrant and circular migrant subgroups using resources in Green Park.

Stage four of Scudder's resettlement sequence is characterized by incorporating resettlers into "their community." According to Moran (1989) and Scudder (1991,) generally this occurs after the first ten years have passed. Scudder (1989, 1991) contends that a settlement is not considered a success until control of project activities of the settlement is handed over to resettlers and their local organizations (Moran 1989; Scudder 1989 and 1991). This transfer signifies a point at which local decision making processes and responsibilities are in the hands of resettlement members and its local leaders, not an external faction (i.e., Kaiser Jamaica Bauxite Company). In addition, success of a resettlement occurs when a second generation of resettlers starts to take over and set up residence, developing their own household responsibilities.

Scudder (1989 and 1991) and Moran (1989) comment that not many resettlements reach stage four. Scudder contends most resettlements are caught in stage three; community members do not gain control of "their" community. In addition, the high incidence of out- migration (especially among the younger population) preclude a second generation from establishing permanent residence or resource use in the resettlement, or maintaining long-term control of "their community."

6.2 Resettlement Evaluation of Green Park: Community Formation Subgroups and Resource Use

6.2.1a Stage One: Resettlement Design for Green Park

As previously stated, Green Park, a commercial beef and sugarcane plantation, was purchased in 1959 by Kaiser Jamaica Bauxite Company (Kaiser) as an agrarian resettlement. This enabled Kaiser to extract bauxite in St. Ann where a number of households or farmlands previously existed⁶⁸ According to Woodhouse, a Kaiser official,

Green Park was selected because most of the resettlers were farmers and they need good agricultural lands. Sugarcane lands are usually regarded as good cultivatable lands with plenty of organic matter. The original intention was to relocate farmers from the mining area which were prime agricultural lands, thus giving them back lands which were considered as good agricultural lands (Woodhouse 1991).

The entire acreage of the Green Park plantation (3115 acres) was originally divided by Kaiser Jamaica Bauxite into 337 individual plots (Map 3.). Kaiser allocated a total of 1129 acres to resettlers; primarily, the former sugarcane lands. At the time the resettlement was designed, Woodhouse stated the remaining acreage "was not suited for agricultural use" (Woodhouse 1991). Kaiser officials drew up the settlement plans identifying where new houses and farmlands where to be located in Green Park. The residential area consisted of one acre plots in Limeskill, and the farming area was composed of one acre to four and a half acre plots in Green Park Proper.

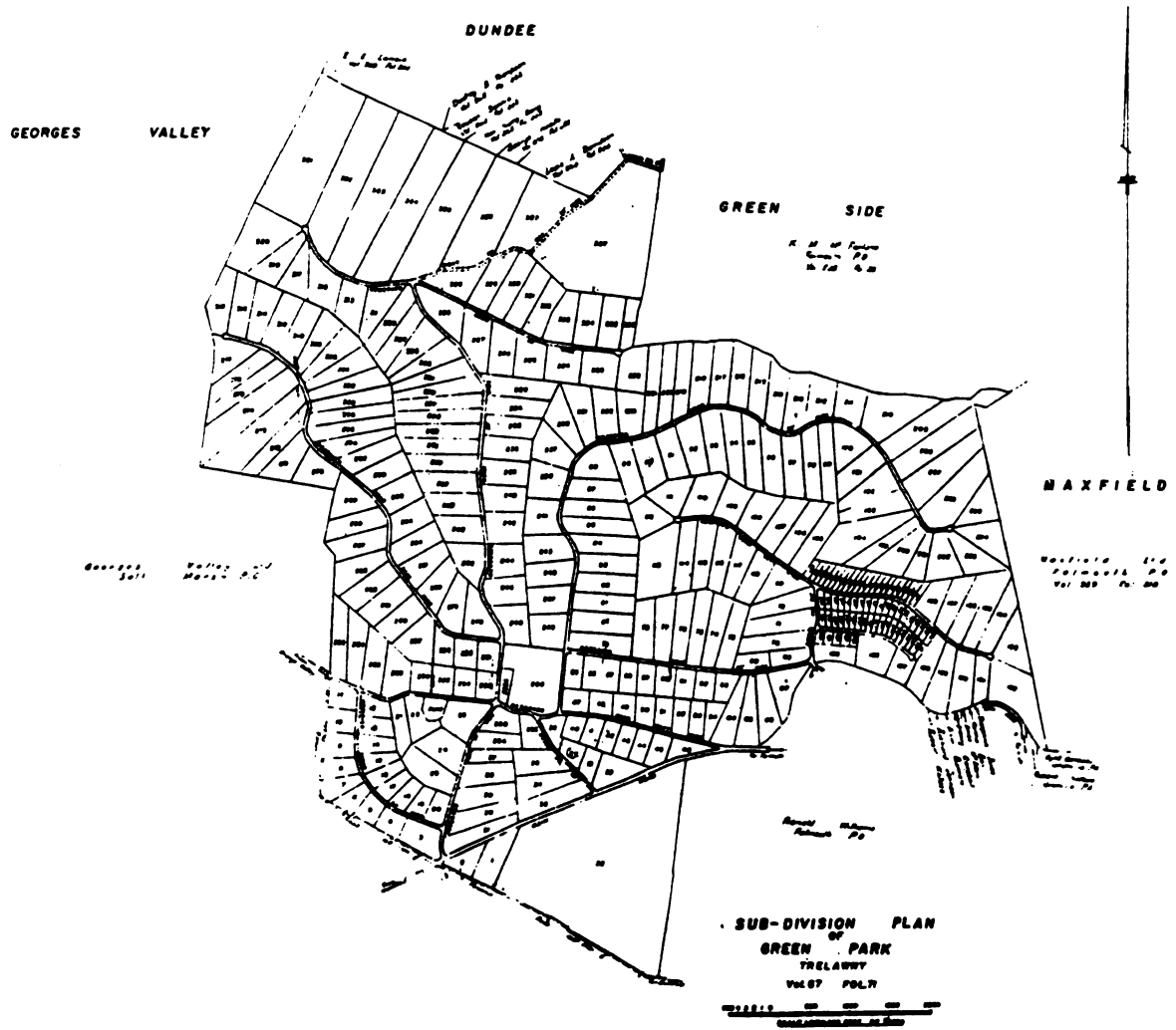
Cowell (1987) comments on the process of displacement and relocation of St. Ann

⁶⁸ According to a Kaiser official in charge of property and leasing (1991), Green Park was an estate where soil fertility was very good. There were plenty of trees culminating into thick woodlands; however, with the passage of time woodlands have been eroded by resettlers in the process of coal burning, fire wood, fence posts and cutting timber for lumber purposes (Woodhouse 1991).

residents onto subdivisions in other areas by Kaiser, ALCOA and ALCAN -- other international bauxite companies -- was similar to that of Kaiser's; the variation identified is related the adaptive processes expressed over time. According to Cowell's (1987) descriptions of Kaiser's site selection of Lime Tree Garden and Thatchfield to Retreat, two sites among a number of resettlements which Cowell examined the impact of bauxite mining on peasant and community relations in Jamaica, Kaiser repeats a similar scenario in developing Green Park's resettlement. In addition, Lime Tree Garden and Thatchfield were developed in the mid-1950s as was Green Park.⁶⁹

Formal survey and ethnographic methods were employed to gather data on land tenure, land use, and land size during the field season. Data were collected on 204 plots (60.5% of the 337 original plot) from the seventy-one interviews conducted. Information on land size, land use, and tenurial relations were informally gathered on the remaining plots. An important point to reiterate concerns availability of specific data on immigrants to Green Park. The number of people who leased/rented lands from Kaiser or who moved into Green Park was available. This land tenure information was sensitive to many resource users who considered the question to be prying. More favorable interviews were conducted when sensitive questions were removed from the questioning process (such as, "from whom did you buy your lands or from whom are you currently renting or leasing").

⁶⁹ According to Cowell, the picture that emerged for Lime Tree Garden and Thatchfield to Retreat, "is not necessarily one of cruelty or disregard for human rights; rather it is one of patronage, based on the jaundiced liberalism of the ruling class in a society farther removed from slavery in anytime than in fact" (Cowell 1987:183).



Map 3. Green Park Resettlement

As previously mentioned in Chapter Five, Kaiser Jamaica Bauxite Company retains ownership of a number of plots, some of which Kaiser leases or rents, and others that they do not. Lease and rent fees are nominal (J\$7.00, J\$15.00 depending on land size). In addition, Kaiser places restrictions on land use concerning cutting of trees, types of crops raised, slash and burn practices and leasing of lands to others (Woodhouse 1991). Kaiser also donated several plots of land on the forested hillside to the Jamaican Forest Department to be a forest preserve. However, according to Woodhouse, who is a Kaiser official, these forested areas currently are harvested illegally for yam stakes, fence posts and for logs to be used to make charcoal. Clearly, Kaiser still impacts resource use of Green Park lands occupied in the resettlement, and this has an effect on how initial resettlement design plays out.

6.2.1b Stage One of Green Park: Infrastructure and Access

As previously mentioned, the initial phase of Scudder's resettlement transformation model includes infrastructure development. Similarly, Green Park's initial infrastructure installation transpired in phase one. Kaiser Jamaica Bauxite constructed the internal road system (7.4 miles of roads) in Green Park in the mid-1960s, cutting into former sugarcane roads and carving new dirt roads for access to new areas being developed for residential and agrarian purposes (Woodhouse, 1991). In 1990-1991, many resource users still refer to the roads as "Kaiser" roads, while others claim they are "Green Park" roads.

Access to Green Park is from three points along the main two-lane asphalt road leaving from Falmouth and extending into the Cockpit Country. These points of entry turn into the rutted dirt and marl "Kaiser" roads. Numerous stories from Green Park

resettlers and empirical observation confirm these roads turn into flooding rivers during the rainy season, leaving deep crevasses and large limestone rocks that obstruct access in and out of the resettlement. Buses, minibuses and taxis are hailed to town with modicum difficulty from the three points of entry to Green Park. Transportation problems generally are related to too few vehicles, over crowding and long waits between available vehicles to reach Falmouth and other areas.

During informal discussions throughout the field season, several resettlers and local migrants recall initial electricity and potable water were made available to those living in the Limeskill region, the intended "residential" area for Green Park. Residents outside Limeskill, (i.e., on the hillsides and former sugarcane lands), never received potable water or electricity even though they had been promised services (Fieldnotes 1990-1991 from Green Park resource users).⁷⁰

To date (1990-1991), the entire area of Green Park is not completely serviced with potable water, electricity or telephones. The nearest public telephone is located in Falmouth, in a public phone booth. According to a number of Green Park resource users, piped water and electricity are available only to those who can afford the installation and monthly or bimonthly service fees in the Limeskill and Hammersmith areas, and only to a few houses in Green Park proper. In fact, during the field season a circular migrant reported paying J\$5000.00 to purchase posts and have post holes dug, but this did not include the costs of the power lines to be hooked from their new house to the nearest main

⁷⁰ This is illustrated by one resettler's case. This particular elderly resettler realized his farming was better in St. Ann, where he relied on higher precipitation levels and deeper soils. However, he saw Green park as an opportunity to obtain a brick house (Fieldnotes 1990-1991). Yet, this resettler never received access to the promised electricity or potable water services. In the end, this resource user reported he built his own cistern (Fieldnotes 1990-1991).

line or user fees (Fieldnotes 1990-1991).

Following a ten-month drought in 1976, a public livestock trough was constructed in the early 1980's for Green Park cattle owners' usage. Over the course of the field season, twelve livestock owners, (regular trough users), recounted informally, how they presented the need of the public trough to the Trelawny Parish Council. These livestock owners pointed out to Parish council members that other communities had standing roadside pipes for households to have access to water and Green Park did not. These livestock owners requested access to a water line for public trough use rather than for standing pipes. During the 1990-1991 field season, Trelawny Parish Council permitted livestock owners to have unlimited water access at the trough with no water fee assessed, providing the trough is maintained and pipes repaired at livestock owners' personal expense in a timely manner. During the field season the water pipes were damaged on several occasions. It was reported by several livestock owners that not everyone who uses the trough pays to repair it.

6.2.1c Resettler Selection Process

Green Park was resettled nearly thirty years ago with sponsored voluntary resettlers who were private small landholding farmers in a number of communities located in St. Ann Parish. Analysis of the formal surveys indicates fourteen households from the seventy-one interviewed (19.7%) relocated from St. Ann Parish. According to resettlers personal accounts of the relocation process, nine of the households (64.3%) are direct resettlers; the other five (35.7%) settled on family land.

Cowell reports in his work on Jamaican bauxite resettlements, that relocation of

entire communities is the normal process for the bauxite companies. In fact, Cowell's research in Lime Tree Garden and from Thatchfield to Retreat indicate the inhabitants were selected from the same communities (Cowell 1987:189). However, for Green Park, the resettled subgroup did not originate from a single community and collectively relocate to the new area, a more common practice for resettlement programs (Moran 1989; Partridge 1989; Scudder 1989, 1991). To reiterate this salient attribute, the resettlement social organization of Green Park reflects different households arriving from different areas of St. Ann Parish. Only a very few of the resettlers (three out of fourteen) came with prior knowledge of one another; strangers adapt and get to know other strangers. Specifically, individual resettlers were relocated from their privately held lands by a TNC (Kaiser) who owned the plantation resold and leased small parcels of this land.

The area in St. Ann Parish (Alexandria and Brownstown) from which many families were relocated is more than ten miles southeast from Green Park. These small farmers, who had for all their lives grown coffee, oranges and ground provisions in the uneven terra rosa hollows of Dry Harbour Mountains in the Cockpit Country, were placed in the middle of cane land, several hundred feet lower in altitude, under a climatic regime about which they would have to start learning.

As in phase one of Scudder's resettlement community formation model the resettlement process for Green Park developed sequentially. Initially, Kaiser representatives approached households in the mining area of St. Ann Parish that lived or worked lands known to contain bauxite ore. They would then buy out the families, relocate them in one of three settlement areas, and charge them a subsidized rate for the new land purchase. A resettler describes his relocation process in the following manner:

De Kaiser people saw me in me field and dem asked if me own de land. Dem say dem going to test de land, and if dem liked it de going to buy or take it from me. (This was in 1967.) Me sell dem one acre. Me have land in St. Ann's but me sister usin it. Me use to go der but me naw have de money now and me health not so good. Kaiser give me a choice of a plot where der be stone, and me say no to de site for me would have to bring in de dirt just to grow flowers. Dem show me anodder site and me naw like dat. Me agree to be relocated in Green Park so me had to pick a site in Green Park (Fieldnotes 1990-1991 on a Green Park Resource User).

As recounted by a number of resettlers and confirmed by a Kaiser representative, Kaiser offered three resettlement options to potential resettlers. Potential resettlers were given the opportunity to examine specific plots and accompanying natural environments prior to relocating, and those that selected Green Park did so as the best of the three options. Again, this resettlement process is similar to what Cowell (1987) reports for Lime Tree Garden and from Thatchfield to Retreat.

Not all of the people from St. Ann relocated to the Green Park resettlement.⁷¹ According to a number of resettlers, if a family or household, did not approve of any of three resettlement areas they were offered as options, the families could receive monetary compensation or take the land and sell it off at slightly higher rates than their subsidized Kaiser rate (this rate was still below the bank rate and would not yield a profit). According to Woodhouse, a Kaiser official supervising property and leasing, "the number of vendors was 207, the number of families was 200, and 17 houses were constructed" (in Green Park) (Woodhouse 1991). Overall, Kaiser demarcated, retained and sold three hundred and thirty-seven plots, varying in size, location and intended use (residential area, farming, wooded regions).

⁷¹ Cowell found in Lime Tree Garden and from Thatchfield to Retreat that "Kaiser offered a minimum acreage of between two and three acres for resettlement. But in some cases settlers found it necessary to sell part of this land in order to clear sale expenses" (Cowell 1987:206). This information was not gathered for Green Park during the field season.

Resettlers who elected to relocate in Green Park took part in negotiations about what they would receive. "What resettlers received bore direct relations to what they sold. For example, those who sold lands with dwellings, houses Kaiser built households of the same size in square foot measurement with all the facilities attached" (Woodhouse 1991). In addition, resettlers who selected lands in Green Park purchased acreage at a subsidized rate (at J\$24/acre (J\$2.00 to US\$1.00) (Woodhouse 1990-1991). Resettlers were not charged interest if they had to borrow money in the negotiation process, "as the resettlement was a sort of package deal" (Woodhouse 1991). In total seventeen two or three room concrete houses⁷² were constructed at a subsidized rate for those who had houses on expropriated lands in St. Ann. Cinder block houses were constructed at a time when wood houses were the norm and still the least expensive to construct, commented Woodhouse and the resettlers during the course of the field season. In addition, two families were offered and accepted former plantation buildings rather than a Kaiser house. Woodhouse added, that in addition to land and houses resettlers received, resettlers acquired fruit trees to plant on the lands. The list of free trees includes citrus, mangoes, pears, coconut and soursop, many of which are still standing (Woodhouse 1991). By 1990-1991 only five Kaiser houses are occupied by original resettled families, the remaining have been resold, while other resettlers have constructed their own houses from wood, cinder block or remained in the plantation houses (Table 32 - Variable Label "HSE 1990-1991").

⁷² According to Cowell, "houses have always been something special for Jamaicans who like to leave a personal stamp on their dwelling. This is not so unnatural since it often represents the culmination of a lifetime of effort. The uniformity of the 'bauxite house', quite apart from its cheapness and ugliness, was a source of resentment to persons, especially those who had previously built a house to their own specifications and who were now given no say in the construction of the houses in the resettlement schemes" (Cowell 1987:205).

6.2.2 Stage Two and Three: Transition from Trial and Error to Experimentation in Green Park

6.2.2a Resettler Land Acquisition

The majority of resettler families (nine or 64.3%) purchased their initial acreage between 1962 and 1968 (Table 32 - Variable label "When Acq"), although this subgroup did not relocate the same year they acquired usufruct land rights in Green Park. However, by 1968 this majority of resettlers arrived in Green Park to use resources, with the earliest arriving in 1962 and the last arriving in 1983 (Table 32 - Variable label "When Come"). Reasons for delay included staying in St. Ann and farming a few more years, waiting for Kaiser to construct their house, taking wage paying positions in other communities and being a resettler's son being too young to establish his own household on family land. As such, approximately 64.3% of the resettlers arrived more than twenty years ago (Table 13 p. 272). The data on remaining resettlers exhibit a sedentary group, with the majority of these resettlers residing in the resettlement for at least twenty years or more.

6.2.2b Resettler Age

Resettlers on average were 35.8 years of age when they acquired land (Appendix 2; Table 32 - Variable Label "Age Acq"). The age range of people upon arrival was between nineteen years of age to fifty-four years of age, averaging 40.4 years of age (Table 32 - Variable Label "Age Come"). In 1990-1991, this resettler subgroup averages 61.2 years of age, ranging from forty-four to seventy-seven years of age (Table 32 - Variable Label "Age 1990-1991", Table 14 p. 274). This age range is compared to the other subgroups in Chapter Six and demonstrates that the average age among Green Park resource users is higher than the average age of Jamaican farmers which is fifty-eight years

of age (LeFranc 1983). Age is important in this context and throughout Chapter Six for it relates to the length of time specific subgroups have been using resources in Green Park and length of time associated with dry-system farming.

6.2.2c Resettler Land Tenure and Landholding Size and Use

All resettlers have access to land use, yet some have more access than others and frequently, ownership of land acts as a prime factor controlling access to land (Table 33 - Variable Label "Land1 Tenure"). A total of ten of the fourteen resettlers (71.4%) came on owned lands averaging 9.7 acres (Table 33 - Variable Label "Land1 Acres"), and this ownership gave these resource users unquestioned access to land use. As indicated in Table 33, land ownership patterns change over time, and major differences in land use follow. For 1990-1991, the average total acreage used is 14.3 acres, yet tremendous variation exists among resettler households (Table 33- Variable Label "Land2 Acres 1990"). However, some households report using as few as 0.25 acres, and others report using up to 72.5 acre, yet not all of these lands are owned by the resettlers. The total acreage currently used on owned lands averages 5.9 acres, reflecting a thirty-five percent decrease from their original acreage owned, which averaged 9.7 acres (Table 33 -Variable Label "Owned 1990"). If the largest four land users are removed as outliers from the calculation of total acreage used, a more realistic land use average is generated; resettlers' total acreage used becomes 5.7 acres rather than 14.3 acres used per household. In other words, the majority of resettlers (71.0%) are small landholders that support a household size averaging approximately 5.3 household members (Table 14 p. 274 and Tables 32 and 33 - Variable Label HHS 1990).

Further discussion is warranted on changes in the size of landholdings from when resettlers first arrived at Green Park to the period of this study in 1990-1991. By 1990-1991, the majority of resettlers (78.5%) own some of the property they use, whereas 7.1% lease, 7.1% squat and 7.1% lease and squat on the lands they use (Table 33- Variable Labels "Own", "Lease", "Rent", "Squat" and "Borrow"). Table 33 also indicates 71.4% of the resettlers (ten households) increased their total acreage of lands used.⁷³ The remaining resettler households' landholdings 21.4% (three) remained the same, whereas 7.1% (one) had a major decrease in acreage used (the loss was recounted as a result of selling plots of lands to pay off a debt).

6.2.2d Resettlers Trial and Error History

In accordance with Scudder's "trial and error" phase of stage two in the resettlement community formation process, resettlers related their "trial and "error" experiences during the formal survey process and throughout the course of the field season. Kaiser selected small farmers; as such, the majority of resettlers (92.3%) reported they had previous cultivating experience in St. Ann prior to relocating in Green Park. The most frequently recalled crops cultivated among resettlers interviewed include yams, coco, coffee, fruit trees; less frequently mentioned were chocho, sweet potato, corn, cabbage and pumpkin. Both resettlers and Falmouth agricultural extension agents (1990-1991) point out St. Ann is located in a more mountainous, cooler and wetter area. Many crops

⁷³ Corresponding ethnographic data analysis uncovers an exception where one household exhibited an initial purchase of 4.5 acres ("Land1 Acq") to a present day use of five acres ("Land2 Acres 1990"). In actuality this primary resource user sold all but half an acre when the spouse past away; now the resettler squats on 4.5 acres and lives on the remaining owned half acre as a subsistence resource user – hence the five acres used.

that survive in St. Ann do not in Green Park; specifically coffee, chocho, cabbage, yams and certain fruit trees (custard apple) did not do well in the semi-arid environment of Green Park (Fieldnotes 1990-1991; Personal communication with Ministry of Agricultural Extension Agents 1990-1991).

During a number of oral histories and related survey questions, resettlers recounted their initial farming experiences during their initial time in Green Park. A number of comments reflect resettlers adaptive processes in relation to their previous farming experiences and how they applied past knowledge and experience to their new environment. Among resettlers, seven households (fifty percent) purchased lands with cane on their newly acquired property; and (fifty-seven percent) tried cultivating sugarcane when they first arrived. The ethnographic data collected reveals the additional cultivator was a resource user who recognized the land was suitable for sugarcane production and decided to plant sugarcane as an initial permanent crop upon arriving. Although resettlers realized they were using resources on a former sugarcane plantation, resettlers cultivating sugarcane continued sugarcane production for only a few years. Resettlers turned to cultivate other crops because they lacked sugarcane cultivating experience and encountered labor problems in cutting, loading and transporting the sugarcane. In fact, one resettler stated he was so disgusted with the sugarcane business that on his last harvest he torched his sugarcane field once the last truck load of cut cane was hauled away (Fieldnotes 1990-1991).

Resettlers were semi-subsistence small-scale agriculturalists and undertook their initial cultivation based on past farming knowledge and experience in Green Park (i.e., as seen with coffee and yam trials). Resettlers recalled that the tuber did not do well in the

long dry periods and dried up or became host for worms. Other resettlers tried coffee only to find coffee could not withstand the seasonal dry times or the hotter temperatures. One resettler claimed he never cultivated when he arrived; rather, he burned coal and sold it as a source of his household's income. Overall, resettlers stated how they had to learn to farm with Green Park's seasonal rainfalls, different soil types, depths and fertility found throughout the hillsides and flat-lands. No longer were the soils the same red hued bauxite soils of St. Ann. This transitional phase based on trial and error from past experiences and knowledge, coincides with Scudder's stage two of the resettlement process.

Some resettled families did not stay long and/or elected not to relocate in Green Park. According to a resource user who purchased lands from a resettler,

People from St. Ann not interested in cane, dis place is dry, so plenty of dem sell out de land. Dem wanted to plant coco, coffee, banana, food stuffs - tings dem used to plant not de cane. All dis land was an estate, dem naw use to plant'n like dis (Fieldnotes 1990-1991).

Instead, many families elected to take the land as compensation and sell the land(s) to non-resettlers (migrants) and settlers. "After awhile some of settlers resold part or all of their lands in small bits, others subdivided to relatives for building houses" (Woodhouse 1991).

This is further exemplified by the fact that there are fourteen resettled household remaining from the initial resettlers selected to use resources in Green Park. Failure to resettle here upon those lands is seen as another adaptive behavior during this period of trial and error.

6.2.2e Resettlers Stage Three - Risk Taking Behavior and Crops

As mentioned earlier in this chapter, stage three of Scudder's model is characterized in part, by a transition from a trial and error, non-risk-taking, subsistence oriented production to experimentation in commercial agriculture. The transition from stage two to stage three is not easily discernible in Green Park; this research differs from Scudder's research in Africa and Southeast Asia, and factors specific to Green Park complicate the analysis. First, upon arriving Green Park resettlers took an initial risk by cultivating cane, a commercial agricultural commodity. Second, a number of resettlers who elected to relocate in Green Park no longer reside or use resources in Green Park, but sold their lands (or lost them to debt) to local and circular migrants. This point is taken up in succeeding discussions on local and circular migrant subgroups utilizing resources in Green Park where the percentage of more recent arrivals is greater.

The transition from sugarcane to other crops began not long after resettlers arrived to Green Park. Survey and ethnographic data indicate that Green Park resettlers from nearly twenty years ago initially planted a variety of crops, experimented with these crops, and began to cultivate pumpkin on a large scale. As previously mentioned in Chapter Four, the mid-to-late 1970's was the period when Jamaica's AMC (agricultural marketing cooperative) trucks were arriving weekly in Green Park to haul away tons of pumpkin for the export market. During this time two households (14.3%) still had some acreage in sugarcane, and five households (35.7%) integrated their cultivation with livestock. Therefore, stage three for Green Park resettlers is characterized by an increase in experimentation and expansion in commercial agriculture in large scale pumpkin, some corn and peas cultivation and livestock rearing.

Resettlers reported that in the last ten years there have been further changes in their cultivating and livestock rearing practices. Among the fourteen resettlers interviewed, 64.2% who had been cultivators drastically reduced the acreage devoted to pumpkin and other cash crops. As mentioned in Chapter Four, the export market was no longer made available in 1980 nor was there transport to local markets. According to these resettlers, the local markets were not equal in size to the export markets; thus, resettlers could not maintain the same level of production and trade. Consequently, some resettlers responded by: selling off lands, allowing some lands to revert to ruinous plots, increasing livestock rearing, integrating a variety of crops (i.e., corn and peas) on a smaller scale (rather than just pumpkin to meet household demands), selling off lands because of debt, and others gradually getting out of farming because of age and health considerations. Clearly, resettlers made multiple adjustments to their situation and modified their agricultural strategies to cope with external forces, and constraints imposed on the resettlement and family demands.

Among resettlers still cultivating in 1990-1991 twelve of fourteen (or 86.0%) have mixed plots integrated with a variety of cash crops, permanent crops (mostly fruit trees), and semi-permanent crops (roots and tubers). No one irrigates, five apply cow manure to crops, and three plow when it is available, but only if they cultivate on two acres or more. In addition, six resettler households (42.0%) regularly burn coal to generate an income to contribute the household income (Table 34 - Variable Label - "Coal").

