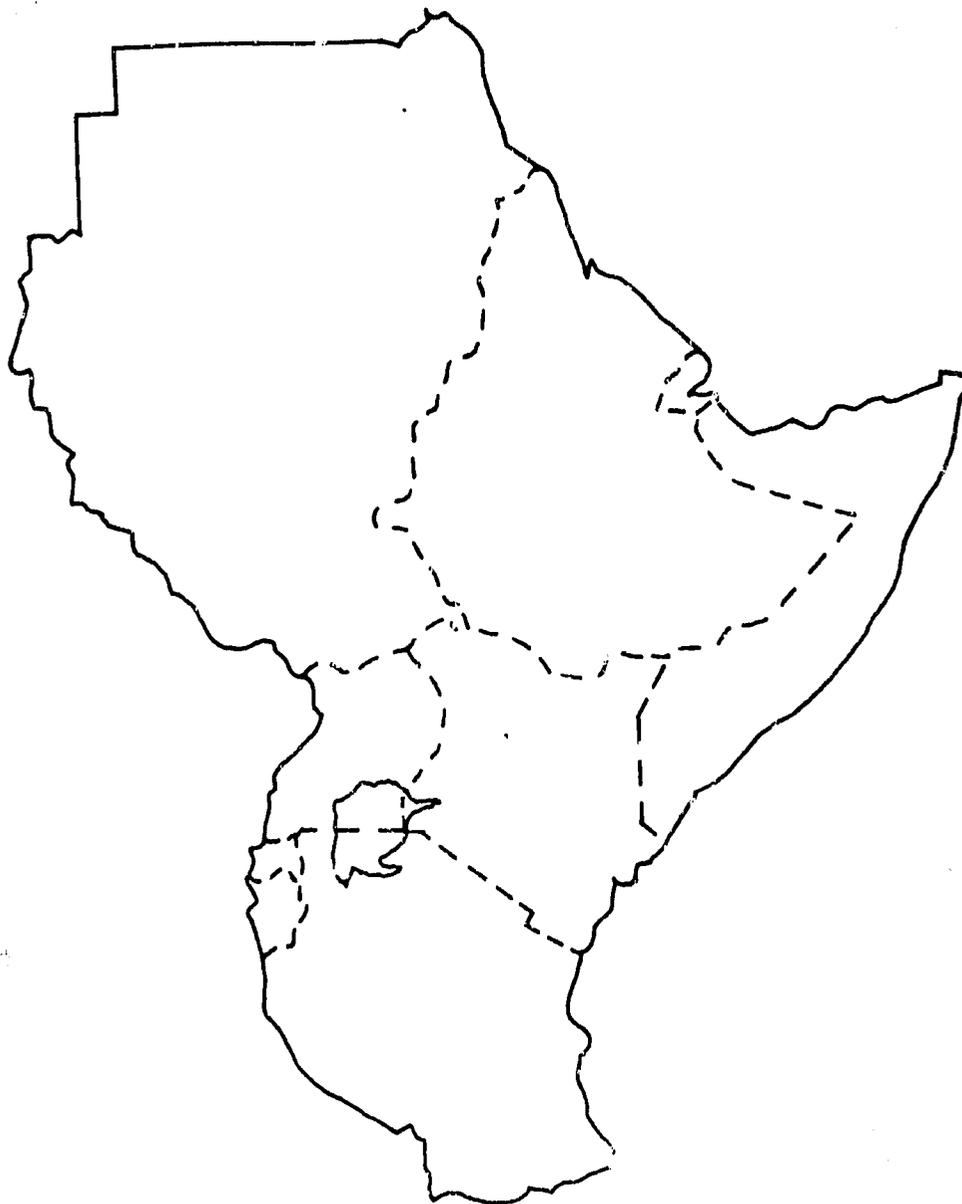


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AGRICULTURAL LIVELIHOODS IN
EASTERN AFRICA:
CLASSIFICATION AND DISTRIBUTION

