An introduction to the Food Economies of Southern Sudan

World Food Programme

Save the Children Fund (UK)

An Introduction to the Food Economies of southern Sudan

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All FEAU members, past and present, wish to express thanks and appreciation to the many Sudanese who have assisted us with friendship and hospitality while working in southern Sudan and for sharing and explaining so much of their knowledge and experience.

(FEAU Manager)

PREFACE

It is hoped that this document will help the reader to have a deeper insight into the lives of Sudanese and a clearer understanding of the dynamics of their livelihoods. The bias towards pastoral people is a result of the continuing conflict in these areas and the inevitable vulnerability demanding the attention of the FEAU. The non-pastoralist tend to have enjoyed greater food security, and relief food is normally only needed for the displaced or returned populations. Nevertheless, the unit will continue to develop a clearer picture of other areas as time and resources allow.

One of the main objectives of the FEAU and the SCF/WFP partnership has been to improve the quality of available information concerning the vulnerable in southern Sudan and to improve the capacity of organisations to utilise this information. Recent initiatives to improve coordination within OLS revealed that many managers and decision makers were unaware of the depth of information available within the FEAU. Apart from information about the livelihood patterns touched on in this document, the unit also holds resource material on a number of other topics. Examples include:- how people budget between one harvest and the next, information on fish, wild foods, socioeconomic differences, trade and exchange mechanisms, calorific and nutritional values of foods, the impact of insecurity, variations in seasonal access to different food sources by different wealth groups etc. In addition, the unit endeavours to keep up to date on population numbers and movements and to stay in touch with the activities of NGO'S, counterparts* and other agencies operating within the southern sector.

Strengthening the link between information and decision making is a necessary endeavour in any development operation. In a chronic complex emergency setting, speed and effective targeting of relief can saves lives and money and few of us are unaware of the increasing demand for limited resources. Within OLS the Food Economy methodology is now widely regarded as useful to those making decisions about food aid and non-food relief interventions. By identifying the mechanisms that condition vulnerability everyone is better placed to understand not only who is vulnerable now, but what changes are likely to make groups vulnerable in the future and then to consider appropriate steps to address some of these issues. With the development of the FEAU database, access to FEAU information will be improved and information disseminated more effectively. The database was initially intended to act as an institutional memory for OLS. It is also hoped that the potential value of the information will increase with improved mechanisms for sharing and utilising it.

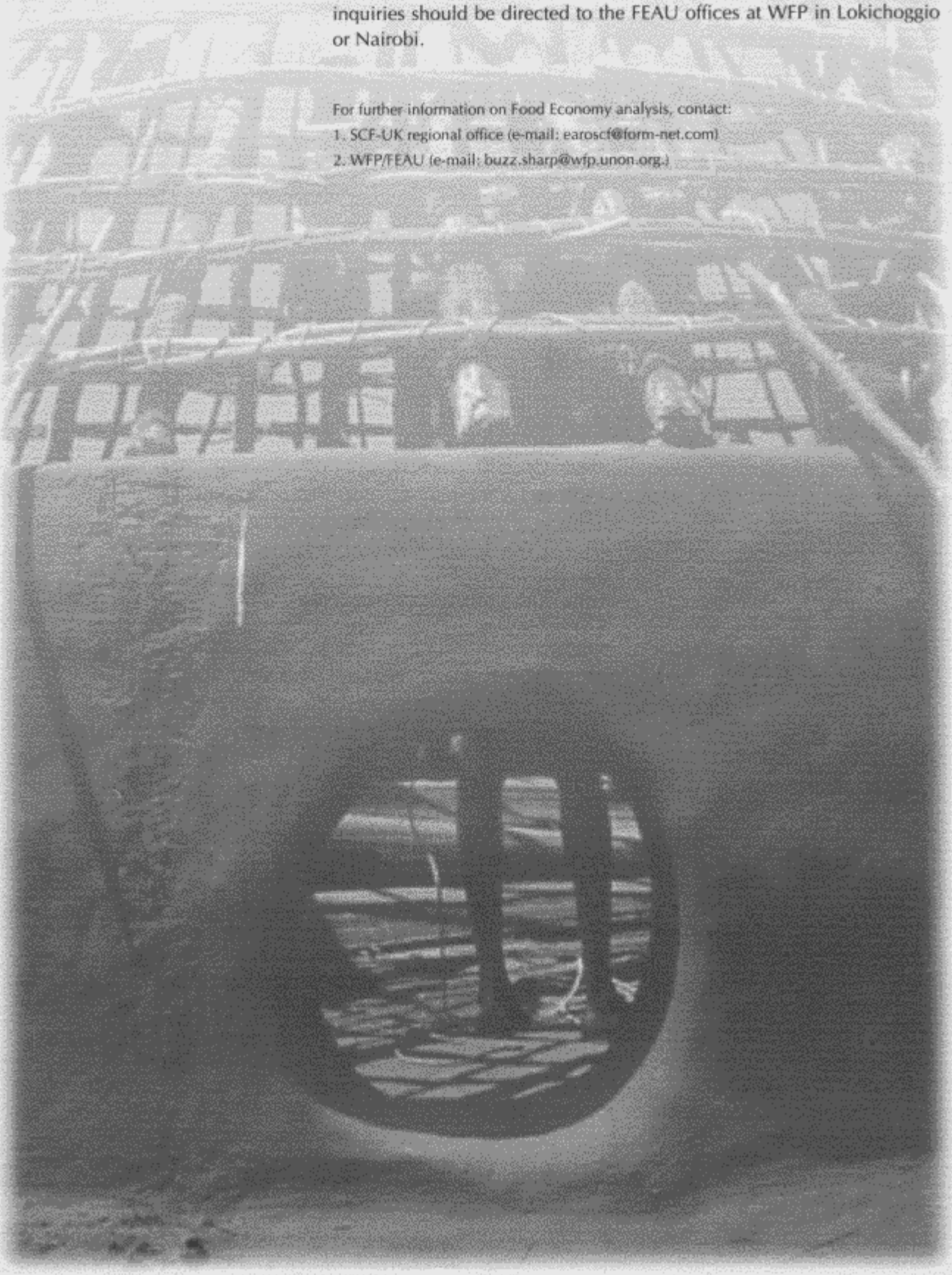
Over the last three years a large number of OLS consortium and counterpart staff have received training in the Food Economy analysis and the demand for training remains high with a growing interest from managers as well as from field staff. One of the benefits of this has been that more and more people are now familiar with "Food Economy" and this will greatly assist planning and coordination as more decision makers use the a common vocabulary and the same standard or framework for the better analysis and targeting of relief support.

* Counterpart refers to a humanitarian wing of the SPLA/M or SSIA/M.

Readers are encouraged to comment on this document and offer further contributions. Information on southern Sudan, and especially food economy assessment reports will be gratefully received by the FEAU. Inquiries relating to the methodology and more details about training in Food Economy will also be welcome. Assessment analysis and FEAU database inquiries should be directed to the FEAU offices at WFP in Lokichoggio or Nairobi.

For further information on Food Economy analysis, contact:

1. SCF-UK regional office (e-mail: earoscf@form-net.com)
2. WFP/FEAU (e-mail: buzz.sharp@wfp.unon.org.)



FOREWORD

In the early 1990's, the World Food Programme delivered thousands of tons of food to hundreds of thousands of people in war-torn southern Sudan for whom malnutrition and death were regrettably commonplace. Well-intentioned and effective in saving lives this assistance certainly was. However, it was primarily supply driven, with insufficient knowledge of the true needs of people who were receiving that food aid.

In 1998, after four years of successful partnership between WFP, the Save the Children Fund (UK) and other members of the Operation Lifeline Sudan consortium, our knowledge of **who exactly** needs relief food, in **what quantities** and for **how long** is considerably greater. This enables WFP to respond more cost-effectively and in a more timely manner to the needs of southern Sudanese people, who in normal times are well able to meet their own needs.

The primary purpose of producing "An Introduction to the Food Economies of southern Sudan" is to make available the accumulated wisdom of WFP and SCF (UK) workers to all those interested in this compelling part of the world. I am confident that the enlightenment and knowledge contained in the following pages will be invaluable to all such people in the years to come.

Like everybody else associated with the food aid programme in southern Sudan, I look forward to the day when peace returns to this agriculturally rich landscape and the people of southern Sudan no longer need food aid.

Mike Sackett

Mike Sackett
WFP Regional Manager
Horn of Africa

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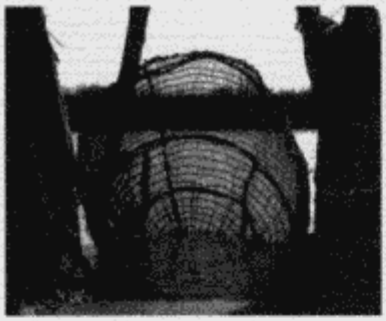


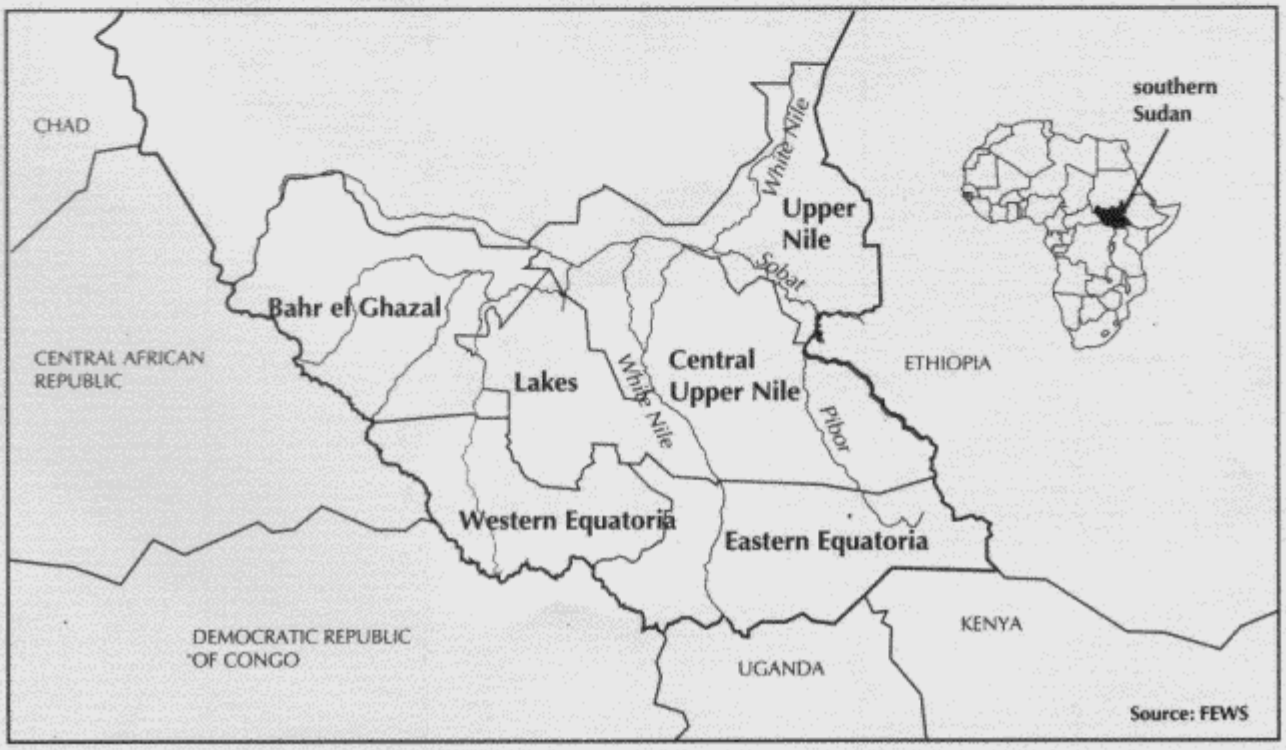
GLOSSARY OF VERNACULAR TERMS

Abur	Dinka fishing group
Bhor	Nuer cowpea variety
Chungor	Nuer cowpea variety
Cuei	Tamarind (*Tamarindus indica*)
Diri	Moru sorghum variety
Dungdung	Nuer cowpea variety
Feddan	Arabic measure of area - 0.42 hectares
Gok	Highland (Dinka)
Jak	Nuer cowpea variety
Khor	Seasonal river (Arabic)
Lalop	Desert Date (*Balanites aegyptiaca*)
Lang	*Ziziphus mucronata*
Lor chok	"Go fat" (Dinka)
Lulu	Shea Butter Nut (*Butyrospermum niloticum*)
Mabior	Dinka sorghum variety
Mau	Local beer
Mocca	Didinga Sorghum variety
Monythany	Dinka fishing group
Nyarango	Moru sorghum variety
Payam	Administrative area within a County (SPLM areas)
Rial	Nuer cowpea variety
Rok	Channel trap for fish
Sudd	Permanent swamp around the Nile and its tributaries
Thoi	Basket trap for fish (Arabic)
Thou	Desert Date (*Balanites aegyptiaca*)
Toic	Seasonally inundated grassland (swampy area)
Tukul	Hut (Arabic)
Ullelo	Sorghum variety

ABBREVIATIONS AND ACRONYMS

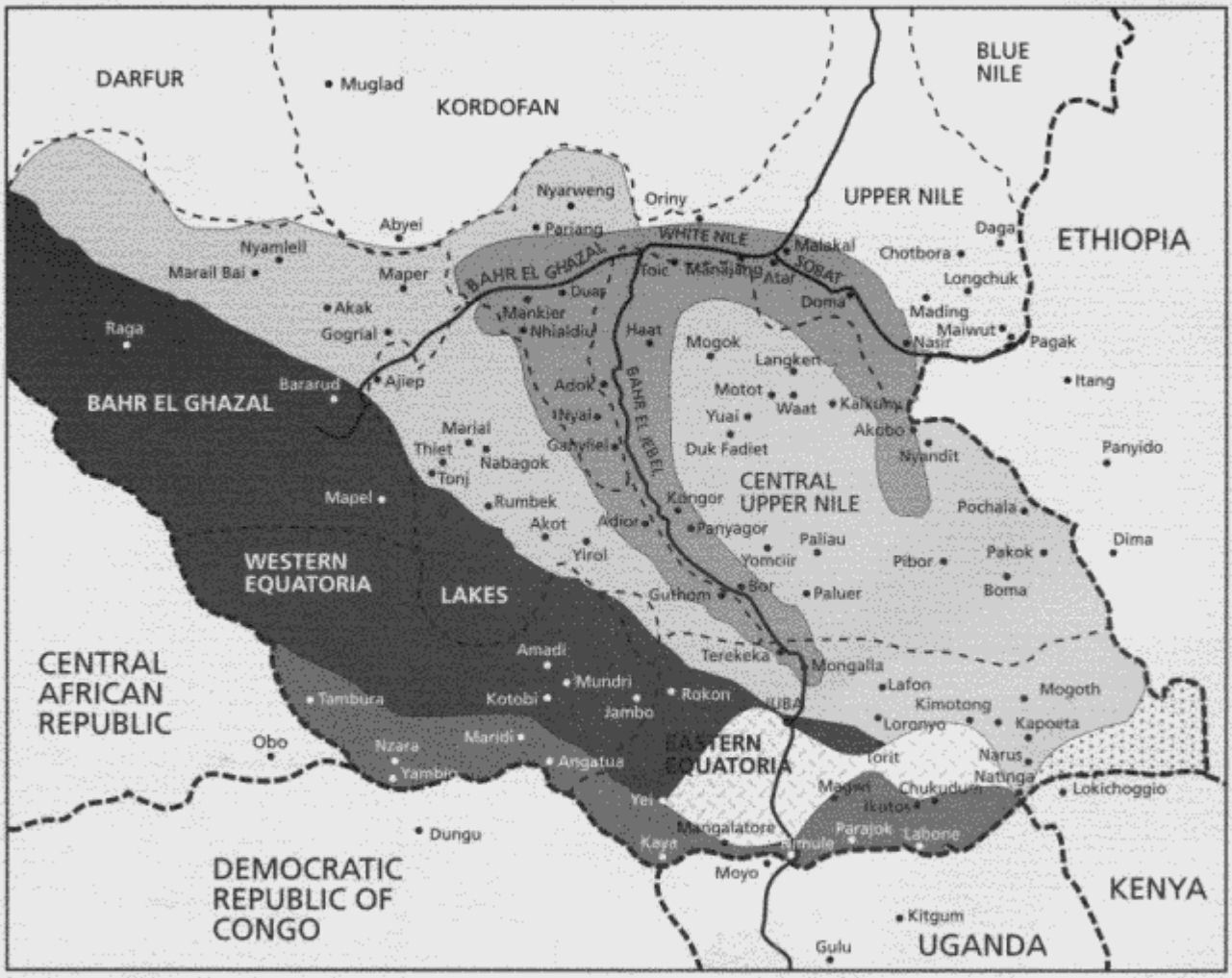
DFID	Department for International Development
ERAP	Equatoria Region Agricultural Programme
FEA	Food Economy Analysis
FEAU	Food Economy Analysis Unit
FEWS	Famine Early Warning Systems
LWF	Lutheran World Federation
MSF	Medecins sans Frontiers
NGO	Non-governmental Organisation
ODA	Overseas Development Administration (of British Government)
OLS	Operation Lifeline Sudan
PDU	Project development Unit
RASS	Relief Association of southern Sudan
SCF	Save the Children Fund
SPLA/M	Sudan People's Liberation Army/Movement
SRRA	Sudan Relief and Rehabilitation Association
SSIA/M	Southern Sudan Independence Army/Movement
Unicef	United Nations Children's Fund
WFP	World Food Programme