In addition to field crops cultivated in Green Park, resettlers have established trees near their house and in field plots. Formal survey and casual field observations reveal variation exists between house and field plots. The survey indicates among resettlers ten

households (71.0%) have trees at their house (Table 34 - Variable Label "Fruit Tree HSE"). The variation of fruit tree combinations at the household varies from one fruit tree variety to as many as ten different varieties, (this is not total number of fruit trees, but rather the total number of varieties). However, fruit bearing trees are planted on lands that are owned, with the predominant trees placed at the house being the ackee tree, orange, banana and breadfruit. In only two cases (14.3%) are trees planted in field orchards on owned land. The variety of trees established in field plots is smaller than those found around the household, ranging from two to six. The ethnographic analysis demonstrates that the planting of fruit bearing trees is an adaptive strategy with which households employ to spread risk on lands they own. As such, fruit bearing trees are established where there is land security and where household members can reap fruits for consumption or sale.

An example illustrates tree use and land tenure practices shared by Green Park resources users. The example is of a resettler who has six fruit bearing tree varieties planted on land owned, but these trees are not established on the land where the resource user resides - the resource user rents his house plot for he and his family. According to this resource user "dis piece me livin, me naw have a lease agreement to plant and me naw want to plant on dis land, me naw own it and dem kaan take it before de tree fit" (Fieldnotes 1990-1991).

6.2.2f Resettlers Stage Three - Risk Taking Behavior and Livestock

In the last thirty years, herd and flock sizes have varied with economic times, household demands and access to resources (land space, water, and pasture), yet livestock

rearing always has been central to the agricultural systems of many resettlers (Table 35). Analysis of resettlers' livestock survey data indicate, seven households (50.0%) came to Green Park with cattle and four households (28.5%) came with goats, of which three (21.4%) came with both cows and goats (Table 35 - Variable Labels "Catt1" and "Goat1", respectively). By 1990-1991 six households (42.8%) have cattle and four households (28.5%) are the same resettlers that came with cattle. In addition, six resettlers (42.8%) have goats of which two (14.3%) are the same resettlers who came to Green Park with goats (Table 35 - Variable Labels "Catt2" and "Goat2", respectively).

A significant increase in real numbers in the livestock population occurs over time (Table 35). In the mid 1960's the initial cattle population was approximately sixteen with the average herd size of 2.4 among those resettlers who brought cattle with them (Table 35 - Variable Label "Catt1"). By 1991 the cattle population increased to forty-eight head among the resettlers with the average herd size of eight, an increase of two hundred percent (Table 35 - Variable Label "Catt2").⁷⁴ Similarly, the initial goat population was approximately fifteen among resettlers with the average herd size at 3.7 (Table 35 - Variable Label "Goat1"). Yet, by 1991 the goat population increased to sixty-five goats with an average herd size of 10.8 (Table 35 - Variable Label "Goat2"), an increase of three hundred-thirty three percent.⁷⁵

Marketing livestock among small-scale owners in Green Park is based on

⁷⁴ Outliers introduce a bias to average herd size, as such when the largest resettler cattle owner that has a herd of twenty-eight head is omitted from the calculation. The average herd size then becomes four among the remaining five cattle owners which is still twice the average herd size of the 1960s.

⁷⁵ If the largest flock owner is omitted from the calculation the average flock size is 7.4. Again, the 1990-1991 average flock size is nearly twice that of the 1960s goat population in Green Park.

household demands. This pattern is not unlike other Jamaican small-scale livestock rearers (Jamaican Livestock Association 1983). Resettler owners sell "when they need a money" or when household demands are "big."⁷⁶ Other resettlers sell according to age of the animal; animals may be sold when "fit" (mature) or culled from the herd when young (bullkins). Goats also are sold "when need a money" and generally when the demands are not as "big" as a cow demand.⁷⁷ All owners of livestock (cattle and goat) contend they cannot make a living just by rearing livestock. Resettlers said on numerous occasions "you have to cover yourself and do odder tings." They cited out climatic and economic uncertainties, inadequate landholdings, and inadequate financial resources by which herds can be increased as reasons for spreading the risk into more than one activity. Clearly, these resettlers perceive risk and are altering their behavior to manage this risk as they experiment and adapt to this environment.

As already referred to in Chapter Five, managing cattle during the protracted dry season is frequently a problem for livestock owners in Green Park. Specifically, the difficult period occurs when the spring rains may or may not arrive until May, and when the dried pasture is eaten down to earth and stones. In tropical dry system farming, the optimal ratio of pasture acreage and herd size is nearly one acre of pasture to one head of cattle (0.8:1.0) (CARDI 1986). Among current resettler cattle owners in Green Park, no one is over-herd in their ratio of pasture acreage and herd size; resettler cattle owners' ratios range between 0.21 to 0.75 pasture-to-one head of cattle (Table 35 - Variable Label

⁷⁶ Depending on age, sex, species, physical condition and use, a head of cattle can bring anywhere from J\$1500 to nearly J\$5000 per head (J\$14.00 = US\$1.00).

⁷⁷ Depending on size, sex and use, when a goat is sold a goat can bring in from J\$200 to J\$600 (J\$14.00 = US\$1.00).

"Past. Ratio"). To sustain cattle (maintain weight or sustain life) during the seasonal dry periods and corresponding lack of pasture, cattle owners compensate by collecting green cane tops, gathering tree fodder and pods, and culling herds. During this field season, resettlers commented informally that most of the cattle lost weight, but none of the resettlers' reported loss of cattle due to lack of feed.

6.2.2g Resettlers' Labor Source and Occupation

Among resettlers, using family labor is the predominant source of labor in cultivation and livestock production. In resettler crop production, nine households (64.3%) regularly are assisted by family members. Spouses and children provide the majority of family labor. However, five resettlers contend they do all the cultivating themselves. Among resettlers who own cattle, no one reports hiring to take care of livestock throughout the annual rearing process. Livestock owners and/or their family members move cattle to new pasture and water twice a day; however, if labor is hired, it tends to be for fence repair or to get feed during the dry season.

Among the resettler subgroup four households (28.5%) claimed they are full-time farmers (Table 35 - Variable Label "Ocp" for occupation). The average landholding size among these four households is thirty acres. However, if the largest land holder is omitted, the average landholding size is sixteen acres. An example is offered to illustrate a resettler with a large landholding that is a full-time farmer. This resettler household has access to a relatively large quantity of land, and the primary resource user supports a large family by rearing livestock (cattle, goats, pigs and chickens) cultivating field crops, planting trees (including orchards with mangos, oranges and coconuts), and marketing weekly. This

primary resource user also is assisted in his agricultural production by family members (spouse, children, and other relatives). In addition, this primary resource user is paying for the education for all the children (of which there are eight) in non-farm trades with the sale of livestock. The children provide labor to the farm around their school schedules. This household is not supported by wage labor activities from other household members, or by the sale of charcoal. Although the two eldest offspring have moved out of Green Park, none of the children have taken up an independent residence in Green Park. Clearly, this case demonstrates the importance of family labor, the use of multiple resource use strategies, and the complex web of social relationships involved in successful adaptive and coping strategies.

The primary resource users from the three (21.4%) other full-time farming households, contend they are now too old to support their household by farming.⁷⁸ Consequently, the children support the primary resource users and spouses (if there is one). The average landholding size among this group is 7.25 acres. Two of the three are tending cattle on this land, but not in quantities to support the household. In addition, there are four households where the resource users squat, rent and own very small parcels of land (Table 33). Ethnographic analysis of these four households suggests that the combined small space, household size and lack of regular full-time wage labor activities places these households in difficult situations, relative to the larger land owning and/or full-time farming resettlers. Again, we see evidence of complex coping strategies that involve family labor and attendant social relationships.

The remaining seven households (fifty percent) no longer are full-time farmers

⁷⁸ One of the elderly resettlers passed away less than a month after an interview.

(Table 35 -Variable Label "Ocp"). These primary resource users support their households on earned wages from either farm- or non-farm related activities. Among these resettlers the average acreage used for crops and/or livestock is 2.8 acres. One exception exists where a resource user who is a land and livestock caretaker has access to more land based resources. The ethnographic analysis reveals there is a marked decrease in land use between full-time farmers and wage-laborers which coincides with increased labor time put toward off-farm employment and to the loss of export markets.

In 1990-1991, those resettlers remaining in Green Park who have been using the resources for a number of years are beyond trying to figure out what will grow in Green Park. Instead these resettlers are constantly struggling with market demands and how to get the product to a market. Proportionally, only two resource users have been using resources for less than ten years, leaving twelve households (85.7%) using resources between fifteen and more than twenty years. As one resettler states, "me bigger now because me not so much coward." Without questions, this resource user, (and many others) are gaining more confidence in farming and decision making with time. The very survival of these people demonstrates they are transitioning from a trial and error period through experimentation and towards a true level of adaptation and coping.

6.3 Resettlement Transformations in Green Park: Local Migrants and Circular Migrants

Characteristic of resettlement transformations and community formation process is the out-migration of resettlers and in-migration of new residents and/or resource users to the resettlement (Moran 1989; Partridge 1989; Scudder 1989, 1991). According to Woodhouse,

After a while some of the resettlers resold part or all of their lands in small bits, others subdivided to relatives for building houses; thus Green Park became so thickly populated and will continue to develop with modern architectural beauty (Woodhouse 1991).

The second subgroup to inhabit and/or use resources regularly in Green Park are local migrants, those who voluntarily relocated from other Jamaican communities less fifteen miles from Green Park (See Chapters Three and Five). The proportion of local migrants interviewed using resources in Green Park is forty-seven households of the seventy-one resource users interviewed (66.2%).

The local migrant subgroup is dynamic, for their arrival is not all in one wave as in a mass in-migration. Rather, it is a continuous and currently an ongoing process. This subgroup is disaggregated and categorized (from an etic perspective) by the number of years they have been using resources in Green Park. These etic categories reflect Scudder's chronology for community formation and resource use (Scudder 1989, 1991). The data indicate that approximately 32.0% have been using resources for more than twenty years ("Before 1970"); the second subgroup (23.4%) of local migrants within the last twenty years ("Since 1970"); the third subgroup (11.23%) arrived between fifteen and ten years ago ("Since 1975"); and last subgroup (27.6%) arrived in the last five years ("Since 1985"). Each of these subgroups are examined separately as subgroups of the local migrant subgroup using resources in Green Park.

6.3.1 Green Park's First Subgroup of Local Migrants - "Before 1970"

The earliest influx of local migrants are the fifteen resource users who arrived between 1963 and 1969 (Table 15, Table 36), and most of these acquired land when they arrived (Table 36- Variable Label "When Acq"). Four of the resource users interviewed

from this subgroup never moved to Green Park and only use Green Park's resources; however, one resource user has been in the process of constructing a medium sized cinder block house in Green Park for more than five years. The average household size among "Before 1970" subgroup in 1990-1991 is 4.5, lower than resettlers' households (Table 36- Variable Label "HHS1990").

6.3.1a Age of Local Migrants "Before 1970"

Analysis of the survey data indicates this "Before 1970" subgroup, on average, was approximately 36.8 years of age when they first arrived, ranging from twenty-one to fifty-four years of age (Table 36 - Variable Label "Age Come"). In 1990-1991 the "Before 1970" subgroup averages 61.2 years of age, ranging from forty-six to seventy-seven (Table 36 - Variable Label "Age 1990-1991"). This is equal to the average age of the primary resource users among those initially resettled and illustrates that these two subgroups are elderly resource users (Tables 32 and 36, Table 16 p. 282).

6.3.1b "Before 1970" Land Tenure and Landholding Size and Use

For more than twenty years, the "Before 1970" subgroup has been using the lands and other resources in Green Park. All of this first subgroup of local migrants purchased their initial plots of land. On average these owners purchased 5.9 acres of land (Table 37 - Variable Label "Land1 Tenure and Land1 Acres, respectively). According to "Before 1970" resource users' personal accounts, their landholdings have fluctuated in total acreage used as a result of the sale and purchase of plots of land. The analysis indicates these resource users currently use more land than they own due to selling off lands to pay

off debts incurred to failed crops to drought and loss of export markets. However, since their arrival these resource users have nearly doubled the average acreage of lands owned and nearly tripled the overall acreage used (Table 37 - Variable Label "Own 1990", "Land2 Acres 1990").

6.3.1c Trial and Error Phase and Experimental Phase of the "Before 1970" Group

Similar to Scudder's stage two developmental sequence, these local migrants went through a "trial and error" phase based on their past agrarian experiences. For example, all "Before 1970" local migrants stated during the survey interview that they had previous farming experience prior to cultivating in Green Park. In fact, nine resource users (sixty percent) had experience in sugarcane and of these, five resource users (33.3%) were employed by the nearby Long Pond and Hamden Sugar Estates. These nine resource users initially kept their lands in cane, but did not "remain in the industry long," as they reported. According to their own accounts, resource users, by the early 1970's many early local migrants had converted their lands to cash crops (pumpkin, corn, peas, bananas and sweet potato). Nearly eighty-six percent had integrated their fields, with cash crops, cane and/or livestock, whereas the remaining thirteen percent retained their land for cattle pasture and never cultivated large acreage in the cash crops. This transformation coincides with Scudder's transition from the trial and error challenges of phase two to risk taking and experimentation of stage three. Moreover, this transition from cane to pumpkin is similar to the transition found among the resettler subgroup. Nevertheless, this change in commodity emphasis is from one commercial agricultural commodity to another, which deviates from Scudder's model.

In addition to commodity shifts, losses in landholdings also occurred, which is similar to Scudder's characteristics for stage three (Scudder 1989 and 1991). For example, by the mid 1980's five households (33.3%) lost considerable acreage to service debts they incurred from failed crops and loss of the export markets. As previously mentioned in Chapters Four and Five, this export market loss occurred when the AMC ceased to transport pumpkin to the government sponsored cooperative for export. Sixty percent of the "Before 1970" local migrants (nine households), redirected their farming activities toward livestock production, and remaining acreage was converted to cattle pasture. The number of these households engaged in livestock rearing (cattle or goat) are small due to the loss of land space and small acreage. The remaining households cultivate only what they can manage at their house, and this is constrained by land space and soil quality at the house and off-farm employment activities. In addition, all resource users currently residing in Green Park have trees planted along their houses.⁷⁹

A significant point revealed through the formal survey and discussions with resource users concerns wage labor. At the onset of the adaptive process, 73.3% of "Before 1970" local migrant resource users were involved in wage labor activities when they arrived in Green Park; the remaining primary resource users claimed they were full-time farmers (four households, 26.6%). By 1990-91, the majority of "Before 1970" subgroup supported their households with wage labor as skilled laborers (i.e., health inspectors, mechanics, civil servants, construction contractors etc.) or as semi-skilled laborers (seasonal cane cutters, security guards, etc.). In addition, only one household

⁷⁹ Only two households (13.3%) have coconut plantations planted on two acre owned plots located away from the houses; and in both instances these resource users do not reside in Green Park but have planted trees on owned plots of land.

burns coal to supplement the farming, off-farm wage labor activities. As a result, the majority of this subgroup has tailored their farming enterprises around their off-farm labor activities, and have adjusted to the market situation and their personal life cycles (age).

6.3.1d Livestock Practices of the "Before 1970" Subgroup

As mentioned earlier, livestock rearing is a part of farming for some of the "Before 1970" households. Five households (33.3%) among the initial wave of local migrants ("Before 1970") brought cattle to Green Park (Table 39 - Variable Label "Catt1"), averaging 2.4 head per herd. However, by 1990-1991 thirteen households (86.6%) were rearing cattle, an increase of a hundred and sixty percent for households rearing cattle (Table 39- Variable Label "Catt2"). In addition, the average herd size increased to 11.2 head per herd, a three hundred and sixty-six percent increase over time. Four households (26.6%) among the initial wave of local migrants brought goats, averaging 13.3 per flock (Table 39 - Variable Label "Goat1"). However, by 1990-1991 the total number of goats reared by this group has declined, a decrease of thirty-two percent, yet the number of goat rearers has doubled, with a decrease in average flock size to 4.5 goats per flock. To date seven of this subgroup (46.0%) rear both cattle and goats. Clearly, there is a difference in number of cattle and goat rearers and number of animals over time which is part of the adaptive strategies developed by this subgroup.

Further analysis of livestock production among "Before 1970" individuals rearing livestock concerns number of animals per acre. Four households are at the one animal per acre feeding ratio (Table 39 - Variable Label "Pasture Ratio"). Although the literature and extension agents contend this is an acceptable level, livestock owners recognize that it is

difficult to maintain animal weight and/or sustain cattle life in Green Park when there are prolonged periods without rain and little means to allow lands to lay fallow and rejuvenate. Among "Before 1970" livestock owners five households (33.3%) reported they are over-herd; they are exceeding the one-to-one ratio. In fact, this subgroup confirmed they lost the highest amount of cattle to the protracted dry period during the 1990-1991 field season. Even individuals who are putting less than one animal on each acre have difficulty. According to a resource user's personal account, he lost several head of cattle to starvation and/or dehydration; he claimed he did not have the time to attend to his animals because of his own regular wage-labor employment commitments and his hired laborers "cannot do as good a job as he" (Field notes 1990-1991).

For these early arrivals of local migrants ("Before 1970"), their farming activities reflect responses to local and external conditions. External forces, over time, such as loss of markets, have influenced what is cultivated and reared and how intensely lands have been used. According to "Before 1970" resource users, there has been an increase in partitioning of Green Park, loss of common lands to graze their livestock, and the increase in human population inhabiting the area since their arrival. Also, this subgroup mentioned the rising price and value of lands per acre, scarcity of labor and lack of good workers as constraints to their agrarian systems.

Overall, the "Before 1970" subgroup differs from Scudder's sequence of community formation and resource use. Specifically, the initial wave of local migrants changed their land use and tenure earlier than Scudder's time frame suggests for stage three. In addition, this subgroup came to Green Park with off-farm wage labor to support their households and farms, a factor that needs to be incorporated into the model of

community formation and resource use specifically.

6.3.2 Green Park's Second Subgroup of Local Migrants ("Since 1970")

A second wave of local migrants is identified as resource users that have been using resources in Green Park since 1970, and are labeled "Since 1970" (Table 40). There are eleven households (23.4% of the forty-seven local migrant subgroup) among this subgroup.⁸⁰ This second wave of primary resource users averaged 38.8 years of age upon arrival, older than "Before 1970" and resettler subgroups (Table 16 p. 282, Table 32, 36, and 40 - Variable Label "Age Come"). By 1990-1991, this primary resource using subgroup averaged 58.4 years of age, ranging from forty-six to sixty-nine (which averages less than "Before 1970" and resettler subgroups) (Table 40 - Variable Label Age 1990-1991).

6.3.2a "Since 1970" Land Tenure, Lands Size and Use

The second subgroup of local migrants acquired their lands between 1966 and 1973 (Table 40 - Variable Label "When Acq"). Exactly, nine of the primary resource users (81.8%) purchased their initial lands, whereas the remaining two leased and rented, respectively (Table 41 - Variable Label "Land1 Tenure"). The average lands initially used were 2.5 acres per "Since 1970" household. By 1990-1991, this subgroup averages 8.6 total acreage used, and of the total acreage used, on average, 5.8 acres are owned acres, nearly doubling the average total acreage used and owned since arrival. In fact, eight of

⁸⁰ Among the "Since 1970" subgroup two households never moved to Green Park, but have continued to use lands and other resources in Green Park to cultivate and rear livestock for the last twenty years.

these households (72.7%) have increased their land use since arrival (Table 41 - Variable Label "Land2 Acres 1990").

6.3.2b "Since 1970" Household Composition

The formal survey data indicate that household size among "Since 1970" households is 5.1 members (Table 41 - Variable label "HHS"). In addition, not all households are dual-adult households among the "Since 1970" subgroup. For example, four households (36.3%) are single headed female households, three of which are widows. These female resource users commented they did not farm prior to coming to Green Park, for they stated their spouses did all the farming. However, all three households currently are sustained by these women's efforts, integrating mixed farming strategies with combinations of higglering at the local Falmouth market once a week, rearing livestock (cattle and/or goats), and wage labor activities. In addition, one woman occasionally burns coal to generate additional income. The remaining eight households (72.7%) are dual-adult households that are supported by dual incomes (both partners contribute to the households cash income). Clearly, this subgroup engages in a number of adaptive activities with which they support their households over time.

6.3.2c "Since 1970" Trial and Error, and Experimentation Phase

The eleven primary resource users from the "Since 1970" local migrant subgroup migrated from nearby regions, and all arrived from areas that receive more rainfall than Green Park. Resource users recalled some of their farming activities from the last twenty years for the formal survey. Three resource users reported they had directed more of their

labor time to their respective trades (carpentry, masonry) and not to farming. The other six households among the "Since 1970" subgroup stated they started in cultivation and lost; they lost their lands to pay debts incurred with the loss of the AMC export market. These results suggest the "Since 1970" subgroup is similar to Scudder's framework in terms of land loss and land use change.

Those having previous cultivating experience mentioned planting crops that are not usually grown in semi-arid environments and are known not to do well in Green Park (coco, chocho, dasheen, coffee, and yam varieties). Among the "Since 1970" subgroup, eight households (72.7%) reported they had experience in planting sugarcane prior to arriving in Green Park. However, by the 1990-1991 field season only two households (18.0%) continued with sugarcane and one of the two cultivated sugarcane without prior experience. Overall, the remaining resource users began their cultivations with cash crops, primarily pumpkin, for this was also when the AMC was still functioning (See Chapter Four). As such, the analysis suggests the "Since 1970" subgroup is similar to previous Green Park resource users' adaptive strategies, that of "trial and error" adaptations of experience and knowledge to Green Park conditions and available markets. However, they deviate from Scudder's model in that they launched into commercial agriculture (sugarcane and pumpkin) from the onset of using resources in Green Park. This subgroup's arrival coincided with market support for pumpkin production. By 1990-1991 this subgroup has modified their agricultural practices by reducing acreage cultivated and supplementing activities with livestock and off-farm wage labor.

6.3.2d "Since 1970" Livestock

The inventory of livestock (cattle and goats) from the formal survey reveals rearing is part of farming for some "Since 1970" local migrants (Table 43). This second subgroup brought eleven head of cattle distributed among five households, averaging 2.2 head per herd (Table 43 - Variable Label "Cattle1"). By 1990-1991 eight households are rearing and have up to forty-seven head, averaging 5.8 head/herd, an increase of 327% in total cattle population over time. Thus, there is an increase in cattle owners and actual number of cattle reared. This subgroup did not bring many goats to Green Park, only six distributed among three households (Table 43 - Variable Label "Goat1"). By 1990-1991 there are twelve goats distributed in six households, averaging 2.4 head per flock. This reflects an increase in number of goat owners and no increase in average flock size (Table 43 - Variable Label "Goat2"). In addition, among "Since 1970" cattle owners, three of the eight owners (37.5%) are over herd in their ratio of land put to pasture and number of cattle feeding on the pasture (Table 43 - Variable Label "Pasture Ratio"). Two other cattle owners are nearing the one-to-one ratio, and commented they struggle during the protracted dry season of 1990-1991. As such, the majority of cattle owners among this subgroup do not have sufficient pasture land for their livestock, in particular to sustain them during the dry season.

6.3.2e Commonalties of Adaptation of Before 1970 and Since 1970 Subgroups

By 1990-1991, this second wave of local migrants are equally diverse in their agricultural and non-farming activities. Among these resource users none are full-time farmers. Specifically, five households from the eleven (45.5%) of the "Since 1970"

subgroup are supported by regular wage labor/or commodity production activities and part-time agricultural activities. Specifically, five households are supported by the primary resource users' income generated from agricultural wage-labor (i.e., as cane cutters, veterinary assistant) or by non-agricultural wage-labor (mason and carpenter) and cultivation. There also is a widow who is supported entirely by her children and their assistance with her livestock.

These two subgroups of local migrants have used resources in Green Park approximately twenty years or more (Before 1970 and Since 1970). The analysis suggests these households are no longer in the "trial and error" phase or the risk aversion phase of stage two detailed in Scudder's community formation and resource use chronology. Clearly, these subgroups have experimented and learned from their experiences. These households' demonstrate that their adaptive agrarian strategies combine cultivation and livestock with wage labor activities. Further ethnographic analysis reveals these households are reinvesting in their households by upgrading their housing stock and educating their children. In addition, nine of these households own their own transport (five own cars and/or trucks, two own tractors and two own a Honda 50). Moreover, these are transformations Scudder identifies for stage three among more successful households (Scudder 1989 and 1991).

Overall, the "Before 1970" and "Since 1970" households who continue to plant are doing so on a small scale, planting house gardens or field plots well under an acre. None of these early local migrants (Before 1970 and Since 1970) has more than a few squares of integrated cultivation in Green Park, with the exception of two resource users whom each still have two acres in sugarcane. Thus, the early local migrants experimented with cash

crops (cane and pumpkin), livestock and their off-farm wage labor employments, and scaled down to existing availability of resources (markets, labor, land, time and capital). Again, this pattern for "Since 1970" deviates slightly from Scudder's Stage two and three, as did the "Before 1970" subgroups' adaptive process for community formation and resource use.

6.3.3 Third Subgroup of Local Migrants in Green Park - "Since 1975"

A third wave of local migrants arrived in Green Park between 1976 and 1984 - ("Since 1975") (Table 44 - Variable Label "When Come"). Eight households from the forty-seven local migrants interviewed (11.23%) are in this subgroup. The primary resource users of this third subgroup on average are approximately fifty-two years of age, ranging from twenty-four to seventy-eight years of age (Table 16 p. 282, Table 44 - Variable Label "Age 1990-1991"). This subgroup's average age is nearly ten years younger than the previous subgroups' average ages. In addition, "Since 1975" household size is on average 4.6 members per household (Table 45 - Variable Label "HHS").

6.3.3a Land Tenure and Landholding Size and Use of the "Since 1975" Subgroup

The "Since 1975" subgroup of local migrants has access to small landholdings (Table 45). Upon arriving, five resource users (62.5%) purchased the lands they initially used, whereas thirty households (37.5%) came on family land (Table 45 - Variable Label "Land1 Tenre"). On average, the initial total lands used was 3.9 acres, ranging from two tenths of an acre to twelve acres. By 1990-1991 the majority of this subgroup did not alter their land tenure pattern. The survey data indicate this subgroup has access to use on

average to 2.7 acres, ranging from two tenths of an acre to six acres (Table 45 - Variable Label "Land2 Acres 1990"). This land use calculation is derived by not including the largest land user, for their land holdings inflate the actual land use for the majority of the resource users in this subgroup. In conjunction with loss of export markets, land space used is too small for "Since 1975" resource users to support their households as full-time farmers. Based on survey and ethnographic data analyses this researcher suggests that it is access to small landholdings that compels "Since 1975" households to engage in other activities to contribute their households' survival, specifically the majority of households are supported by wage-labor activities.

6.3.3b "Since 1975" Agricultural History

To evaluate Scudder's stage two developmental sequence for the "Since 1975" subgroup, resource users were asked questions on their past farming experience. The survey data shows that among the "Since 1975" subgroup three households (37.5%) claimed they had no farming experience, one household (12.5%) never took up farming, whereas five other resource users (62.5%) stated they had experience with cash crops in neighboring areas. These five households (62.5%) with agricultural experience actively planted cash crops, (four of which planted on several acres while one initially only maintained a house garden); two households primarily used their lands for pasture when they initially came and continued to do so during the field season. Those who used the lands for only pasture stated during the interview "de plans fe de lands in Green Park was fe grass".