A FIRST APPROXIMATION

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1980

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This regional paper is the first in a series intended to provide an overview of certain sectoral issues in East Africa. Under the sponsorship of the International Development Program at Clark University the primary author was Professor Turner. However, Drs. Leonard Berry, Mesfin Wolde Mariam and Philip O'Keefe provided assistance and advice, they are further acknowledged in the text. H. Heidt and his staff are responsible for the cartography. Sian Steward and staff assisted in gathering the background and documents. Shirlene McGrath and Ruby Hunter typed the final document and Pat Hart coordinated the production. However, final responsibility for errors of judgment or inaccuracies lies with Len Berry and Richard Ford who undertook the final editing of the document.

This overview is intended as a first approximation of agricultural livelihoods in East Africa. Any comments or corrections concerning the document will be gratefully appreciated.

FOREWORD

This paper is a background commentary to a large 1:2,500,000 four color map which has been prepared by the Cartography Lab at Clark University. The report and the map are seen as only a beginning to a better identification of agricultural systems in East Africa. As these systems are the basis of most of the economy of the region and as the current food crisis in East Africa suggests there are serious problems in the operation of the food production/distribution system we feel that the next stage of this work is important. The map accompanying this text is a black and white reduced version of the original and should only be used to generally indicate the pattern of agricultural system distribution. A larger color version will be published later.

TABLE OF CONTENTS

	<u>PAGE</u>
Acknowledgments	i
Foreword	ii
Table of Contents	iii
List of Tables	iv
1. <u>ABSTRACT</u>	1
2. <u>INTRODUCTION</u>	2
2.1 MAP: Distribution of Agricultural Livelihoods in Eastern Africa	3
3. <u>THE CLASSIFICATION AND ITS RATIONALE</u>	5
3.1 Nomadic Pastoralism	9
3.2 Semi-Nomadic Pastoralism	9
3.3 Ranching	10
3.4 Extensive Smallholder Cultivation	10
3.5 Intensive Smallholder Cultivation	11
3.6 Smallholder Market Cultivation	12
3.7 Large-Scale Marketing Cultivation	12
4. <u>CLASSIFICATION AND MAP ACCURACY</u>	16
5. <u>REPORT REFERENCES</u>	18
6. <u>MAP REFERENCES</u>	19

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
1	- General Tendancies in Liveli- hood Categories	8