Sudan: Provinces accessible to OLS (southern sector)



Map of southern Sudan

FOOD ECONOMY AREAS



PART ONE

Background to the Food Economy Methodology in southern Sudan

BACKGROUND TO THE FOOD ECONOMY METHODOLOGY

INTRODUCTION TO THE DOCUMENT

This document, which describes the six main food economy areas of southern Sudan, brings together a summary of information on food security in southern Sudan which has been gathered by Save the Children Fund UK and World Food Programme, in the period since the Food Economy Approach was introduced in 1994.

The document presents an overview of the socio-economic composition of local populations, their available food options, and their strategies for accessing food and seeking survival. As such, the document aims to provide useful background information on access to food in southern Sudan for agencies operating in, or with an interest in the region. It does not attempt to fully explain the current political situation in the area, to examine the role of humanitarian bodies or to fully assess the impact and importance of food security interventions.

DESCRIPTION OF HOUSEHOLD FOOD ECONOMY ANALYSIS

A method of analysing food security at household level

Household food economy analysis is a method for assessing the needs of areas or population groups facing problems of acute food insecurity.

The method is based upon an understanding of the various options people employ to secure **access** to food. The approach goes beyond traditional production-based assessments by exploring, in a systematic fashion, the other food sources people rely upon, and the extent to which these can be expanded in times of crisis. In a bad year, for example, can people increase their consumption of wild foods? Or can some members of the family migrate in search of employment? Can the most affected households turn to their better-off kin for gifts or loans to help them get by? Or do they have food stocks they can draw down?

The results lend themselves to simple visual presentation in the form of pie charts. An example of a pie chart analysis for the war affected Akot area of southern Sudan is given in Figure 1. In a bad year—in this case a year of production failure—a typical household may lose half its food crop production, equivalent to 30% of its annual food consumption. Before the war, this could be made up by expanding the consumption of fish and wild foods, and increased slaughter of cattle for meat. With the war, however, a number of these strategies have been undermined—lack of fishing equipment limits the catch of fish, loss of livestock means that fewer animals can now be slaughtered, and so on. These days, therefore, families are likely to go hungry when their crops fail.

Looking for alternatives to food aid

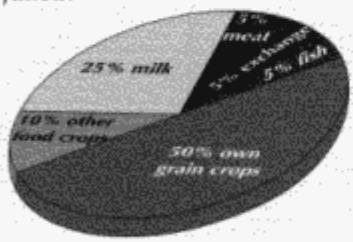
One way to tackle the problem of hunger is by providing food aid. But the

Figure 1:

Sources of food in Akot, south Sudan

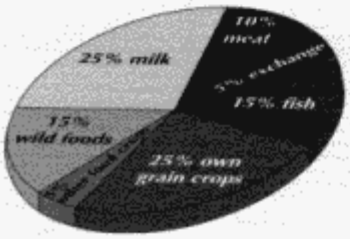
A 'normal' year pre-war

In Akot, before the war, more fish, meat and wild foods would be consumed when the crops failed.



A 'bad' year pre-war

Since the war began, the catch of fish in Akot has been limited by a lack of fishing equipment. Providing such equipment is a realistic alternative to food aid.



By taking into account people's own efforts to obtain food at times of crisis, estimates of food needs derived using the approach tend to be lower than those generated by other approaches.

approach also recognizes that food aid may not be the only solution. By focusing on the mechanisms used to gain access to food at times of crisis, the analysis can be used to suggest interventions other than food aid—interventions that will support rather than replace local initiatives.

Better estimation of food aid needs

Where food aid has a role to play, the approach allows a better estimation of needs than provided by a production-based assessment. In the case of Akot, food aid needs could be calculated from the pie charts as follows. suppose the typical family cannot afford to slaughter any additional animals, then they would face a deficit equivalent to 5% of their annual food needs. If they cannot expand fishing, they will require an additional 10%, and so on.

By undertaking similar analyses for poor and rich households, as well as the typical household represented here, a quantitative analysis of total food needs can be built up.

Household food economy analysis also has a significant contribution to make in terms of targeting assistance, since it allows a clearer definition of who is vulnerable and why.

A clearer definition of what food aid is for

In a food economy analysis, vulnerability is linked to economic circumstances, rather than pre-defined group parameters such as 'elderly' or 'disabled'.

An important aspect of the analysis is that it helps to define more clearly what food aid is for. All too often outside observers ask "where are the dead bodies?" when food aid fails to arrive in the quantities originally requested. But in the case of Akot, for example, the objective of providing food aid might not be in response to an increase in the number of deaths, but rather to save assets and preserve future livelihoods by providing families with the option of retaining livestock they would otherwise have to slaughter for food; a timely intervention designed to avert rather than respond to an emergency.

Analysing the effects of conflict and insecurity

The approach can be used to analyse any problem resulting in reduced access to one or more sources of food, be it production failure due to natural causes (e.g drought or flood), or problems resulting from conflict and insecurity.

In the case of Akot, for example, conflict and insecurity could have a wide range of effects on households access to food:

- Raiding and destruction of crops or food stocks would reduce access to the "own grain crops" and other "food crops" slices of the pie (see Figure 1).
- Raiding of livestock would reduce access to "milk" and "meat".
- Reduced access to areas affected by conflict could reduce access to "wild foods" and "fish", if these are found in the insecure areas.

Gathering the information: the use of key informants

A family only becomes food insecure if, having lost access to one or more food sources, it is unable to expand other sources to make up the deficit.

The approach draws as far as possible on existing documentation, but also taps into the knowledge of local people in a highly structured and systematic way using 'key informant' enquiries (recognising that in most cases it is unrealistic to expect information needs to be met in any other way, eg via expensive household surveys).

Depending on the information required, key informants can be found at any level—village, district, or regional. They may be government workers or NGO employees (working on agricultural, veterinary or other programmes), teachers, representatives from village organisations (farmers'

We are aiming at a picture where 'things add up' in a basic sense—a picture that is both plausible and possible. This is arrived at through a combination of information and judgement.

union, women's union'), traditional local leaders or traders. But above all, they are people who, by virtue of their position or experience, know the answers to most of our questions.

The use of key informants is becoming more common in many fields, and the validity of the information obtained in this way is increasingly recognised. Our experience has been that, with appropriate selection and proper cross checking within and between interviews, the judgement of key informants on quantitative questions—such as the typical livestock holding of an area—deserves the same confidence that we instinctively give to their judgements on qualitative questions—such as the types and uses of livestock. That this is not a statistical confidence by no means negates the value of the information.

Rigour comes from the focus on food, and the fact that if people are surviving, they must in most circumstances be consuming close to 100% of their calorie requirements. The task is to piece together the relative importance of the various food sources for different families, basing this estimation on an understanding of how much of each source a family may have access to, and a knowledge of that food's potential calorific contribution. By grounding the investigation in nutritional principles[1] and a basic knowledge of what is possible or plausible in order to survive, the methodology encourages a vigorous ongoing analysis and results in a tightly constructed final picture.

FOOD INSECURITY IN SOUTHERN SUDAN

Even before the present war the basic economy of southern Sudan was mainly one of subsistence production, with farmers selling surpluses for cash in good years. Food security has always been based on the household level, with a variety of strategies which seek to reduce risk. Internal political conflicts and tribal disputes in southern Sudan have, however, since 1983 eroded many people's abilities to remain self sufficient in food, and have increased the risk factor. Insecurity effects people in many ways, both direct and indirect. These include the closure of markets; restrictions on movement; curtailment of trade routes and exchange relationships; displacement of people; abandonment of agriculture; loss of cattle and crops; and reduced ability for secure storage. The effects of insecurity therefore have many direct impacts on people's food economies. They also exacerbate the effects of recurrent food stress arising as a result of non-security factors such as drought, floods, pests and disease.

The extent to which this insecurity impinges on the food economy depends both on the type of insecurity, what food economy area it takes place in, and the time at which it occurs. For example, if an agro-pastoralist community is forcibly displaced for a temporary period during the planting season they may suffer more in food security terms than if they had been displaced during the dry season, when most of their cattle would have been away in the *toic* and their grain would already have been harvested.

If baseline information has been gathered in an area it is generally possible to understand which food options are likely to be reduced following any change in security or other conditions, which food options may be expanded, and for how long. The food economy approach has allowed such baseline information to be gathered from a range of sites in southern Sudan, and this document is an attempt to build up a picture of overall food security and its contributing factors. It is hoped that this can then be used to determine the most appropriate responses.

[1] The data on which most of this document depends concentrates on the calorific value of foods. The breakdown of the food sources is based on the need for 1,900 KCal per day for survival. The need for other nutrients, while recognised, is not central to this data.

THE FOOD ECONOMY APPROACH IN SOUTHERN SUDAN

The period up to 1994 saw a gradual increase in food aid interventions in southern Sudan. The country lacked reliable records relating to agricultural production, and even if these had been available they would have revealed very little about the population's access to food. Nutritional surveys tended only to reveal evidence of people's suffering, and proved difficult and costly to implement.

The OLS (Operation Lifeline Sudan) consortium, consisting of Unicef, WFP and some 35 NGOs and agencies, lacked a method of analysis to assess needs and to plan appropriate interventions. The Food Economy Approach was introduced in 1994 when Save the Children Fund UK[2] entered into a partnership with WFP supported by DFID (ODA). The aim was to provide a standard framework for analysis by describing how people are surviving, based on the understanding of all the various food options people employ to secure access to their daily nutritional requirements.

By collecting information about which food options are available to households, this approach aims to help show where local communities are facing a food shortage and to prioritise more carefully the needs and resources for assistance, without undermining local coping strategies. The Food Economy Approach takes the household as the basic unit of analysis, defined in southern Sudan as a woman and her dependants[3].

The approach is based on understanding all the options people employ to secure access to food. In contrast to the traditional approach which assesses people's food security by looking only at what people grow and harvest, it focuses on people's complete traditional livelihoods and explores all the food sources they rely upon and the mechanisms they use to access them. This approach takes full account of those food sources which would be less significant in more market oriented economies. More space is devoted to the less familiar sources of food in this document as it is assumed the reader will be familiar with normal agricultural production strategies.

The Food Economy Approach recognises that food production has never been the sole basis upon which people in southern Sudan access food, and that insufficient food production does not necessarily mean that people have insufficient food access. Since the population density in southern Sudan is low, interaction between the domestic and wild domains is very significant. People are only made vulnerable or food insecure by crop failure if they also lack access to other food sources which may substitute for lack of crops.

In southern Sudan people generally manage to survive, and therefore must be consuming close to their calorific requirements. They survive on a number of different food sources over the year, including crops, livestock products such as milk, meat and blood, wild foods and fish, each of which is obtained through a number of different mechanisms such as cultivation; gathering; hunting; trade using savings or earnings from labour; kinship support mechanisms; migration to different areas; and food aid distribution. The role of the Food Economy Approach is to piece together the relative importance of these different food sources at different times for different families, and understand how a change in conditions - such as drought or insecurity - affects people's mechanisms for gaining access to food and may leave them vulnerable or food insecure.

For the past fifteen years, the people of Sudan have been struggling to survive in the midst of civil war. In response to the on-going crisis, the international community has regularly provided humanitarian assistance,

[2] The Food Economy Approach originates from work carried out by John Seaman, Julius Holt and Penny Allen of SCF-UK.

[3] Several households may therefore be located in one compound. Many men are polygamous, and thus overlap several households.

including both food and non-food aid. The on-going conflict and the region's geography and economy present formidable challenges to monitoring food insecurity and targeting relief aid. Analyses of food security under these circumstances must take the following factors into account:

- **Diversity of livelihood systems.** Livelihoods in southern Sudan are highly varied. Household food and incomes are drawn from a wide range of agricultural and non-agricultural activities, including crop and animal production, hunting, gathering, fishing as well as trade and bartering. Any analysis of food security must assess the roles of these sources of household livelihood, the interactions among them, and how they vary from one Food Economy zone to another.
- **Complex disruptions to livelihoods.** The ripple effects of conflict undermine otherwise robust traditional mechanisms for dealing with natural shocks such as drought and flooding. By disrupting productive activities and destroying off-farm sources of livelihood, conflict combines with natural phenomena to curtail the diversity of food sources, leaving populations vulnerable to food insecurity.
- **Providing aid in the midst of war.** Physical risk, large-scale movements of displaced people, and the general confusion that arises during complex emergencies combine to complicate efforts to deliver humanitarian relief.

Familiarity with southern Sudan's livelihood systems and an understanding of how those systems respond to stress is a prerequisite for the effective monitoring of food security and the design of appropriate relief interventions.

Diversity of Livelihood Systems

Southern Sudan offers many potential sources of food, owing to the varied landscape and climate within its nearly 640,00km^2 (about the size of France). The FEAU has classified southern Sudan into six main food economy zones (see map page 8). Within these zones crop production accounts for less than half of total food consumption in much of the region, with the rest coming from a combination of animal husbandry, fishing, wild food collection and, on occasions, food aid. In such circumstances, providing food aid is one possible response to food insecurity. But is it always the most appropriate? For instance, if a population that has traditionally relied on fishing to augment its food supply shows signs of food insecurity, an assessment of the situation should include some examination of fishing conditions. Appropriate relief measures might include fishing tools, such as nets, lines, and hooks.