6.3.3c "Since 1975" Livestock

In addition to prior cropping experience, a number of "Since 1975" resource users were livestock owners (Table 47 - Variable Label Catt1 and Goat1). The "Since 1975" subgroup brought twenty-seven head of cattle distributed among six households, averaging 4.5 head per herd. By 1990-1991 there were forty-two head among the "Since 1975" subgroup, averaging seven head per herd; this is an increase of fifty-five percent for the total cattle population (Table 47 - Variable Label "Catt2"). The survey also shows there were no new cattle owners represented. Survey and ethnographic data indicate that among these cattle owners three are clearly over herd in their cattle-to-pasture feeding ratio and two struggled during the dry seasons of 1990-1991 (Table 47 - Variable Label "Pasture Ratio"). A few goats were brought in with this subgroup, eleven distributed among three households (Table 47 - Variable Label "Goat1"). By 1990-1991 only two households have goats for a total of three for this subgroup, representing a decrease of 72.7% over time (Table 47 - Variable Label "Goat2").

6.3.3d "Since 1975" Agricultural Modifications

"Since 1975" resource users reported minimal agricultural changes for the last ten years. The data clearly demonstrate that all of the households remained small to very small resource users, where the land use average is 2.7 acres, ranging from 0.2 acres to six acres (Table 45). Those with livestock generally have small herds or flocks. Ethnographic data analysis identified exceptions where one livestock owner is terribly over herd throughout the year, and not just in the dry season. The livestock owner's cattle survived with cut and carry of guinea grass carried by hired laborers year round. In addition,

members in one "Since 1975" household had no interest in farming. This household is supported by operating a small-dry goods shop on the premise and receiving assistance from in-laws on whose property the house and shop rests. Among this subgroup, four are supporting their household with off-farm wages. Three are part-time farmers (due to their age) and are supported by family members who are not farmers and have not taken up residence in Green Park.

Given the time that has elapsed for using resources in Green Park (and following Scudder's model), one would anticipate this third subgroup to be in the experimenting phase of stage three, where resource users would be trying different forms of production and moving from subsistence production to commercial production. However, this subgroup has little land with which to farm, and expanding landholdings and production is not a possibility for this subgroup. According to all "Since 1975" resource users who provided information during the formal survey interview, land price is too high for "Since 1975" subgroup to purchase, and little land is available to use that is not already being claimed and used. The analysis of the ethnographic and survey data suggests a shortage of capital and access to small land space preclude this group from being full-time farmers and experimenting in commercial agriculture. This implies that this subgroup might not be able to move beyond a risk aversion phase, characteristic of stage two, for they do not have the resources with which to take chances nor ample land with which to expand into larger scaled commercial agriculture. Moreover, this subgroup must adapt their agrarian and household survival strategies to the existing local markets.

This "Since 1975" subgroup clearly deviates from Scudder's developmental sequence. This subgroup does not have internal access to local resources with which to

expand and alter their agrarian strategies from that of subsistence production (garden plots) to commercial agriculture production. Accordingly, they are obliged to support their households primarily with off-farm wage labor activities which is confirmed in Table 46 with the number of primary resource users involved in off-farm activities.

6.3.4 Forth Wave of Local Migrants in Green Park - "Since 1985"

The forth wave of the local migrants arrived in the last five years ("Since 1985") (Table 48). This subgroup, 13 of 47 households interviewed, represents 27.6% of the local migrants. This last subgroup of local migrants has been using resources that have been, in many cases, intensively used for a number of years.

6.3.4a "Since 1985" Age and Household Size

The "Since 1985" subgroup averaged 46.2 years of age when initially arriving to use the resources in Green Park (Table 48-Variable Label "Age Come"). By 1990-1991 this subgroup averaged approximately 49.5 years of age, ranging from twenty-five to seventy-six years old (Table 48- Variable Label "Age 1990"). The age range indicates this last wave of local migrants is on average nearly ten years older than previous local migrant subgroups, yet remains on average the youngest subgroup currently using resources in Green Park. In addition, the survey indicates the household size among "Since 1985" resource users is 4.6 members, similar to the other local migrant groups (Table 16 p.282, Table 49 - Variable Label "HHS").

6.3.4b "Since 1985" Land Acquisition

Thirty-eight percent of the last wave of local migrants arrived between 1985 and 1990 (Table 49 - Variable Label "When Come") although sixty-one percent began to use resources since 1989. Among this subgroup three resource users (23.1%) bought their initial lands, eight resource users (61.5%) paid to use lands, and two resource users (15.4%) squatted on roadsides and property not in use by absentee landowners (unknown to the owners) (Table 49 - Variable Label "Land1 Tenure"). Initial land use of "Since 1985" resource users was, on average, three acres of land per household (Table 49 - Variable Label "Land1 Acres"). By 1990-1991 this subgroup used, on average, 4.1 acres (Table 49 - Variable Label "Land2 Acres 1990"). However, if the two largest users are removed in the analysis as outliers, (one of whose family rents land and just uses Green Park to sleep), the average is 2.6 acres - small landholdings (Table 49 - Variable Label "Land2 Acres 1990").

Among "Since 1985" local migrants, four households have not moved into Green Park, and two households have leased lands for their livestock. The remaining two have used roadsides and squatted on lands of absentee landlords for their own livestock and cultivations. In addition, among this subgroup, six households lease the houses in which they reside in Green Park and do not own any land in Green Park and three are not doing any farming in Green Park, (neither crops nor livestock). Two resource users own their house and house plot and are intensively using lands for cash crops, fruit trees and livestock (both cattle and goats). These two resource users own transport, market regularly and have full-time non-agricultural wage labor employment to contribute to the household's survival. However, the majority of this subgroup do not own the lands which

they use (Table 49) and are constrained in resource use by land use contracts and limited size of land with which they have access.

6.3.4c "Since 1985" Livestock

Similar to other Green Park resource users rearing livestock is a part of the agrarian practices for some of "Since 1985" local migrants (Table 51). This last wave of migrants brought with them twenty-seven head of cattle distributed among five households, averaging 5.4 head per herd (Table 51 - Variable Label "Catt1"). By 1990-1991 there are fifty head among this subgroup distributed among six households, averaging 8.3 head per herd (Table 51- Variable Label "Catt2"). This change over time reflects an increase of one rearer and nearly eighty-five percent in cattle population. In addition, this subgroup brought with them forty-six goats distributed among three households, averaging 15.3 goats per flock (Table 51 - Variable Label "Goat1"). By 1990-1991 there are sixty-eight goats distributed among seven households, averaging 9.7 goats per flock (Table 51 - Variable Label "Goat2"). The number of goat owners has increased by 47.8% over time, yet the flock size has decreased by 36.6%. The data also indicate that all of the "Since 1985" cattle owners exceed the recommended one-to-one feeding ratio during both the wet and dry seasons for the 1990-1991 field season.

6.3.4d "Since 1985" Trial and Error, and Experimentation History

In the course of gathering the survey data, the majority of "Since 1985" local migrants reported having previous farming experience, producing pumpkin, yams, bananas, plantain, and other tubers. In addition, two reported having sugarcane

experience, five had experience with livestock in conjunction with the food crops they cultivated, and two reported they did not cultivate prior to arriving. By 1990-1991, the "Since 1985" subgroup has diversified their means of generating an income, for none of the households is engaged in full-time farming for household survival (Table 50 - Variable Label "Ocp"). "Since 1985" resource users stated they combined wage labor and/or petty commodity production activities with subsistence agricultural activities. Alternatively, some are not farming but instead are full-time wage laborers or higglers.

By 1990-1991 four households (thirty percent) among the "Since 1985" subgroup are currently experimenting in agriculture on lands they own. One household went from using 4.75 acres around the house for food crops and livestock to planting 150 orange trees and maintaining space for tethered cattle. Another household is experimenting with banana, tobacco, dasheen, cabbage, (crops not traditionally or recently grown in Green Park -- (banana being the exception). Yet, neither household is supported by full-time farming, but by off-farm wage labor. In addition, for the first time since they arrived, two households have planted house gardens this past year. Interestingly, these four households do not conform to Scudder's developmental sequence, for they are experimenting (taking risks) much earlier than Scudder's model anticipates.

In addition, the survey indicates seven households (53.8%) are not planting any crops in Green Park. Moreover, of these seven households, four (30.1%) do not reside in Green Park and are only using the lands for pasture for their livestock. Three households (27.3%) do not own the land where they reside and claimed they do not have rights to cultivate or reap from the fruit bearing trees that are on the property, for it is not written in their renting or leasing contracts. These three households are involved in full-time wage

labor activities to sustain their households, and two of these struggle to manage a marginal existence. Again, these seven households do not follow Scudder's model for they are not able to similarly adapt resource use like their predecessors.

Overall, it appears from the survey and ethnographic data that the "Since 1985" subgroup does not conform to Scudder's adaptive framework for community formation and resource use. Moreover, the "Since 1985" subgroup has access to fewer resources and is composed of very small land users. Therefore, the analysis suggests a large percentage of the "Since 1985" resource users are forced to seek off-farm employment for their household's survival; an important facet of this subgroup's adaptive and coping strategies.

6.3.5 Circular Migrants in Green Park

As a subgroup migrating to use Green Park's resources, circular migrants are the last subgroup to be discussed (Table 52). As previously stated in Chapter Three, circular migrants are Jamaican resource users that are returning from extended stays overseas. From the seventy-one interviews conducted ten households (14.08%) are circular migrants. Sixty percent (six of ten households) of the circular migrants arrived in the last five years, thirty percent in the last ten years and ten percent (one) in the last fifteen years (Table 52).

Common to other regions of Jamaica, circular migrants built spacious cinder block homes in Green Park, a marked contrast to clapboard houses commonly found among small-scale rural Jamaican agriculturalists and the small two-room Kaiser cinder block houses (Momsen 1987). A number of unfinished and finished concrete homes of absentee

land lords, who currently reside overseas, also are found in Green Park. Of these ten circular migrant households, eight are currently retired and pensioned from their previous employment experiences overseas (Table 54- Variable Label "Pension"). As of 1990-1991, only one resource user remains employed overseas and has not returned to live in Green Park on a permanent basis (the house is still under construction as well). This resource user has a caretaker to care for his livestock and to watch over housing construction; this is a common pattern, similar to what the previous circular migrants had done in their recent pasts. In addition, three of the circular migrant households own their own transport.

6.3.5a "Circular Migrants" Household Size

The 1990-1991 survey data on household size among this group currently residing in Green Park is proportionally small (Table 52-Variable Label "HHS"). On average, the household size is 2.3 members per household, nearly half the size of all other subgroups (Tables 32, 36, 40, 44 and 48). Moreover, among circular migrants four are without spouses (two spouses overseas and two spouses deceased). In addition to income from his overseas pension, one elderly widower is raising his grandchildren and great-grandchildren on his two-acre plot, marketing his surplus, performing tailoring activities and receiving resources from the grandchildren's mother. Clearly, smaller family size of this subgroup provides a smaller pool of family household labor.

6.3.5b "Circular Migrants" Age and Land Acquisition

On average this subgroup purchased lands when they were approximately 52.6 years of age (Table 52 - Variable Label "Age Acq."). Circular migrants reported they did not arrive immediately after purchasing lands; on average they were 58.2 years of age when they came to use the resources in Green Park (Table 52 -Variable Label "Age Come"). The delay in arrival is attributed to circular migrants remaining overseas to secure their pensions (Fieldnotes 1990-1991). Upon arrival, this group is considerably older than the previous subgroups by nearly twenty years. The 1990-1991 survey indicates the average of this subgroup is approximately 63.5 years, ranging from fifty to seventy-six years of age (Table 16 p. 282, Table 52 - Variable Label "Age 1990"). This average is significantly older than the most recent local migrants using resources in Green Park by almost twenty years. The salience of resource users age, length of residency in Green Park and past farming experience are linked clearly to current and future resource use, and is integrated in the discussion which follows.

The data on land acquisition for circular migrants reveal, on average, that circular migrants purchased their lands in the late 1970's (Table 52).⁸¹ As previous subgroups reported, circular migrants delayed arrival from one to nearly ten years. In the interim, others Green Park resource users became care takers of lands whereby caretakers monitored housing construction and protected lands. A number of these care takers reported using these land to rear their own livestock and/or raise their own crops.

⁸¹ According to a number of circular migrants who purchased lands in the 1970's, the majority did so when Jamaica was undergoing difficult economic times towards the end of Michael Manley's social-democratic rule. During this period more lands became available from others emigrating Jamaica (See Boyd 1988; Edie 1991; Manley 1991 for further details).

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6.3.5c "Circular Migrants" Land Tenure and Landholding Size and Use

According to the survey and ethnographic data, all circular migrants purchased the lands where they reside. This subgroup initially purchased 3.8 acres, ranging from two acres to ten acres (Table 53 - Variable Label "Land1 Acres" and "Land1 Tenure"). One exception exists where one of the early procurers, who also is one of the more recent migrants, reported that he purchased ten acres in the 1970s when the land values were much lower than in recent times. By 1990-1991 circular migrants increased their average land owned to five acres (Table 53 - Variable Label "Own 1990"). However, circular migrants use an average total acreage of 6.5 acres, ranging from 2.0 to 12.5 acres (Table 53 - Variable Label "Land2 Acres 1990"). In addition, three circular migrant households reported they lease lands which increases their average land use size. All those leasing lands (thirty percent) are rearing livestock. Overall, sixty percent of the circular migrants rear livestock on multiple plots they purchased or currently lease, suggesting this subgroup has access to capital to invest in land and livestock. Moreover, since the initial land acquisition fifty percent have increased their land use acreage over time, and the remaining have stayed the same.

According to ethnographic analysis of the data, circular migrants arrived to Green Park with minimal to deeply recessed farming knowledge and experience. Although approximately seventy percent reported they had previous farming experience in their youth, (some in crops and some with livestock), these older resource users had been overseas over twenty-five years and during which time they did not farm. In addition, two households with past farming experience stated they did not turn to livestock upon arrival,

but began with integrated kitchen gardens, although marketing agricultural commodities among circular migrants is not yet the norm (Table 54). Among circular migrants, only two market regularly from their crops and fruit bearing trees, and one of these households also is supported by wage labor activities. A more common trend among circular migrants is illustrated with the following example. One circular migrant, who is a widow and who has been in Green Park nearly ten years, cultivates a variety of food crops and fruit bearing trees around her house. As she says "me never has to buy food and me enjoys de work for it keeps me fit." This resource user does not market regularly nor sell her surplus; instead she relies on her cash income from her overseas pension and savings.

Thirty percent of circular migrant households (three) have no previous farming experience prior to arriving to use Green Park's resources. These resource users reported they were born and raised in urban centers in Jamaica and also spent their adult lives overseas in urban centers. By the 1990-1991 field season two of these circular migrant households had taken to farming, but on very small scales. Their farming is limited to the area around their house. In addition, all circular migrants have fruit bearing trees on their lands around their house, yet none in field plots (Table 55 -Variable Label "Fruit Tree HSE" and Fruit Tree FLD"). As of the date of the survey only one resource user, had not turned to farming, although fruit bearing trees had been planted on the house property by hired laborers. This resource user has been here less than a year and elected to plant trees prior to food crops.

6.3.5d "Circular Migrants" Livestock

Cattle and goat rearing among circular migrants is common (Table 55). Circular migrants reported during the survey interview that sixty percent (six households) rear cattle, averaging 5.8 head per herd (Table 55 - Variable Label "Catt2"). There is one exception where one cattle owner brought with him one head to Green Park, because this circular migrant came to Green Park after residing a year in a neighboring community. Among circular migrant cattle owners, three are clearly over-herd; and two others (twenty percent) are very close to the feeding ratio limits (Table 55 - Variable Label "Past. Ratio"). Two livestock owners purchased hillside plots which they converted to pasture, burning down trees and bulldozing "the bush." In both cases, there is considerable loss of top soil where limestone cobbles and flat rock have begun to surface to the point where not even grass grows in the area. Clearly, circular migrants' initial adaptive strategy, that of clearing hillsides to increase access pasture grasses, is not withstanding the test of time for long-term use of the hillside.

Overall, six of the circular migrants (sixty percent) are experimenting by combining livestock with crops. For example, on three different plots of land totaling 12.5 acres, one male circular migrant, along with his wife and family, has integrated pigs, chickens, cattle, and goats with tree crops and food crops. There is another case where, one female circular migrant, who had never farmed before, is trying a variety of cash crops and fruit trees on her 4.5 acre house plot. She displayed all of her fruit trees she was starting from seeds that were in plastic bags in the shade, nearly fifty of them. She tends the garden crops and minds the goats, while her husband tends to the cattle. She says "me enjoys de plantin, food is too dear, especially now me know me kaan doit". She and her husband

contend they did not have intentions of marketing their surplus, just to provide for themselves.

The data suggest the majority of circular migrants are in or quickly moving toward the third stage of the resettlement process, that of experimentation. Everyone here that has a pension owns land with which to support their households, and are experimenting in livestock, crops and fruit bearing trees. Based on informal discussions with circular migrants it is suggested that the security from pensions and time spent gaining experience in Green Park contribute to these households in becoming less risk adverse. The data reveal three circular migrant households are more dependent on their agricultural practices than the others, for in two cases their households are large (supporting five and six members). In the last case, the resource user did not return with a pension; therefore he supports the household with wage labor, agricultural production, and marketing. In general, the circular migrants deviate from Scudder's development sequence, for they are experimenting ahead of Scudder's time frame for resettlement transformations. The majority are not dependent on wage-labor activities to support their household, but rather rely on their pensions to add to their agricultural activities. Clearly, the adaptive and coping strategies for circular migrants differ from resettlers and local migrants who do not have pensions, and who have different farming experiences, household demands and access to resources (land, trees, capital, and labor, etc.).

6.4 Subgroups Compared and Contrasted

Overall, the data from the seventy-one interviews conducted reflect a very dynamic resettlement process. Table 13 summarizes subgroups' resident status and year of arrival

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to use resources in Green Park. Approximately fifty percent of the Green Park resource users arrived twenty years or more ago, whereas nearly ten percent arrived in the last fifteen years, and twenty-seven percent arrived in the last five years. In addition, "Before 1970" and "Since 1985" local migrant subgroups are the two largest subgroups, followed by local migrant (Since 1970), resettlers (pre-1970), and circular migrants (post-1985). This researcher suggests that this constant influx of resource users, who must acclimate themselves to their new social and natural environments, contributes to a community formation process that oscillates among its members between stage two and stage three. These findings provide strong evidence for why Green Park remains a resettlement in transition which is discussed in further detail in Chapter Six.

Table 13. Resident Status and Year of Arrival to Green Park

Resident Status	1985-1990	1980-1990	1975-1990	1970-1990	Before 1970	Total N=71
Resettler n=14		2 14.3%	2 14.3%	1 7.1%	9 64.3%	14 19.7%
Local Migrant n=47	13 27.6%	4 8.5%	4 8.5%	11 23.4%	15 31.9%	47 66.2%
Circular Migrant n=10	6 60.0%	3 30.0%	1 10.0%			10 14.1%
Total N=71	19 26.8%	9 12.7%	7 9.8%	12 16.9%	24 33.8%	71 100.0%

General trends were identified for all Green Park resource users operating in the agrarian systems of Green Park. The analysis indicates Green Park is a heterogeneous,

dynamic resettlement of resource users who engage in a very wide range of agricultural practices and wage-labor activities. The average age among primary resource users is fifty-six years (Table 14). Among the resettlers nearly seventy-seven percent are over age fifty-six; among the local migrants, this age group is approximately fifty-six percent and for the circular migrants, seventy percent. Among the resource users, resettlers have the largest households with 5.4 members and circular migrants, the smallest, with 2.4 members (Table 14). Overall, Green Park primary resource users are elderly, their household size is small due to out-migration of offspring, and there is not much family labor. As a result, resource users have modified their agricultural strategies in part with the life cycle of the resource user and household, as well as to the availability of markets.

A high percentage of resource users are involved in wage labor activities (Table 14). These resource users coordinate their wage labor activities with agrarian practices (i.e., what they are rearing and/or cultivating), reflecting the amount of land to which they have access, the market, and access to the market and capital resources. Among resettlers forty-three percent are engaged in off-farm income generation activities, whereas among local migrants it is seventy percent and among circular migrants it is one hundred percent, for all are either wage laborers and/or received pensions.

Table 14. Resettlement Household Subgroups by Age, Time in Green Park, Household Size and Off-Farm Income

Subgroups	Avg. When Acq.	Avg. When Come	Avg. Time in Green Park	Avg. Age Resource User	House Hold Size	Off Farm Income
Resettler n=14 20.0%	1966	1968	21 yrs	56 ≤ 76.9% n=10	5.3	43.0%
Local Migrants * n=47 66.0%	1975	1977	14.6 yrs	56 ≤ 51.8% n=24	4.7	70.0%
Circular Migrants n=10 14.0%	1977	1985	5.4 yrs	56 ≤ 70.0% n=7	2.4	100%

* Local migrants: Before 1970 n=15 avg when come 1966
 Since 1970 n=11 avg when come 1971
 Since 1975 n= 8 avg when come 1980
 Since 1985 n=13 avg when come 1989

The high percentage of resource users involved in off-farm income and wage labor has effected both internal and external identities. An internal identity has been generated where many of the resource users do not identify themselves as farmers (although they do indeed "farm" in many senses of the word and practice) and an external identity exists whereby the agricultural extension agents located in Falmouth do not consider Green Park a farming community. Access to new agricultural technologies and programs that subsidize agricultural activities is no longer extended to Green Park as they had been in the past, for outsiders perceive this region as a non-agrarian resettlement composed of

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wage laborers and retirees. Thus, increased in: in-migration, redistribution of landholdings with varying degrees of land tenure status, variation in land use practices and wage labor activities, contribute to a cycle which may well lessen farming activities in the future and further impact processes of adaptation, community formation and other facets of Scudder's transformation phenomenon.

6.4.1 Landholdings of Subgroups Compared and Contrasted

Scudder's community formation chronology anticipates variation between sponsored resettlers and voluntary resettlers adaptive strategies, as actors discussed previously in Chapters One and Six. In Green Park, a number of factors contribute to variation in adaptive strategies observed between resettlers (sponsored resettlers), local migrants and circular migrants (voluntary resettlers). For example, over the years, landholding transfers and subdivisions have occurred among resettlers, local migrants, and circular migrants. The resettler subgroup has had access to lands and other resources in Green Park the longest of any subgroup (Table 14). Resettlers have been utilizing Green Park's resources for an average of twenty one years, for local migrants for is 14.6 years, and circular migrants for 5.4 years.

Table 15 illustrates and summarizes land tenure changes from initial acreage used (Land1) to present acreage used (Land2), and current ownership (Own) between resource using subgroups. Overall, land use acreage has increased dramatically for local migrants, "Before 1970" and "Since 1970", and circular migrants. The largest land owners and land users are local migrants "Before 1970" followed by "Since 1970" local migrants. More importantly to note, is that the largest decrease in land ownership is among the resettler

subgroup, and the largest increase has been among the "Before 1970" and "Since 1970" subgroups (See Tables 33 through Table 51). Some of these transfers have come about because of loss of lands incurred by debt and others have sold or given lands to relatives.

Together with the landholding changes, land use modifications also have occurred from when the resettlers first arrived. Total acreage used by resettlers has fluctuated since their arrival. A number of resettlers have lost ownership to lands over time to debts incurred as a result of markets, failed crops, poor health and age. On average, by 1990-1991, the total acreage used by the resettler subgroup is 5.7 acres per household which is less from when they first purchased lands in Green Park (Table 15 and Table 33). To reiterate, by 1990-1991 resettler households are fewer in number than when the resettlement process commenced, suggesting those who left did not adapt to the new conditions in Green Park. Remaining resettlers have had the longest access to lands, yet the data indicate a decrease in total land ownership and use over time. In summary, the acreage loss among resettlers is related to multiple of factors, some of which include loss of access to export markets, lessening of agricultural support, out-migration of youth and increasing fragmentation of lands.

A number of resettlers experimented with crops planted in St. Ann, while others continued with sugarcane that was already on their property. Sugarcane and St. Ann crops did not last long among the resettler cultivators, and a number shifted to pumpkin and corn production. However, when the markets for these latter crops were removed, those who were able, transferred their land use practices to rearing livestock; others were forced to sell out and/or supplement their household income with wage laborer activities and/or coal burning. By 1990-1991, there remained only four full-time farmers, where the

primary resource users were not involved in a wage labor activity and did not receive their primary support from relatives' wage labor. There are six resettlers that also burn charcoal to supplement the household income; one of there is a full-time farmer who burns twice a year on a large scale (i.e., producing more than one hundred fifty pound sacks at a single burning).

According to Scudder, voluntary sponsored resettlers see an attraction in new areas that makes them willing to participate in the challenges and uncertainties involved in relocation. This holds true for those resettlers from St. Ann who selected to relocate in Green Park rather than another settlement. Scudder contends that in the resettlement process spontaneous voluntary settlers tend to be more successful in less time and at lower financial cost than government sponsored voluntary or involuntary settlers. Scudder asserts that access to alternate resources (i.e., kinship ties, both internal and external) facilitate this process. A similar trend is apparent among the early local migrant subgroups that voluntarily relocated to Green Park.

Table 15. Land Tenure and Resource Users

Subgroups	Land1 Avg. Use (Acres)	Land2 Avg. Use (Acres)**	Own (Acres) 1990-91
Resettlers n=14	9.7 n=10	5.7 n=9	5.9 n=11
Local Before 1970 n=15	5.9 n=15	6.6 n=11	5.6 n=12
Local Since 1970 n=11	2.5 n=11	6.8 n=10	5.8 n=10
Local Since 1975 n=8	3.9 n=8	2.7 n=7	3.1 n=6
Local Since 1985 n=13	3.2 n=13	2.6 n=11	5.9 n=3
Circular Migrants n=10	3.8 n=10	6.5 n=10	4.9 n=10

**** Land2 Averages are calculated without the largest landowners included, for their landholdings bias the results (See Tables 37, 41, 45, 49 and 53).**

The local migrant subgroups that arrived to Green Park at least twenty years ago ("Before 1970" and "Since 1970") have access to the largest total acreage used, relative to the other subgroups (Table 15). Since arriving in Green Park, this combined subgroup has been able to increase its access to total acreage used. This combined subgroup is represented by slightly more than thirty-six percent of the resource using population in Green Park; on average, this subgroup has access to a total acreage of nearly ten acres. These subgroups purchased lands earlier than other local migrants and at a time when less

successful resettlers were selling out. In addition, most of these primary resource users are and have been skilled and unskilled laborers employed regularly while using resources in Green Park. Similar to the resettler subgroup, these early local migrants have modified their landholding and land use, based on the availability to markets. Earlier local migrants experimented in sugarcane and pumpkin while export markets were present. However, the majority of this subgroup has converted their landholdings into pasture for cattle rearing when access to the export markets were eliminated from Green Park.

Those with the least access to land are those local migrants who arrived since 1975 and since 1985 (Table 15). This combined subgroup represents more than thirty percent of the resource using Green Park population. On average, this combined subgroup has access to only 2.5 acres, and some of this is not owned land. A greater proportion of these households struggled in their ability to support the general well-being of members of their respective household. This was clearly observed with the number of children not attending school regularly because these resource users stated they could not afford school fees.

Many of these local migrant resource users who arrived since 1975, and in particular those since 1985, are utilizing rented lands. The renters are not given access to cultivate or reap on these lands, and must produce or purchase crops or fruits elsewhere. However, cases exist where these resource users use lands for fruit bearing trees without permission from the land owner, yet, no one in this subgroup of local resource users burns coal to supplement their household income. As a result, these resource users are dependent on wage labor or commodity production (selling bake goods or items made from wicker), and their agricultural activities to support their households. In such cases,

these resource users and household members have been involved in a number of irregular off-farm activities - occupational multiplicity - to provide for the household demands (shelter, food, education, and clothing).