1. ABSTRACT

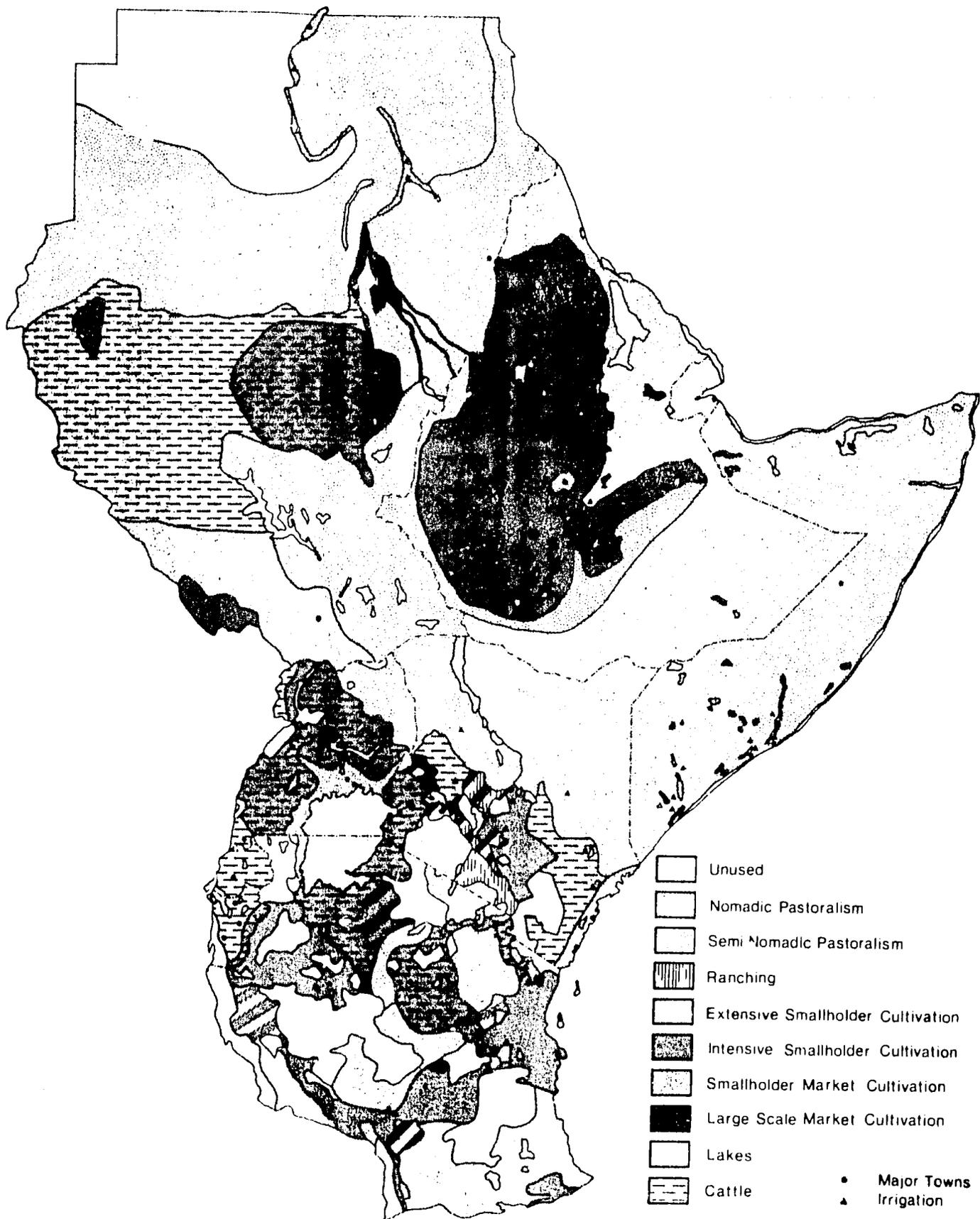
Agricultural development in eastern Africa may be assisted by an understanding of the types and distributions of the existing livelihoods in that broad and environmentally diverse region. This paper is an initial attempt to provide a generic classification of livelihoods types and to map their distributions. The classification involves a continuum of livelihoods based on output intensity and includes, in order of increasing intensity, nomadic pastoralism, semi-nomadic pastoralism, ranching, extensive smallholder cultivation, intensive smallholder cultivation, smallholder market cultivation, and large-scale market cultivation. The problems of the classification and the accuracy of the maps are discussed, emphasizing the problems of the data for such an endeavor.

2. INTRODUCTION

Eastern Africa is beset by various agriculturally related problems. Total population is increasing rapidly while the ratio of farmers to non-farmers decreases. National balances of trade are poor, and inorganic energy resources are limited. Development in the region involves increasing total food supplies, per capita food consumption, and agricultural export earnings. These needs entail that an increasingly smaller segment of the population produce an increasingly larger amount of food and export crops while minimizing inorganic energy inputs.

Numerous agricultural schemes designed to increase total and per capita agricultural production have been implemented with varying degrees of success, and more schemes are "on the drawing boards." Such schemes usually consider what types of agriculture could exist in a specific locality and pay minimal attention to those types of livelihoods presently in them. An understanding of the current types and distributions of agricultural livelihoods in eastern Africa, however, is an important base or "springboard" for development in the region. This report classifies agricultural livelihoods in eastern Africa and maps the distributions of these livelihoods for the countries of Sudan, Ethiopia, Djibouti, Somalia, Kenya, Uganda, Burundi, Rwanda, and Tanzania.