Complex Disruptions to Livelihoods

The civil war has significantly disrupted livelihoods throughout southern Sudan, even beyond areas touched directly by the fighting. The populations most affected are those caught up in areas of conflict, who are often forced to flee for their safety. Herds are raided, crops are burned and assets are pillaged. The loss of productive assets forces households to rely on secondary sources—a shift that may not be sustainable over time.

Even for those not directly in the line of fire, the conflict disrupts traditional agricultural and pastoral practices, exacerbating the effects of bad weather. Farmers may reduce areas cropped for fear of destruction during raids and labour shortages constrain their ability to cultivate. Production from cattle falls as normal seasonal migrations are disrupted and cattle herds, the main insurance against drought, are reduced. As

households rely more on crops, they become more vulnerable to poor rainfall, without the safety net of other traditional coping strategies.

Conflict undermines the benefits of trade, which increase people's opportunities to meet their food needs. Trade also helps people to avoid relying on any one food source while providing them with additional income to purchase needed food and supplies. The absence of trade limits such opportunities and increases reliance on outside food assistance to cover the variability in local production.

Before the civil war, there was significant trade of surplus cattle. The production of cash crops for export—including tea, coffee, sesame and palm oil—was low but increasing, even in the relatively isolated Equatoria. However, the war has caused a collapse of trade, particularly between rural areas and major population centres. Many towns are under the military control of one group while surrounding areas are controlled by another. Movement of goods and people in and out of the town is restricted, cutting off markets for producers and consumers alike and making both groups more vulnerable to food insecurity.

The deterioration of infrastructure has severely curtailed the movement of agricultural goods between surplus and deficit areas. For example, when several NGOs, including CARE (USA) and World Vision International, embarked on an innovative programme for exchanging consumer goods for grain, the poor state of roads necessitated the distribution of grain by airplane. Rebuilding trade links is a prerequisite to establishing food security in southern Sudan.

Providing Aid in the Midst of War

Refugees often play major roles in Africa's complex emergencies. Exchanges of territory among the warring parties create new displaced populations as well as opportunities for others to return. However, returnees can quickly become a major burden. Where strong ties exist between returnees and people who remained behind, the sharing of food and seed can ease resettlement without outside support. However, when the scale of the movement is too large or occurs during a poor crop season, local communities become hard pressed to assist in supporting returnees, and short-term food relief becomes necessary.

For example, when large parts of western Equatoria changed hands in the early 1990's, there was an exodus of Zande across the border to join relatives in the Central African Republic and the former Zaire. By early 1997, most of those who had fled had returned to western Equatoria. Kinship support and adequate food supplies enabled the returnees and those who had stayed in Sudan to share food and seed with minimal outside support for this transition.

A contrasting example is the ongoing return of refugees to eastern and western Equatoria since April 1997, prompted by the deteriorating security situation in the camps in northern Uganda and improving conditions in southern Sudan. The large number of people (130,000), combined with poor growing conditions immediately after the planting season, exceeded the support capacity of the local communities, and relief food became necessary.

FOOD ECONOMY ZONES OF SOUTHERN SUDAN

The food economy approach is based on identifying a number of food economy areas which reflect similar livelihood patterns and similar threats to maintaining them. A food economy area is defined as a collection of sites/counties/districts that do not necessarily fall within one administrative system, but have similar food and income options and are prone to similar risks. Within any food economy area there may exist different types of people, varying in social, cultural and economic characteristics as well as in their access to food, but operating within the same context.

Taken as a whole, the southern Sudan forms a wide shallow basin bounded by the plateau of the Nile-Congo watershed in the west and southwest, by the mountains of the Uganda border in the south and by the Ethiopian highlands in the east. Every part of this vast basin drains into the Nile and its numerous tributaries. In the centre of the basin there is an extensive swamp zone. To the west and south, the edge of the swamp zone is bordered by the rising ground of the ironstone ridge which forms the fringe of the Central African Ironstone Plateau.

Within this area, six broad food areas have been identified, and are described in this document (see Maps):

- **The Flood Plains;** which border northern Sudan, are prone to extensive seasonal flooding of the tributaries of the Nile, which replenishes low-lying swamp areas (*toic*). Dinka and Nuer herders graze their cattle on the savanna in the wet season and on the *toic* in the dry season. Crops, milk, fish and the occasional consumption of meat provide important contributions to their diet. The *toic* also provides fish and wild foods—important seasonal supplements to the sorghum and other crops grown both in the upland areas and in the *toic* as insurance against drought and flooding.
- **The Nile Corridor;** in which most people live close to the three major rivers of the south: the Nile, the Sobat, and the Pibor. Cattle play a less important role in the economy than in the neighbouring flood plains, and inhabitants of this zone rely heavily on fish, crops and wild foods for their sustenance. Even the Dinka herders displaced by fighting elsewhere who have recently migrated into this zone are compensating for their war-related herd losses by learning to use the *toic*—harvesting fish, crops and waterlily seeds—as well as by trading livestock for grain with other local groups.
- **The Ironstone Plateau**[4]**;** on which annual rainfall ranges from 950 to 1,300 mm and crops typically provide more than half of a household's total food needs. At least two crops a year are common in this zone. Sorghum is the staple crop and is supplemented with cowpeas, maize, millet and cassava. Wild foods are plentiful, game is hunted and the rivers are fished. Tsetse fly (*Glossina morsitans*) infestation, however, keeps cattle populations low.

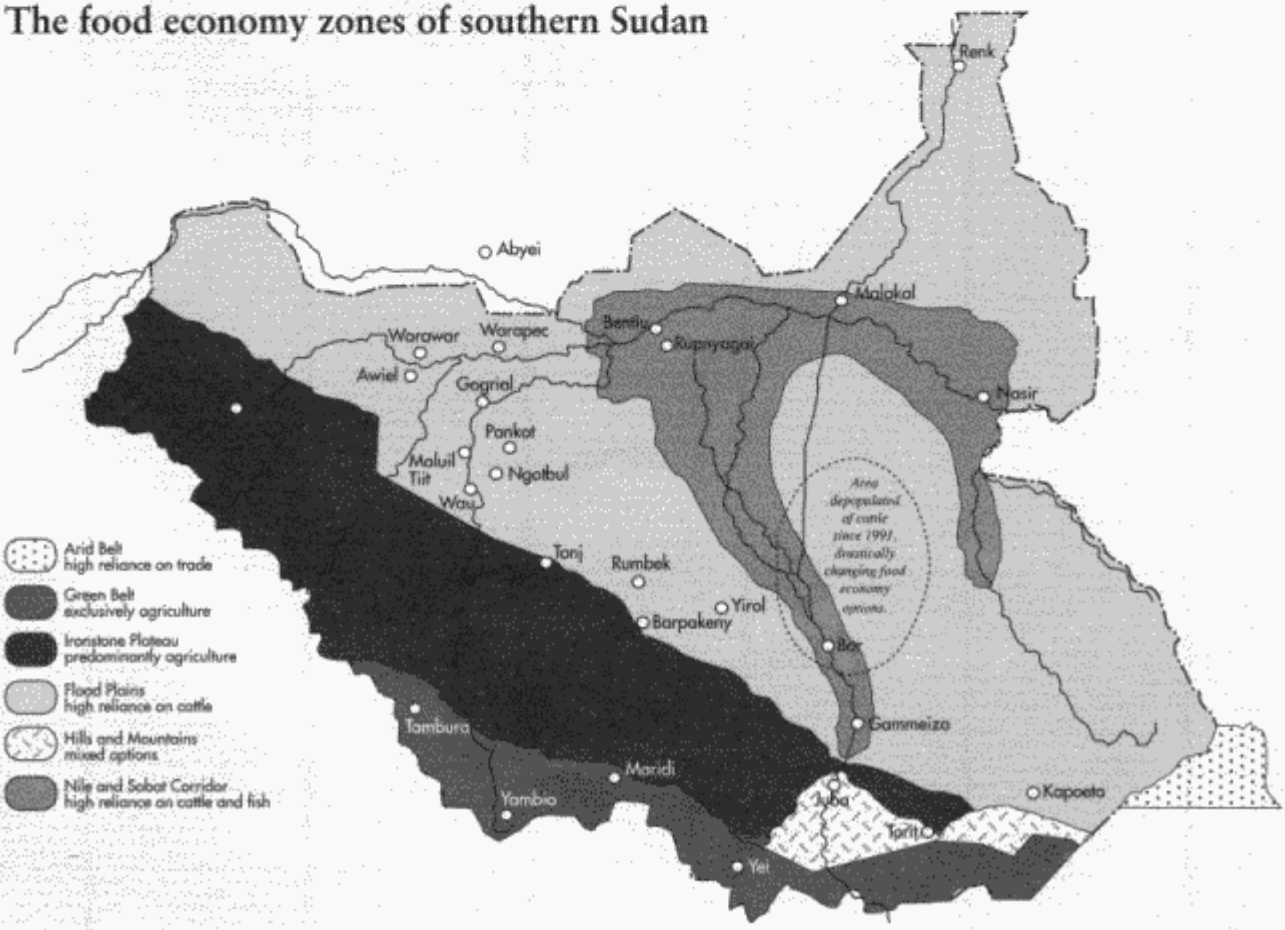
[4] The Ironstone Plateau is regarded as a transitional zone. The Jur/Luo group are a good example of this demonstrating important exchange mechanisms between pastoral and agricultural groups, but for the purposes of this document it is treated as one FE zone.

- **The Green Belt** runs along Sudan's southwestern border. The largest ethnic group here is the Zande, who live on both sides of the border. They are agriculturalists, growing two crops a year of maize, finger millet, groundnuts, sorghum, cassava and rice. With abundant rainfall (1,350 to 1,600 mm) and naturally fertile soils, this has traditionally been a zone of grain surpluses and great potential. Even in the bad year of 1995, Operation Lifeline Sudan recorded crop production at 150 percent of total household needs. A large variety of other food sources, including yams, mangoes and honey along with fish, are also available.

- **The Hills and Mountains** zone in eastern Equatoria receives anywhere from 750 to 2,200 mm of rain per year in its higher elevations. Livestock production is possible, although crops (mainly sorghum, millet, beans and maize) provide the major food source. With relatively few rivers, fish are not an important component of the diet. Households collect wild foods and trade surplus grain for livestock with neighbouring pastoralists. Production has been disrupted as households have used the fertile valleys less and intensified cultivation higher in the hills as a result of continuing conflict.

- **The Arid Zone**, in Sudan's southeastern corner, is inhabited by agro-pastoralists. The zone has very low rainfall (an average of 200 mm per year) and few permanent rivers or water points. Livestock products provide two thirds of local diets. Grain (mainly sorghum, largely accessed by trade) and wild foods meet the remaining calorific needs. The already limited crop production has been reduced as households have been displaced from the most reliable and productive arable lands.

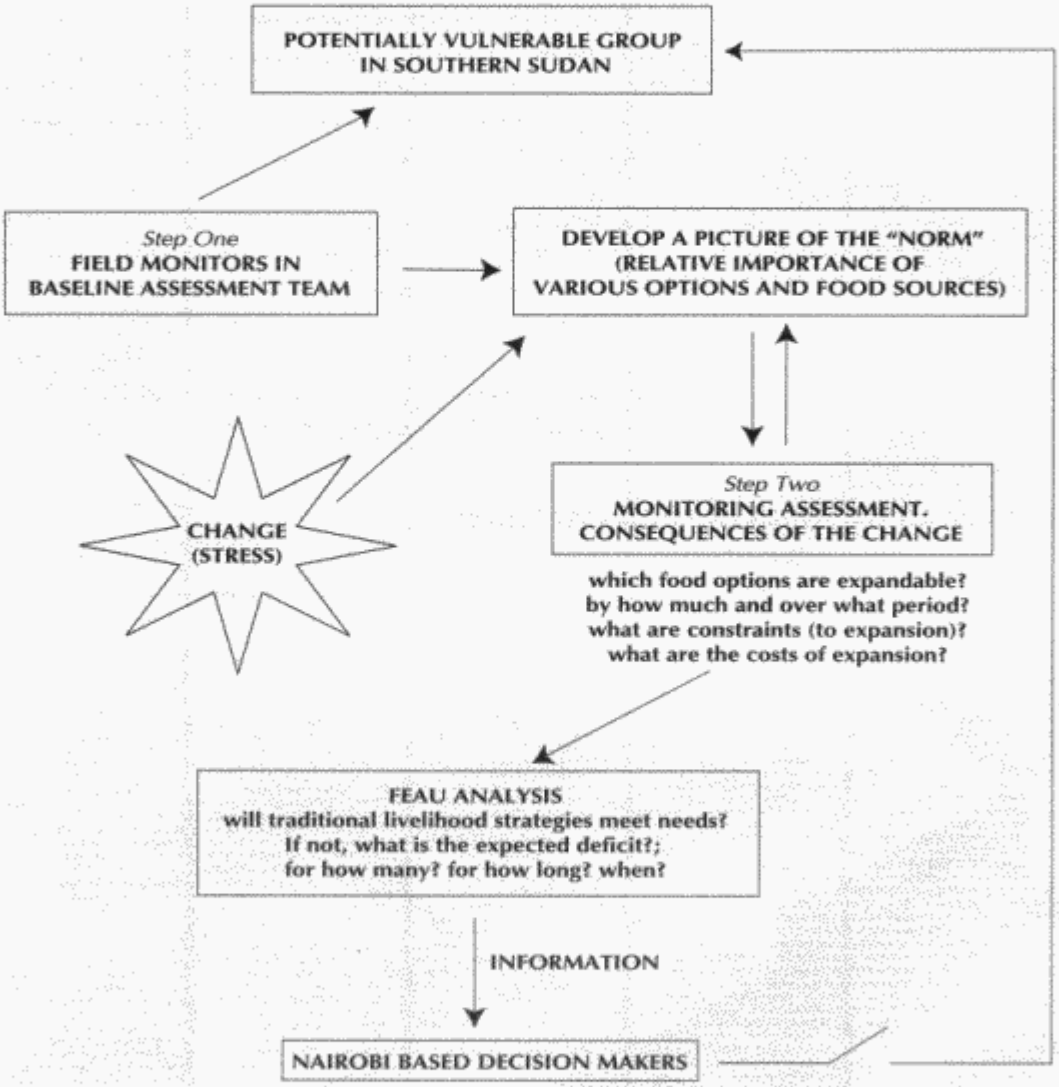
The food economy zones of southern Sudan



DEVELOPING THE FOOD ECONOMY PICTURE

The diagram and text below outlines a very brief description of the steps involved in assessments and food economy analysis.

INFORMATION: "CLOSING THE GAP".



STEP ONE: BASELINE ASSESSMENT

Once the food economy zones have been identified, food monitors develop the baseline picture of access to various food sources for different wealth groups in both good years and bad in order to understand normal coping mechanisms. This reveals the flexibility of the food economy and it's ability to adapt to normal agro-climatical and socio-economic variants. Further analysis reveals the 'norm' or 'pre-war' baseline.

STEP TWO: MONITORING ASSESSMENT

Once the baseline picture is established it becomes possible to monitor the impact of change. A line of inquiry using Key Informants, semi-structured interviews and other Rapid Rural Appraisal techniques allows the access to the various food options to be considered. Following a simple calculation of their nutritional values, an analysis of the contribution of various foods can be made. This reveals whether different food sources can be expanded to compensate for losses. This may sometimes be referred to as assessing the "coping mechanisms". When the remaining food sources are unable to meet the needs, the deficit can be calculated allowing the needs of the vulnerable group to be considered[5].