Circular migrants are a relatively new and a potentially increasing subgroup in Green Park (Table 15). On average this subgroup has access to 6.5 acres, which is twice that of the local migrants that arrived in the last five years. The majority of circular migrants own the lands on which they reside, and in several cases, have increased their landholdings by purchasing and/or leasing additional lands. Circular migrants are not relying fully on land-based resources for household survival. The majority of this subgroup have overseas employment pensions which contribute to their household income. None of the circular migrants is burning coal to supplement the pension funds. Only two households market their produce regularly, and in one case it is because the circular migrant returned prior to receiving a pension.

6.4.2 Subgroups Livestock Compared and Contrasted

Livestock rearing, in particular cattle and goats, represents a component agrarian strategies for seventy-six percent of the resource users'. Since the arrival of each subgroup, the overall number of livestock owners have increased as has the total number of livestock, both cattle and goats (Table 16). In addition, the average cattle herd size has increased; however, the average flock size has fluctuated among the goat owners. In general, the major constraints identified for rearing cattle are lack of pasture during the dry season, and lack of capital and land space with which to expand. Major constraints identified for rearing goats have been stealing and wild dogs.

The various subgroups manage livestock (cattle and goats) based on their access to available land resources, capital, and time. Table 16 summarizes the livestock population for all of the subgroups presented above. Among the resettler subgroup, a decrease in livestock rearers has occurred from when this subgroup first came to Green Park, primarily due to out-migration and the aging of livestock owners who sold out. However, the total cattle population has increased as has the average herd size among the resettlers. In addition, a slight increase in the number of resettler households that rear goats has occurred from when the population first came. Moreover, the total goat population has increased as has the average flock size. During the 1990-1991 field season, no one among the resettler subgroup was over-herd in its cattle feeding and pasture ratio. This is unique among resettlers as all other subgroups are overherd in varying degrees. No cattle owner lost a head of cattle during the six-month dry period of 1990-1991, although a number of head did not maintain their weight. Clearly, the cattle management practices among resettlers are less intensive than other cattle owners, indicating an adaptive strategy designed within their constraints of available resources.

Proportionally, the largest number of cattle owners are currently the local migrant subgroup that has been using resources in Green Park for more than twenty years (Table 16). Nearly ninety percent of the early local migrants ("Before 1970") currently rear cattle, which is nearly a forty percent increase from when this subgroup first came to Green Park. Both the total cattle population and the average herd size have increased. This local migrant group owns the majority of cattle reared in Green Park, with the nearly fifty percent among this group, yet the total goat population has decreased as has the average flock size.

Table 16. Livestock and Resource Users

Subgroups	Cattle1 Total Avg.	Cattle2 Total Avg.	Over- Herd	Goat1 Total Avg.	Goat2 Total Avg.
Resettler n=14 Owners	17 2.4 n=7	48 4 n=7	0	15 3.7 n=4	65 7.4 n=6
Local Before 1970 n=15 Owners	14 2.4 n=5	146 11.2 n=13	8 53%	53 13.3 n=4	36 4.5 n=8
Local Since 1970 n=11 Owners	11 2.2 n=5	47 5.8 n=8	3 27%	6 2.0 n=3	12 2.4 n=5
Local Since 1975 n=8 Owners	27 4.5 n=6	42 7 n=6	4 50%	11 3.6 n=3	3 1.5 n=2
Local Since 1985 n=13 Owners	27 5.4 n=5	50 8.3 n=6	6 46%	46 15.3 n=3	68 9.7 n=7
Circular n=10 Owners	1 n=1	35 5.8 n=6	5 50%	0	26 5.2 n=5

Among "Before 1970" local migrants, nearly eighty percent of the cattle owners are over-herd for the amount of pasture land available for their cattle. Members of this

subgroup also lost cattle to starvation, dehydration or other factors related to lack of feed during the protracted dry season in 1990-1991. Although this group represents the larger land users, they are a group highly involved in wage-labor activities. Those that lost cattle contend they did not have the time to care for them. This illustrates the fact although this subgroup owns most of the livestock and the majority of the land, their cattle management practices are not adapted fully to available resources and related constraints, in particular the labor time of the resource users.

Among local migrants that have been using resources in Green Park since 1970, nearly seventy-five percent currently rear cattle, an increase from when this subgroup first came to Green Park. The total cattle population has increased as has the average herd size. In addition, forty-five percent of this second group of local migrants raises goat an increase in total number of goat rearers. Both the total goat population and the flock size has increased for these tenders. Among the "Since 1970" subgroup, four cattle owners are clearly over-herd and two others struggle during the protracted dry season. None of these cattle owners lost cattle during the dry season 1990-1991, although two culled their herd to provide pasture for the remaining cattle.

Among the local migrant subgroup that has been using resources in Green Park since 1975, nearly seventy-five percent currently rear cattle. There is no increase or largest average herd sizes as well. This coincides with this subgroup having access to the largest total acreage of land used. In addition, slightly more than fifty percent of this initial group of local migrants rears goats. The number of goat rearers has increased decrease in the number of actual rearers in this subgroup, although it has not been the same households rearing for the last fifteen years. Even though there is no fluctuation in

number of cattle owners, there is an increase in the overall cattle population. The total cattle population has increased as has the average herd size. There has been a change in the goat rearing population. The actual number of rearers has remained constant; however the actual goat population has decreased as has the average flock size.

Among the "Since 1975" subgroup, four cattle owners are over-herd and a fifth struggled during the protracted dry season. Several cattle died among this subgroup's cattle population as a result of the difficult dry condition and lack of access to pasture. Relative to the early local migrant subgroups, resettlers and circular migrants, this group has access to very small land holdings, (approximately two acres).

Among the local migrant subgroups that have been using resources in Green Park since 1985, more than forty-five percent currently rear cattle (Table 16). Both the number of actual rearers and the total number of cattle raised have increased. The total cattle population has increased as has the average herd size. In addition, a change also has occurred in the goat rearing population. The actual number of rearers, and the actual goat population and the average flock size have all increased among this subgroup.

All of the cattle owners among the "Since 1985" subgroup are over-herd and struggle during the protracted dry season. In addition, two cattle owners culled their herds and one cattle owner lost a cow as a result of the lack of pasture from which to feed during the 1990-1991 dry season. Similar to those local migrants arriving in 1975 or later, this subgroup has minimal access to land in Green Park and the total acreage that they do utilize is approximately two acres. These later arrivals have access to more marginal resources which adds more stress to husbandry practices.

The majority of circular migrants rear cattle in Green Park (Table 16). The total

cattle population and average herd size is comparable to that of resettlers that have been in Green Park nearly thirty years. In addition, nearly fifty percent of the circular migrants raise goats with an average flock size considerably higher than other local migrant subgroups, yet much less than the resettler population. However, the overall management practices among circular migrants is much different than resettlers livestock practices. Among cattle rearing circular migrants, nearly eighty-five percent are over-herd. Although owners and animals struggled on the available pasture, none of the cattle owners culled or lost animals to the protracted dry period of 1990-1991. The majority of circular migrants are too new to livestock rearing in Green Park and have not sold cattle since they have begun to rear.

6.5 Stage Four: Green Park Resource Users and "Their" Community

The final phase of community formation in Scudder's developmental sequence is characterized by inhabitants incorporating themselves in "their" community. According to Scudder's resettlement framework, a resettlement is not considered a community until control of the settlement project activities is handed over to settlers and their local organizations, and when second generation households begin to take over the resettlement (Moran 1989; Scudder 1989 and 1991). Reaching this forth stage is central to Scudder's notion of a resettlement becoming a community. Therefore, Green Park's stage four is evaluated using Scudder's process for community formation and criteria that established Caribbeanists have used to describe Caribbean community characteristics.

As previously mentioned in Chapters One and Five, characteristics for a Caribbean community center on kinship ties and geographical boundaries (Clarke 1957; Cowel 1987;

Craton 1987; Price 1988; Rubenstein 1987; Smith 1962, 1965). Smith (1965) defines Jamaican community affinity more narrowly by examining several indicators that he argues serve to bind community members together. These indicators include: local variations of visiting, praedial larceny, kinship, leadership, free or exchange labor in farming, interest free loans, religious affiliations, tradition and interest. A number of these indicators are examined for Green Park.

The position taken by this researcher -- derived from archival research and survey and ethnographic data collected over a thirteen month field season -- suggests that during a thirty year period of time, this resettlement process has not led to a "community" either via Scudder's development sequence or other literature on Caribbean community characteristics. The constant inflow of new residents, who frequently are strangers, has not led to a full sense of community, the development of community leaders, or the development of internal organizations. As a result, it is the opinion of this researcher that a collective spirit for decision making, (be it for resource use, access to and dissemination of information etc.), has not formed, in particular, among primary resource user households. The following litany of examples demonstrates clearly that Green Park remains a resettlement in transition, where it is neither fully a resettlement nor a community.

6.5.1 Neighborliness

The "sense" of Green Park being a community is explored through Smith's concept of "neighborliness". Neighborliness refers to a kindred spirit of sharing collectively and reciprocally because of residing within geographical boundaries of a common area - "the

community" (Price 1988; Smith 1962 and 1965). According to a Jamaica USAID report (1978), a value shared among small-scale farmers is neighborliness, expressed in the form of hospitality and as a form of insurance. According to the Jamaica USAID report, "sharing food as needed indicates a value on hospitality and sociability, it is also clearly a type of insurance since a giver could hope to be a receiver should he have needed" (USAID 1978:213). Writing on Jamaican rural communities, Smith purports community members know their neighbors. Smith (1965) contends,

people generally know their own community and its personnel in considerable detail, although they may be unwilling to talk or tell the truth; but they tend to be vague and less well-informed about adjacent communities since visits are rarely exchanged across these boundaries and since inter-community ties are individual and specific rather than general and diffuse (Smith 1965:177).

Evidence to support Green Park's neighborliness is derived from ethnographic data and survey data. Varying degrees of neighborliness are expressed among Green Park resource users. A few examples illustrate the complexity of the concept, however, it is recognized there is no clear pattern of "neighborliness". It is not always consistent within the community, within certain internal networks, or by specific individuals.

During the field season, a number of instances occurred where Green Park resource users looked after the aged and infirmed by offering food or labor when necessary. In addition, when resource users were asked during the survey interview what they did with some of their mature fruits and food crops, the majority replied they would "share it out". Other examples of neighborliness is displayed in sharing farming insights, technology and labor. This researcher witnessed sharing of information on: African star grass, the distribution of government cattle feed, the maintenance of the cattle water trough, and callaloo suckers and potato slips when thinning patches. In addition, labor

information was exchanged serving as a laborer or identifying a source for good, hard working laborers.

Although actions of "neighborliness" are recounted by resource users and observed by this researcher, tendencies for non-neighborliness and individualism occurred that govern a number of internal social interactions. Several examples are offered to illustrate how Green Park tends to operate on an individual household basis, contradicting a sense of neighborliness found in community.

A range of variation was observed among Green Park resource users when they visited each other. Casual and participant observation and comments shared by resource users during the field season revealed that not visiting ("passing the gate") or knowing your neighbors (by sight or in detail) are common among Green Park resource users. An interview with a circular migrant (aided by the research assistant) illustrates Smith's notion of a community "knowing" its members. Upon completion of an interview with an elderly circular migrant, who had been residing in Green Park for nearly nine years, the circular migrant commented, "dis de first time him pass de gate." Both resource users (circular migrant and resettler) admitted to greeting each other on the road, but not at each other's home - or "passing the gate". Following the interview the research assistant commented "this is the first me know about her tings."

Another example is drawn from the reasons that local migrants select to move to Green Park. Some local migrants contend they moved to Green Park to "get away from people." One local migrant's comments exemplifies the spirit of non-neighborliness held by some local migrants when she stated, "me naw like strangers, so me lockup de front yard and me sit in de back."

The livestock practices of some Green Park resource users offers other examples of individualistic behavior. Livestock owners who do not have good relations with their fellow "Green Park citizenry" and whose cows "jump de fence" are generally charged by a professional outside valuator. On several occasions, livestock owners charged others whose cattle ate from their pastures without permission or received something in exchange for the eaten pasture (i.e., grazing fees). A valuator was called to assess the damages from the cattle and the potential worth of lost crops or pasture on more than five occasions during the field season. According to the resource user "if de cows jump de fence its de livestock owner's worry fe de crops don move. De valuator must be called." Repeated trespasses during the year can be a costly loss to a livestock owner. In fact, one livestock owner was charged J\$3000.00 for cane damage when five of his cows "crossed de fence", (the assessed fee is almost the equivalent of one fit cow sold to pay the debt).

Another example occurred when this researcher organized "cane ban" collection drives - the collection of cut green sugarcane tops. It is apparent from empirical observations that not all livestock owners interact with one another, share information, or water their animals at the trough. (The majority of livestock owners are independent of the trough.) Further disassociation among livestock owners was confirmed with empirical observations where this researcher witnessed a number of Green Park livestock owners (twenty-one) meeting for the first time on the back end of the Ministry of Agriculture dump-truck by introducing themselves and identifying where they resided and for how long. In addition, during the actual collection of cane ban, livestock owners tended to collect by and for themselves. Negative out bursts were displayed when the cane ban bundles were redistributed to each owner's pasture. Accusations against how much each

livestock owner bundled, how large were the bundles to how much they should received were called out as the truck was unloaded at each livestock owner's pasture. No clear leader emerged on any of the drives, and the squabbles were resolved when the truck driver moved onto the next livestock owner's pasture to drop off the cane ban bundles.

Overall, however, the above examples remain inconclusive to confirm the degree of neighborliness in Green Park, for no clear associations between resident status subgroups, occupational groups, or age grades have been identified. The examples illustrate only the "sense" of neighborliness is present and absent in Green Park.

6.5.2 Kinship

Kinship and second generation establishment are other indicators used by Scudder in the analysis of resettlement transformation and community formation, and by Caribbeanists in defining a community. As noted in Chapters One and Five, Caribbeanists stress the importance of kinship in an established community, including affinal and consanguinal ties. Scudder's last phase of community formation requires the more established or entrenched households in the resettlement to have the second generation begin to take up residence to establish themselves and take control of "their" community. As such, Scudder alludes to the importance of kinship relations to achieve the goal of community formation.

According to Cowell's work in Lime Tree Garden and Thatchfield to Retreat resettlements, the districts were comprised of close-knit family relationships. Cowell found,

The general impression was that almost everyone could trace his/her relationship to everyone else - however remote. The closeness emerging from an intermingling of blood relationships was compounded by the relative stability of residential

patterns and the consequent evolution of equally close non-family relationships over time (Cowell 1987:189)

However, what Cowell found in other Jamaican bauxite resettlements is not what is occurring in Green Park.

According to Scudder's resettlement developmental sequence and other literature on Caribbean communities, Green Park has not yet reached a "community" composition where many kinship relations exist among the resource users. In Green Park, few second generations are establishing themselves, and the youth are moving out of the resettlement.

Green Park is a resettlement composed of primarily elderly residents and grand children (Table 19). By 1990-1991, seven second generation households (fifty percent) from the resettler subgroup were established. Five of these seven households set up separate households on lands that they received as parcels from their parent's land or lands that they are renting in the area. Among the "Before 1970" subgroup, two second generation households have set up on parents' land by 1990-1991.

Within the "Since 1970" local migrant subgroup, five consanguinial kinship relations exist, with are two examples where siblings followed another sibling and remained in Green Park setting up separate households. Interestingly, among these four households, all are renting or squatting on extremely small land segments, generally on just squares of acres (tenths of acres). The last relation is a second generation purchasing the land from his father and building his own house and remaining in the area. The house has been under construction for sometime while the son works on a cruise ship most of the year.

Lastly, no second generations are setting up residences among the circular migrants as of 1990-1991. Two separate kinship relations exist among four households of

the circular migrants, with two sisters residing next to each other on their own land in separate households, (consanguinial kin). The other two households, also on separate owned lands, are affinal kin related as marriage in-laws; each learned of the available lands while they were overseas.

In the thirty years of the resettlement process, sixteen households (twenty-two percent) are kin related, where ten households (fourteen percent) are from second generation households establishing independent residence in Green Park. A greater proportion of Green Park's second generation population live in Kingston, overseas, or other Jamaican communities. Potentially, the low percentage of second generations and kinsfolk taking up residence in Green Park with an increase in non-familial immigration, is an indicator for the youthfulness of the resettlement. According to Scudder and Smith, where kinship relations are not well-established internally, lineage ties cannot not facilitate community integration.

In contrast, ethnographic observations and repeated discussions with resource users during the field season suggest kinship ties remain strong between communities from which the resettlers migrated. The ties and networks extend overseas as well. As such, external kinship ties support individual households in the resettlement, but not internal relations. A number of resource users discussed maintaining multiple linkages outside the resettlement, both familial (rooted in communities of origin - kinship), and non-familial ties (employment location, church affiliation, and recreational activities). Many of these linkages were maintained through varying forms of reciprocity that are directed toward individual households or groups in other areas, not necessarily to the entire resettlement.

This dichotomy of internal versus external linkages is important as it clearly reveals

much about the degree that resource users identify with Green Park and feel a part of both Green Park and the evolving community. For example, consanguinial and affinal kinship ties frequently are supported, in part, by attending weddings, funerals and holidays in communities of origin. In addition, seasonal food sharing also is part of reciprocal exchanges between kin-based households across physical boundaries (localities). Food not able to be grown in Green Park (certain yam varieties, coffee, and fish) was shared between households in Green Park. Seasonal variation in the maturation fruits varies in different parts of the islands. During the field season resource users shared news of receiving food from kin, where harvests were shared between some families either by direct exchange, transported by friends, family members, or meeting in the market.

Throughout the course of the field season, non-familial ties were maintained through varying reciprocal exchanges between church brothers and sisters, drinking buddies (sporting partners), and co-workers. Reciprocal exchanges were in the form of labor, food exchanges, sharing of tools, and transporting goods or people. Both familial and non-familial ties serve to ensure that a source is available on which to call on to receive assistance (money, employment, food, labor, shelter etc.) when one is in need.⁸² These non-familial ties are internal and external to Green Park, for not everyone is a member of the same church, socializes or labors at the same places. Nonetheless, external linkages are still (or may be) better indicators of integration of resource users into Green Park and the emerging community.

⁸² The reciprocal exchanges which the researcher observed and were recounted to her were frequently between households. One exception was a wedding held in Green Park when members of another church (of the same denomination but located in Falmouth) attended the ceremony.

6.5.3 Social Institutions

Cohesiveness is typical of Jamaican rural communities, it is emphasized by the involvement of the church and the school and intern-linkage between both institutions (Cowell 1987). According to Cowell, "the culmination of this was the community was galvanized within a framework of a common moral and religious outlook" (Cowell 1987:189). As such, some internal social institutions serve to socialize and strengthen ties between individuals and/or households (Cowell 1987; Craton 1987; Rubenstein 1987; and Smith 1965). Yet, internal social institutions generally found in "established" communities, are not found in Green Park. For example, Green Park does not have a local government or local leaders, a school, a church attended by the majority of residents⁸³, a community center, nor playing field for cricket or soccer matches. Without internal social institutions, Green Park may lack avenues needed to strengthen community cohesion and social relations.

Many social institutions that facilitate social integration lay outside Green Park, and such institutions include churches, schools, markets, and medical facilities. Different religious affiliations exist in Green Park, each with specific Sabbath days, rules and responsibilities (i.e., Seventh Day Adventists, Baptists, Evangelists, Rastafarians and Jews), yet these churches lay outside Green Park. Many of those who attend religious activities travel outside Green Park for fellowship, although not everyone is religious or

⁸³ An Evangelist church is located in the community, but not attended by all community members. A number of Green Park resource users belong to various religious denominations and attend services in Falmouth. The differing religious sects include Evangelist, Seventh Day Adventist, Church of England, Jewish and Rastafarian. A number of others do not subscribe to any particular faith. These sects have different holy days and days of worship (Saturday or Sunday) which influences when work days and community meetings are held.

practices.

Markets located outside Green Park, in Falmouth, Bounty Hall and Montego Bay, are utilized by Green Park resource users. Markets are not only areas where producers may distribute their harvests, but markets provide producers and consumers a means to interact, converse, share information, trade and maintain a variety of relationships.

Educational facilities include public and private, basic, primary and secondary schools and vocational training institutions; all lie outside Green Park. Children attending any one of these institutions walk or take public transport. According to many resource users who informally shared their personal economic situations with this research, not all children can afford to be sent to school or attend beyond the first years. Casual observation and personal accounts confirmed many children did not regularly attend classes because of the costs (round trip public transport fares, books, uniform and lunch fees).

Additional areas where people congregate include rum shops, street corners and bus stops located on the fringe (edge) of Green Park or in neighboring communities. In these places, people may loiter, drink, and gain access to transport, social discourse, and material and informational exchange also take place here.

Minimal farming information is supplied by these outside institutions. The exception is the market, where information on prices received and access to markets (transport dependent) influence production. The role of the market was identified when resource users were asked: 1. how and where people learn of new ways in farming; 2. about information related to livestock production; tree management and 3. about prices for farm products. In addition, farm-related information was acquired from the "farm

store" (located in Falmouth), friends within the resettlement, agricultural extension agents, a veterinary assistant, the television, and radio.

In 1990-1991, information appeared to be exchanged on a one-to-one basis between individual resource users. An example previously described serves to illustrate this point. The introduction of African star among Green Park livestock owners has taken over twenty years. To date not all livestock owners currently plant African star; of those that do have African star established, it is not their primary pasture grass. In addition, some confusion remains among resource users as to the establishment of African star. The misconceptions that pervade are related to the information exchange process. For example, some resource users believe African star can be planted only if the field is plowed with a tractor. If they cannot afford the tractor rental, then they do not plant African star; yet, other resource users recognize African star will take if a few suckers are planted (Fieldnotes 1990-1991).

6.5.4 Local Leadership and Local Organizations

A forth criterion of community formation is the development of local leadership and organizations within the community; this also parallels Scudder's phase four with the expansion of internal leadership and control. In Jamaica, national farming organizations exist with local community branches; these include Jamaica Agriculture Association, Jamaica Livestock Association, Coconut Industry Board, and Island Fisheries. According to Cowell's research in Lime Tree Garden and Thatchfield to Retreat where there was an active branch of the Jamaican Agricultural Society and a branch of Citrus Growers Association, "these community organizations promote discipline and cohesiveness and was

a training ground for leadership" (Cowell 1987:186).

None of the local branches of these national organization's are located in Green Park, nor are there internal formal organizations in Green Park (outside of the one church in Green Park that not everyone attends). A minority of Green Park resource users are members of national organizations.²⁴ Yet fifty-seven resource users (80.3%) are not members of any farmers' organizations. Interestingly, the survey data reveal no one is a member of the Jamaica Livestock Association, and yet, there are forty-six cattle owners, (as well as goat, chick, and pig owners). A viable need for membership in some trade organization exists that could facilitate technology and information transfer, and sharing of "lessons learned", yet resource users in Green Park elect not to belong. Clearly, social factors that prevent or inhibit membership outweigh perceived benefits.

In absence of a local, internal organization, individual resource users' do possess ties to the Ministry of Agriculture - Falmouth office. Presently, the distribution of farm assistance is in the hands of the Agricultural extension agents from the Falmouth Land Authority office. Therefore, to receive aid from the Ministry of Agriculture, (such as in the form of feed for livestock, seed, insecticide or farm assistance after a disaster (hurricane)), one must be registered as a farmer at the Land Authority at the Ministry of Agriculture located in Falmouth. According to a Falmouth senior agricultural extension agent (Brooks 1990), thirty-six of forty-six livestock owners in Green Park are registered with

²⁴ For example, ten resource users (14.1%) are members of the Jamaican Agricultural Society, one (1.4%) is a member of the Coconut Industry Board, two (2.8%) are members of both the Coconut Industry Board and the Jamaican Agriculture Society, one (1.4%) is a member of Island Fisheries. A majority of those that are members of the national farming organizations reported during the interviews they were inactive members and do not attend the meetings. A few resource users commented they were not members because of the membership fee and others commented they never got anything from the meetings or meetings were rarely held, thus why pay.

this agency.

In addition to these linkages that do exist, a greater degree of support by this agency of local agricultural producers is apparent. Green Park resource users did comment repeatedly during the course of the field season that there should be more involvement (participation and representation) in the animal feed and seed disbursement with the Land Authority (Fieldnotes 1990-1991). Resource users say "some people get who don have cows, chickens and dem still get feed, seed and wire". Field days, where agricultural extension agents organized tree plantings or field seeding, distribution of sprays and seeds, are of the past. Resource users contend agricultural extension officers no longer come to assist them as they had when "tings were gettin settled."⁸⁵

6.5.5 Praedial Larceny

Caribbeanists Brierly (1987) and Smith (1965; 1989) contend praedial larceny (stealing from friends, family or anyone) is another indicator of a sense of community. According to Smith, stealing within a community is directed against strangers, where households are not accepted or have not accepted the community. Smith finds in his work on Jamaican communities that

members of a community regard praedial larceny as an especially heinous offense to steal on another's livestock or crops; and if such theft is found out, it normally gives rise to ejection from the community as an effect of local ridicule and ostracism. On the other hand, there does not appear to be any similar prohibition against larceny of crops or livestock belonging to members of other communities, or to strangers within the community. Persons who regularly suffer losses by theft from the holdings on which they live are not usually true members of that local community. They live

⁸⁵ Dry system farming technology is employed in St. Elizabeth for crops and livestock yet it is not extended to Green Park which also is a semi-arid agricultural area that could benefit from such technology and information.

within it, but are not of it. Either the community has not accepted them or they have not accepted the community (Smith 1965:184).

In addition, praedial larceny serves as an alternate response to shortages and to meet immediate household demands. As such, praedial larceny is viewed as an adaptive strategy not only for Green Park, but for Jamaica as well (Smith 1989; Stone 1989). Data were not systematically collected for each household on the frequency or type of praedial larceny in which they partook by which they were a victim. Informal discussions and oral histories do provide limited data. Praedial larceny was reported to be committed on many levels: theft of cash, theft of property (goats, cattle, ripened produce, fence posts, living trees, tools, charcoal), cheating between producers and consumers concerning the fifth quarter from cattle or bags of coal, and violence against individuals (which may or may not be economically rooted).

In Green Park, all resource users report incidents of praedial larceny, be it in livestock, crops, or material goods and a number of the thefts are in internal. For example, one resource user pointed to a group loitering around a local rum shack and said "dem boys are wicked, de tief peoples' goats all de time, every time people claim de lose a goat one of dem boasts he naw lost one." In addition, an incident occurred during the field season where five houses were broken into (guns and machetes were used against the victims) for money. Green Park residents contend it was orchestrated from within Green Park, although two of the three assailants were from a neighboring community. In summary, praedial larceny in Green Park has been a problem for resource users and will likely remain a problem, especially with the increasing competition for resources and with the increase of wage-laborers and circular migrants migrating into the area.

6.5.6 The Role of Kaiser

Scudder contends, those responsible for the resettlement scheme must release control of the resettlement for it to reach its final stage - that of a community. The strong presence that Kaiser maintains in Green Park is further evidence of why Green Park's community formation oscillates between stage two and stage three and does not move forward to stage four. While residing in Green Park, this research observed Kaiser officials who periodically came to check on their property. Recall from Chapter Five, a number of resource users rent or lease lands for their livestock rearing and cultivation from Kaiser. As mentioned earlier in this chapter, Kaiser maintains control of lands in the hillside and former sugarcane region with restrictions on land usage. However, Kaiser is not fully active in controlling use of wooded hillsides; empirical observation of this area indicates that it currently is being clear cut for charcoal production, livestock rearing and cultivation. Patches of cleared areas are visible from the roadsides as well. Although Kaiser's control is incomplete, its land ownership and regulations distorts adaptive, coping and community formation strategies in Green Park.