Agricultural Livelihood Systems



2.1 Distribution of Agricultural Livelihoods in Eastern Africa

Such an undertaking is difficult because of the environmental complexity of the region and the number of traditional adaptations to it and because of the discrepancies in data quality by area. Eastern Africa encompasses a large range of habitats, from tropical forests to desert ergs, from coastal to lacustrine shorelines, and from poorly drained lowlands to highland volcanic slopes, to name a few. These diverse environs have interacted in numerous ways to produce unique assemblages of agricultural livelihoods, be they dual-herding, nomadic pastoralists in Somalia or smallholder coffee farmers in Tanzania. Some of these livelihood systems are well documented; others are not. Furthermore, traditional livelihoods are rapidly changing throughout the region as they are subjected to various forms of sociopolitical and socioeconomic pressures. Transplanted among many of these traditional livelihoods are western, mechanized types of agriculture established by European settlers and companies, and capital intensive agriculture introduced by local governments in cooperation with various planning agencies. Given this complexity and the data problems, the classification and map presented here should be considered a "first approximation" of the agricultural livelihoods in eastern African and subject to change as our data sets and experience increase.

3. THE CLASSIFICATION AND ITS RATIONALE

Classification schemes of agricultural livelihoods or land uses are numerous. Typically such schemes are based on some distinguishing criterion of the livelihoods, such as the principal staple or export crop, the technology employed, the intensity of inputs into the system, or some combination of these and other criteria. The classification utilized should be that best suited for the objectives of the study. The overriding object in development is to improve agricultural production by increasing total output, with the consequence of larger food supplies or higher standards of living in the local area, country, or region. In this regard, output is the major criterion of the classification, and each livelihood category reflects the broader qualities of it.

Here, agriculture (cultivation and herding) is regarded in terms of an intensification continuum which measures the level of output (e.g., by weight, calories, price, and so forth) per unit area and time (Turner and Doolittle, 1978). Generally, a relationship exists between output intensity and input intensity (e.g., labor, capital, technology) such that as inputs increase so do outputs (Boserup, 1965). Environmental influences act as a constraint on this relationship; similar procedures or levels of inputs will not result in similar levels of out-

puts in markedly different environments (Brookfield, 1972; Turner, Hanham, and Portararo, 1977). Nevertheless, the relationship is sufficiently strong to be useful for broad, comparative purposes. The literature is more specific on general levels of inputs by livelihoods than it is on levels of output, such that surrogate measures of output must be used. These surrogates include techniques/procedures of cultivation, crop-fallow cycles, and so forth (Turner and Doolittle, 1978).

The categories are intended to represent the relative levels of output per farming unit (the farmer and/or herder and dependents). These levels are based on the measures discussed and on the degree of involvement with market cultivation. Subsistence farmers tend to maximize agricultural efficiency at low levels of desired output; that is, they meet subsistence needs with least effort. The result is minimal surplus other than that available during good conditions for cultivation. As market production evolves, output per farm unit increases in order to insure some level of surplus for sale. As near total market cultivation is encountered, output increases considerably for two reasons. First, market farmers can rarely "purchase" subsistence as cheaply as they could produce it themselves. Second, they tend to maintain higher wants (satisfiers) which demand more purchasing power by higher outputs (or switching crops).

It must be observed that the increase in output described does not entail a one-to-one relationship with reliance on purchased foods. Impoverished farmers, operating at marginal subsistence levels, frequently purchase a considerable amount of their foods because of poor yields or crop failure and/or superior off-farm livelihood opportunities. It is emphasized that this circumstance is largely a result of regional economics and not the inadequacies of the farmer. For example, farmers on marginal lands may be unwilling to place needed inputs into land improvements to ensure production because the ultimate reward is insufficient and/or off-farm opportunities provide a more efficient means of obtaining subsistence.