Identification of groups at a given location:

Part of the normal inquiry of an assessment involves establishing a communities definition of wealth. For example, in some areas, wealth is related to the number of cattle a man owns; in others, a man may be regarded as wealthy if he has many wives. Once this has been established, discussions can reveal the percentage of the community that are regarded as wealthy and poor and also the size of the group regarded as being in between or the "mid" group. More inquiry can reveal how surpluses held by 'better off' groups are redistributed within the community and the mechanisms that make this possible. Further investigation reveals how food can be accessed through trade and exchange and this includes kinship support and obligations. (e.g In many cases, the poor access food by labouring for wealthier groups.) With this information, it is possible to analyse needs of groups more precisely.

Finally, a report is submitted to Lokichoggio FEAU for quality control and further checks before being sent to the FEAU manager in Nairobi, the emergencies office and other OLS decision-makers.

Changes in WFP food aid targeting

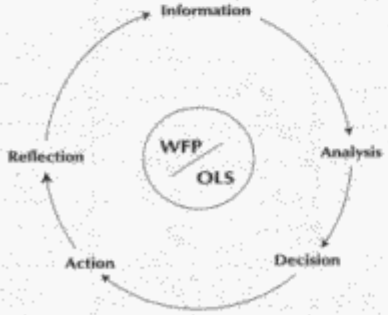
Before the FEA methodology was introduced, a number of relief centres were operating in various locations of southern Sudan. Gradually these were phased out as families reestablished their livelihoods in 'home' areas. One indicator of success for the FEAU must be that over the past four years more accurate targeting has enabled people to sustain their normal livelihoods even though assets have been depleted. In the more insecure areas, many people are on the brink of survival but they do not migrate to food distribution centres when OLS relief access is not restricted. It is the careful targeting of relief support that has prevented the re-emergence of such centres. However, when the required food aid cannot be delivered, often due to logistical constraints, the cost is borne by the Sudanese. Cattle may have to be sold or slaughtered, some family members may have migrated to the north to find work, etc. (On occasion, increased deaths result.) Others may have adopted new survival tactics, but dependency on UN food relief has not been observed. The quantities that are delivered are generally enough to allow survival until other food sources become available, or to enable labourers to clear land and plant. Alternatively, relief food may prevent further asset depletion (e.g. sustainable herds lost and seeds consumed, etc.). This illustrates the delicate balance that exists in protecting livelihoods.

FEA is currently being used by WFP in Somalia, Sudan, Kenya, Uganda, Ethiopia and the Lakes region both in open and closed economies as well

[5]In the southern Sudan context, this is not always obvious. On occasions the wealthy cattle owners have been found to be the most vulnerable. They have limited options to access food after cattle are raided or killed.

as in refugee camps. (See Appendix II for further key features of the Food Economy Methodology.)

Information used in Analysis	
Where?	Maps; FEA Zones
Who?	Wealth ranking, social-economic matrix
How much?	Comparing the NORM to NOW pictures (baseline and monitoring pie-charts). Calculating the size of the deficit and the percentage of the population exposed to the shortfall.
When?	Seasonal crop and activity calendars
How long for?	Calendars. Considering other factors that will effect access to food sources. Possible changes for better or worse.
How many?	Population estimates. Percentage of the Community exposed, Population movements.
Why?	Analysis of the factors contributing to the change from the baseline and impact on coping mechanisms. Constraints to access, seasonal access limitations preventing traditional survival options?
Response?	- food, non-food - by: UN, NGO, local group?



What's so special about the Food Economy approach?

Although the WFP uses the food economy approach to determine food needs, it has a much wider application within OLS as a whole. By comprehending the elements of a given economy, FEA also helps identify resource constraints and the consequences resulting from reduced access. The approach enables an analysis from a pre-established baseline. This allows planners to use the same **standard framework for analysis and decision making**.

The following questions were raised by managers at a workshop held in Nairobi in 1997 to appraise the value of the methodology:- Will it provide the answers we need to allow us to justify our actions? Does it represent good value compared to other assessment approaches? Will it provide more than just a picture of relative vulnerability? Is it appropriate for emergencies? Can it provide actual figures (tonnages) of food aid required?

Is there a standard framework for analysis? Is the method transparent enough to satisfy donors and recipients? Experience has shown that FEA can provide the information managers need.

Decision makers working within the OLS consortium have made the following comments:-*

"FEA provides an efficient and effective tool for assessing food needs."

"It answers the questions, Where, who, why, how much, how long for?"

"It is a system that tells you how things work and what's actually going on at the ground level."

"Between south Sudan and Nairobi we have a large physical gap and information gap which has been significantly reduced by the introduction of the food economy approach."

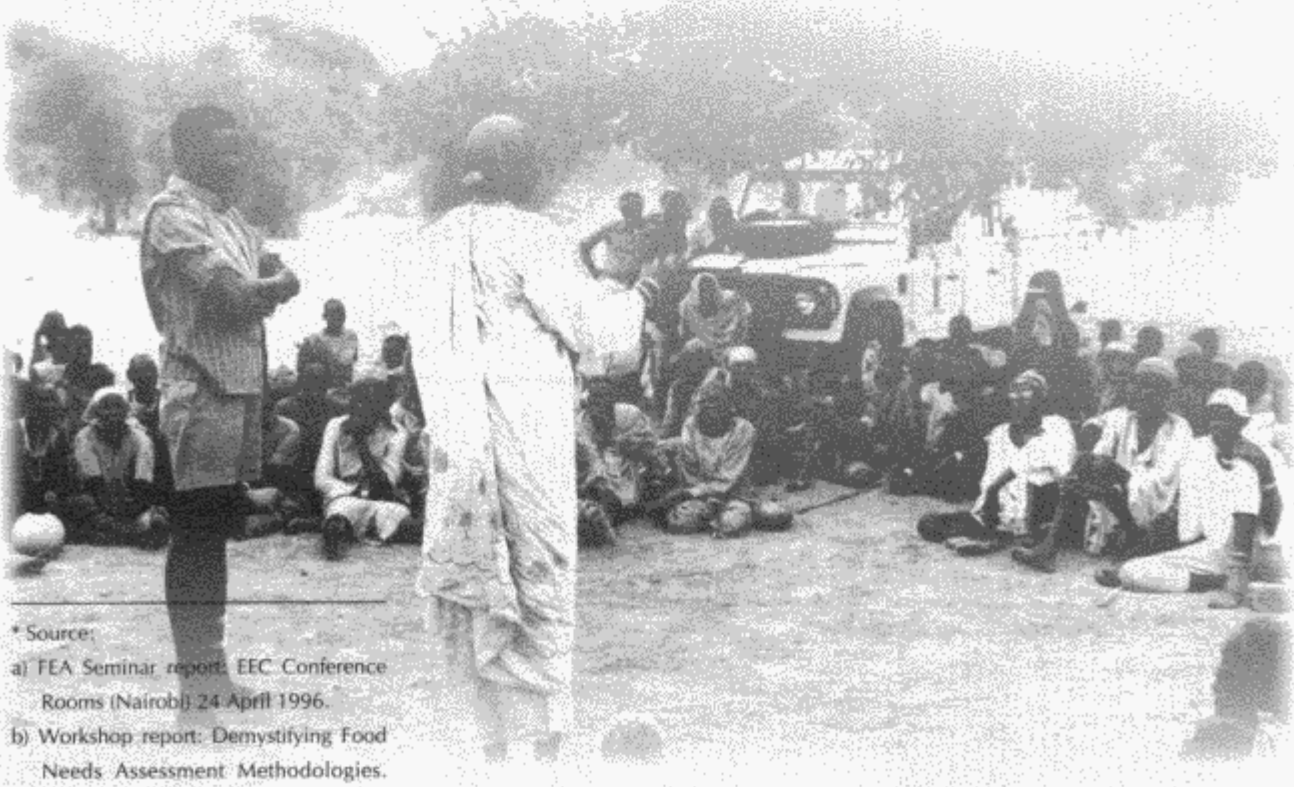
"It's a system that supports local livelihoods by an appreciation of traditional survival mechanisms."

"It has helped promote a "common language" amongst OLS decision makers."

"It helps prioritise the extent of need in different locations even in times of conflict and in different times of year and for different sectors of the population."

Sudanese have commented:-

"The assessment teams help us recognise the real problems. The discussions help us think about ways to address these problems."



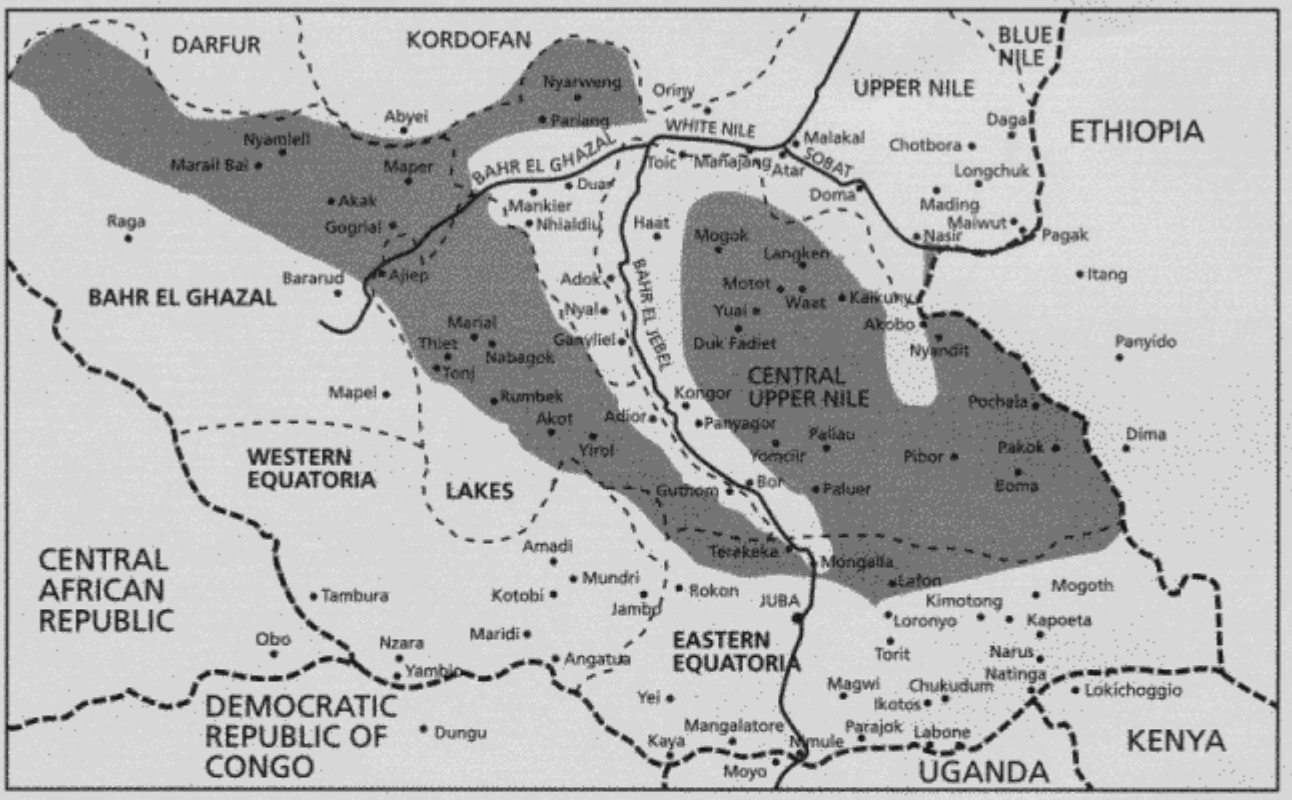
* Source:
a) FEA Seminar report: EEC Conference Rooms (Nairobi) 24 April 1996.
b) Workshop report: Demystifying Food Needs Assessment Methodologies. (Nairobi) June 25-27, 1997.

PART TWO

An Introduction to the Food Economies of southern Sudan

Prepared by
WFP/OLS Food Economy Analysis Unit
from information gathered in SPLA/M and SSLA/M areas between 1994 and 1997

THE FLOOD PLAINS FOOD ECONOMY ZONE



SEASONAL CALENDER

Northern Bahr el Ghazal and Lakes Area

KEY

Planting ——— Harvesting/Usage ▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Maize					———		▬▬	▬▬				
Sesame					———		▬▬	▬▬				
Okra					———		▬▬	▬▬				
Pumpkin					———		▬▬	▬▬				
Sorghum					———				▬▬	▬▬		
Groundnuts						———				▬▬	▬▬	▬▬
Tobacco	Transplant ———		Harvest ▬▬						Planted HH nursery/germinate ———			
Livestock Movement	Cattle Camps ▬▬							Higher Grounds ▬▬			Cattle Camps ▬▬	
Trade/exchange	▬▬											▬▬
Meat	▬▬				Food for Work ▬▬						Ceremonies ▬▬	
Fishing		Drying Pools ▬▬								Seasonal Rivers ▬▬		
Wild-food	▬▬								▬▬		▬▬	

Fishing - carried out in two places i.e. (1) drying rivers/pools and (2) seasonal rivers when water level is receding

Meat - Mostly eaten during ceremonial occasions (Nov-Jan) and in some parts of the region it is eaten during the hunger gap when people come to work for food.

Livestock - Cattle camps from Oct/Nov-March/April. During April the cattle are mostly found within the surrounding areas of the village. August the cattle move to higher grounds.

Millet - is planted in some places, particularly in Northern Areas.