The following example illustrates the lack of internal control Green Park resource users have of "their" community, and identifies an impediment to community formation and achieving local political autonomy. As previously mentioned, as of 1990-1991, Green Park is without a community center and playing field for sport events. Neighboring communities that have a community center and playing field, use the facilities for fund raisers, and club and social gatherings which strengthen community ties. Representatives from Green Park's youth approached Kaiser officials at their St. Ann headquarters to gain permission to use vacant Kaiser lands located near the Great House, (also formerly flat

sugarcane lands), to use as an organized playing field and to build a concession stand to sell items and hold meetings.⁸⁶ Kaiser, in the form of a letter, denied Green Park's youth their request for access to those lands for ball court and concession stand purposes, and followed through with a personal visit to halt construction of the concession stand (Fieldnotes 1990-1991).

Real-estate values have escalated in the last thirty years. According to a Kaiser official and several resource users, thirty years ago Kaiser sold lands for J\$24.00 to resettlers (J\$2.00 to US\$1.00). In 1990-1991 land owners are purchasing and selling some lands for over J\$30,000.00 per plot (J\$14.00 to US\$1.00). Kaiser retains acreage but leases and rents land to Green Park resource users; Kaiser officials were not queried as to why they retain landholdings in Green Park, yet this researcher offers the value of the land to be a legitimate, although speculative reason. Nonetheless, according to Scudder's model, Kaiser's failure to turn over control of Green Park to resource users living here prevents the evolution of Green Park to be a successful resettlement. Accordingly, Green Park cannot move on to stage four of the resettlement process, whereby the resource users have responsibility for their immediate surroundings. This concept of resource use and management is explored further in the following section.

6.6 Collective Impact of Resource Use and Perception of Changes Among Green Park Resource Users

When de drought comes on we can only do so much, but when it comes de month of July to August we goin to prepare our farming land. We begin to

⁸⁶ This research was present at the meeting between a Kaiser official in charge of land management, a youth representative from Green Park and a Peace Corp volunteer working with youth groups and organizations in Trelawny.

prepare from August to September and begin to put in our crop in the latter part of September. So when de rain break we are ready so we don't lose it. Right down to January we can plant. When de corn planting is over we can plant peas and any odder crops, sweet potato, but only one side of corn. We plant right down until November after dat we can break. Den we going into our odder crops right now we can't plant for five months of the year. The rest of the months we spend on our livestock by cleaning pasture, looking our fences if it gone bad and need repair and tings like dat.

So we can be fully engaged in our day to day program in agriculture once you put yourself to into it and decide you are going to make something from it. Agriculture is not a very, I would say, necktie job. But it is a very independent job. Right now I am a full-time farmer, I am telling you the body is not doing it full time but the mind and heart is (Quoted from an elderly livestock owner describes his annual farming cycle - Field notes 1990-1991).

Resource users have experienced a number of changes in Green Park that have impacted their households over time. As the quotation suggests, the life and farming cycles of the resource users are only part of the changes discussed. As years passed, resource users aged, and agricultural practices and conditions also changed, responding to internal and external forces. The analysis now turns to specific changes in natural resource use, perceptions of these changes by resource users, and their adaptive responses to such real or perceived changes. These modifications are related to a dynamic biophysical environment and the attendant sociocultural, political and economic conditions.

Multiple survival strategies and agricultural enterprises exist in Green Park and have existed for the last thirty years. As previously mentioned, there have been changes in loss of top soil on the flat lands and hillsides, loss of soil fertility and tree species in certain areas of Green Park, as well as perceived changes the rainfall pattern. Resource users commented on these land changes repeatedly in the course of the field season.

6.6.1 Perception of Change in Rainfall Pattern

Several observations were made by resource users in relation to the rainfall pattern. According to the survey data, eighty-two percent of the resource users reported a change in Green Park's rainfall pattern. However, of those who reported a change in the pattern seventy-nine percent reported they notice fewer spring rains than in past years, yet three percent contend the change they perceived in the rainfall was because they relocated from an area that received higher precipitation amounts. Some resource users contend the rainfall pattern is shifting because the charcoal burners are taking down too many "big trees," thus there is no way to hold the clouds and make the rains fall over Green Park.

There is wide speculation as to why the rainfall pattern is shifting, but clearly the majority recognize there is a change. Recall Chapter Five, where a number of resource users reported that the unreliability of the spring rains and/or lack of spring rains is the reason they no longer plant a spring crop. According to resource users, not planting a spring crop limits their opportunities to cultivate year round; some resource users reported, "me lose a money see me plant dis time." In other cases, resource users reported that they shifted to cattle rearing because of the protracted dry periods. However, as a resource user summarizes, "me work hard on me crop to get likkle bit and fe only part of de year. Wid de cow me can have it all year and be sure to get sumptin when me sell it o when me need a money."

One year's observation of rainfall and adaptation to limited precipitation is inconclusive to make any statement on climatic change. However, comments from resource users could be significant and worthy of further exploration. Many of the resource users' comments are directed not to less amounts of precipitation, but to changes

in seasonality and duration of the rains since their arrival.

6.6.2 Perception of Change in Land-Based Resources

6.6.2a Soils

Soil erosion is known to be a serious problem in Jamaica (Kapos 1986; Regional Research Centre 1970; JAS 1990). For example, "Jamaica's rugged topography and steeply sloping hillsides make the island highly vulnerable to the erosion force of the intense tropical down pours which are experienced from time to time" (JAS 1990:25). Problems related to soil erosion are recorded since 1830s when soil loss contributed to a dramatic decline in the coffee production in the Blue Mountain and John Crow Mountain regions (JAS 1990:25).

Green Park experiences problems related to loss of topsoil or decline in soil fertility that are typical of the above dynamics. Recall, Green Park had been a successful sugarcane plantation for over two hundred years (Fremmer 1963; Higman 1988). According to historic literature on sugarcane production soil fertility was maintained with cattle dung and lime ash; lime ash was used to lower the acidity level of soil (Fremmer n.d; Higman 1988).⁸⁷

Since Kaiser purchased this area in the post plantation period, Green Park has been a resettlement for slightly more than three decades. Yet, hillsides, flat-lands and rolling lands of the Green Park area display clear signs of soil erosion and top soil loss.

⁸⁷ The lime ash was produced from burning limestone in a lime kiln. Limeskill, a word derived from lime kiln, is the name of the residential community area of Green Park. It is named after burning limestone in that part of the community that was used as lime ash for the Green Park sugar cane fields. Lime paste is currently used on orange trees to keep ants away and it was also used as cement (Field notes 1990-1991).

Limestone and flat-rock are surfacing throughout the area. During the survey interviews, eleven percent of those interviewed commented on soil erosion, showed the researcher the flat-rock (slabs of limestone) on their plots, and stated the onset of rains wash away the soil. In addition, these observations were shared with this researcher repeatedly during the field season.⁸⁸ The dry season lasts until the spring rains fall. Accordingly, when cows eat all the pasture covering and when no crops are being cultivated during that dry season, the soil has little ability for retention against erosive forces.

Resource users, in particular those whose livelihoods at one time or another depended directly on the earth, tend to be perceptive to changes in soil quality, fertility and type (clay like or not). For example, resource users are able to describe when they thought "the soil was tired;" resource users displayed areas where soils would crumble in their hands. For resource users this type of brittle soil is an unfertile or tired soil. For example, a resettler recounts

In St. Ann me did a fair bit of cultivation and sold in Duncans and Clarkson markets when de crops come in. De lands were clear and me had a tank wit water fe de house and de crops. Here me on a hill and far from de main road. De first tree years were good here den tings began to get dry. Today, me have 30 yam mounds but dem naw bare like when me first come, de soil tired.... (Fieldnotes 1990-1991 on a Green Park Resource User).

Overall approximately, thirty-one percent of the resource users commented that the soils are old ("weary") and burn up in the dry time. The crops that are on such soils are said "not to come up good" and "next year dey need to give de land a rest."

⁸⁸ For example, resource users commented, "have you (to the researcher) ever seen farming (crop production) among so much rock?" Others took the researcher to flat-lands and hillsides to show soil erosion on the lands they use. In addition, during the dry season when the cattle eat down the pasture, cattle owners remark, "now what do dey expect us (government and/or extension agents) to do, feed de cow rocks?"

In other instances, resource users noted change according to plant species in their fields which may indicate changes in soils or management practices. Logwood (*Haematoxylum campechianum*) and pepper rod (*Croton humilis*) are the two species frequently mentioned and empirically observed. "Logwood is common on exposed limestone hillsides in dry secondary thickets and planted fences (Adams, C.D. 1972:330) and pepper rod, an aromatic shrub, is common in rough pastures and rocky thickets in arid areas" (Adams, C.D. 1972:414). Logwood is found on hillsides, pasture lands and ruinate plots.

6.6.2b Land Use

In the course of the field season, resource users frequently commented on how the lack of land space affected their land use strategies. In response to the increased subdivisions, use, and ownership of plots, resource users reported that their ability to let lands lay fallow and to rotate cattle on to their plots became more difficult. For example, in the past, resource users had unoccupied and/or unowned lands on which they could tether their animals, allowing their lands to lay fallow. The implication from this analysis suggests that plots of land are being used more intensely with shorter to no fallow periods. Earlier sections of Chapter Six indicated that the overall total acreage used by the majority of resource users is small and the number of plots they used is few. The flexibility which resource users have to let lands lay fallow (for pasture or to rejuvenate soils) is constrained by the number of plots, size of total holdings and outside resources (capital and employment) a resource user may have. Thus, the majority of resource users, are using resources more intensively, until the land-base resource is depleted or

deteriorated to a point that it is not fruitful for cultivation or animal rearing.

6.6.2c Trees

Direct inquiry was made on tree planting, and the data support the existence of cultural trends for tree use and land tenure (List 2). The significance of which is related to long-term resource use, replanting and planning for future tree use. Thus, considering, household needs, land contract agreements and cultural practices related to the entire agrosilvopastoral system figure into future planning of resource use in Green Park.

Trees are planted are a part of long-term planning for resource users. The majority of resource users have fruit bearing trees planted at their house or in fields, on lands frequently under ownership.⁸⁹ Fruit bearing trees tend to planted shortly after land acquisition, and for resource users to have in their later years. Trees are less labor intensive than short-term crops, but trees take several years before they produce fruit regularly (Edwards 1961). Those leasing or renting houses, however require a contract to harvest from already established trees or to plant trees for themselves. In addition, trees used as living fences are also planted on lands that are owned by households. According to a number of resource users, not everyone likes trees for when the breeze blows the canopies catch, loosening the wire fence, and the cattle escape. Trees used in charcoal production or as regular sources of animal feed were not planted but left to natural regeneration processes.

⁸⁹ Fruit bearing trees frequently planted include: primarily ackee, orange, breadfruit, banana, mangos and coconuts and living fences include Gliricidia sepium and Erythrina species which formerly served as boundary markers (Tables 24 and 25). Trees used for yam stakes, fence posts and charcoal are frequently harvested from lands owned by others without permission, although similar practices occur on owned lands as well.

Livestock owners and charcoal burners commented between themselves and to the researcher about loss of tree species. According to these resource users, the most noteworthy loss is the breadnut tree that is said to be found in greater quantities on the hillsides less than three decades ago. However, the breadnut tree is no longer as abundant, according to both long time burners and livestock rearers.⁹⁰

Many charcoal burners utilize the larger hardwood trees from the hillside that surrounds Green Park.⁹¹ Yet, both birchgum and breadnut trees are recognized as fodder trees by livestock owners and frequently are used as an alternate feed source during the dry seasons. A number of other hardwood tree species are being removed from the hillsides, as well, for charcoal production (logwood, bullet). Clearly, the overlap in resource use among resource users' activities (cultivation, livestock rearing and charcoal burning) have direct and indirect linkages to resource competition and increase pressure on future availability of those resources.

6.6.3 Carrying Capacity

Frequently, the literature turns to population increase as a primary cause for

⁹⁰ Breadnut may not seed annually or at least when it is under stress. During the 1990-1991 field season one breadnut seed was found in the hills after four repeated and staggered hikes specifically in search of breadnut seed. The succeeding researcher requested breadnut seed for his future experiments in Green Park. Unfortunately, only one seed was found. The life cycle of the breadnut tree warrants further investigation. The older resources users commented that when they were younger they used to eat the breadnut after it was boiled and cooked with coconut milk to make a dish "called run-down".

⁹¹ Pimento (Pimenta dioica) (a permanent export crop), breadnut (Brosimum alicastrum) (a recognized fodder tree) and braziletto (Peltophorum linnaci) (a recognized fence post or lumber tree) are the three favorite mature (large) hardwoods used for burning. Birchgum (Busera simarub) is a wetter tree. It is not good for charcoal, but is used to support the mound (kiln) as the charcoal burns.

resource decline or degradation and as a factor influencing agrarian adaptive strategies (Clay 1988; Denevan 1986; and Leonard 1987). Carrying capacity -- the ability of a given resource base to support a maximum number of people without appreciable change in resource quality -- is a useful means to deal with population and resource use.

Approximately twenty years ago, fifty percent of the present population using resources in Green Park of resource users interviewed were not in Green Park. Thus, in almost twenty years, nearly a doubling of households in Green Park has occurred with multiple plot owners and users engaging in multi-purpose land uses. Yet, this current population is less than half the population that resided at Green Park during the zenith of the plantation-slave system in the 1800's. Accordingly, this researcher suggest that transformations in resource use (and attendant changes in environmental quality) are not due to population increase or changes to carrying capacity. Rather, transformations of resource use (and attendant changes in environmental quality) reflect multiple resource users, land ownership and usufruct rights, especially in the last thirty years.

Population transformations and land use changes have had a direct impact on Green Park. In the early days of the resettlement, few fences demarcated property boundaries. Gliricidia sepium, Erythrina tree species, and a six inch concrete post served as boundary markers demarcating plot corners. During such time animals were more free to graze on communal lands. Increasingly, however, more plots of land have been partitioned and fenced into smaller parcels, restricting both animal and human uses of the lands to primarily resource owners or recognized users. Consequently, there is a reduction in available open-space-lands which the more longtime residents were accustomed to utilizing, and an augmentation in owned plots of land by more resource users. These

changes clearly influenced how resource users managed their fields for cultivation, livestock rearing, and charcoal burning.

Overall, from this research it is suggested that the loss of soil and soil fertility is not only related to population increase, agriculture commodity market fluctuations, and migration, but also to the intensity in which the lands have been used over time. Moreover, it is not sufficient to suggest any one agricultural production activity solely contributes to soil degradation, loss of tree species, and changing rainfall patterns. Rather, these changes to resource quality reflect influences of all these factors (population increase, changes in agricultural market, and migration) as they interact in concert with changes in land tenure, land use, and the cultural influences the many subgroups of people bring to Green Park.

6.6.4 Strategies of Various Resource Users

Long-term planning for future generations' use of land-based resources is not the cultural norm. Empirically one finds minimal soil maintenance and limited permanent vegetation protection in Green Park. To compensate for infertile soils or "tired soils", resource users reported several options in the course of the field season. Some resource users have alternate land space which they use to cultivate the following season, enabling the land currently in use to lay fallow. However, as the earlier discussion illustrated the majority of resource users are small holders and have limited land space with which to let lie fallow for any period of time. Some resource users who are cattle owners put their cattle on tired soil lands to directly and "freely" put fertilizer into the soils. The composition and need for organic fertilizers varies with the soil fertility, the animals

producing manure and their access, access to cash, and need for manure relative to land use needs.

Although a number of resource users commented on some facet of soil erosion, not a single resource user is consciously engaging in some activity to retard or alleviate the process of soil loss or soil erosion on the former sugarcane lands or the hillsides. For example, no one is contour farming, terrace farming nor strategically using trees to retain soils in Green Park. The reverse was observed. In fact, a number of resource users were observed by this researcher (or personally reported to her) removing trees from their plots to increase land space for more grass for their livestock, to cultivate crops, or to provide wood for charcoal for personal home use or generate income. Resource users orientation to pasture is so strong they will cut down trees to increase land available for pasture for their livestock.

Time and resources are spread thinly among the resettlement, within the household and non-farm activities.⁹² As a result, resource users tend to focus on immediate family needs. A household belief that appears to be shared by many resource users is notion of using what is on hand, for it might not be here tomorrow (eat what is in season for there is

⁹² According to a number of resource users who share a common perspective, a better life for children is perceived as not having to rely solely on farming, if at all, for a livelihood. In part, this is a perspective expressed by those who currently rear livestock and cultivate. Moreover, in the Caribbean it is common for the youth not to be all too eager to participate in agriculture and seek out other opportunities (LeFranc 1983; USAID 1978). According to a 1978 USAID report, "attitudes of small farmers, as reported, often seem in conflict. For example, one is told that because slaves were not permitted to own land, the major value of the rural poor is to own land. One is also told that because slavery was mostly associated with agriculture, the major value of the rural poor is to get of agriculture. Both attitudes (or residues of these attitudes) are probably true, although the strength of the linkage to the slave past is questionable. What seems to be the case is that older people desire to own land for the independence and security land ownership implies, while young people want to leave the land for the greater opportunities and excitement offered by cities" (USAID 1978:229).

minimal storage; a "breeze" (hurricane) could come and blow it all away; the rains could come and rot the field crops, drought could come and dry up crops, cattle etc.; or one could die or be killed, etc.). All these possibilities occurred in the recent past, and many of them occurred during this field season.

Currently, resource users manage their agricultural activities as though resources are abundant or are there to serve their needs and will always be available. This is exemplified by a number of resource users increasing flock and herd size and not having the land space to adequately support the larger herd. Also, both livestock herders and crop cultivators clear cut hillsides to obtain usable acreage, and this generates erosion, soil loss, and exposes limestone. Charcoal burners also burn from the trees on the wood hillsides and add to process of soil loss. Increasingly, more livestock owners recognize the loss of tree species in the hills and blame the charcoal burners for this loss. Clearly, these three groups of resource users are all contributing to soil loss and degradation as each group changes the hillside ecosystem to serve their own purposes.

Are Green Park resource users unable and/or unwilling to adjust to the reality of deterioration of land-base resources in their resettlement? The trade-off of providing for the general well-being of the household and protecting the health of their agricultural system varies considerably among resource users. As such, the ability to support members household in terms of providing for every day living (food, shelter, clothing, education, health, church, etc.) also varies. Several examples are offered to illustrate the diversity found among the resource users and the complexity of the challenges facing resource users.

First, certain households exist whose collective efforts support large families from

the sale of farm products (cultivation and livestock). These households maintained higher status in certain circles for their ability to provide for the household, specifically to feed, cloth, educate, and to attend church with their children. Specifically, this group of resource users derives their status from the progressive characteristics of their activities. Similar to Cowell's findings in Lime Tree Garden and Thatchfield to Retreat resettlements, this group of resource users tend to have access to above average acreage of land (20 to 25 acres) are hard working, and their agricultural practices are innovative (Cowell 1987, Fieldnotes 1990-1991). In other circles, less status was achieved through the quality of housing or number of material goods possessed by these households if income source was based on limited resource agriculture production or pensions.

Second, some resource users support their farms with off-farm labor. Such households frequently draw on income earned from plumbing and construction contracts, being health inspectors, driving taxis or trucks, being a security guard, or working as a school cook to support both the household and farm needs. These resource users are both men and women, and work their lands or animals, in addition to their wage labor obligations. Some of these resource users gained status based not solely on how much capital they have reinvested into their farm from their wage labor activities, how much land they have acquired or how big their houses have become. Rather, the manner in which they have shared with others in the resettlement (such as, in providing others with new farming information, hiring labor from the resettlement and sharing harvest products) is the source of their status.

Third, other households realize they have too many cattle for the amount of pasture land to which they have access. These households regularly rely on roadsides as

feed sources to supplement their own pasture lands. Such households are not always considered well-off in the eyes of other resource users because of the amount of cattle they have. In fact, their farming practices are questioned by other livestock owners as not being prudent, especially when the annual dry season(s) approaches. For example, keeping larger numbers of animals in a poor state may not bring prestige and it is not an optimal use of resources. However, in instances where a livestock owner has five "maaga cows" (emaciated cows) and little pasture, the owner can still claim five living cows and is considered "better-off" than someone with no cows. Alternate measures are taken to try to keep the animals alive. Nonetheless, eventual cow slaughter or live sale can provide the owner with a substantial sum of money, (especially if the animal has weathered the dry season and is sold fit), and sometimes at the expense of land-based and human-based resources.⁹³

Another example is offered to demonstrate "bigger" is not always interpreted as "better." In this case, a resource user is known to be a relatively large scale part-time farmer for Green Park, for he has thirty head of cattle, and forty-eight acres of land (of which thirty-five acres of land are in pasture). However, this resource user, who has an elaborate animal husbandry system for his cattle, lost the second highest amount of cattle from his herd during the 1990-1991 dry season.⁹⁴ This resource user states he did not have the time to move his animals to different pastures, cut and carry for his herd, collect

⁹³ Depending on the age, sex, frequency of calving, size etc., an animal can bring from J\$1000.00 up to nearly J\$5000.00.

⁹⁴ The specific cause of death is unknown to the livestock owner, however he suggested it could have been due to lack of water or pasture.

cane ban, or gather tree fodder. He hired-out occasionally, but commented workers do not work as good as he (Fieldnotes 1990-1991). In this case, more money did not help this resource user's situation; he contends what was needed, was more of his own time for livestock management, rather than more money to hire labor.

In fact, this resource user has gained status over the years for sharing behavior. Specifically, he shares ripened fruits from fruit-bearing trees on his property, hiring others to assist in his cultivation and livestock production, and shares new farming techniques with fellow cultivators and livestock rearers. His actions are perceived by other resource users as being generous and caring for others than just himself. His behavior and this perception by others contributes to his status in the resettlement, a status that is confirmed in the field notes.

In contrast, another case exists where the combined off-farm labor and agricultural production and distribution activities of both spouses have enabled this household to expand. Specifically, this household has several head of cattle, a few goats in their flock, nearly a hundred chickens, a pig, a number of fruit-bearing trees, a large garden plot, a relatively large house, a car, and truck. Yet this household is not well-respected within the resettlement. Both adults within the household hire their labor from outside Green Park, and they do not share nor interact with others in the resettlement. Coincidentally, this household is regularly burglarized. Clearly, mere efficiency and productivity in coping and adaptive strategies neither guarantees success or long term viability in resource use.

Lower down the social hierarchy, resource users tended to be characterized by more limited access to high quality land and/or less rigorous application of self and agricultural techniques. Correspondingly, there are less material signs of success. In fact,

a number of these households have little access to land with secure tenure status to cultivate or rear livestock. As such, families with little to no land tend to supplement their income from own account agriculture with irregular employment in unskilled labor activities, and in some cases burning charcoal using trees from other resource user's plots and stealing from others. No one strategy works for this subgroup, for access and competition for resources are even greater between them. As such, along the continuum their quality of life is not equal to those above them.

6.7 Reorganizing Scudder's Model for Green Park's Resettlement

Although Scudder's research on resettlement transformations and chronology is based on work in Africa and Asia, the analysis of the Green Park resettlement illuminates some similarities and differences. The differences discussed in this analysis are sufficient to warrant further investigations to see if Caribbean resettlements as a unique group, generate their own pattern of community formation. The following discussion concerning the reorganization of Scudder's resettlement transformation processes and chronology is offered as a new stage for resettlement investigations in the Caribbean region.

Scudder's four stages of community formation are modified to better understand the chronology that transpired for Green Park. Stage one commenced with planning and sponsored resettler selection. In Green Park the infrastructure is modified with the addition of roads, installation of potable water and electricity. Stage two began with the "trial and error" phase of resettlement, whereby resettlers were experimenting with prior farming knowledge from St. Ann in Green Park. Resettlers were risk adverse at this stage. However, in contrast to Scudder's model, where one would anticipate resettler's to be

subsistence agriculturalists, a number of Green Park resettlers were involved in sugarcane cultivation (a commercial crop). Resettlers who partook in sugarcane cultivation also assumed an additional risk, for many had no prior experience in sugarcane cultivation, yet launched into it and other crops in their new environment. Accordingly, second stage behavior in Green Park sees an earlier than expected move toward commercial agricultural production and away from risk aversion.

Not surprisingly, early on in stage two, a number of land transfers occur. Local migrants ("Before 1970") began to use Green Park's resources concurrently with resettlers. This early land transfer is another deviation from Scudder's chronology. In addition, upon arrival, local migrants were involved in wage labor activities from the onset to support their households and farms. A recognition of the importance of wage labor is significant in further investigations.

Scudder identifies stage three, the phase of social and economic development, as a period for increased experimentation in commercial agriculture, reinvestment in the farm and household, the rise of local leaders among successful households, and increased land transfers among non-successful households. However, in Green Park, stage three is a period of increased experimentation in commercial agriculture and adjustment to available markets, especially resettlers, "Before 1970" and "Since 1970" subgroups. In addition, increased land transfers are represented by the increase in number of local and circular migrants in Green Park. The in-migration of resource users, however, starts the process anew, returning to the risk adverse, transition period of stage two. Moreover, landholdings are smaller and more intensively used, forcing later migrants to sustain their households with off-farm wage labor (skilled and unskilled). Apparently, Green Park

resource users seem to move into experimentation and changes in land tenure earlier than Scudder's model would indicate. Concurrently, Green Park resource users appear to cycle back into earlier stages of resettlement, indicating a possible feedback mechanism.

Scudder's model recognizes kinship ties help to support the household's adaptive process. In contrast, Green Park resource users exhibit stronger ties toward the communities from which they moved. In addition, proportionally few affinal or consanguinial kinship residences have been established in Green Park. As such, Scudder's model fails to include linkages to external factors, specifically linkages to the region from which the settlers originated, to neighboring areas, or to the state. For example, wage labor activities provide a means to support households, but are found outside of Green Park. Many of the large land users among early local migrants and the smaller landholders of the more recent migrants are dependent on these wage-labor activities for household survival.

The recent composition of the resettlement is such that it has not had a history of operating collectively. The dynamic and continual influx of new resource users into the resettlement has constrained the development of social institutions and resettlement leaders. Resource users have not collectively organized in such a way to facilitate a group decision-making process for the resettlement or empower a set of resource users to act regularly on behalf of the resettlement. The presence of institutions in Green Park to recognize leaders and facilitate discussion Green Park might provide an avenue to attain regular access to agricultural information, technology or credit from the Ministry of Agriculture located in Falmouth. Such an institution also could be an organized entity with which agricultural extension agents may interact, or could internally control resource

use in the resettlement.

Scudder's stage four provides for the handing over of the resettlement to its members, a second generation residing in the area and making decisions on its behalf, and an increase in kinship relations - all indication typical of a community. Unlike Scudder's stage four, Green Park remains a resettlement in transition. The inflow of households into Green Park is a continual in-migration of strangers, with newcomers varying in their degree of experience in dry-system farming. This continual household in- and out-migration perpetuate stage two and stage three level of the community formation process. Specifically, the newer resource users are risk averse as they adapt to their new social and natural environments, while seasoned resource users experiment within their household's resource constraints (land, capital, labor, and livestock). These new migrants are bringing with them minimal or different farming techniques that they adapt to Green Park's biophysical conditions and local market availability. More recent local migrants are also more dependent on the wage labor activities to support their households. In addition, the aging population is turning over lands that are less productive to succeeding generations. Moreover, continued in- and out-migrations are not strengthening the internal kinship relations.