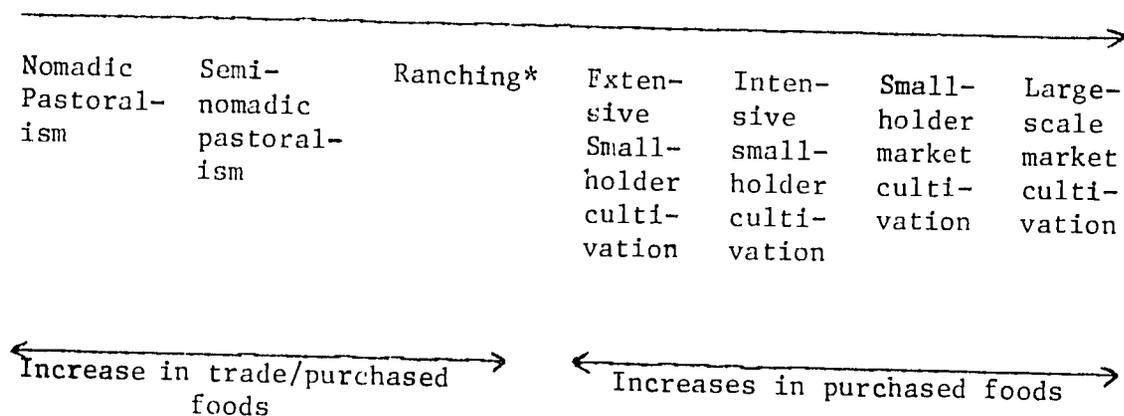
Several other factors are also considered in this classification. The significance placed on livestock by farming units tends to affect output in that the animals often require fodder crops and, in turn, can provide power and waste products for cultivation. Irrigation can increase output on drylands by providing security to production and opening the possibility of multi-cropping (two or more harvests per year). Planned government projects can also affect output, particularly in regard to stimulating a move to market production and use of new technologies, such as hybrid crops.

The categories used here are: nomadic pastoralism, semi-nomadic pastoralism, ranching, extensive smallholder cultivation, intensive smallholder cultivation, smallholder market cultivation, and large-scale market cultivation. The movement from nomadic pastoralism to large-scale market cultivation tends to be associated with major increases in output per farm unit area and time. While exceptions exist, this relationship holds in a broader sense and is useful for comparative purposes.

TABLE 1

General Tendencies in Livelihood Categories

Increases in agricultural intensity (output), inputs, and surplus



* Ranching is an exception to the relative levels of inputs and surplus and can exceed those levels associated with smallholder cultivation which emphasize subsistence.

3.1 Nomadic Pastoralism. This form of livelihood is characterized by a strong emphasis on subsistence production of livestock which are maintained by movement of the herds and the herding unit over a specified area. But some groups, the Somali herders for example, have a long history of commercial sales of animals. No or minimal effort is expended on cultivation, and vegetable foods are generally obtained by trade or purchase. The more marginal the habitat in terms of biomass, the more output extensive is this mode of livelihood.

Nomadic pastoralism in eastern Africa is associated with two broad but distinctive groups: the Semitic peoples of the Saharan fringes and the Horn of Africa who raise camels, sheep, and goats, and the Nilo-Hamitic peoples of the drier zones from Kenya/Uganda southward who raise cattle, sheep, and goats. These two groups display a wide array of nomadic patterns.

3.2 Semi-Nomadic Pastoralism. This livelihood involves a major emphasis on livestock production as described above but also involves considerable cultivation, usually near a permanent village. In some instance, particularly in southern Sudan, only a segment of the group actually migrates with the herds, while another segment remains at the permanent village. This livelihood is less dependent on food trade with farmers than are purely nomadic groups.