BACKGROUND TO THE AREA

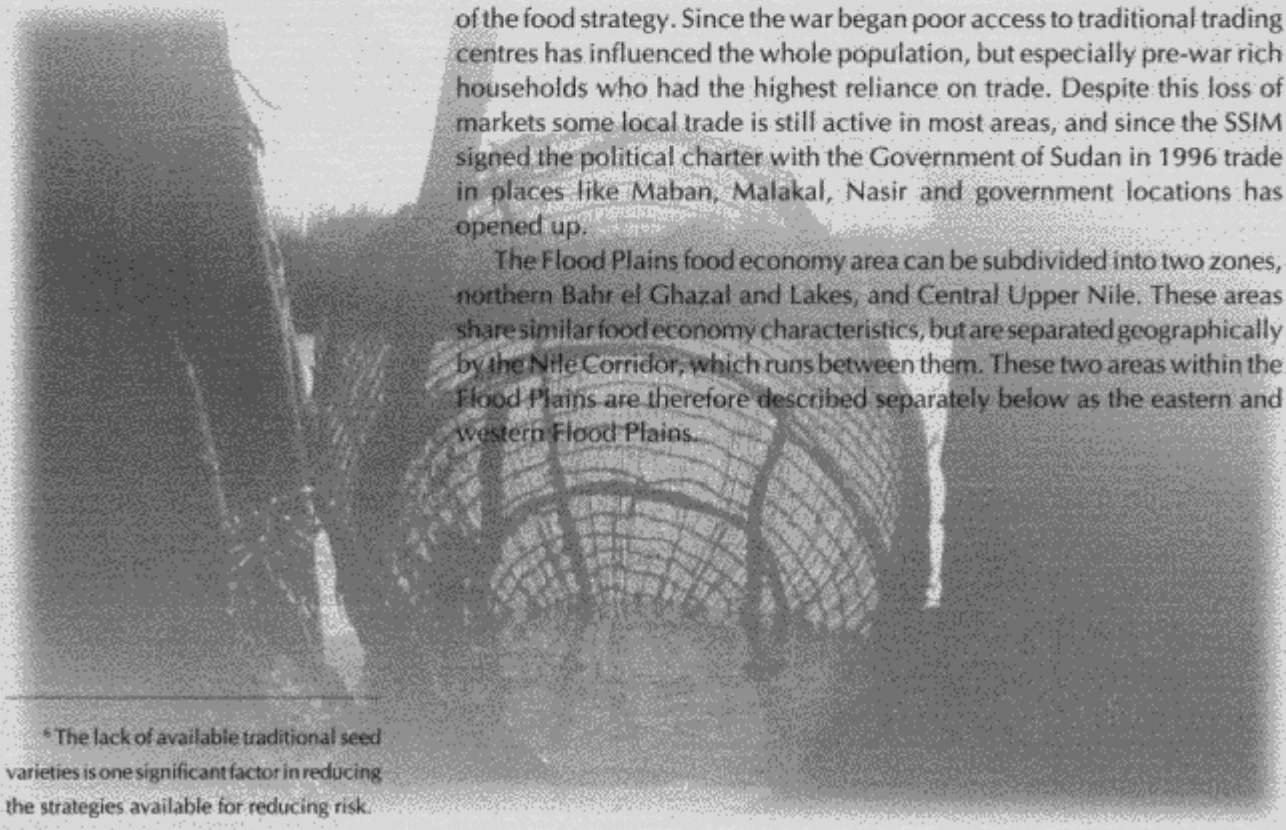
The Flood Plains region comprises those areas of southern Sudan which are prone to seasonal flooding during the rainy season of April to September, with the exception of the Nile Corridor (see next section). Within the Flood Plains, soil types vary considerably, and it is not uncommon to find three or more different soil types within a 40 km radius. The lowest areas, known as *toic*, are usually flooded by river water for around 4 months of the year and have soils of a fertile black clay mixture. Higher areas of the Flood Plains have less fertile and sandier soils.

The dominant production system in the Flood Plains is agro-pastoralism, which combines arable cultivation with livestock production under a system of transhumant pastoralism (the seasonal movement of livestock herds and herders to follow the availability of pasture and water). Agro-pastoralists differ from nomadic pastoralists in having permanent settlements. Permanent human settlements are located on the higher land above the flood plains which remains free from flooding even during the height of the June to September wet season. During the dry season, a significant proportion of the human and livestock population move downwards to the *toic* in search of pasture and water. Crops are planted in both the flood plains themselves and higher areas.

Both drought and floods have affected the Flood Plains food economy since the start of the war. These climatic extremes have always had a major impact on crop production, but since the war started households have not been able to employ as many risk-reducing practices in agriculture as they did formerly[6]. The options available to make up for any loss in crop production have also been curtailed. The causes include the loss of major markets and traders; and reduction in cattle numbers which has meant that there is less meat and milk to sell.

The loss of markets as a result of war has significantly affected the populations of the Flood Plains area, for whom trade is an important part of the food strategy. Since the war began poor access to traditional trading centres has influenced the whole population, but especially pre-war rich households who had the highest reliance on trade. Despite this loss of markets some local trade is still active in most areas, and since the SSIM signed the political charter with the Government of Sudan in 1996 trade in places like Maban, Malakal, Nasir and government locations has opened up.

The Flood Plains food economy area can be subdivided into two zones, northern Bahr el Ghazal and Lakes, and Central Upper Nile. These areas share similar food economy characteristics, but are separated geographically by the Nile Corridor, which runs between them. These two areas within the Flood Plains are therefore described separately below as the eastern and western Flood Plains.



[6] The lack of available traditional seed varieties is one significant factor in reducing the strategies available for reducing risk.

THE WESTERN FLOOD PLAINS (NORTHERN BAHR EL GHAZAL AND LAKES)

BACKGROUND TO THE AREA

Northern Bahr el Ghazal and Lakes comprises a number of counties (see Table 1). It contains an estimated population of about 1.5 million, comprised of different Dinka groups which are dominated by the Malual, followed by Rek and Twic.

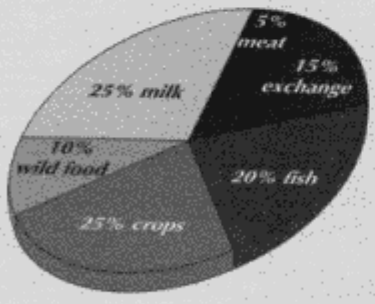
Although these Dinka groups have minor differences they are included in the same food economy area due to their common dependence on agro-pastoralism. Although livestock are of primary importance in cultural and socio-economic terms and are a major source of cash income (Dickey 1991), the greatest part of the Bahr el Ghazal Dinka's diet is likely to be derived from crops (Barbour 1961, Duncan 1978). Since the advent of the war, arable agricultural production has gained further importance.

Table 1: Counties and Ethnic Groups in the northern Bahr el Ghazal and Lakes area.

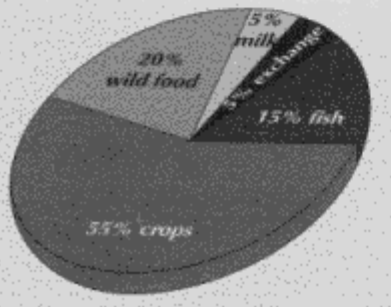
County	Dinka groups	Other
Aweil East	Malual	
Aweil West	Malual	
Gogrial	Ngok, Rek (Aguok, Apuk, Awan, Kuac)	
Tonj	Rek (Aguok, Apuk, Awan, Kuac) Twic	
Twic	Twic	Bul
Rumbek	Agar	
Wau	Rek	Jur
Yirol	Aliap, Atwot, Cec, Twic	

Figure 2:

Normal year food economy



Households with few cattle



OVERVIEW OF THE FOOD ECONOMY

The relative importance of different food options to the normal year household food economy of Bahr el Ghazal Dinka is represented in Figure 2, comparing average and poor households. Households with few cattle (five or less, of which at any time only one may be a cow in milk), may be considered to be poor. In contrast, average households have access to between 15-20 cattle, of which four may be in milk at any one time. A rich man, with up to five wives, is likely to have access to 70-100 cattle.

As Figure 2 illustrates, the food economy of average Bahr el Ghazal Dinka households is normally dominated by milk, crops and fish. For poor households, crops are of greatest importance, contributing half of the annual food needs, while milk and exchange foods are both of relatively less importance than they are for average households, and wild foods of greater importance.

PRODUCTION AND COLLECTION

CROPS

CONSTRAINTS TO CROP PRODUCTION

Crops are of great dietary importance in the northern Bahr el Ghazal and Lakes area. Arable cultivation includes a range of crops, planted at different times and in different areas. Crops are rainfed, and grown for subsistence, selling the surplus in good years.

Farming is precarious and subject to a number of risks. As well as local rainfall varying greatly, both in total amount and distribution, the nature of the soil and the low slope across the flood plains mean that the area is susceptible to both drought and flood. In addition pests such as stem borers and weaver birds commonly attack the crops, and farmers have no access to pesticides. There are no fertilisers available except cattle manure, and the amount of land planted is often constrained by lack of labour.

Farmers engage in a number of risk-minimising practices. These include use of different traditional crop varieties and planting on both high and low land - for example by planting an early crop on the *toic* prior to cultivating in higher village areas, or by preparing a field on higher land which can be devoted to groundnuts.

The war has also reduced the amount of labour available for farming. Household labour is often inadequate. Community labour is very common throughout the region, with payment normally made in the form of *mau* (local beer) or through the slaughter of a goat or bull. Those who are unable to afford payment can only put a limited area under cultivation unless they have many sons to carry out farm work[7]. Having many sons is also a way of building up wealth in the form of livestock by cultivating large farms, and then bringing in labour from outside, but due to the war these sons are now often away from home.

Fighting or fear of attack has meant that many households have had to flee their homes more than once. Displaced groups may be able to return within a month or two to their homes, or they may have to settle semi-permanently in another area where they can cultivate. In both cases seeds and tools are often lost during displacement and only a small area, usually of virgin land, can be cleared and planted in the first year.

These constraints together mean that poor families often fail to produce even the normal half of their annual food needs from their own crop production. In 1995, for example, poor households in the surplus area of Achong chong (Wau county) produced only 30% of their food needs from crops and households in lower potential areas produced only about 20%. Due to the inadequacy of cultivated crops, households find it necessary to expand other food sources such as wild foods or the exchange of labour for cash or grain.

CULTIVATION PRACTICES

Farms are an average of 2 feddans[8] (around 8,000 square metres) in size. Cultivation starts when the first rains fall, generally at the beginning of May. A variety of quick growing crops are planted first, including maize, sesame, okra, pumpkin and a short-term variety of sorghum[9]. These crops are planted over a small area around the tukuls (thatched, mud or grass walled houses in villages) and only comprise a small proportion of the household's total crop area. Most will be ready within 45-60 days, and help to fill the hungry gap before the main crop is ready for harvest.

[7] Duncan's survey in the late 1970s showed that those with a working party cultivated an average of 5.3 feddans, while those without only 3.0 feddans. Those with working parties produce more, making it possible, if the area remains secure, for them to have one the next year. Wealth is thus self-perpetuating.

[8] The feddan is the local measure of area. It is an area defined as 60 m by 70 m, i.e. 4,200 square metres. One feddan equals 1.04 acres or 0.42 hectares.

[9] Green grams, *Vigna radiata*, are also a popular food crop with the Dinka.

The main crop, sorghum, is planted immediately after the quick maturing crops, often intercropped with small amounts of beans, sesame and millet. It is harvested between September and October (in Aweil, Gogrial and Tonj) and December and January (in Rumbek, Tonj, Wau and Yirol). A small amount of maize is commonly planted after the main sorghum crop.

Groundnuts and tobacco are also cultivated in suitable areas. The area under groundnuts and the timing of operations varies throughout the region, mainly depending on the amount of gok (highland) land with light soils available. Short-term groundnuts are usually planted with other quick growing crops at the onset of the rains in May, while other varieties are planted around June and harvested between October and December. The quick maturing variety is often, with maize, the first food available.

Certain areas are particularly known for tobacco production[10]. Tobacco is usually planted around the tukul in November, when cattle manure the land as they move towards dry-season *toic* grazing. It is then transplanted after 30-45 days to more fertile areas after the rains, often on riverbanks or in *toic* areas where the floods have receded. Those who cultivate tobacco are usually involved in trade. Even a poor family, in tobacco growing areas, may cultivate three heads of tobacco, two of which will be for own consumption and one for trade. Tobacco is thus an important factor in the exchange input to the food economy.

LIVESTOCK

Although crops are of primary importance in dietary terms, livestock form the main source of cash income for the people of the Bahr el Ghazal and Lakes area. They are viewed as a vital famine reserve and also play a central role in local socio-cultural systems.

The vast majority of households own small stock and approximately 80% still retain cattle[11]. Cattle numbers vary in different areas and for different groups. In normal years, poor households may have five or less cattle, average households have access to between 15-20 cattle of which four may be in milk at any one time, and rich households are likely to have access to 70-100 cattle. Since the advent of the war, although average households within Rek and Twic areas still have three or four milking cows, the Malual Dinka have suffered many losses due to looting and are reported to have only one or two cows per household.

SEASONAL LIVESTOCK MOVEMENTS

Settlement and production activities are largely determined by the seasonal movement of livestock herds in search of pasture and water. The movement of livestock depends on the *toic*. In contrast to semi-arid area pastoralists, the Dinka cattle have better pasture, and therefore milk production, in the dry season than in the rains. In a normal year most cattle will be involved in two seasonal movements. The first is the dry season movement, when the waters begin to recede from the flood lands around the rivers and the cattle move to *toic* further inland where grazing is good (see Table 2). This begins in October or November and the cattle remain in these areas, staying in cattle camps, until March or April, just before the rains begin. At the onset of the rains, cattle are moved back to wet season camps, often stopping along the route to manure village fields[12].

[10] Areas identified as well known for growing tobacco include Aguak, Akon, Akuar, Awon, Kuajok, Malony, Malual Baai and north Akop payams.

[11] Maule (1990) describes Nilotic cattle as being characteristically "tall, long legged and narrow bodied, and have long crescent or lyre shaped horns. Live weight is very variable, about 250-350 kg for mature bulls and 180-250 kg for cows. The estimated daily milk yield is about 2 litres apart from milk taken by the calf."

[12] The use of cattle to manure the fields is a particularly significant part of the agricultural practice of the western Dinka, enabling them to have a more stable agricultural system. It was identified by Tothill (1940), as a traditional practice which was particularly significant for expansion to other agro-pastoral areas. Thus a reduction in cattle numbers can also significantly effect the ability to produce crops.

Table 2: Toic Areas for northern Bahr el Ghazal and Lakes Area

County	*Toic* area
Aweil East	Apuk *Toic, Alel Kuo* (Luo area), *Char Kuo*, Paliet
Aweil West	Northern areas and Alel
Gogrial	Apuk, Kender, Kongoor, Lou
Tonj	Kongoor, Lou
Rumbek	*Akeu*, River Naam, Lake Nyubor, River Gel (for Cuibet, Pagoor payams and some of Tonj)
Yirol	Lake Nyubor

(*Note*: Char Kuo, Alel Kuo and Akeu toics have been more heavily utilised since 1995 increasing tension amongst groups)

In normal dry seasons each household is left with between one and three milking cows in the permanent villages when the herds are moved to temporary cattle camps. When the majority of herds are returned to manure the village fields before the onset of the rains in April, some remain in the *toic*. A few young men stay with the remaining cattle and traditionally compete to see who can become the fattest over this period in a Dinka contest called lor chok (literally: "go fat"). Only when water levels rise again in August will the cattle move to higher ground, returning to wet season cattle camps in clan groups. After the harvest is complete cattle return to villages where they manure the fields for the next year and may also be used in the bride price negotiations which take place at this time of the year.

Any type of insecurity effects the normal patterns of livestock movement as well as the composition of household members who accompany the herds. Insecurity in the Bahr el Ghazal and Lakes area has significantly affected the composition of herds, their movement patterns and speed of movement. Attacks by the Kerebino militia (from 1995-97) and Nuer cattle raiding have resulted in a number of changes, including a large influx of cattle into Tonj county. For example, users of Apuk *Toic* have been restricted to a small area which they use before moving into the adjacent areas of Kongoor and Lou *Toic* to graze.

With increased insecurity more children stay in the villages in the dry season instead of moving to the cattle camps. Before the war the number of milking cows that remained in villages was limited, because the priority was to cover the needs of people who moved with the livestock to cattle camps. Since the war priority has been given to those who remain in the village. As more children are forced to stay in villages, more cattle are also left behind. The number of children who remain in villages depends on the number of young people in a household. Those who move to cattle camps are responsible for watching cattle and taking care of their younger siblings. Households who have only one or two adolescents do not have the option of sending very young children - of five years or under - to cattle camps, as there is no one to look after them.

Traditional *toic* usage has developed in relation to understanding of the available pasture and the nutritional and health needs of the cattle. Changes in human and animal movements and different patterns of *toic* use are likely to result in long-term deterioration in the condition of livestock. A reduction in the life expectancy of the cattle, higher death rates of calves due to poor nutrition, reduced calving rates and increased disease rates resulting from high concentrations of cattle in small areas have all already been reported.

usually exhausted within a few days or weeks.