A much greater and troublesome impediment to stage four actualization concerns the role of Kaiser Jamaica Bauxite as it retains control over some lands in Green Park. Accordingly, such control of Green Park and use of land-based resources is not entirely in the hands of the resource users. In addition to the manner in which Kaiser Jamaica Bauxite distorts the political economy of the resettlement, external markets, government policies and the complex relationships between market and policy have influenced

resource use and management at the household level and affect the future of Green Park's resources.

A major casualty of resettlement programs has been at the expense of small-scale agriculture. Similar to what Cowell (1987) finds in Lime Tree Garden and from Thatchfield to Retreat, this researcher finds for Green Park resource users. The physical amenities of brick housing, potable water, and electricity do not make an agricultural community. The lifestyle of the people has shifted from a rural oriented agricultural one to a urban oriented, semi-proletariat and commercial one. However, the negative impact on food production has important consequences for national development (Beckford 1987), as well as on the local biophysical environment. Arguably, the visible resource degradation is linked to lack of land management, and long-term commitment to the land and is a symptom of the community not investing in the land for future generations. This is related to both internal dynamics and outside forces (control). This researcher recognizes that this process requires further exploration.

Green Park, however, cannot move forward on its own right to stage four until Kaiser turns over control and responsibility of Green Park to resource users. Consequently, Green Park may not evolve into a community because of Kaiser's presence and because of the inherent dynamism among the subgroups. Thus, development plans that assume the existence of "community" and homogeneity are, therefore, highly unlikely to be either relevant or successful.

6.8 Summary

Chapter Six explores community formation, agricultural adaptive strategies, and changes and perception of change in resource use over time. The analysis is divided into resettler, local migrant, and circular migrant subgroups, and their respective adaptive strategies are examined using Scudder's stages of community formation and resource use. Specifically, resettlers, local migrants and circular migrants are examined from stage one (from planning to the initial arrival), stage two (immersion into the new area and trial and error phase), stage three (early integration into the resettlement and experimenting) and stage four (settlement and when project designers have turned over the resettlement to the community and a second generation begins to establish).

Green Park is composed of multiple farming activities, utilizing and adapting to microclimates and occupational activities. Resource users varied in their use and access to resources - labor, land, trees, markets, and water. This research suggests that a range of farm types exist in Green Park and together form an agrarian system. Cultivating in Green Park is a mixture of old and new approaches. A number of resource users claimed they cultivated lands prior to tilling the soils in Green Park. Those with previous cultivating histories brought with them past farming experiences and knowledge in their "farming tool kits" which are appropriate for more wetter regions. Some resource users had experiences planting crops did not perform well in hot, semi-arid and drought prone areas (numerous yam varieties, as well as coffee and bananas). In addition, few resource users had prior experience in sugarcane cultivation, yet some of the earlier resettlers and later purchasers acquired lands with sugarcane on their plots. Overall, total acreage in cultivation has decreased among the resource users. The transformation is related to loss of the export

market, to increased land fragmentation and ownership and indirectly to changes in rainfall pattern and soil quality.

Cattle and goat rearing are the more predominant livestock production activities found in Green Park and have had a relatively long history as part of the agricultural practices. Overall the cattle and goat populations have increased, as have the number of owners. However, variation is found among the subgroups as to herd and flock size per household and number of owners. The livestock increase coincides with the loss of export markets.

In summary, the evidence suggests Green Park is not yet a community, according to Scudder's and the Caribbean literature's criteria. Several indicators were examined to evaluate Green Park that included: kinship, leadership, formal organizations, neighborliness, praedial larceny, and the role Kaiser plays in Green Park. Accordingly, this researcher suggests that Green Park remains a resettlement in transition; it is not yet a "community" either from Scudder's perspective or from literature describing Caribbean communities characteristics. Conferring with Scudder's resettlement transformation chronology, Green Park oscillates between stage two and three in the community formation process. Kinship relations are not well established nor integrated in Green Park. In addition, the vacillation is perpetuated with the continued in-migration of migrants and out-migration of the second generation. Each new wave of households is forced to go through a similar adaptive process, from the trial and error stage to the experimental stage depending on resource availability. The last two waves of local migrants with minimal access to land space are dependent on wage labor to support their households. Circular migrants had the land space and capital but are not dependent on farming or related

resources as a source of livelihood. The early local migrants have the land space, and access to capital but less time to manage their resources; accordingly, they lost considerable head of cattle during the dry season. In addition, Kaiser's presence detracts from Green Park resource users gaining full responsibility for planning for the community and its resource use.

This cycling of stage two and stage three, coupled with Kaiser's presence in Green Park contribute to a feedback mechanism which is having a negative affect on community formation and resource use. Chapter Seven explores this process further, as well as expands on the differences between Scudder's model for community formation and the reality of Green Park.

CHAPTER VII

CONCLUSION

7.1 Introduction

The closing chapter of this dissertation will highlight the salient theoretical and substantive contributions this research has made to anthropology. In addition, this chapter reviews the objectives and questions that guided this research endeavor and provides a summary of their results. Lastly, this chapter looks forward to future research projects that this project stimulated.

7.2 Contribution to Anthropology

An integrated ecological anthropological theoretical perspective was used to examine a resettlement process, and the attendant community formation and resource use over time in a Caribbean agrarian resettlement. In particular, this perspective examined an integrated agrarian system, including the sociocultural, economic, political, and environmental factors involved. Moreover, this research deviates from past ecological anthropological perspectives, specifically from human systems ecology and functional ecosystems ecology (ecosystem ecology). The orientation unites elements of these previous perspectives to illustrate multiple interactions over time.

Specifically, this approach examined the sociocultural and environmental

relationships, and processes involved in resettler and migrant households' adaptive behavior to agriculture production and resource use in a resettlement. Ultimately, this approach facilitated the understanding of a social and natural environment in transition and why cows and trees have become a part of the agrarian system found among some resource users in the Green Park resettlement.

The ecological anthropological perspective used in this research was applied to Scudder's model for resettlement transformation and community formation (Scudder 1989 and 1991). Although considerable research on resettlements have been conducted in Southeast Asia and Africa, a paucity of research on Caribbean resettlements, let alone of Caribbean communities exists. In addition, this analysis challenged Scudder's resettlement transformation chronology and produced a modified framework to understand Green Park's internal dynamic and transformation processes.

Several unique contributions are made in this resettlement study. Past approaches have tended to examine the relocation process of entire communities (Cowell 1987). However, this study examined a resettlement composed of resource users originating from many communities. Hence, it is not a study of a single community relocating to a resettlement and its adaptation to a new environment over time, but rather a study of multiple households from different communities migrating voluntarily and involuntarily over an extended period of time to a new environment. The implications for long-term resource use on a resettlement scheme of this nature, are therefore, vast and complex. Given this mixed group of resource users examined, this study provided an understanding of adaptive processes among varying members of a resettlement, information that can contribute to future policy and project design, and expand existing theoretical orientations.

Clearly, the ethnographic approach applied to a single resettlement area provides credence for the importance of local level studies and its contribution to the larger body of Caribbean "community" studies. Several adaptive patterns were identified that otherwise might have been glossed over or missed in a regional or national level analysis. As such, this approach is a bottom-up approach whereby fieldwork is location specific and event focused. Historical materials were an integral element of the entire process for such information provided an understanding of the past, which served as a context in which to better understand the present situation; this approach also helped to identify external and internal linkages between Green Park resources and others over time.

As previously mentioned, Scudder's model did not coincide with adaptive processes found in Green Park. The chronological framework was modified to accommodate the transformation processes occurring in Green Park's resettlement. Variables such as length of resource use in Green Park; age; and access to capital, information, labor, land and markets, as well as off-farm income and time commitment to off-farm activities, led to the general theoretical understanding of the nature of Green Park's resettlement transformation process. Although some of these variables are identical to Scudder's, the time frame for subsequent outcomes varied, and some outcomes did not materialize. In addition, Green Park is without the major internal social institutions (school, market, church attended by a majority of the population, farmer organizations) that would facilitate community building and leadership development as found in established Caribbean communities.

Different from Scudder's model is also the role non-farm activities play in terms of resource use and community transformation. In Green Park, a number of resource users

are involved in wage-labor activities, as a response to loss of export markets and to less land availability for full-time farming. These latter changes have affected resource users access to sources of capital, and labor; these changes also impact the amount of time resource users can (or wish) to devote to agricultural activities.

Caribbean agrarian communities are known for affinal and consanguinal relations. However, Green Park was not founded on resettling a community to another area; and in contrast to Scudder's model internal kinship relations are not yet pervasive in Green Park. Rather, younger kins-people are emigrating, leaving Green Park a resettlement of elderly resource users. Moreover, an increase in number of new migrants to Green Park, especially the circular migrants exists. Each of the subgroups immigrating to Green Park bring with them different knowledge and experience in resource use. As such, the context influx of new resource users, accompanied adapting to Green Park is leaving its mark on Green Park. Correspondingly, this process contributes to the cycle of Green Park resource users oscillating from stage two and three with in the resettlement process.

Kaiser Jamaica Bauxite's presence and failure to release control of Green Park acts as an additional barrier for Green Park resource users to move forward to stage four - becoming a community. As such, Green Park resource users do not have control of their resettlement. Therefore, Green Park remains in transition, caught between being a resettlement and becoming a community. Further explanations on this process are addressed in Chapter Six.

7.3 Objectives Met and Questioned Answered

Two research objectives were examined in this investigation. First, applied research was conducted to examine the efficiency of Scudder's four stage model of resettlement transformation and community formation in Green Park, Jamaica. Secondly, this work investigated the historical formation of a resettlement and the ensuing post-resettlement adaptive processes. A number of questions were raised and guided this research. A review of the questions is presented.

- 1) How do different settler groups adapt to Green Park through their use of resources?
- 2) What observable patterns exist in the way these settlers adapt to this environment?
- 3) How do these patterns vary as a function of being indigenous to this region or arriving from outside Green Park?
- 4) What are the ranges of success associated with the different settler groups in creating social networks in Green park to facilitate the adaptive process? and
- 5) What is the impact on the local agroecosystem vis-à-vis differential resource use experience, knowledge, age, gender and access to resources over time?

Clearly, the data analyses provided in Chapters Five and Six met the objectives and above research questions. A brief summary highlights general trends identified from results of this analysis.

Green Park, a recently established resettlement in rural Jamaica, was initially created by Kaiser Jamaica Bauxite Mining Company. The resettlement is founded on the relocation of individual households from different communities located in St. Ann Parish, Jamaica onto a former sugarcane plantation formerly known as Green Park Manor. Over time, the composition of the present day resettlement is integrated with households who were once sponsored resettlers, and with spontaneous voluntary settlers (local migrants

and circular migrants).

In contrast to the plantation-slave economic system, Green Park is a young heterogeneous resettlement with small size households supporting an older population. Its population includes less than 100 households composed of resettlers, local migrants and circular migrants. Wage labor activities, livestock, and access to land contribute to the variation found among resource users' adaptive strategies. Owning cattle or land, or resident status, each in their own right are insufficient criteria to evaluate Green Park resource users' adaptive strategies. Ownership of these resources or resident status may contribute to the wealth or income for the household, or act as a drain on resource accumulation. Moreover, an increase in land divisions of Green Park land space has occurred that has influenced land tenure and land use adaptive strategies. Over time, a range of agrarian resource management practices has emerged, resulting from the interaction of a variety of local social and natural factors and external factors (markets, policies, pricing, and transportation).

Specific results indicate a number of patterns and trends to community formation and resource use. The composition of the resettlement is significant for several reasons. First, people who have come to depend on Green Park's resources (land, soils, water, trees etc.) brought with them a wide range of experience in use. This range includes minimal experience of resource use or management, (as often happens with some returning migrants), utilization of resources based on practices better suited for different microclimates, and early experiences of those who are managing with acquired knowledge based on a period of "trial and error" in Green Park.

Second, people have come to depend on resources differently. Resettlers and

migrants have adapted their agrarian strategies to incorporate mixed production systems of crops, livestock, trees and wage labor activities. This adaptive behavior is a means to reduce risk by not relying exclusively on agriculture. As a result, the resettlement is composed of non-farmers, wage earners, charcoal burners, livestock owners, cultivators of crops (permanent, cash and garden crops), fishermen and a combination of all these. Some households rely heavily on land-based resources in their subsistence and commercial agrarian practices, whereas others rely more on off-farm activities to sustain their households, contending they are not farmers. The differences are related to length of resource use in Green Park, age, off-farm income, time commitment to off-farm activities, and access to capital, information, labor, land and markets.

In summary, this integrated ecological anthropological perspective provided insight on resettlement formation and resource use over time. Internally, adaptive strategies of resource users in Green Park reflect the variation found among stage two and stage three behaviors in community formation. The continual in- and out-migration of resource users have affected the process of resource use. Externally, adaptive strategies of resource users in Green Park have responded to the presence and absence of export markets and control from Kaiser Jamaica Bauxite company.

Political and economic factors have changed in the region over the years, and have influenced resources use in Green Park and throughout Jamaica. Resource users who were in a position to turn to livestock rearing, in particular cattle, did so. As a resource user states, "cattle is a way to earn something from the land rather than let it lie idle" (Fieldnotes 1990-1991). Also, cattle serve as a savings account for the household. Cattle rearing is an adaptive strategy in response to environmental uncertainties, fluctuating

markets, aging resource users, and length of time using resources in Green Park. The analysis of farming practices related to cattle, crops and livestock indicates no one strategy predominates the Green Park resource using resettlement; however, a trend for increasing livestock production among all settler groups was evident in Green Park. Green Park is composed of a variety of resource users who vie for use and access to resources - labor, land, trees, markets and water. Partially as a result of this competition, the current ecological balance and diversity of Green Park are threatened by use, overuse, and misuse. It is suggested that some of the current, collective coping and diversification strategies are partially successful; however, their long-term use strategies are leading to resource degradation. As such, the dynamic, open system of Green Park is not able to support a resettlement on its present trajectory.

For example, the relationship among resource users, land and tree tenure, and use is compelling. In Green Park a number of resource users clear the lands they use by slash and burn methods. This land preparation method requires the cutting, drying and burning of trees, brush, and debris, and the ash produced in the process provides fertilizer for the soil. The slash and burn process is utilized to kill the annual regrowth of pioneering species and also serves as a means to lower inputs for clearing fields, maintaining soil quality and controlling pest and fungi infestation.

As previously mentioned, resource users were asked if they perceived a difference in the soil (earth) from where there are no trees and where there are trees. Accordingly, 52.0 % of the resource users did notice a difference and a range of comments were made regarding the soil quality, specifically in reference to where there were trees and where there were no trees. However, 46.0 % did not notice a change, and these informants

admitted to not looking or paying attention to the soil in relation to trees. The remaining cases indicated there is no difference in the soil between where there are or are not trees.

The perception resource users have of trees in relation to change in Green Park was of interest to the researcher. Resource users were asked in very general terms if they noticed changes in the trees located in Green Park. Three camps emerged from such a general and purposely vague, open-ended question. Some resource users focused on the loss of trees in the area, in particular the loss of trees as a result of burning coal (43.6 %) or increasing farming areas for crops (2.8%) or livestock (2.8%). The second group contended they had not lived in Green Park a sufficient amount of time to comment if the trees had changed since their arrival (25.35%). The third group noticed changes in the trees themselves, responding to changes in the trees from the wet season to dry (15.49%) whereas the remaining commented on the change as a result of the loss and regrowth after hurricane Gilbert (9.85%).

Therefore, one might suggest based on the above perceptions from resource users interviewed that if people could see a benefit to trees and soil they would keep and/or maintain trees on the lands they use. Clearly this is not the case in Green Park for most farmers practice slash and burn cultivation for crop production and cattle rearing which not only removes the pioneering "weed" species but also potentially "useful" seedlings. The exceptions are the "food trees" planted in the fields or near the house.

Land and tree use (reaping of fruits, felling) and land and tree tenure relations were examined. The majority of the resource users reported that if a person owns land, s/he own the trees on the land as well. In addition, the majority of resource users replied if s/he owned the land s/he owned the trees and, they could tell others (if s/he wanted) not to

use the trees.⁹⁵ Different rules operate when land is leased or rented.

A wide range of perceptions between leased and rented lands and tree tenure and tree use is revealed.⁹⁶ When lands are leased, a third of the resource users contend the lessee can use the lands, and trees are a part of the use, while a third of the resource users state tree use depends on the lease agreement if the trees can be used (reaped, cleared or felled). In addition, a few resource users commented that the trees belong to the land owner and could not be used, while others stated when leasing the land, fruit can be picked from the trees to eat, but one could not sell the fruit from those trees.⁹⁷ When lands are leased, a majority of resource users stated they could tell others not to use the trees on the lands being leased for they were in charge. However, sometimes resource users said that land and tree use also depended on the lease contract, as well as on the type of trees on the land. A small percentage of resource users said they could tell others not to use the trees for the trees could not be destroyed, while others were unsure or did not know if they could tell others not to use the trees on the leased land.⁹⁸

⁹⁵ Approximately 98.6% of the resource users interviewed reported that if a person owns land, s/he owns the trees as well. In addition, 98.6% said if s/he owned the land s/he owned the trees and could tell others (if s/he wanted) not to use the trees.

⁹⁶ When lands are leased, 35.2% of the resource users contend the lessee can use the lands, and trees are a part of the use. However, 33.8% state tree use depends on the lease agreement if the trees can be used (reaped, cleared or felled).

⁹⁷ Approximately, 11.3% of the resource users said that the trees belong to the land owner and could not be used and, 7.0% said when leasing the land, fruit can be picked from the trees to eat but one could not sell the fruit from those trees.

⁹⁸ When lands are leased, 69.0% stated they could tell others not to use the trees on the lands being leased for they were in charge. Approximately, 16.9% of the resource users said they could tell others not to use the trees for the trees could not be destroyed, whereas 7.0% were unsure or did not know if they could tell others not to use the trees on the leased land.

When lands are rented, some resource users replied that they would be renting the trees as well, while others reported that this would be true only if it were in the rent agreement, others did not know if trees were part of the rent contract or if some other arrangement had to be made according to the type of type of tree or not used at all.⁹⁹

Therefore, land tenure appears to influence tree establishment and resource management. The data indicate that if a person owns land, s/he is more likely to plant a tree on it than if s/he only leases or rents it. Orchards established in Green Park to date are located on plots which are owned by the resource users. Most resource users stated s/he would not plant a tree on rented land, for generally the agreement is of a short and insecure duration. Leased land normally has a longer term contract and is formalized with a legal document. If the resource user is leasing land for an extended period of time, then the likelihood of planting trees on such land is greater. Generally, land is leased for six to nine years with options of renewing the lease contract and in some cases purchasing the property, commonly referred to as "leased-to-own land."

A number of livestock owners reminded the researcher that trees would have to be planted with the rainy season or they would not survive. In addition, livestock owners recognized that when animals are hungry and they like something they "lick it down" (knock it over). In other words, as the seedlings are maturing, the trees need protection,

⁹⁹ When lands are rented, 37.0% of resource users replied that they would be renting the trees as well. Nearly 20.0% reported that this would be true only if it were in the rent agreement, whereas 11.0% did not know if trees were part of the rent contract. Approximately, 10.0% said that they were not supposed to use the trees, while 7.0% said it depended on the type of the tree, and 7.0% said they were not to use the trees on rented land. When asked if they could tell others not to use the trees on the land they were renting, 70.0% replied "yes" because they were the ones responsible, 9.0% felt it depended on the rental agreement, and 7.0% indicated they did not know.

or the cattle and goats were "lick dem down" before the seedlings can mature to a regular and/or be a reliable feed source. Therefore, it is suggested that the relationship charcoal burners, livestock rearers and cultivators have to their resources and their long-term resource use needs to be considered further when examining adaptive strategies.

In addition, the intensification of land use in Green Park is leading to noticeable transformations of resources on the flat-lands and hillsides. The short-term adaptive strategies have contributed to physical deterioration and elimination of certain cultural and biophysical niches. As a result, there are fewer full-time farmers utilizing resources in Green Park with the loss of the export markets, and availability and affordability of labor and land. The current land tenure and land use systems are losing their capacities to provide subsistence for resource users. This process has contributed to increasing the number of wage laborers and to creating an image of Green Park as a "bedroom resettlement" located on the main road not far from an urban center - the parish capital city of Falmouth. Presently, attempts to encourage Green Park resource users to increase crop production without a larger market (more than the existing domestic markets) do not seem appropriate. Few incentives exist to stay in cash crops, especially for the young people. Once again, the resettlement is influenced by the outside or external forces. Interestingly, the very external forces that caused the settlement to exist (Kaiser Jamaica Bauxite, Jamaica National Politics, and the interrelationship between the two) also is contributing to its demise.

7.4 Further Research

Ethnographic research conducted in Green Park provides data on the nature of the sociocultural adaptive processes for an agrarian resettlement system. A number of comparative research suggestions emerged while in the field and upon completion of this analysis. First, future research that compares the Green Park resettlement scheme to other resettlements would be of interest. Other resettlements having similar or dissimilar biophysical characteristics with longer resettlement histories and/or composed of different subgroups are of interest to explore further. As previously mentioned, the Green Park research was an investigation of a resettlement whose resource users originated over time from a number of communities. Thus, an alternative comparative approach could examine the relocation of entire Caribbean communities, specifically to compare and contrast their transformation processes. From this perspective, a research question could examine the varying degrees of changes among different types of Caribbean resettlements. Are such differences significant to differentiate a regional resettlement adaptive process resulting in a Caribbean model?

It is important to reiterate the significance of further resettlement studies in Jamaica and the Caribbean to compare Green Park to other resettlements. Specifically, it is of interest to ferret out if Green Park is an anomaly or representative of resettlements in the Caribbean and to evaluate the appropriateness of Scudder's model for resettlement transformation chronology for the Caribbean. A more thorough evaluation of the existing four stage framework can only truly be undertaken with a number of studies, for that is essentially how Scudder et al. have derived the existing model for Africa and Southeast Asia.

Second, another research area of interest is to compare Green Park's historical formation to those processes of an established non-resettled community. Similarly, a comparative study between a resettlement and an established agrarian community could identify alternative patterns and provide further insights on agrarian and social transformations. Pursuing questions which differentiate resource use in a resettlement versus non-resettled communities could provide insight in to short-term and long-term resource uses.

A third research topic to examine would be to return to Green Park ten years from now and to re-examine the resettlement to see if it has entered the fourth stage of Scudder's framework. How have Caribbeanist characteristics of a community, and resource users' perception of the resettlement and use of land-based resources tracked over time?

In addition to the above substantive areas for further research, ideas to explore concern the looming theoretical questions. The integrated ecological anthropological approach used in this research provided much food for thought in the upper power echelons. Although not part of the original research design, an area of growing interest, is to explore the resettlement transformation from a political ecology theoretical orientation. In general, "Third-World political ecology has been defined as the attempt to understand the political sources, conditions and ramifications of environmental change" (Bryant 1992:13). Blaikie and Brookfield (1987) offer a working definition for political ecology as well.

The phrase 'political' ecology combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources and also within classes and groups within a society itself (Blaikie and Brookfield 1987:17).

Hence, a political ecology theoretical orientation focuses on complex sets of relationships found at different geographic scales, hierarchies of socioeconomic organizations (e.g. individual, household, community, region, state and global) and the contradictions between social and environmental changes through time (Blaikie and Brookfield 1987). As such, political ecology differentiates between groups and the interactions among socioeconomic and political institutions; it also examines environmental resources across local, national and global scales.

Political ecology incorporates political economy in its theoretical orientation. As such, the role of the state is central to the analysis of policy formation and social and environmental impact. The state can serve as a power broker in terms of regulating policy and access to resources between groups within a society. Such research tends to examine the ramifications of policy on social groups and the environment. As such, political ecology does not look as closely at less empowered groups contributing to processes of policy formation. For example, political ecology research endeavors have been directed toward: 1. the role of state policies, interstate relations and global capitalism in relation to environmental issues, 2. conflict over access of resources, and 3. political ramifications of environmental change. These research foci are primarily top down in their examination of political economy, implications for social groups and the regional environmental conditions.

A regional political ecology interest emerged as an outgrowth of the present research and data analysis of Green Park. This research conducted fieldwork with one research agenda; however, the analysis indicates additional important dimensions exists for

political ecology not revealed in earlier theoretical orientations. The data available for this research on state policies, and the role TNCs (Kaiser) play in an integrated context with the political economy of the state, are limited at this time. Further research and data collection are warranted and merit considerable attention to more clearly understand how Green Park articulates in a larger context. Different sets of objectives and questions emerged from this perspective which include the following. For example, what control do TNCs have over resettlement scheme design vis-à-vis state policies and economic structure? What specific role does Kaiser have with Jamaica's national economy, and how will that affect long-term local land-based resource use? Further research needs to be conducted on Kaiser to more accurately identify the hierarchy of political and economic structures and to more clearly understand the flow of power between local, national and international political and economic institutions. Research in this area will further our understanding of how Kaiser interacts at all levels and its subsequent impacts on Green Park and the national political economy.

7.5 Conclusions

It is of the opinion of this researcher that Green Park has the potential for becoming a non-agrarian resettlement if the current agrarian processes are kept on their same trajectory. The lack of affordable inputs, lack of markets, charcoal production without reforestation coupled with a range of farming management practices can lead to further soil erosion, soil infertility, loss of species diversity, and a decline in the number of resource users in the area can support. On its present course, the future of the area is rather bleak. A failure to pay attention to current resource practices will exacerbate

present day problems, not ameliorate them. Green Park may only be able to sustain a smaller population with an increased in the abandonment of homesteads. However, loss of variability (including species diversity), increase in- and out-migration, limited market participation, fuelwood famine, an increase of soil erosion, protracted dry periods and limited future land use are within the realm of plausible outcomes given the current situation. The prospect of increasing "good" production within current resource management practices is not likely. Thus, future research could explore alternatives within the existing household constraints that provide for long-term resource use.

Interest in modifying the current agrarian system is to reduce the harshness of the dry conditions during the dry seasons and to sustain the land-base resources for the future.

A modified strategy that incorporates pasture management with improved pasturage would enable some resource users to provide their livestock with a reliable feed source throughout the year. These improved practices could include using African star grass, a drought tolerant grass (already existing in limited acreage in the area) or an alternate drought resistant species, and an increase in fodder tree establishment and use. This could provide both pasture and fodder for browsing for cows to eat; the cow could look up or down for its feed source. In addition, tree replacement in areas prone to erosion is recommended. Where cultivators, livestock rearers and charcoal makers are using hillside lands, a modified agrarian approach is suggested, one with regular tree planting. Such trees could be strategically placed to reduce the rate of soil erosion, providing a future for crops, pasture for cattle, and a source for charcoal.

Accordingly, modified strategies need to be "contextually" appropriate, not just culturally, economically, politically, environmentally or technologically appropriate. As

such, various forms of agricultural strategies necessary to modify an agrarian ecosystem cannot assume a stage four community or a homogeneous community for Green Park; rather the emphasis should be on tailoring strategies in the context of a resettlement in transition.

APPENDICES

APPENDIX 1.

APPENDIX 1. Formal Survey Used in Data Collection in Green Park (1990-1991)

Hello.

My Name is Susan Andreatta. I am a researcher from Michigan State University. This is a project designed by a non-governmental organization in Jamaica, called Jamaica Agricultural Development Foundation.

This project focuses on farming in Green Park and things which influence your farming.

There are two purposes of the project: 1. to describe how you farm in Green Park, and 2. to identify your farming problems in Green Park and possible solution you might have (how things used to be, how they are now, what might happen in time).

If you permit me, I would like to ask you questions on uses of land, livestock, labor, trees and markets. The information you give me is confidential. No one will be able to identify your individual responses. The information is coded in such a way only I have the key. After the data is analyzed, the key will be destroyed.