Semi-nomadism has been increasing in eastern Africa, as many nomadic groups have had restrictions placed on their movements. This circumstance is apparent in Masailand as the herding units become increasingly involved in cultivation as their land holdings are reduced. Traditional zones of semi-nomadism are or were the Sud region of Sudan, western Ethiopia, and the Nilo-Hamitic-dominated zones of Rwanda/Burundi.

3.3 Ranching. The rearing of livestock for commercial production only is limited in eastern Africa. It is confined largely to the highlands of Kenya where Europeans may maintain a ranching component to their large farms or estates, and some Kenyans have engaged in the livelihood. Some experimental ranching of wild animals has taken place in Kenya and Tanzania. So-called ranches exist in the eastern segments of Masailand in Kenya where individuals or families own grazing land. However, production is not geared for the market, and the livelihood may better represent a modern elaboration of nomadic pastoralism.

3.4 Extensive Smallholder Cultivation. Smallholder farmsteads dominate the cultivated zones of eastern Africa where a large majority of farms are less than five ha in size (2 ha or less is a common farm size). The extensive category is dependent on the crop-fallow data where direct output data are lacking. Crop-fallow cycles less than 1:1

(one year of cultivation to one year of fallow) is considered extensive. Most production in this category is subsistence-oriented, although a "normal" surplus or surplus from a portion of the farm set aside for such may be sold on the market. Such production is limited and unstable because of the subsistence emphasis and off-farm activities. Inputs are low for those reasons discussed. Interestingly, few areas of eastern Africa are devoted to long-fallow cultivation in which land is rested for 10 more years, indicating that economically cultivable land is not abundant.

3.5 Intensive Smallholder Cultivation. The distinguishing criterion of this form of agriculture, which is, perhaps, the most prevalent livelihood in eastern Africa in terms of the number of people engaged in it, is that the period of cultivation tends to equal or exceed the period of fallow (the crop fallow cycle is 1:1). Again, major emphasis is placed on subsistence production, but a segment of the output is often devoted exclusively to market crops. Stability in production may be higher than among extensive cultivation because of the increased technological inputs and labor associated with the higher levels of output required. In some zones, particularly in highland Kenya and Ethiopia and on several islands in Lake Victoria, intensive smallholder cultivation traditionally has rivaled in sophistication that of most any form of indigenous land use in the world.

3.6 Smallholder Market Cultivation. This livelihood category is distinguished by a strong emphasis on production for the market, although subsistence production usually exists as well. Emphasis tends to be placed on the intensive cultivation of international export commodities, particularly coffee, sisal, and similar crops. This type of agriculture is spatially restricted in eastern Africa to various high quality habitats, such as the wetter volcanic slopes, as are the smallholder coffee farms on the slopes of Mt. Kilamajaro, or as in the various irrigation schemes established by local governments. This livelihood is rarely undertaken unless the market crop in question provides sufficient security in return from the market that the farmer is rewarded with a standard of living higher than which could be obtained by emphasis on subsistence production. To hedge on the inherent risk of market production, smallholder farmers often engaged directly or indirectly, through family or other ties, in auxiliary livelihoods, such as subsistence production or herding.

3.7 Large-scale Marketing Cultivation. This type of livelihood is distinguished by larger farms, above 5 ha but more commonly larger, and an emphasis on chemical and mechanical inputs and/or irrigation to produce export crops. Input and outputs tend to be higher than the other livelihoods, but efficiency (output per unit input)

may be lower. This livelihood is aerally restricted in eastern Africa, although it tends to receive more recognition by planners than any other form. In Ethiopia and Sudan large-scale market cultivation is associated with irrigation projects founded by private netrepreneuers or the governments, with an emphasis on cereals, cotton, and plantation crops. In the highlands of Kenya it is associated with European farms and/or plantations. Plantations are also common in the coastal zones.

As noted previously, several exceptional circumstances that affect livelihoods are considered in the classification scheme. These have been noted by the addition of symbols to the major categories.