There is varying opinion regarding the fishing potential of southern Sudan and the changing availability of fish over the years. The area of *toic* in the country was increasing from the early 1960s until 1981, when it was reported to have begun shrinking. This concurs with fisherfolks' reports that fishing yields have reduced since 1982, and agro-pastoralists' claims of changing rainfall patterns. Reduced water levels are thought to have decreased the breeding grounds, resulting in an overall decline in fish populations. These changes must, however, also be seen in the context of the population's increasing dependence on fish as other elements of their food economies become more restricted due to the war, and the resultant reduction of fish populations and yields due to increased off-take. Work is being undertaken to assess the impact of OLS inputs.

WILD FOODS

A large variety of wild foods are found in the northern Bahr el Ghazal and Lakes area, and are collected both for home consumption and trade. Desert Date (*Balanites aegyptiaca - lalop* or *thou*)[14], Shea Butter Nut (*Butyrospermum niloticum - lulu*) and seeds of water lily (*Nymphaea lotus*) all have a particularly high nutritional value[15]. Although leaves are commonly available in the wet season, and are eaten as vegetables even in good harvest years, they have very low calorific values and make a negligible contribution to household food economy as a result, though they are important in household nutrition. Households who make up a fifth of their yearly food needs by consuming wild foods - such as households with few cattle (see Figure 2) - could do this by collecting *lalop*, although this is unlikely in a normal or good harvest year. Although they may have to collect a relatively large amount of *lalop* following a bad harvest, in a normal year they would be more likely to depend on a range of wild foods. The seed, fruit and pericarp of Desert Date (*lalop*) is collected and eaten every year, especially by poor families, but is of particular importance in poor harvest years. Although the seed of the water lily is more nutritious than sorghum, it is labour-intensive to collect and cook. Households who live close to major rivers tend to be the main consumers of water lily seeds, obtaining them from rivers and pools of the *toic* during the dry season. Abur also collect water lily seeds from a wider range of sites every year because they have canoes and can access it more easily. Shea Butter Nut (*Butyrospermum niloticum*) is found only in Tonj county and in Jurchol and Jur Beli areas in the Ironstone Plateau, but the people of Bahr el Ghazal enter these places to trade for its oil. Other wild foods are used as trade items, including the cooked seed of Desert Date (*Balanites aegyptiaca*), Tamarind (*Tamarindus indica -cuei*) and fruits of *Ziziphus mucronata* (*lang*), particularly in times of bad harvest and in areas where there is access to grain.

EXCHANGE

TRADE AND EXCHANGE

Before the war, the varying food economies of different socio-economic groups meant that the exchange of cattle for grain was a common and mutually beneficial way of supporting communities' livelihoods. In years of poor crop harvests households made up their food shortages either by bartering or by buying grain from neighbouring surplus areas or through

[14] Balanites aegyptiaca: Nutritional composition of fruit pulp and seed kernel, expressed at % w/w:

Component	Pulp	Kernel
Total carbohydrate content	88	20.8
Crude Protein	1.2 - 6.6	27.6
Fats	0.1 - 0.4	48.3
Crude Fibre	0.4 - 4.4	0.3
Vitamin C	0.9 - 1.6	-
Ash	2.4 - 6.9	3.0

Source: Hall and Walker (1991) Balanites aegyptiaca - A Monograph.

[15] The doleib palm (Borassus aethiopum) is also significant in many areas. Both the stringy pulp around the large seeds, and the sprouted seeds can be eaten.

well-established trading networks which linked flood plain communities with western Equatoria or with communities in productive areas of northern Sudan, such as the Gezira. Households would generally obtain cash by selling cattle and then use the money to buy grain from traders in the main markets of Akuoc, Aweil, Gogrial, Mayen Abun, Rumbek, Thiet, Tonj, Wau and Yirol.

Exchange of cattle for grain is highly dependent on good harvests in surplus areas of grain production. In normal years, surplus areas include Abiem, Boncuei and Malual in northern Bahr el Ghazal; Gok areas in Rumbek county; Anan Atak and Makuac payams in Tonj county; Pagarau and Tinagau in east Yirol; and Jurchol areas in the Ironstone Plateau.

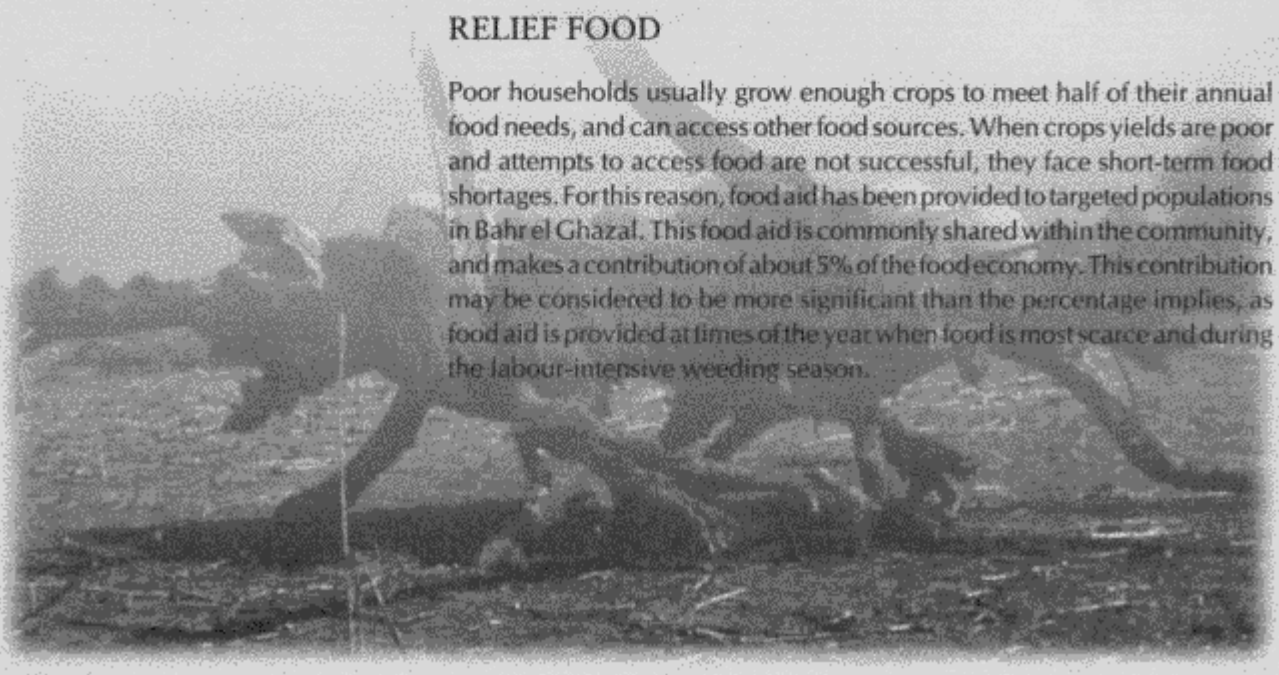
In recent years the majority of the traditional markets have been under the control of the Government of Sudan. Although trade is possible in towns held by the government, it is regulated, and both government and the SPLA restrict entry. Trade is largely restricted to non-crop household goods such as clothes, salt and soap. Grain is usually only available after a bumper harvest, and then only at poor rates of exchange. Some new markets have appeared to replace government-controlled trading centres, including Barpakeny, Malual Tit, Manyiel, Ngbagok, Pankot, Warapec and Warawar.

To overcome unfavourable exchange rates in government markets, households travel to surplus grain-producing areas to find individuals who are willing to trade their extra grain for cattle. Those who own few cattle attempt to find others willing to exchange grain for other items such as tobacco or fish, or go to work on other people's farms. Households from both Gogrial and Tonj counties go to Jurchol ethnic group areas such as Achong chong, Bararud and Mapel to work at harvest time in December and January, and households living in northern areas may go to work on groundnut farms in Abiem around July.

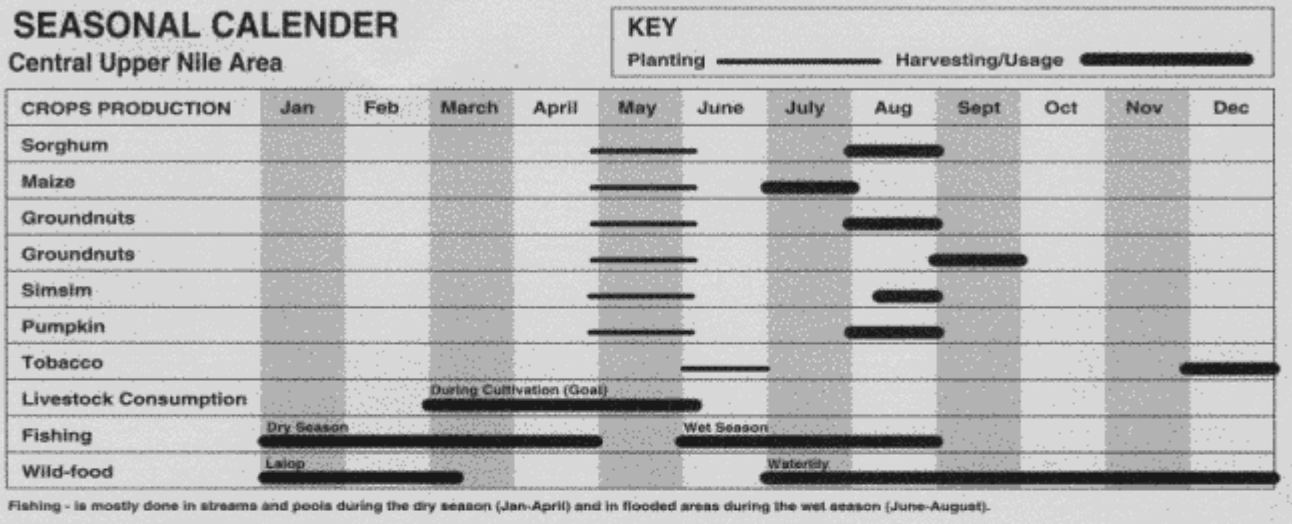
According to Figure 2, poor families do not usually gain a significant amount of food from exchange. However, since the advent of war they have been able to produce only small amounts of grain, so have been increasingly forced into petty trade and labour exchange. This trade and exchange often takes place at poor terms of trade, to the detriment of their livelihood systems.

RELIEF FOOD

Poor households usually grow enough crops to meet half of their annual food needs, and can access other food sources. When crops yields are poor and attempts to access food are not successful, they face short-term food shortages. For this reason, food aid has been provided to targeted populations in Bahr el Ghazal. This food aid is commonly shared within the community, and makes a contribution of about 5% of the food economy. This contribution may be considered to be more significant than the percentage implies, as food aid is provided at times of the year when food is most scarce and during the labour-intensive weeding season.



THE EASTERN FLOOD PLAINS (CENTRAL UPPER NILE)



Fishing - is mostly done in streams and pools during the dry season (Jan-April) and in flooded areas during the wet season (June-August).

BACKGROUND TO THE AREA

For the purpose of food security analysis, the Central Upper Nile region of the Flood Plains may be considered as the area between, but away from, the Nile and Sobat Rivers (see Map). It consists of Bieh and Phou States which are populated by Nuer groups (and governed by the SSIM since its split from the SPLA/M in 1991) and Dinka-occupied north Bor (administered by the SPLA/M) and Atar (bordered to the north by Shilluk). This food economy area extends further south, but the description here refers to the northern parts populated by Nuer and Dinka groups.

Nuer and Dinka groups have been engaged in a series of punitive raids on each other in recent years. These raids have impacted considerably on the food economy of the area. In September 1991 the SPLA-Nasir forces (later to become the SSIM) attacked the Duk and Kongoor area. A reported 2,000 people were killed in this attack and a similar number died later from disease and hunger. These and subsequent attacks resulted in thousands of people being displaced to Equatoria and Bahr el Ghazal, or leaving highland villages to move close to the Nile in southern parts of Bor County. All the cattle in that area were lost, and there has been little opportunity to restock. Lack of food and continued fear of insecurity meant that the area was largely deserted until 1995, when households began to move back and cultivate small farms.

OVERVIEW OF THE FOOD ECONOMY

The relative importance of different food options to the annual household food economy of the Central Upper Nile area is represented in Figure 3, comparing average and poor households. Poor Lou Nuer households are considered to be those with few cattle (10 or less, of which at any time two

MEAT

Meat does not usually make up a large proportion of a Dinka household's diet. The most common reason for meat consumption is livestock death. Meat consumption however increases at particular times of the year, especially in December and January when cattle are killed for ceremonial purposes. Meat is also more significant during the cultivation period, when households with larger fields slaughter a bull or goat to pay for labour. In a year following a bad harvest, when little food is available, meat consumption will increase in the hungry gap season between May and the crop harvest.

FISH

Fish contribute significantly to the diet. The fishing season depends on the water level in the main rivers, which are in turn influenced by rainfall far away in their catchment areas. The water levels in the Kuem and Lol Rivers are determined by rainfall patterns up to the border of the Central African Republic, the River Jur is fed by the rain falling in the area uo to the border of the Democratic Republic of Congo and the Nile is affected by Uganda's rainfall and that over Lake Victoriacatchment.

Fishing can be carried out throughout the year in a range of wetland areas, including rivers, seasonally inundated areas (*toic*), pools and permanent swamps (*sudd*). After the dry season, lung fish which have been buried since the previous year emerge from the ground and are fished in or near pools formed from drying rivers such as the Jur and Lol. They are also dug up from the ground in the dry season. This is followed by a peak in fishing activities while these rivers fill up again and catfish migrate up flooding *khors* followed by a lull, before increasing again in the later part of the hungry gap season. At harvest time in October, water reaches a level where it overflows the river banks, flooding low-lying areas and filling seasonal rivers and pools. The flood waters begin to recede in November, and by late in the dry season rivers have receded back into pools resulting in a final peak.

Those carrying out fishing activities can be considered in two separate groups. The Abur are fishermen who own few, or no, cattle and are only minor agriculturalists, but depend on fishing for their livelihoods throughout the year. They form only a small percentage of the population in Bahr el Ghazal and are found mainly in Nyamlell, along the Lol River, and in *toic* areas of northern Liethnom where they are referred to as the Jurmananger. The Abur are those most seriously affected by reductions in fish yields or fishing areas because they depend on fish for trade, and fish shortages thus also affect their access to grain, pulses, milk, oil, meat and non-food items.

The majority agro-pastoralist population fish at specific times of the year. They mainly use traditional methods for fishing, although some use fishing nets[13] and hooks at some specific seasons. For the agro-pastoralist population there are two main fishing seasons. The first is from October to December, when dams and basket traps are used to catch rok fish (literally: "fish caught using basket traps") moving in the rising and falling flood waters. The largest quantities of fish are caught when the flood waters recede. This type of fishing is commoner in Akak, Akon, Nyamlell and Wunrok payams and in some parts of Aweil east. Fishing in Rumbek and Yirol is mainly carried out in the second fishing season, the late dry season from February to April, when waters are reduced to small pools. Almost all family members fish in this period, using spears, baskets (*thoi*), hooks and nets. Dry season fish stocks are

[13] Bloss (1945) mentions two types of nets. Nile throwing nets are used in some places, particularly Nyambell, Wau and Gogrial, in large pools and along river banks. The expense of these nets limits their use. At low river Dinka also use drag nets, right across a pool. One account describes an operation that took over two days. (Since 1994 over $1 million worth of fishing nets and hooks were introduced. Now gill nets are commonly used.)

may be a cow in milk). In contrast, richer, or average, households have access to more than 20 cattle with five or six in milk at any one time; a rich man with four or five wives may own more than 100 cattle.