Would you be willing to participate?

Thank you very much.

Name Date age Sex

Household:

How many people live in your house? How are these people related to you?

Do you have children elsewhere?

LAND:

When did you come to Green Park? Where did you move from?

How much property do you first acquire when you came to GP? Total

How did you acquire your land(s); Did you buy them, lease, rent, get it from your family?

Do you have lands outside of G.P. that you use?

Is there a difference how you farm on rented and lease and owned lands? Explain

How are your lands currently subdivided? (pasture, livestock, permanent crops, cash crops, house)

List number of parcels and what is on them.

Plot sz /season / titled / location/ Crops/ Pasture/ Livestock/ rotated/howget/

1.

2.

3.

4.

5.

6.

7.

8.

9.

tot.

What did you plant before you came to GP?

When you first came to GP what did you plant?

Are you planting different things now? How has your planting changed from when you first came?

Do you have more lands for crops now than 10 years ago? 20 years ago? Why?

What risks do face when raising kitchen crops, cash crops, permanent crops?

Livestock:

When you first came to GP did you have cattle? Goats?

How much cattle do you have now? goats?

If no cattle now, did you ever rear cattle? When did you stop rearing cattle?
Why not now?

How long have you rearing cattle? Do you have more cattle now or less than 10 years ago? Why?

Why do you rear cattle?

Do you have more lands for cattle now than 10 years ago? 20 years ago?
why?

Do you have more lands for pasture/cattle than crops now? Why?

5 years ago,

10 years ago

20 years ago

(labor markets rains yourtime policies make more bank other)

What are the problems in rearing livestock?

goats

pigs

chickens

cows

Do you have enough land for pasture for cattle?

Could you manage more cattle? What would you need to manage more cattle?

In dry times, what do you feed cattle? Explain (grasses, tree fodder, sugar cane ban, bag feed)

Do you buy bag feed?

In wetter times, what do you feed cattle? Explain:

grasses, tree fodder, sugar cane ban, bag feed

In dry times do you use bag feed before tree fodder? why or why not

If bag feed was not subsidized which would you prefer, tree fodder or bag feed? Why?

Do you plant African Star? How did you learn about it?

How many plots in AS? Do you C/C or graze it?

Do you plant Napier grass? Why or why not?

How many plots of Napier? Do you C/C or graze it?

DIFFERENCE BETWEEN LAND TENURE AND TREE TENURE:

If you own your land do you own your trees on land?

Can you tell others not to use tree on your land?

If you lease (not own) land can you use trees on it.

Can you tell others not to use trees on it?

If you rent your lands (not own) can you use the trees on it?

Can you tell others not to use trees on it?

If a person or family moves away from Green Park (foreign) but does not sell lands, can you use them? (Say such lands become a field of logwood?)

What happens to land when a person or family returns to Green Park?

If people are away from their lands do they still have rights to/over their lands?

What is the difference in the type of tree you plant on the land you use?

non-fodder tree

fodder tree

rented

leased

owned

house plot

non-house plot

Tree Management:

 howplanted	 where put	 carefor whohow	 sell/home use
coconut			
orange			
banana			
breadfruit			
ackee			
brasilita			
logwood			
quick stick			

Which trees have more value? Why?

Do you trade some of the fruits with your neighbors?

What problems are there to planting more trees? (consider land ownership, time, labor (M/F))

Do you notice a difference in soils where there are trees vs no trees?

Fodder Trees:

Do you ever use trees (tree leaves/pods) to feed cattle or goats 1.Y 2.N If Y which ssp:
 cattle _____
 goats _____

When you use trees to feed cattle how long does it take to get there, gather it and bring it back - total time _____?

How much is gathered by family member? U: _____ Sp _____ so _____ da _____ ot _____

Do you allow others (non-family) to use your fodder trees? 1.Y 2.N If yes,
 Do you get something in return? _____

Do you think more trees should be planted for cattle feed? Y or N

What are advantages to planting more trees for cattle feed?

What are the disadvantages to planting more trees for cattle feed?

What lands are best suited for planting of fodder trees (household, pasture owned, rented, leased)? Why?

Market:

When do you sell your livestock? #/last year

Does a butcher come to you or do you take the animal to the butcher?

Do you always sell to the same butcher? Why?

Who do you prefer to sell? Why?

When you sell cattle do you keep the money or do you give it to the misses?

When sell with October rains where does money go to 1st _____ 2nd _____
 3rd _____ 4th _____?

1. farm 2. weddings, household repairs 3. equipment 4. health 5. school fees 6. keep money for self 7. buy land 8. buy more cattle 9. other

When sell with Spring rains where does money go to 1st _____ 2nd _____
 3rd _____ 4th _____?

Can you make a living from just rearing cattle and having lands in pasture?
 Explain?

Do you plant crops or have fruit trees?

When you raise crops is it for food for the family or for money for other things/demands?

Markets for Crops: Sell

item/#days/wk/whom sell/where/when/how market/who sell/export/local

1

2

3

4

5

6

7

8

9

10

How do you get your produce to market?

Is that a difficult process?

If it were easier would you sell more?

When the (misses) sells at the market, does she keep the money or does she give it to you?

When you sell to a higgler, do you keep the money or do you give it to the misses?

When sell from Oct. rain crops where does money go to 1st _____ 2nd _____

3rd _____ 4th _____?

1. farm 2. weddings, household repairs 3. equipment _____

4. health 5. school fees 6. keep money for self 7. buy land 8. buy more cattle 9. other

When sell from Spring rain crops where does money go to 1st _____ 2nd _____

3rd _____ 4th _____?

Technology:

What tools do you currently use in farming (livestock and crops)?

Do you use a tractor to prepare your lands? Do you hire out or exchange for something else?

Labor:

Do you have others helping you with farming? Y N,

(farming includes: preparing the lands, reaping, marketing)

(when: fulltime=everyday, regularly=couple days a week, occasionally=now & then, none)

Do you have sufficient labor? why or why not? (availability, wage rate, need, other)

Does your "family" help you with farming?

What do they do? Do you pay them?

				crop/
who	task (farm)	when	pay	season

Do you hire non-family people help you with your crops?

				crop/
who	house in	task	when	pay season

Do you have people help you with your livestock?

who	task	when	pay	season?
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Do you have charcoal burners clear your pastures? Explain?

What is your "job", occupation? How much time do you spend at this job?

Job	time/year	when	still farm?
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Which job earns you the most money?

Which job takes the most time?

How frequently did you do this job last year?

What ways does this job affect your farming?

What are the outside obligations of family or household members?

who job #hrs/week #/year pay

Communication:

How do you find out about new technologies, such as new ways of farming?

How do you find out which pesticides to use on your cultivations?

Do you participate (vote) in a farmer's organization? Which?

How often do you go?

Do you use this organization to find out new farming techniques or other information (markets)?

Who do you talk to about your livestock? (when)

When you have a problem with livestock who do you consult?

When you have a problem about a particular tree who do you consult?

When you have a problem with a particular crop who do you consult?

When you have a problem with land, i.e. disease, who do you consult?

When you need more labor to farm, who do consult?

Who are the other people in community that you talk with (reason with) on a regular basis?

Decision Making

Have you participated in a community Project in Green Park? Y. N. what?

How often?

In what ways does a change in Prime Ministers and Government Parties affect what crops you plant? (type cash crops and permanent)? (e.g. Agro-21, AMC)

In what ways does the land authority (RADA) affect what crops you plant?

In what ways does a change in Prime Ministers and Government Parties affect how you rear livestock?

In what ways does the land authority (RADA) affect how you rear livestock?

How do prices in the local market affect what crops you produce?

How does getting your produce to the market affect what you produce?

How do prices in the export market affect what crops you produce?

How does getting your produce to the export market affect what crops are produced?

How do prices in the local market affect how much livestock you rear?

How does getting the livestock to market affect how much you rear?

In what ways does the export market affect how much livestock you rear?

Did the credit program help you buy more land?

Have you ever taken a loan to buy more land, or cattle, pigs? y or n Why or why not?

In your household who decides what is to be sold, in what quantities and when to sell _____ crop at the local market?

cash crop:

permanent crop:

In your household who decides when it is time to sell cattle?

In your household who decides to put the children through school?

In your household who decides to pay for the children's education?

Over the last _____ years have you acquired additional lands? Is (are) it (they) rented, leased, owned, squatted?

Why do you get more lands?

If you wanted more land is it available?

Who decided what the land(s) were to be used for?

In your household who decides to make repairs on house?

In your household who decides if you need to hire additional labor to prepare the lands, harvest, market?

If you wanted to hire more labor, is it available?

In your household who decides who does what jobs in farming?

In your household who does the day-to-day discipline of the children?

Cooking Process:

How is your food cooked? 1. electric, 2. kerosene, 3. gas, 4. wood, 5. coalfire, 6. combinations _____

What foods do you cook with coalfire or wood?

If wood or coal are used:

Do you buy wood or collect? How often per week to you need to get more wood?

Do you buy coal or burn it? How often do you use coal to cook with? How much coal per week do you use?

**Do you use more or less coal now than you did 6 months ago, 1 ya, 10ya?
Why?**

How much kerosene do you buy a month?

How much gas do you buy a month?

What do you cook with the gas or kerosene?

Natural Environment:

**Since you have lived in the community what changes have you noticed in the:
rain fall**

crop yields

soil quality

land availability

trees

How have these changes affected your farming?

Open Ended Questions: History

**Since you have lived in the community, how have the local and export markets changed
how you:
raise crops**

rear cattle and other livestock?

**Since you have lived in the community, how have national governments (taxes, change in
gov., laws) changed how you:**

raise crops

rear cattle and other livestock?

**Since you have lived in Green Park how have changes in available farming technology
affected how you farm (crops and livestock)?**

Since more people come to live in Green Park have you changed how you farmed?

Describe farming cycle: Sept to Sept

Charcoal Production:

How do you burn coal (make charcoal)?

How often do you burn coal (make charcoal)?

What trees are best suited for burning coal? Where are they found?

Where do you get the trees to burn coal?

Do you own, rent or lease the lands you get your trees to burn coal?

Do you sell the coal?

If you do not sell coal do you burn it just for your own use or do you share with others?

Do you get something in return?

Who do you sell your coal to?

Do you always sell to the same people?

How much coal do you sell per/week?

When are you paid to burn coal?

Can you making a living burning and selling coal?

Do you own, rent or lease other lands? Did you use to burn coal on these lands?

Do you plant crops? (Start on page 2)

Do you have cattle? (start on page 2)

APPENDIX 2.

APPENDIX 2. Tables 17 through 55

Table 17. Age Range of Primary Resource User by Resident Status and by Sex

Age Range	24-39 Years		40-55 Years		56-71 Years		72Years and over	
Sex	M	F	M	F	M	F	M	F
Resettler n=14	0%	0%	28.5% (4)	0%	28.5% (4)	14.3% (2)	28.5% (4)	0
	0%		28.5% (4)		43.0% (6)		28.5% (4)	
Local Migrant n=47	12.7% (6)	2.1% (1)	23.4% (11)	6.4% (3)	29.8% (14)	10.6% (5)	12.7% (6)	2.1% (1)
	14.9% (7)		29.8% (14)		40.4% (19)		14.9% (7)	
Circular Migrant n=10	0%	0%	20.0% (2)	10.0% (1)	30.0% (3)	20.0% (2)	20.0% (2)	0%
	0%		30.0% (3)		50.0% (5)		20.0% (2)	
total n=71	5.6% (4)	4.2% (3)	22.5% (16)	9.9% (7)	2.8% (2)	8.5% (6)	16.9% (12)	1.4% (1)
	9.9% (7)		29.6% (21)		42.3% (30)		18.3% (13)	

Table 18. Marital Status of Primary Resource User by Resident Status and by Sex (Frequency and Percent)

Marital Status	Married Adults Other		SingleAdult Widow		Married but Spouse Abroad		Total	
Sex	M	F	M	F	M	F	M	F
Settler n=14	57.1% (8)	0%	28.5% (4)	14.3% (2)	0%	0%	78.5% (11)	14.3% (2)
	57.1% (8)		43.0% (6)		0%		100% (14)	
Local Migrant n=47	72.0% (34)	8.5% (4)	6.4% (3)	10.6% (5)	0%	2.1% (1)	78.7% (37)	21.3% (10)
	80.8% (38)		17.0% (8)		2.1% (1)		100% (47)	
Circular Migrant n=10	30.0% (3)	0%	20.0% (2)	30.0% (3)	10.0% (1)	10.0 % (1)	60.0% (6)	40.0% (4)
	30.0% (3)		50.0% (5)		20.0% (2)		100% (10)	
total n=71	63.4% (43)	5.6% (4)	12.6% (9)	14.1% (10)	1.4% (1)	2.8% (2)	100% (71)	
	69.0% (49)		26.7% (19)		4.3% (3)			

Table 19. Household Composition of Family and Non-family Members (Excluding Informant, Spouse and Children)

Household Members	Percent
Grandson	35.5%
Granddaughter	26.9%
Tenants	6.5%
Nephew	5.4%
Niece	4.3%
Daughter-in-law	3.2%
Spouse's children (step kids)	2.2%
Great grand children	2.2%
Brother	2.2%
Live-in care taker (female)	2.2%
Guests	1.1%
Sister	1.1%
Gardener	1.1%
Cousin	1.1%
Adopted boy	1.1%
Mother	1.1%
Grand niece	1.1%
	<hr/> 100.00%

Note: Table 19 illustrates the range of family and non-family members contributing to the household composition. Clearly, grandchildren dominate household membership.

Table 20. Number of sons and daughters still at home

Number of Sons	Percent	Number of Daughters	Percent
0	53.4%	0	49.3%
1	22.5%	1	29.6%
2	16.9%	2	12.7%
3	4.2%	3	8.5%
4	1.4%		
5	0.0%		
6	1.4%		
	<hr/> 100.00%		<hr/> 100.0%

Note: Table 20 illustrates the frequency of sons and daughters still residing home. The majority of resource users have no sons or daughters currently residing at home. The data indicate those with off-spring residing at home tend to have only one daughter or son at home.

Table 21a. Primary Occupation of Resource Users

Primary Occupation	Percent
Farmer	42.0%
Wage labor:	31.0%
mason	
chicken factory	
public health inspector	
plumber	
mechanic	
cook	
day laborer	
public works	
house caretaker	
construction/carpentry	
security guard	
hospital	
sugar cane cutter	
horticulturalist	
veterinary assistant	
truck driver	
Self-employed:	11.0%
shop keeper	
wicker maker	
higgler	
butcher	
coal burner	
Retired	10.0%
Housewife	6.0%
	<u>100.0%</u>

Table 21b. Secondary Occupation of Resource Users

Occupation	Percent
Farmer	37.0%
None	28.0%
Retired	14.0%
Self-employed	10.0%
shop keeper	
marketing crops	
coal burner	
tailor/seamstress	
Wage-labor	8.0%
garbage contract	
day labor	
accountant	
house caretaker	
Housewife	3.0%
	100.0%

Table 22a. Primary Occupations of Resource Users' Spouses

Primary Occupation	Percent
Housewife	44.00%
Wage labor	37.00%
day labor	
customs officer	
hotel maid	
construction	
overseas working	
parish council	
nurse	
accountant	
teacher	
lawyer	
truck driver	
tour ship	
Self-employed	10.00%
seamstress/tailor	
baker	
shop keeper	
fisherman	
higgler	
Farmer	8.00%
Farmer/housewife	1.00%
	<u>100.00%</u>

Table 22b. Secondary Occupations of Resource Users' Spouses

Secondary Occupation	Percent
None	35.00%
Farmer/housewife	27.00%
Housewife	11.00%
Self-employed	11.00%
seamstress/tailor	
baker	
shop	
marketing/higglering	
Wage-labor	10.00%
day labor	
hotel maid	
Farmer	6.00%
	<hr/> 100.00%

Table 23. Frequency of Individual Plots by Land Use or Land Use Combination in Green Park

Land Use or Land Use Combination per plot	Percent
Pasture	34.3%
Residence/garden/fruit tree/pasture	8.8%
Residence/garden/fruit tree	8.3%
Pasture/ruinate	7.4%
Cash crop fields	7.4%
Pasture/fruit trees	4.4%
Pasture/residence	2.5%
Ruinate/forested	2.0%
Sugar cane	1.5%
Ruinate	1.5%
Garden	1.5%
Residence/garden/fruit trees/yard	1.5%
Residence/pasture/fruit trees	1.5%
Residence/fruit trees	1.5%
Lends out	1.5%
Residence/forested/fruit trees	1.0%
Forested	1.0%
Pasture/forest	1.0%
Cash crop/fruit trees	1.0%
Residence/garden	1.0%
Residence/fruit trees/cash crops/pasture	1.0%
Roadside used	1.0%
Residence	0.5%
Cash crop/ruinate	0.5%
Residence/cash & perm crop/multi houses	0.5%
Residence/pasture/garden/fruit tree/ruinate	0.5%
Residence/yard/cane/pasture/fruit tree	0.5%
Residence/pasture/garden	0.5%
Residence/store/garden	0.5%
Residence/store	0.5%
Residence/pasture	0.5%
Residence/yard	0.5%
Pasture/cash crop/fruit tree	0.5%
	<hr/> 100.00%

Table 24. Percentage of Households where types of Fruit Bearing Trees are Located

Fruit Trees	Percent
ackee	83.09%
orange	77.46%
breadfruit	67.60%
banana	66.19%
mango	64.78%
coconut	59.15%
pear (avocado)	45.07%
nasberry	29.57%
lime	23.94%
grapefruit	23.94%
sweetsop	22.53%
jewplum	21.12%
soursop	14.08%
guinep	12.67%
star apple	9.85%
cherry	8.45%
pimento	8.45%
pawpaw (papaya)	8.45%
tamarind	8.45%
guava	4.22%
pommegranent	4.22%
annatto	2.80%
custard apple	2.80%
eggfruit	2.80%
tangerine	2.80%

Table 25. Percentage of Field Plots Where Types of Fruit Bearing Trees are Planted

Fruit Trees	Percent
mango	12.67%
orange	9.85%
coconut	8.45%
pimento	2.80%
ackee	2.80%
banana	2.80%
lime	2.80%
breadfruit	1.40%
pawpaw (papaya)	1.40%
plantain	1.40%
grapefruit	1.40%

Note: Percentages indicate frequencies with which each fruit tree is planted in field plots. Fruit trees planted in field plots, in particular, oranges, mangos and coconuts that are planted in orchards or plantations, are planted on owned lands.

Table 26. Percentage of Households Involved in Types of Crop Production

Crop	Percent
<hr/>	
Permanent crops:	
sugarcane	7.0%
Semi-permanent crops:	
sweet potato	54.9%
cassava	45.1%
yam	25.4%
dasheen	5.6%
white potato	4.2%
Short-term crops:	
pumpkin	77.5%
peas	57.7%
corn	57.7%
cucumber	36.6%
sugar bean	33.8%
callaloo	28.2%
chocho	26.8%
tomato	19.7%
hot pepper	11.3%
okra	11.3%
gungo peas	9.9%
popchow	8.5%
carrots	7.0%
sweet pepper	2.8%
cabbage	2.8%
onion	1.4%

Table 27. Importance of Family Labor in Crop Production

Labor Source	Percent (relative frequency)
do not "farm"	30.70%
resource user alone	26.60%
sons	18.00%
informant and spouse	6.80%
spouse	5.50%
family - team work	
*(generic response)	4.10%
hires out only	3.20%
informant and hired laborer	1.30%
adopted son	1.00%
mother	1.00%
daughter	0.80%
nephew	0.60%
granddaughters	0.20%
	<hr/>
	100.00%

* Informant did not identify individual family members who assisted on the farm; tasks were attended to as they were needed by available family members.

Table 28. Relative Frequency of Crop Production Tasks which are Hired Out

Task employed	Percent
plow	65.50%
weeding	10.30%
mending fence line	4.30%
planting	4.30%
prepare lands	3.40%
reaping	3.40%
planting	1.70%
spraying	1.70%
moulding corn	0.90%
dig yam pits	0.90%
manure trees	0.90%
kill wasps	0.90%
burning fields	0.90%
cutting sugar cane	0.90%
	<hr/>
	100.00%

Table 29. Tree Fodder Species Used

Common name	Scientific name	Percent of of those who use tree fodder
bacedar	<u>Guazuma ulmifolia</u>	89.13%
guango	<u>Samanea saman</u>	73.90%
breadnut	<u>Brosimum alicastrum</u>	43.47%
*logwood	<u>Haematoxylum campechianum</u>	26.00%
bujgum (red birch)	<u>Bursera simaruba</u>	17.39%
*quickstick, grow stick		
st. vincent bush	<u>Gliricidia sepium</u>	13.04%
\$*wild tamarind		
mimosa	<u>Leuceana leucocephala</u>	8.69%
**ramoon	<u>Trophis racemosa</u>	4.34%
never die, immortal	<u>Erythrina corallodendrum</u>	4.34%
fig		2.17%
guinep	<u>Melicoccus bijugatus</u>	2.17%
ackee	<u>Blighia sapida</u>	2.17%
dogwood	<u>Pisicida piscipula</u>	2.17%
orange	<u>Citrus sinensis</u>	2.17%
huuk	??	2.17%
plum	<u>Spondias dulcis</u>	2.17%

* Trees observed to be eaten by animals, fodder not carried to them

\$ The tree did not have a common name used by the resource users in the area prior to the onset of the project.

** Trees not found in the area but are found in St. Ann

Note: The use of tree leaves, pods and seeds for animal feed is part of the dry season management practice for some livestock owners. It was reported that 84.78% of cattle and goat owners use tree fodder to supplement their livestock's diet and/or recognize which tree species their animals will reach out and nibble, independent of the animal owner or caretaker.

Table 30. Importance of Family Labor Used in Livestock Rearing

Labor Source	Percent (relative frequency)
owner (male)	59.80%
son(s)	15.10%
hire out	11.10%
owner (female)	4.90%
grandson	2.80%
daughter	1.50%
adopted boy	1.50%
spouse female	0.90%
father	0.90%
spouse male	0.60%
brother	0.60%
mother	0.30%
	----- 100.00%

Table 31. Relative Frequency of Livestock Management TasksHired Out

Tasks employed	Percent (relative frequency)
clear pasture	23.00%
cut/carry grass	18.00%
water	15.50%
fence repair	15.50%
rotate feeding	10.00%
collect tree fodder	10.00%
collect cane ban	8.00%

	100.00%

Table 32. Resettler Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990-1991	HOUSE MATERIAL 1990-1991
1	1962	45	1962	45	74	medium brick
2	1964	37	1964	37	64	medium brick
3	1966	47	1966	47	72	kaiser
4	1966	42	1966	42	67	sugar
5	1966	33	1966	33	58	wood
6	1967	27	1967	27	51	medium brick
7	1966	42	1967	43	67	kaiser
8	1967	51	1967	51	75	kaiser
9	1968	33	1968	33	58	sugar
10	1966	19	1971	24	44	wood
11	1966	20	1977	31	45	wood
12	1968	54	1978	64	77	medium brick
13	1964	27	1982	45	54	kaiser
14	1963	24	1983	44	52	kaiser

Definitions of Variable Labels:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired.

This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Definitions for Variable Labels for Table 33:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenorial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Table 33. Resettler's Land Tenure

CASE	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BORROW 1990	HOUSE HOLD SIZE 1990
1	4.5	buy	9.0	9	0	0	0	0	2
2	4.5	buy	5.0	0.5	0	0	4.5	0	4
3	4.0	buy	10.5	4	0	0	4.5	0	2
4**	22	buy	0.5	0.5	3.0	0	0	.2	6
5	0	borrow	0	0.1	0.25	0	3.0	0	8
6	17.0	family	*72.5	14.5	0	1.5	0	0	10
7	12	buy	12.0	12.0	4.5	0	0	0	2
8**	4.3	buy	4.3	4.3	18.0	0	0	0	13
9	0	family	2.3	0	0	0	2.3	0	1
10	0	family	*32.0	0	0	0	0	29	1
11	0	family	0.25	0	0	0	0	0	6
12	4.0	buy	8.25	8.25	0	0	0	0	6
13	4.5	buy	*18.0	4.5	0	4.5	0	4.5	4
14	20	family	*26.0	8.0	0	0	0	0	9
TOT	96.8	N/A	200.6	65.6	—	—	—	—	74
AVG	9.7	N/A	14.3	5.9	—	—	—	—	5.3

* Removed from calculation for averaging total acreage used

** Extremely marginal (poor) households

N/A Not applicable

— Too few cases for valid calculations

Comments: When four largest landowners for Land2 Acres are removed the average land used becomes 5.7 acres n=9.

Definitions of Variable Lables for Table 34:

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house. This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 34. Resettler Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FARM INC.	FRUIT TREE HOUSE	FRUIT TREE FIELD	PEN- SION	CHLD SUPT	OCP
1	N	N	N	N	10	N	N	Y	rfar
2	N	Y	Y	N	6	2	N	Y	farm
3	Y	Y	N	Y	4	N	N	N	omfw
4	N	N	N	Y	6	N	N	N	omw
5	N	N	N	Y	4	N	N	N	omw
6	N	Y	Y	N	8	5	N	N	farm
7	Y	N	N	Y	0	3	N	Y	omw coal
8	Y	N	N	N	7	N	N	Y	chid farm
9	N	N	N	Y	0	4	N	N	omfw
10	Y	N	N	Y	0	0	N	N	omfw
11	Y	N	N	Y	0	3	N	N	omw coal
12	N	N	N	N	2	N	N	Y	rfar chid
13	Y	Y	Y	N	2	6	N	N	farm coal
14	N	Y	Y	N	6	3	N	Y	farm

Primary source of income for household is derived from:

FARM - Full-time farming activities

FARM-COAL- Combined own farming enterprise with coal

OMW-COAL- Occupational multiplicity off-farm wage labor and coal

OMFW - Occupational multiplicity on-farm wage labor

RFAR - Retired farmer supported by children or others

CHILD Support from children

Y= Cases where resource users indicate they participate in those activities

N= Cases where resource users indicate they do not participate in those activities

Definitions for Variable Labels for Table 35:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Table 35. Resettlers' Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	2	6	0.75	0	0	0	0	NO
2	1	0	N/A	2	0	4	0	NO
3	2	3	0.37	1	7	0	0	N/A
4	0	0	N/A	10	0	0	0	N/A
5	0	0	N/A	0	18	9	0	NO
6	5	28*	0.69	2	6	25	2	NO
7	1	0	N/A	0	4	0	0	N/A
8	0	0	N/A	0	0	24	0	NO
9	0	0	N/A	0	0	0	0	N/A
10	0	7	0.21	0	0	0	0	N/A
11	0	0	N/A	0	0	30	0	NO
12	3	0	N/A	0	0	0	0	N/A
13	0	1	0.22	0	2	0	0	N/A
14	3	3	0.6	0	28**	0	3	N/A
TOT.	17	48	—	15	65	92	7	N/A 9* NO 5*
AVG.	2.4	8	—	3.7	10.8	18.4	2.3	N/A

* If case 6 is not calculated in for CATT2 the average current herd size among those rearing cattle is 4 head per herd.

** If case 14 is not calculated for GOAT2 the average current flock size among those rearing goat is 7.4 goat per flock.

N/A = not applicable

— Too few cases for valid calculations

* Values indicate frequencies of chicken marketing

Comments: Since resettlers arrived to use resources in Green Park, the overall cattle and goat populations have increased. Herd and flock average sizes and number of livestock owners have increased. Among the resettler livestock owners, 57.0% (8/14) rear livestock of which 28.0% (4/14) rear both cattle and goats, 14.0% (2/14) rear just goats and 14.0% (2/14) rear just cattle. The cattle-to-pasture ratio is calculated from acreage in pasture and number of livestock feeding from pasture. None of the cattle owners are over-herd.