- (a) Livestock is often important subsidiary activity for smallholder farmers. Livestock rearing involves effort on the part of the farmer, but can lead to productive farming results as previously discussed.
- (b) Irrigation schemes have important impacts on the levels of output and can provide a security level which makes smallholder farming an acceptable risk.
- (c) Various livelihoods exist that do not fit well into the categories provided or warrant special recognition for several reasons. The Gezira scheme in Sudan is

designated in that it represents the largest of the large-scale irrigation projects in eastern Africa in which considerable sums of money have been invested. The Zande scheme of southwestern Sudan is special in that it represents one of the first planned attempts in eastern Africa to restructure a traditional agricultural economy. Several zones in Ethiopia, Sudan (Jebel Marra), and Tanzania (Ukara Island) have been designated because they represent highly intensive, long-term, indigenous cultivation schemes, usually involving terracing and other major agro-engineering works. While such cultivation techniques are not unique in eastern Africa, these have been recognized because they stand out as examples of traditional, high output cultivation surrounded by more extensive livelihood types. Finally, eastern Masailand in Kenya is recognized because here the traditional nomadic herders have taken individual or family ownership of their land, disrupting traditional herding patterns.

Large segments of eastern Africa are utilized so extensively as to not warrant a designation as supporting no livelihood system. Such natural zones include mangrove swamps, higher elevated slopes, salt pans, ergs, and lands of poor native soil fertility and tsetse fly domination. In addition, much land in Kenya and Tanzania especially, is reserved as national parks or game reserves. Some of these zones are frequently penetrated by pastoralists and occasional farmers. For the most part, however, these lands are not intended for agricultural use and have been designated as such.

Finally, large portions of several zones designated as a particular livelihood are composed of farmsteads dispersed among "empty" or unused lands. Unfortunately, the data quality and mapping scale prohibited the precise demarcation of the farmed versus the non-farmed land, particularly in parts of northeastern Tanzania, northern Uganda, western Sudan, and the rugged terrain of Ethiopia. In such cases the entire zone has been designed by the more dominant agricultural livelihood, but where the unused land exceeds those supporting two livelihood types, symbols are used to designate this circumstance.

4. CLASSIFICATION AND MAP ACCURACY

The classification developed here is necessarily broad in order that a pan-eastern Africa scale could be handled. More fine-tuned categories could be developed with superior data and a less ambitious areal scope. It is emphasized that this classification is intended to provide information on the general types of agricultural livelihoods in the region and on the relative productivity (intensity) of these land uses. In order to achieve these goals a number of assumptions were employed in regard to surrogate measures of output. While these assumptions are founded on various accepted principles, their validity to an eastern Africa sphere requires field data.

By far the greatest concern of the report are the accuracy of the categories to the actual livelihoods group placed within them and of the demarcation of the livelihoods. The data were drawn largely on the literature and from various documents housed at the Program for International Development, Library, Clark University (see references). The quality of the data by country varied enormously. The data for Tanzania and Kenya were good; that for Ethiopia, and Burundi/Rwanda was poor. Large segments of Uganda and Sudan are also lacking adequate documentation. The various islands in Lake Victoria display a variety of livelihoods, but these are inadequately documented (often erroneously documented). Considerable inac-

curacies may be involved with the demarcation of livelihood of the islands belonging to Uganda.

Categorization and map preparation was assisted by Drs. Leonard Berry, Mesfin Wolde Mariam, and Philip O'Keefe who have had considerable research experience throughout the region. Indeed, the demarcation of Ethiopia relied extensively on the knowledge of Dr. Mesfin Wolde Mariam who has devoted years of research to rural land uses in his country.

Other problems in map preparation involve the location of various irrigation and government projects. Often preparation involved the use of several map projects which did not accurately overlay one another.

Despite these and other problems, the large patterns emerging from the work are relatively accurate given the scope of the project. Experts on particular areas in the region will undoubtedly find demarcation or categorization inaccurate. The work is a first approximation, and further attempts will undoubtedly be more refined and accurate.

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