As Figure 3 illustrates, milk, meat and crops constitute the main part of food economies for both average and poor households. For poor households, milk is less important, and own crops of greater importance, than for average households. Average households have a greater reliance on trade and exchange food sources, while poor households rely more on wild foods including fish.

PRODUCTION AND COLLECTION

CROPS

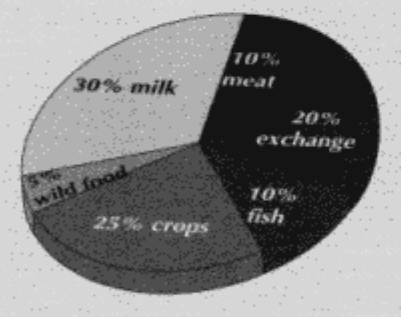
The bulk of the population of the Central Upper Nile area (prior to the war this was up to 80% of households) spends the dry season in the *toic*. At the beginning of the rains, men return to the farming areas, often bringing their wives with them, while children remain with the cattle herds in the *toic*.

Farming areas are mostly low-lying flood lands. The main crop is sorghum, including both long and short-term types. Maize, cowpeas[16], pumpkin, okra and sesame are also grown. Tobacco is the only significant cash crop in the area. Groundnuts are limited to areas where the soil is sandier, such as the Duk Ridge around Ayol.

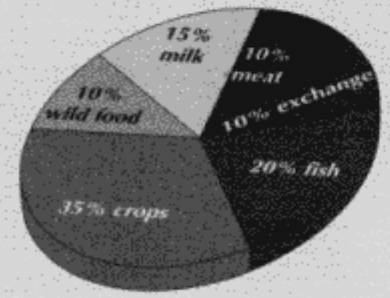
Most soils in the Central Upper Nile area have a high clay content, being broken by the sun into deep cracks as they dry, and inundated when it rains. This makes agricultural production difficult, and neither the Lou nor Gawaar Nuer have ever been able to rely heavily on the crops they plant. Crops typically contribute only between a quarter and a third to the normal year food economy of the area (see Figure 3). They have kept their cultivation period short, and land clearing doesn't start until the rains start in April, with planting in May and June (or, for tobacco, in July). Community labour is uncommon, and most households use their own labour to prepare and plant farms, since, they say, they all need to work on their farms at the same time.

Figure 3:

Normal year food economy



Households with few cattle



LIVESTOCK

Cattle form a central part of Nuer life. Although livelihood patterns were similar for both the Dinka and Nuer in this region before the war, the Dinka of Bor County held the largest cattle herds and depended more on meat and milk. The poorest households owned about 20 cattle and the wealthiest more that 200. Whereas poor Nuer households had access to less that 10 cattle and two milking cows, rich households had access to more than 20 cattle with five or six in milk at any time. This balance was drastically altered in 1991, when both tribes punitively raided each other.

Since the advent of the war, cattle numbers have decreased for all socio-economic groups in the area, and more households have become poor. In bad harvest years goats, and increasingly cattle, are slaughtered for consumption. Even in normal years livestock are slaughtered between April and October for ceremonial purposes, when households return from the *toic* to begin cultivation, which is followed by bride price negotiations. Generally at least one animal is likely to die from a poor household's herd each year, and this will be eaten as meat.

[16] Their significance may be shown by the different types of cowpeas which are grown including Chungor (a small variety that grows down), Dungdung and Rial (larger varieties), Jak (many coloured cowpeas) and Bhor (white beans).

Table 3: Areas and ethnic groups in the Central Upper Nile area.

Area	Ethnic groups	Estimated Population
Atar	Dinka	50,000[17]
Bieh	Lou (Gun and Mor) Nuer	90,000
Phou	Gawaar Nuer	50,000
North Bor	Dinka	90,000[18]

Seasonal livestock movements

Human and animal populations move from wet-season villages in the central savannah to find dry-season pasture and water in the *toics*, usually moving just after the main harvest, around the beginning of November. For the Lou, Gawaar and north Bor Dinka, movement to *toic* areas takes place in two stages. Cattle are first herded to nearby *toics*, such as Nyanding and Nyerol, and later moved towards main rivers once these start to dry up.

Before the war about 60% of cattle and less than a third of small stock would move to dry-season *toics*. The milk of livestock remaining in wet-season villages formed an important part of the diet of elderly people, parents and children. Following a poor wet season, most members of the village would move to the *toic* by the peak of the dry season.

Impacts of insecurity on herd numbers and movement

Insecurity in the Central Upper Nile area, especially since 1991, has curtailed access to some of the better-watered and therefore more productive *toics*, with knock-on effects on animal health and productivity. In 1993 and 1994 fighting between the Lou and Jikany resulted in a decrease in both cattle numbers and access to preferred *toics*, on the Pibor and Sobat Rivers. Lou in the east of Bieh State now have markedly smaller herds than other groups in the Nuer area. Full access to these *toics* had not been regained by the 1995/96 dry season for the eastern Lou. Gun Lou's access to the Sobat could not be assured either due to the takeover of Nasir by Government of Sudan troops in 1995. Other groups - such as the Ceng Duk of Pulchol District - have accessed other major *toics*, such as the Gawaar *toic*.

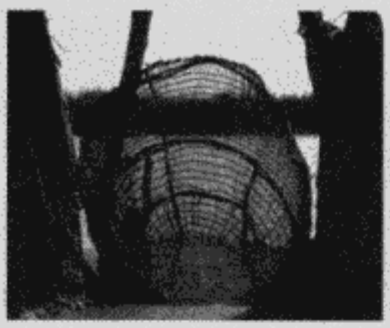
FISH

In Central Upper Nile area there are both those who fish seasonally and those who primarily depend on fishing. The Dinka Monythany who live on the Nile in western parts of Bor County fish all the year round, as do Nuer who live in *toic* areas. However both these groups may also keep some cattle on pockets of higher land near the river.

The Nuer in Central Upper Nile fish both in the dry and wet seasons, although more fishing takes place and catches are larger in the dry season. There are two main types of fishing area: local streams and pools, including Khor Fullus south of Nyerol, Nyanding, the Jonglei Canal and its associated pools such as Achillbong and Panyang; and, in a wet year, the flooded areas around these streams and pools and near villages. As waters recede, baskets and traps are used to catch fish, and as the land dries up households travel further from home to more distant pools such as Pading, Padoi and Panyang. The time when these more distant pools dry up and become less productive, generally around February, normally coincides with the main movements to the *toics*. Whether or not households continue fishing in the

[17] From SPLA/M

[18] From SRRA.



toics up to April depends on the availability of other food sources, especially milk and grain. In a year following a bad harvest on average four household members may be expected to fish, using hooks, nets and spears.

In a good year, as in the past, fish do not form such an important food source. This is mainly due to the relatively long distances - about three days' walk - between main rivers and centres such as Ayod and Waat. Labour spent fishing increases when food is short or harvests are poor. Over the last decade residents of both Bor County and the Atar Dinka have been forced to increase their reliance on fish, because of loss of cattle and poor access to trade. The events of 1991 have led to the Dinka remaining in north Bor spending most of the year in the Nile *toics*. They use spears to catch large quantities of fish at the beginning of the rainy season. Soon after the rains become heavy, catches reach a peak, when water floods out of the Nile into the *toic*. Catches during the peak season are increased by the use of nets and hooks. The Atar Dinka fish both the Atar River and the Jonglei Canal, and are able to provide for up to half their food needs from fish.

WILD FOODS

Wild foods are traded and eaten more by poor households with fewer cattle, and/or in the period following a bad harvest. Desert Date (*Balanites aegyptiaca*) is probably the most important wild food collected in the Central Upper Nile area and makes up between 5-15% of a household's food needs, depending on location and season.

Water lily (*Nymphaea lotus*) seeds and roots are also readily available and significant in calorific terms. They have always been an important food source for residents of *toic* areas, where it is available all year round[19]. They are of greatest importance to households with few or no cattle. Recently the Bor Dinka have used water lily seed to make up about one third of their food needs. It is collected in *toic* and Nile areas between July and December, as the floods recede.

EXCHANGE

Although the Nuer of the Central Upper Nile area have never been able to depend heavily on their own crops, grain from exchange has always been an important part of their diet. Prior to the war, cattle for grain exchange took place every year, normally when the cattle returned from the *toic* at the start of the agricultural season. Exchanges were made either at the *toic*, where there was good access to producers living in the Nile Corridor food economy area, or at market centres. Major centres for exchange included Malakal and towns on the Juba-Malakal road such as Atar and Kongor. Grain was brought from Renk and Kosti into Malakal, where cattle and tobacco could be sold at market centres. Tobacco was also taken to the southern border of the Nuer area to be traded with the Murle.

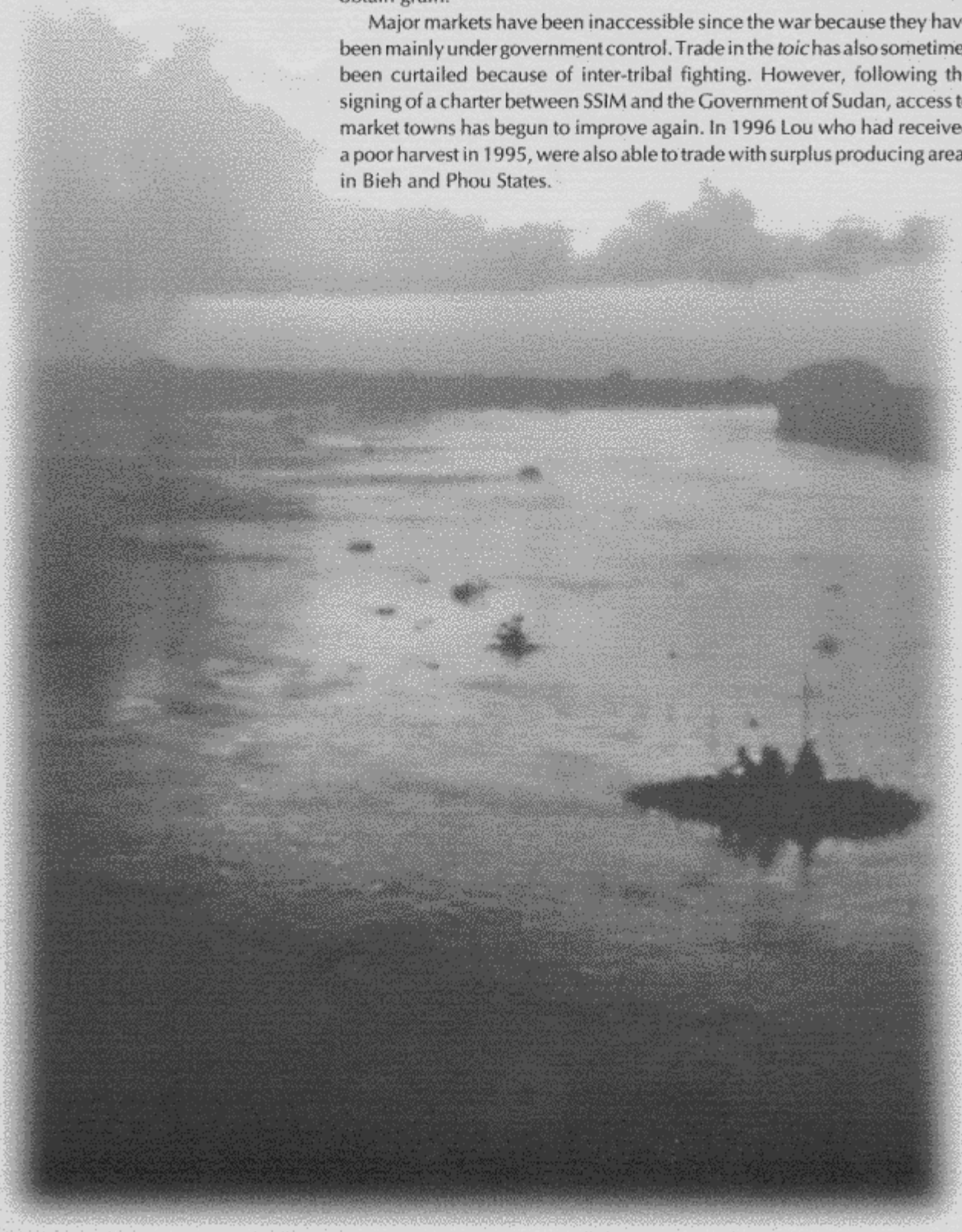
Table 4: Toic areas for Central Upper Nile area

Group	*Toic* area
Lou	East and west Banks of Sobat, Khor Fullus
Gawaar	Zeraf
North Bor Dinka	East Bank of Nile
Atar Dinka	Atar and Khor Fullus
Jikany	Pibor (Romyieri)

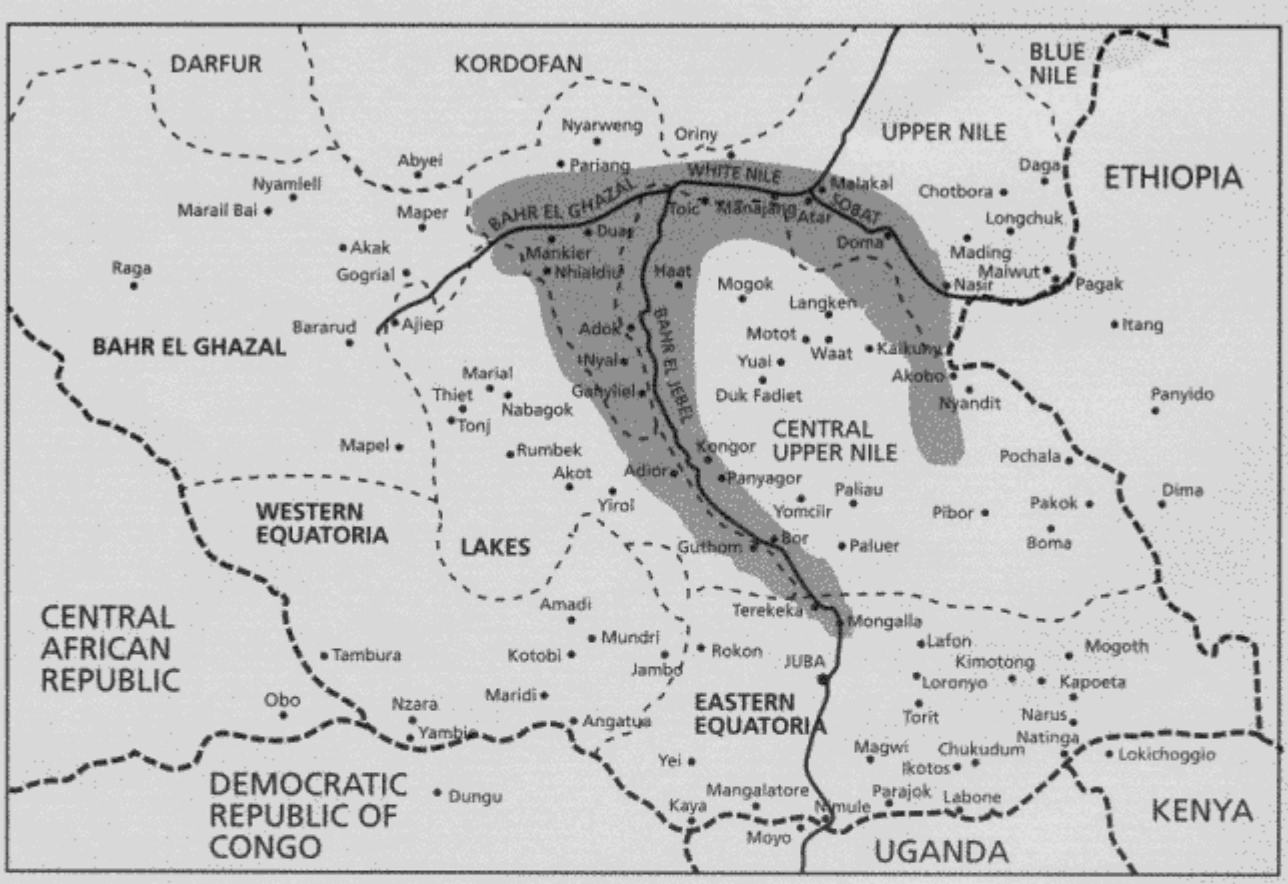
[19] Butt (1952) comments that whereas other wild foods are looked down on by adults, Nuer have a particular liking for the roots and seeds of water lilies.