Definitions for Variable Labels for Table 36:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired. This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Table 36. Local Migrants (Before 1970) Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990-91	HOUSE MATERIAL 1990-91
1	1963	44	1963	44	72	not in G.P.
2	1963	34	1963	34	62	medium brick
3	1963	49	1963	49	77	medium brick
4	1963	35	1963	35	61	medium brick
5	1966	51	1966	51	76	not in G.P.
6	1966	31	1966	31	56	small brick
7	1966	21	1966	21	46	medium brick
8	1967	36	1967	36	60	medium brick
9	1968	43	1968	43	66	small brick
10	1968	31	1968	31	54	medium brick
11	1968	32	1968	32	55	small brick
12	1968	26	1928	26	49	medium brick
13	1968	54	1968	54	77	wood
14	1968	38	1968	38	61	not in G.P.
15	1969	28	1969	28	505	not in GP

Definitions for Variable Labels for Table 37:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenurial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Table 37. First Subgroup of Local Migrants' (Arriving Before 1970) Land Tenure

CASE	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BORROW 1990	HOUSE HOLD SIZE 1990
1	4.5	buy	18.0*	4.5	9	0	0	4.5	2
2	9.0	buy	4.5	4.5	0	0	0	0	8
3	11.0	buy	11.0	7.0	4.0	0	0	0	2
4	20.0	buy	23.0*	23.0*	0	0	0	0	3
5	4.0	buy	11.0	11.0	0	0	0	0	4
6	0.5	buy	0.5	0.5	0	0	0	0	4
7	2.0	buy	2.0	2.0	0	0	0	0	4
8	12.5	buy	12.5	12.5	0	0	0	0	2
9	4.5	buy	5.5	4.5	0	0	0	1	6
10	4.0	buy	6.0	4.0	2.0	0	0		5
11	2.5	buy	4.5	2.5	2.0	0	0	0	6
12	4.0	buy	12.0	12.0	0	0	0	0	4
13	4.0	buy	3.0	2.0	0	0	1	0	2
14	4.0	buy	52.7*	34.7*	18.0	0	0	0	5
15	2.0	buy	35.0*	35.0*	0	0	0	0	10
TOT	88.5	N/A	201.25	159.7	35.0	—	—	—	67
AVG	5.9	N/A	13.41	10.6	7.0	—	—	—	4.5

* If four largest land users from LAND2 are removed land use average = 6.6 acres

** If three largest land owners are removed average land owned = 5.6 acres

N/A Not applicable

— Too few cases for valid calculations

Definition for Variable Lable for Table 38:

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house.
This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 38. Local Migrants (Before 1970) Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FARM INC.	FRUIT TREE HOUSE	FRUIT TREE FLIED	PEN- SION	CHLD SPPT	OCP
1	N	N	N	N	9	N	N	Y	rfar
2	N	N	N	Y	8	N	N	Y	wage skil
3	N	N	N	N	10	N	N	Y	rfar
4	N	N	N	Y	10	N	N	N	wage skil
5	N	N	N	N	N/A	4	Y	N	farm
6	N	N	N	Y	7	N	N	N	wage skil
7	N	N	N	Y	9	N	N	N	wage uski
8	N	N	N	Y	6	N	Y	N	wage skil
9	N	N	N	Y	6	N	Y	N	self empl
10	N	N	N	Y	5	N	N	N	wage skil
11	Y	N	N	Y	10	N	N	N	wage uski
12	N	Y	Y	Y	10	2	N	N	wage skil
13	N	N	N	N	3	N	N	Y	rfar chid
14	N	Y	Y	Y	5	3	N	N	wage skil
15	N	N	N	Y	7	10	N	N	wage skil

WAGE - off-farm wage labor: SKIL (skilled, trade or professional) USKI (unskilled labor), FARM - full-time farming, RFAR - retired from farming, support from children, CHID - support from children, SELF EMPL - Self employed (i.e., shop owner, wicker, coal, butcher)

Y= cases where resource users indicate they participate in these activities

N= cases where resource users indicate they do not participate in these activities

Definitions for Variable Lables for Table 39:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Table 39. Local Migrants' (Before 1970) Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	4	22	1.2	0	3	12	0	NO
2	2	1	1.0	3	0	0	0	N/A
3	0	5	1.0	0	3	5	0	NO
4	0	30	1.5	0	0	24	1	NO
5	3	18	1.4	0	0	7	0	NO
6	0	0	N/A	0	0	12	0	NO
7	0	0	N/A	15	1	0	0	N/A
8	0	3	0.3	0	10	0	0	N/A
9	0	6	1.3	0	0	36	0	YES
10	0	12	*	0	6	30	0	NO
11	0	3	1.0	0	0	5	1	NO
12	0	5	1.75	0	6	50	1	YES
13	0	2	1.0	0	2	0	0	N/A
14	3	28	0.8	25	0	0	0	N/A
15	2	11	0.52	10	5	0	0	N/A
TOT.	14	146		53	36	181	3	*7 N *6 N/A *2 Y
AVG	2.4	11.2	—	13.3	4.5	14.5	1.5	N/A

N/A - not applicable

*Values indicate frequencies of chicken marketing

** Case 12 has some acreage in Green Park, yet the resource user has more than sufficient family land near Carick Foyal which lies across the street from Green Park. Calculating his cattle-to-pasture acreage used in Green Park alone is inaccurate for cattle are in Green Park part of the time.

Comments: Since local migrants (before 1970) arrived to use resources in Green Park the total number of cattle owners has nearly tripled and the total cattle population has increased ten fold as has the herd size. Yet, the goat population has decreased by nearly fifty percent and the flock size has decreased by 34.0%. Currently, 93.0% (13/14) local migrants rear either cattle or goats of which 50.0% (7/14) rear both cattle and goats, 43.0% (6/14) rear just cattle and 7.0% (1/14) rear just goat. Eight cattle owners are over-herd with the number of pasture acreage and herd size.

Table 40. Local Migrant (Since 1970) Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990-91	HOUSE MATERIAL 1990-91
1	1970	48	1970	48	69	medium brick
2	1967	33	1970	36	57	not in G.P.
3	1970	39	1970	39	60	sugar house
4	1970	39	1970	39	60	small brick
5	1970	48	1970	48	69	small brick
6	1971	41	1971	41	60	wood
7	1966	41	1971	46	66	medium brick
8	1972	27	1972	27	46	not in G.P.
9	1973	44	1973	44	61	small brick
10	1973	29	1973	29	47	kaiser
11	1973	30	1973	30	48	medium brick

Definitions for Variable Lables for Table 40:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired. This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Definitions for Variable Labels for Table 41:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenurial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Table 41. Second Subgroup of Local Migrants' (Since 1970) Land Tenure

C A S E	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BOR- ROW 1990	HOUSE HOLD SIZE 1990
1	4.5	buy	13.0	12.5	9	0	0	0.5	4
2	4.5	leased	26.0	26.0	0	0	0	0	6
3	0.1	rent	0.1	0	0	0.1	0	0	3
4	8.5	buy	8.5	8.5	0	0	0	0	8
5	0.3	buy	5.5	5.5	0	0	0	1	2
6	.25	buy	4.75	.25	.5	0	0	4	4
7	4.0	buy	2.5	2.0	0	0	0	0	6
8	2.0	buy	14.0	2.0	12	0	0	0	4
9	0.5	buy	9.5	0.5	0	0	0	9	9
10	0.5	buy	6.5	4.5	0	2	0		4
11	2.5	buy	4.5	2.5	2.0	0	0	0	6
TOT	27.65	9 buy 2 rent	94.85	64.3	--	--	--	--	58
AVG	2.51	N/A	8.6	5.8	--	--	--	--	5.1

If the largest land users are removed in LAND2 then land use = 6.8 acres, n=10

N/A not applicable

-- Too few cases for valid calculations

Definitions for Variable Labels for Table 42:

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house.
This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 42. Local Migrants (Since 1970) Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FARM INC.	FRUIT TREE HOUSE	FRUIT TREE FIELD	PEN- SION	CHLD SPPT	OCP
1	N	Y	Y	Y	9	2	N	N	farm
2	N	N	N	Y	N/A	10	N	N	wage skil
3	N	N	N	Y	1	none	N	N	self empl
4	N	Y	Y	N	3	none	N	N	farm
5	N	Y	Y	Y	6	none	N	N	farm self empl
6	N	N	N	Y	8	none	N	N	wage skil
7	N	N	N	N	5	none	N	N	chid
8	N	Y	N	Y	4	none	N	N	wage
9	Y	Y	Y	Y	10	none	N	N	omfw
10	N	N	Y	Y	8	none	N	N	omfw
11	N	N	N	Y	11	none	N	N	self empl

Primary income source for household:

WAGE - off-farm wage labor: SKIL (skilled labor - trade or professional)

FARM - full-time farming

RFAR - retired farming support is from children

OMFW - occupational multiplicity on-farm wage labor

SELF EMPL - self employed - produce or make something to sell

CHID - supported by children

Y= cases where resource users indicate they participate in these activities

N= cases where resource users indicate they participate in these activities

Definitions for Variable Labels for Table 43:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Table 43. Local Migrants' (Since 1970) Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	4	0	N/A	0	4	12	0	NO
2	1	9	0.45	0	1	0	0	N/A
3	0	0	N/A	0	0	3	0	NO
4	0	6	1.1	3	0	24	4	NO
5	3	3	0.75	1	0	400	0	YES
6	0	2	0.5	0	1	0	0	N/A
7	0	5	2.5	0	0	0	0	N/A
8	1	12	1.0	0	0	0	0	N/A
9	0	0	N/A	2	0	12	0	NO
10	0	4	0.66	0	4	20	0	NO
11	2	6	1.2	0	2	600	5	YES
TOT. AVG	11 2.2	47 5.8	—	6 2.0	12 2.4	1071	9 4.5	*9 N *2 Y

N/A - Not applicable, not raising cattle or chickens 1990-1991

— Too few cases for valid calculations

* Values indicate frequency of chicken marketing

Comments: Since local migrants (since 1970) arrived to use resources in Green Park, the livestock production has increased as has the number of owners and herd and flock sizes. The average herd size has nearly doubled, yet the flock size has remained nearly the same. Among the local migrants 82.0% (9/11) own either cattle or goats of which 36.0% (4/11) own both cattle and goats, 36.0% (4/11) own just cattle and 9.0% (1/11) own just goat. Three cattle owners are over-herd.

Table 44. Local Migrants (Since 1975) Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990-91	HOUSE MATERIAL 1990-91
1	1972	42	1976	46	61	medium brick
2	1976	23	1976	23	38	small brick
3	1977	58	1977	58	72	small brick
4	1978	61	1978	61	78	not in G.P.
5	1981	27	1981	27	37	small brick
6	1981	26	1981	26	36	small brick
7	1984	17	1984	17	24	wood
8	1972	51	1984	63	70	small brick

Definitions for Variable Labels for Table 44:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired. This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Definitions for Variable Labels for Table 45:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenurial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Table 45. Third Subgroup of Local Migrants' (Since 1975) Land Tenure

.C A S E	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BOR- ROW 1990	HOUSE HOLD SIZE 1990
1	5.0	buy	5.0	5.0	0	0	0	0	3
2	0.75	buy	0.75	.75	0	0	0	0	6
3	0.5	buy	0.5	0.5	0	0	0	0	8
4	12.0*	buy	26.5**	18.0* **	8.5	0	0	0	6
5	6.0	family	6.0	6.0	0	0	0	0	5
6	4.0	family	4.0	4.0	0	0	0	0	4
7	0.2	family	0.2	0	0	0	0	0.2	5
8	2.7	buy	2.7	2.7	0	0	0	0	0
TOT	31.15	5 buy 3 fam	45.65	36.9	—	—	—	—	37
AVG	3.9	N/A	5.7	5.3	—	—	—	—	4.6

* When this case is not included in the calculation actual land used is 19.15 acres and average land used is 2.7 acres.

** When largest land user in LAND2 is removed average land use is 2.7 acres.

*** When largest land owner is removed from OWN average land owned is 3.15 acres.

N/A Not applicable

— Too few cases for valid calculations

Definitions for Variable Labels for Table 46:

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house.

This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 46. Local Migrants (Since 1975) Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FARM INC.	FRUIT TREE HOUSE	FRUIT TREE FIELD	PEN- SION	CHLD SUPT	OCP
1	N	N	N	Y	10	N	Y	N	wage skil
2	N	N	N	Y	10	N	N	N	wages kil
3	N	N	N	N	6	N	N	Y	rfar chid
4	N	Y	Y	N	7	N	N	N	farm
5	N	N	N	Y	3	N	N	N	wages kil
6	N	N	N	Y	9	N	N	N	self empl
7	N	N	N	Y	0	N	N	N	self empl
8	N	N	N	N	7	N	N	Y	rfar chid

N/A - Not applicable, not raising chickens 1990-1991

Primary income source for household:

WAGE - off-farm wage labor - SKIL (skilled labor - trade or professional)

FARM - full-time farming

RFAR - retired farmer supported by children or others

CHID - support from children

SELF EMPL - self employed (produce something to sell, not wage labor)

Y = cases where resource users indicate they participate in these activities

N = cases where resource users indicate they do not participate in these activities

Table 47. Local Migrants' (Since 1975) Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	1	13	2.8	0	0	0	0	N/A
2	0	0	N/A	0	2	0	0	N/A
3	8	5	2.5	6	0	2	0	NO
4	5	14	0.7	0	0	26	0	NO
5	8	6	1.03	0	0	14	0	NO
6	4	3	0.8	4	0	150	0	YES
7	0	0	0	0	0	0	0	N/A
8	1	1	0	1	1	0	0	N/A
TOT. AVG.	27 4.5	42 7.0	—	11 3.6	3 1.5	192	0 0	*4 N/A *3 N *1 Y

N/A - Not applicable, not raising cattle chickens 1990-1991

— Too few cases for valid calculations

* Values indicated frequency of chicken marketing

Comments: Since local migrants' (since 1975) arrival to use resources in Green Park the cattle population has increased as has the herd size. In fact, the cattle rearers are the same rearers; there are no additional rearers among this subgroup. However, the goat population has decreased. Among the local migrants, 88.0% have either cattle or goats. Nearly, 75.0% (6/8) have cattle of which 13.0% (1/8) owns both cattle and goats, and 25.0% (2/8) have just goat.

Definitions for Variable Labels for Table 47:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Definition for Variable Labels for Table 48:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired. This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Table 48. Local Migrants (Since 1985) Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990	HOUSE MATERIAL 1990
1	1974	38	1985	41	55	medium brick
2	1986	48	1986	48	48	wood
3	1986	37	1986	37	42	not in G.P.
4	1987	66	1987	66	70	not in G.P.
5	1987	37	1987	37	37	kaiser
6	1989	50	1989	50	52	kasier
7	1989	75	1989	75	76	not in G.P.
8	1989	44	1989	44	46	large brick
9	1989	24	1989	24	26	wood
10	1990	41	1990	41	43	sugar house
11	1990	24	1990	24	25	not in G.P.
12	1989	60	1990	61	61	medium brick
13	1985	57	1990	62	62	medium brick

Definitions for Variable Labels for Table 49:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenurial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Table 49. Last Wave of Local Migrants' (after 1985) Land Tenure

CASE	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BORROW 1990	HOUSE HOLD SIZE 1990
1	4.0	buy	16.5*	8.5	8.0	0	0	0	3
2	1.5	lease	1.5	0	1.5	0	0	0	5
3	2.5	squat	2.5	0	0	0	2.5	0	6
4	2.0	lease	2.0	0	2.0	0	0	0	7
5	2.0	rent	2.0	0	0	2.0	0	0	6
6	4.5	rent	4.5	0	0	4.5	0	0	10
7	2.0	squat	2.0	0	0	0	2.0	0	5
8	8.0	rent	8.0*	0	0	8.0	0	0	4
9	0.5	rent	0.5	0	0	0.5	0	0	1
10	0.25	rent	0.25	0	0	0.25	0	0	4
11	4.5	lease	4.5	0	4.5	0	0	0	2
12	4.5	buy	4.5	4.5	0	0	0	0	3
13	4.75	buy	4.75	4.75	0	0	0	0	4
TOT	41.0	N/A	53.5	17.75	--	--	--	--	60
AVG	3.2	N/A	4.1	5.9	--	--	--	--	4.6

* When cases not calculated into the total acreage used the average reflects 2.6 acres are used.

N/A not applicable

-- Too few cases for valid calculations

Definition for Variable Lables for Table 50

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house. This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 50. Local Migrants (Since 1985) 1990-1991) Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FRM INC.	FRUIT TREE HOUSE	FRUIT TREE FLIED	PEN- SION	CHLD SPPT	OCP
1	N	N	N	Y	6	N	N	N	wage uskl
2	N	N	N	Y	7	N	N	N	self empl
3	N	N	N	Y	N/A	N	N	N	wage skil
4	N	Y	Y	N	9	N	N	N	omfw
5	N	N	N	Y	4	N	N	N	omfw
6	Y	N	N	Y	5	N	N	Y	omfw
7	N	N	N	Y	N/A	N	N	Y	rfar chid
8	N	N	N	N	4	N	N	N	self empl
9	N	N	N	Y	5	N	N	N	self empl
10	N	N	N	Y	2	N	N	N	wage uski
11	N	Y	Y	N	N/A	N	N	N	omfw
12	N	Y	Y	N	7	N	N	N	omfw
13	N	N	N	Y	8	N	N	Y	wage skil

Primary income source for household:

WAGE - off-farm wage labor - SKIL (skilled labor - trade or professional) USKI (unskilled labor), FARM - full-time farming, OMFw - occupational multiplicity on-farm wage labor

OMW - occupational multiplicity off-farm wage labor

RFAR - retired farmer, support primarily from children or others

CHID - support from children

SELF EMPL - self employed (non-wage labor)

Y = cases where resource users indicate they participate in these activities

N= cases where resource users indicate they particiapte in these activitieis

Definition for Variable Lable for Table 51:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Table 51. Local Migrant's (Since 1985) Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	0	15	1.5	0	20	12	6	NO
2	0	0	N/A	0	12	6	0	NO
3	7	12	4.8	16	4	12	0	NO
4	1	5	2.5	0	0	15	0	NO
5	0	0	N/A	0	0	0	0	N/A
6	0	0	N/A	0	3	0	0	N/A
7	12	12	4.8	2	2	0	0	N/A
8	0	0	N/A	0	0	0	0	N/A
9	0	0	N/A	0	0	0	0	N/A
10	0	0	N/A	0	0	0	0	N/A
11	2	2	1.0	28	23	36	0	YES
12	0	0	N/1	0	4	0	0	N/A
13	5	4	1.3	0	0	10	0	N/A
TOT AVG	27 5.4	50 8.3	—	46 15.3	68 9.7	91 15.1	6 0	*9 N/A *4 N *1 Y

N/A - not applicable, not raising cattle or chickens 1990-1991

— Too few cases for valid calculations

* Values indicate frequency of chicken marketing behavior

Comments: Among the local migrants (1985) the livestock population has increased for cattle and goats. Among those who own cattle the number of cattle rearers, as well as the herd size has increased. However, among the goat rearers the number of rearers has decreased as has the flock size. Six cattle owners are over-herd.

Table 52. Circular Migrants' Resident Status

CASE	WHEN ACQUIRE	AGE ACQUIRE	WHEN COME	AGE COME	AGE 1990	HOUSE MATERIAL 1990
1	1975	60	1977	62	76	small brick
2	1978	57	1982	61	61	medium brick
3	1977	39	1982	44	53	small brick
4	1972	52	1982	62	71	medium brick
5	1972	46	1987	61	65	medium brick
6	1982	51	1988	57	60	medium brick
7	1980	53	1989	62	64	large brick
8	1968	49	1989	70	72	medium brick
9	1985	48	1990	53	54	large brick
10	1984	43	visit	41	50	large brick

* Case 10 still resides overseas and is employed overseas

Definitions for Variable Labels for Table 52:

WHEN ACQUIRE refers to when primary resource users first acquired (bought, leased, rented etc) lands in Green Park.

AGE ACQUIRE refers to the age of the primary resource user when s/he first acquired access to use or own lands in Green Park.

WHEN COME refers to when the primary resource user elected to use the resources acquired.

This does not require the resource user to live in Green Park, only use the resources in Green Park.

AGE COME refers to the age of the primary resource when s/he came to use the resources in Green Park.

AGE 1990 is the age of the primary resource user's age at the time the survey was conducted.

HOUSE MATERIAL refers to the main construction materials used resource user's house in Green Park

Table 53. Circular Migrants' Land Tenure

CASE	LAND1 ACRES	LAND1 TENURE	LAND2 ACRES 1990	OWN 1990	LEASE 1990	RENT 1990	SQUAT 1990	BORROW 1990	HOUSE HOLD SIZE
1	10.0	buy	10.0	10.0	0	0	0	0	1
2	2.0	buy	6.0	2.0	4.0	0	0	0	3
3	2.0	buy	2.0	2.0	0	0	0	0	5
4	2.0	buy	2.0	2.0	0	0	0	0	3
5	2.5	buy	11.5	11.5	0	0	0	0	2
6	4.5	buy	12.5	4.5	9.0	0	0	0	5
7	4.0	buy	8.0	4.0	4.0	0	0	0	2
8	4.7	buy	7.2	7.2	0	0	0	0	0
9	2.5	buy	2.5	2.5	0	0	0	0	1
10	3.75	buy	3.75	3.75	0	0	0	0	1
TOT	37.95	N/A	65.45	49.5	—	—	—		23
AVG	3.8	N/A	6.5	4.9	—	—	—	—	2.3

N/A Not applicable

— Too few cases for valid calculations

Definitions for Variable Labels for Table 53:

LAND1 ACRE refers to the amount of land first using in Green Park

LAND1 TENURE refers to the tenorial status (own, lease, rent, family, borrow) of the initial lands used in Green Park.

LAND2 ACRES 1990 refers to the amount of land using when the survey was conducted.

OWN 1990 refers to the amount of land a resource user owns when the survey was conducted.

LEASE 1990 refers to the amount of land a resource users leases when the survey was conducted.

RENT 1990 refers to the amount of land a resource users rents when the survey was conducted.

SQUAT 1990 refers to the amount of land a resource users squats when the survey was conducted.

BORROW 1990 refers to the amount of land a resource users borrows when the survey was conducted.

HOUSEHOLD SIZE 1990 refers to the size of the resource user's household when the survey was conducted.

Definition for Variable Labels for Table 54:

COAL refers to the production of charcoal

CASH CROP MARK refers to the selling of short term or semi-permanent crops.

PERM CROP MARK refers to the selling of permanent crops.

OFF-FARM INC refers to earning an income from non-farming activities.

FRUIT TREES HOUSE refers to the number of different fruit tree types planted around the house.
This does not include total number of trees, nor species variation. For example, mango, ackee, breadfruit would be counted as three types.

FRUIT TREES FIELD refer to the number of different fruit tree types planted in field plots located away from the house.

PENSION refers to a pension from overseas or Jamaica as a source of income.

CHLD SPPT refers to financial remuneration received by parents from their children.

OCP identifies what a primary resource user considers as their primary occupation.

Table 54. Circular Migrants Farm and Off-Farm Activities

CASE	COAL	CASH CROP MARK	PERM CROP MARK	OFF- FARM INC.	FRUIT TREE HOUSE	FRUIT TREE FIELD	PEN- SION	CHLD SPPT	OCCP
1	N	Y	Y	Y	8	N	N	Y	wgfr
2	N	N	N	N	10	N	Y	N	retr
3	N	Y	Y	Y	8	N	N	N	wgfr farm
4	N	N	N	N	8	N	Y	N	retr
5	N	N	N	N	8	N	Y	N	retr
6	N	Y	Y	N	8	N	Y	N	retr farm
7	N	N	N	N	8	N	Y	N	retr
8	N	N	N	N	4	N	Y	N	retr
9	N	N	N	N	9	N	Y	N	retr
10 *	N	N	N	N	7	N	N	N	wage

* Case 10 still resides overseas and is employed overseas

Y = cases where resource users indicate they participate in these activities

N = cases where resource users indicate they do not participate in these activities

Primary income source for household:

OMWF - occupational multiplicity - on-farm wage labor

FARM - full-time farming

WAGE - off-farm wage labor

RETR - retired from overseas employment - pensioned

WGFR - off-farm wage labor and own farming enterprise

Definition for Variable Lable for Table 55:

CATT1 refers to the number of cattle resource users brought with them when they first came to use resources in Green Park.

CATT2 refers to the number of cattle resource users had at the time of the survey.

PAST. RATIO is the ratio of number of cattle feeding to the available pasture acreage used by a household.

GOAT1 refers to the number of goats resource users brought with them when they first came to use resources in Green Park.

GOAT2 refers to the number of goats resource users had at the time the survey was conducted.

CHICK refers to the number of fowl resource users had at the time the survey was conducted.

PIGS refers to the number of pigs resource users had at the time the survey was conducted.

CHICK SELL indicates the selling of chickens raised by a household.

Table 55. Circular Migrants' Livestock in Green Park

CASE	CATT1	CATT2	PAST. RATIO	GOAT1	GOAT2	CHICK	PIG	CHICK SELL
1	0	0	N/A	0	0	5	0	NO
2	0	0	N/A	0	0	20	0	NO
3	0	8	1.6	0	2	0	0	N/A
4	0	4	1.0	0	9	4	0	NO
5	0	10	1.1	0	4	0	0	N/A
6	1	4	0.4	0	3	75	8	YES
7	0	4	0.8	0	8	12	0	NO
8	0	0	N/A	0	0	37	0	NO
9	0	0	N/A	0	0	0	0	N/A
10	0	5	2.0	0	0	0	0	N/A
TOT AVG	1	35 5.8	—	0	26 5.2	153 25.5	8 0	*9 N *1 Y

— Too few cases for valid calculations

* Values indicate frequencies of chicken marketing

Comments: Among the circular migrants 60.0% (6/10) raise either cattle or goats, of which 50.0% (5/10) rear both cattle and goats and 10.0% (1/10) rear just cattle. Five cattle owners are over-herd.

APPENIX 3.

APPENIX 3. List 1. Tree Species Found in Green Park

Common Name	Genus and species
Almond	<u>Terminalia catappa</u>
Bacedar, Bastard Cedar	<u>Guazauma ulmifolia</u>
Bamboo	<u>Bambusa vulgaris</u>
Blind eye	<u>Helicteres jamaicensis</u>
Brasilettia	<u>Peltophorum linnæi</u>
Breadnut	<u>Brosimum akicastrum</u>
Bullet Tree	<u>Bumelia nigra</u>
Cedar	<u>Cedrela odorata</u>
Coconut	<u>Cocos nucifera</u>
Dogwood	<u>Piscidia piscipula</u>
Fiddlewood	<u>Citharexylum fruticosum</u>
Figwood	<u>Ficus</u> spp.
Fustic Tree	<u>Chlorophora tinctoria</u>
Guango	<u>Samanea saman</u>
Huuk	?
Logwood	<u>Haematoxylum campechianum</u>
Mango	<u>Mangifera</u> spp.
Mimosa, Wild Tamarind	<u>Leuceana leucocephala</u>
Never die, Immortal	<u>Erythrina corallodendrum</u>
Orange	<u>Citrus</u> spp.
Pimenta	<u>Pimenta dioica</u>
Quick Stick, grow stick,	
St. Vincent Bush	<u>Gliricidia sepium</u>
Sydney	?
Tamarind	<u>Tamarindus indica</u>
Trumpet Tree	<u>Cercopia peltata</u>
Yellow Sanders	<u>Fagara elephantiasis</u>

(From Adams, 1972 and Jamaica Livestock Association, 1983).

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