Exchange of cattle for grain was also common between deficit and surplus producing areas within the region. The Duk Ridge, stretching from Mogok to Panyagor, was a surplus area and households would go into Ayod or the Dinka areas of north Bor to trade. In a year when production was poor in this area, it was quite common to be able to obtain grain on favourable terms in Yuai, and the exchange of cattle would take place in the opposite direction. Kaikuny and Lankien were also known to be productive areas, and the Atar Dinka would move to the north of the Sobat or Old Fangak to obtain grain.

Major markets have been inaccessible since the war because they have been mainly under government control. Trade in the *toic* has also sometimes been curtailed because of inter-tribal fighting. However, following the signing of a charter between SSIM and the Government of Sudan, access to market towns has begun to improve again. In 1996 Lou who had received a poor harvest in 1995, were also able to trade with surplus producing areas in Bieh and Phou States.



THE NILE CORRIDOR FOOD ECONOMY ZONE



SEASONAL CALENDER

Nile/Sobat Corridor Area

KEY

Planting ——— Harvesting/Usage ▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Sorghum						▬▬			▬▬	▬▬		
Maize	Nile ▬▬			Nile ▬▬	1st planting ▬▬	▬▬	▬▬	▬▬	2nd planting ▬▬	▬▬	▬▬	
Pumpkin						▬▬		▬▬	▬▬	▬▬		
Tobacco							▬▬				▬▬	
Cattle Movement	Dry Season/Toics ▬▬	▬▬	▬▬	▬▬	High Ground ▬▬	▬▬	▬▬					
Meat Consumption											Ceremonial Feast ▬▬	
Milk					Wet Season ▬▬	▬▬	▬▬	▬▬	▬▬			
Fishing	Dry Season/Fishing Camps ▬▬	▬▬	▬▬	▬▬	▬▬	Nyei ▬▬	Wet Season ▬▬	▬▬	▬▬			
Wild Food	Lalop Collected ▬▬	▬▬	▬▬	Lalop Consumed ▬▬	▬▬	▬▬	Waterlily ▬▬	▬▬	▬▬	▬▬	▬▬	▬▬

Fishing - Nyei fishing is done during July when fish surge out of the river into flooded areas.

BACKGROUND TO THE AREA

The Nile Corridor is the area around three of the major rivers in southern Sudan - the Nile and Sobat Rivers and the lower reaches of the Pibor River. Most of the area has flood plain soil with a high clay content.

The food economy of the Nile Corridor, like that of the Flood Plains area, centres around cattle, with the exception of Athoc payam, whose population lost virtually all their livestock in the 1991/2 raids. The Nile Corridor has however become distinct from the Flood Plains largely as a result of the effects of the war, which include displacement and the loss of markets and assets. These circumstances have meant that many communities have adapted to rely less on crop and cattle production and exchange, and more to exploiting wild foods, including fish. In addition many have increased the amount of maize grown relative to sorghum.

Although crops are damaged by both floods and drought, flood years are less likely to result in a food deficit than drought ones because both fish and wild foods are generally plentiful in flood years.

The Nile Corridor area contains both Dinka and Nuer, and has an estimated total population of over 650,000 (see Table 5).

Two broad categories of household live in the area: those whose homes and villages can only be reached from the river, and those who live further inland on higher land. Households who are only accessible from the river, many on islands, include farmers who grow maize and traditional fishermen. Households who live in higher areas such as Akobo and Duar move to the *toic* in the dry season either with their cattle or to stay in fishing camps.

Since the war began there have been major hostilities between the Dinka and Nuer, and between different Nuer groups. This has significantly affected the food economy of the Nile Corridor area. Having lost cattle due to intra-tribal fighting, the Lou of Akobo have faced a food shortage for several years, particularly when fish yields are low. Like other Lou sections, they have not been able to access their traditional *toic* areas.

The food economy of Bor South has changed drastically since 1991. Although the population now residing there has decreased, households are reported to be returning from *toic* areas west of the Nile, and moving back to higher areas.

Western Upper Nile has been relatively unaffected by insecurity. However raids by the Dinka, especially into Ganyiel in 1995, have resulted in some households losing cattle and homes.

[20] Including Maiwut, excluding Latijor State and the northern areas of Chotbura and Longuchuk.

[21] From RASS 1995.

OVERVIEW OF THE FOOD ECONOMY

The relative importance, in a year of minimal crop production, of different food options to the household food economy of higher areas of the Nile Corridor area is represented in Figure 4, comparing average households

Table 5: Areas and ethnic groups in the Nile Corridor area

Area	Ethnic groups	Estimated population
Akobo	Nuer	20,000 - 30,000
Eastern Upper Nile[20]	Nuer	90,000
Western Upper Nile	Nuer	437,200[21]
Zeraf Island	Nuer	
South Bor, Kolnyang and Athoc payams	Dinka	100,000

and households with no cattle. Although even high areas are prone to flooding most households have access to livestock.

As Figure 4 illustrates, the food economy of poor households depends more on wild foods, gifts and exchange, and less on meat and milk, than of average households. For both groups, own crops and fish contribute the same amount - together, a half - to annual food needs.

PRODUCTION AND COLLECTION

CROPS

Households commonly harvest two crops a year in the Nile Corridor area. They may even plant three crops if they move closer to the river as the floods recede, and plant either in the previously flooded areas, or plant later in December or January on the banks of the major rivers.

Initial planting is carried out with the first rains, followed by more intensive planting in June. The main sorghum crop is planted in June and harvested in September or October. In most districts a small amount of maize is grown around settlements, on the higher ground, and matures in August. In northern-central areas of west Upper Nile – such as Lek (*Nhialdu*) – households now grow maize, rather than sorghum, as their main staple. A variety of other crops are also cultivated in the Nile Corridor area, including pumpkins and cowpeas when there is seed. Groundnuts are only grown in few places, where there is sandy soil and cassava in Nyoung district.

Crop damage caused by birds, especially quelea, is more likely in the Nile Corridor than in other areas, because the birds breed and live in the *toic*.

CULTIVATION PRACTICES

In the Nile Corridor, the number of crops and of crop varieties is more restricted than in the other areas. Sorghum and maize are the crops grown most extensively, the two main varieties of maize having been introduced since the Addis Ababa Accord (El Sammani 1984). Lesser crops include sesame, groundnuts, beans (*Phaseolus spp.*) and tobacco. Both the maize and the sorghum varieties grown widely were tolerant to water-logging. In recent years, these varieties and 'normal' practises have been disrupted by insecurity.

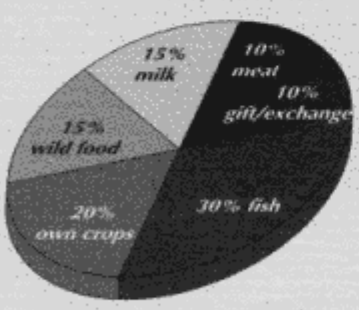
Traditionally, sowing begins in May with tobacco and maize and takes place around the *luak* where manure and ashes are used to increase fertility. Sorghum is sown in the main fields by the men and does not usually benefit from manuring. Resowing, often necessary where the young seedlings have been washed away, and weeding, begin soon after sowing. Weed infestation is very heavy and often two or more weedings are necessary in each cropping period (El Sammani 1984).

Harvesting of first season crops begins with maize in early August, followed by sorghum from mid-August to the end of September. Extended resowing gives rise to a prolonged harvest period, most of the ripening crop being consumed as it becomes available because the previous year's harvest is usually used up.

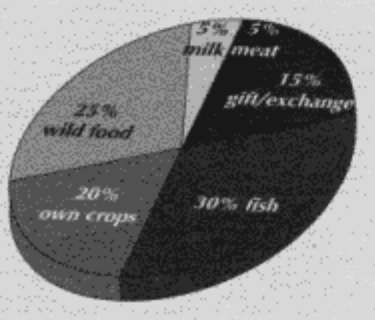
In October, the land is cleared and resown with a second crop of sorghum. Resowing is limited this time, but weeding is crucial because of limited soil moisture. Harvesting is again extended but finishes in January. The success of this second crop depends heavily on adequate rainfall late in the season and the water retained in the soil. Yields are higher in the early-season crop. El Sammani (1984) gives sorghum yields of about 230

Figure 4:

Normal year food economy



Households with few cattle



kg/feddan for the first crop compared with 150 kg/feddan for the second.

Ratoon crops of sorghum can be taken in a good rainy season (Tothill 1984) and, after harvest, the stalks are usually grazed by the few animals remaining at the homestead.

Most of the implements used are made locally apart from the hoe heads, which are often made by the Jur. The implements tend to be very inefficient, the hoes and digging sticks, for example, barely scratch the soil surface.

While flooding and drought are the main hazards to cropping in the area, pests and diseases also have a marked depressing effect on yields. The most prevalent in the Twic Dinka area are birds, grasshoppers, army worms, stem borers, aphids (*Aphis sorghi*) and sorghum head smut (El Sammani, 1984).

Infestation of weeds, pests and diseases are made worse because no form of rotation is practised, the system being virtually one of monocropping. Tothill (1984), describes the prevailing land use intensity as that of shifting cultivation with four to six years of cropping followed by twelve or more years of fallow. The Twic area, however, would appear to be virtually permanent cultivation (El Sammani, 1984). In the latter area, farm size was found to average 1.43 feddans, of which almost all was devoted to sorghum. Variations are thought to be due to the area of well drained land available, the availability of family labour, the degree of weed infestation, and the motivation of a farmer to cultivate.

Tothill (1984), describes the cattle-owning Nilotics as improvident and poor cultivators, with little interest in new crops such as cotton, sweet potatoes and cassava, but their attitudes are hardly surprising given the problem of soils and climate that they face. Storage of any surplus is also difficult because of the high humidities prevailing throughout the year. Whatever the reason, poor crop performance is common and large quantities of grain must be accessed through trade traditionally paid for by the sale of cattle.

LIVESTOCK

Western Upper Nile reportedly contains the largest cattle populations in southern Sudan, and may still contain herds as large as they were before the war, especially in northern areas. Rich families in Ler own up to 400 cattle, while average families own around 20 cattle. Akobo has however suffered cattle losses due to conflict between Lou and Jikany, and Lou living here have smaller herds than those in Bieh state. Zeraf Island also has few cattle.

Cattle move to *toic* areas slightly later than is the case in Flood Plains areas which lie further from the major rivers. In western Upper Nile herds are moved to the River Nile in January, and when the rains become heavy are relocated to higher lands at up to one day's walk from villages.

Besides cattle, as with Nuer and Dinka elsewhere, goats are also kept in the Nile Corridor. In a bad harvest year, goats are more likely to be slaughtered for meat. In the southern part of western Upper Nile and Bor county, wild game from hunting is also a common source of meat.

FISH

Even in good harvest years fish form an important part - about one fifth - of household food needs in the Nile Corridor. Fishing increases in importance in bad harvest years, when more time is spent fishing, and more people will engage in it.

Some household members will move to fishing camps near or in the *toic* between January and April (a few now remain throughout the year), using

nets and lines with hooks in the rivers, and spears in pools. Part of this catch will be dried and brought back to eat in the villages, or traded for grain. The fish are more abundant in the rainy season and people mainly fish nearer to their homes in seasonal rivers. However, if a household is facing a food shortage some members will remain in fishing camps near to major rivers. Fish are most important at this time of the year, before the harvest is ready, especially if households were not able to exchange for grain before the start of the rains.

WILD FOODS

Wild foods are mostly collected and eaten during the dry season, in the first three months of the year, although they may be stored for later consumption during the second quarter. *Lalop* (Desert Date) and water lily (*Nymphaea lotus*) are the most significant wild foods harvested in the Nile Corridor area[22]. *Lalop* is collected from forest areas inland, near to villages, and water lily seed is gathered from the *toic*. Collections of water lily seed increase in bad harvest years, partly because more household members will move to the *toic*.

EXCHANGE

Trade and exchange

Crop surplus areas include Bul, Lek and Nyoung district (Nyal). In Bul and Lek, grain surpluses are traded with those areas where crop production is less predictable, such as Adok, Jagei and Jikany. Other Nuer districts engage in grain trade with Nyoung district. Fangak, on Zeraf Island, has traditionally been a surplus producing area, but in recent years harvests have decreased as a result of a variety of pests and unfavourable climatic conditions.

In parts of the Nile Corridor pre-war exchange patterns have been replaced by a reliance on fish and water lily seed. This has taken place when exchange routes like those to Ethiopia and between the Lou and Jikany in the Pibor and Sobat areas have been cut off. Former exchange routes south and north of western Upper Nile have been curtailed since the factional split of 1991; and options for those living on Zeraf Island have been reduced due to uneasy relations between the Shilluk and Nuer.

In some districts, however, food income from exchange is still important following a bad harvest year. In most cases households will try to exchange items like mats, pots and tobacco prior to selling livestock. In Akobo and Zeraf Island, exchange of such hand-made items is more limited and households are more likely to be forced to exchange livestock.

It is more likely that cattle will be exchanged in a drought year than a flood one, because of fewer other food options being available. Major market centres in Western Upper Nile include Leer and Rupnyagai. Nuer on the Zeraf trade in Gawaar areas, and the Jikany (Eastern) and some Lou trade with Ethiopia, with other sections of the Lou, and, at times, with the Mundari or the Murle. Malakal has historically been the central market for fish to the North coming out of southern Sudan. Changes in the political arena open and close trade opportunities. The Bahr-el-Zeraf and Bahr-el-Jebel rivers can allow good market access when insecurity is not a constraint.

Gifts and kin

Kin are still called on to provide gifts of grain when harvests are inadequate.

[22] Evans-Pritchard (1940) also states that "The seeds of 'wild rice' (Oryza barthii) are collected and a number of wild plants that grow on village sites are used as seasoning for porridge." (p.75)

Although such gifts may be relatively small, households may be able to trade with their kin for more. Redistribution of food between kin was especially important in 1995, when it was estimated that about half of the population of the Nile Corridor produced enough grain to support themselves and were therefore able to sell or give away a proportion of their harvest. Redistribution is also an important source of food for recent returnees to Bor South, especially in the period before they have planted or when they face seasonal food deficits.

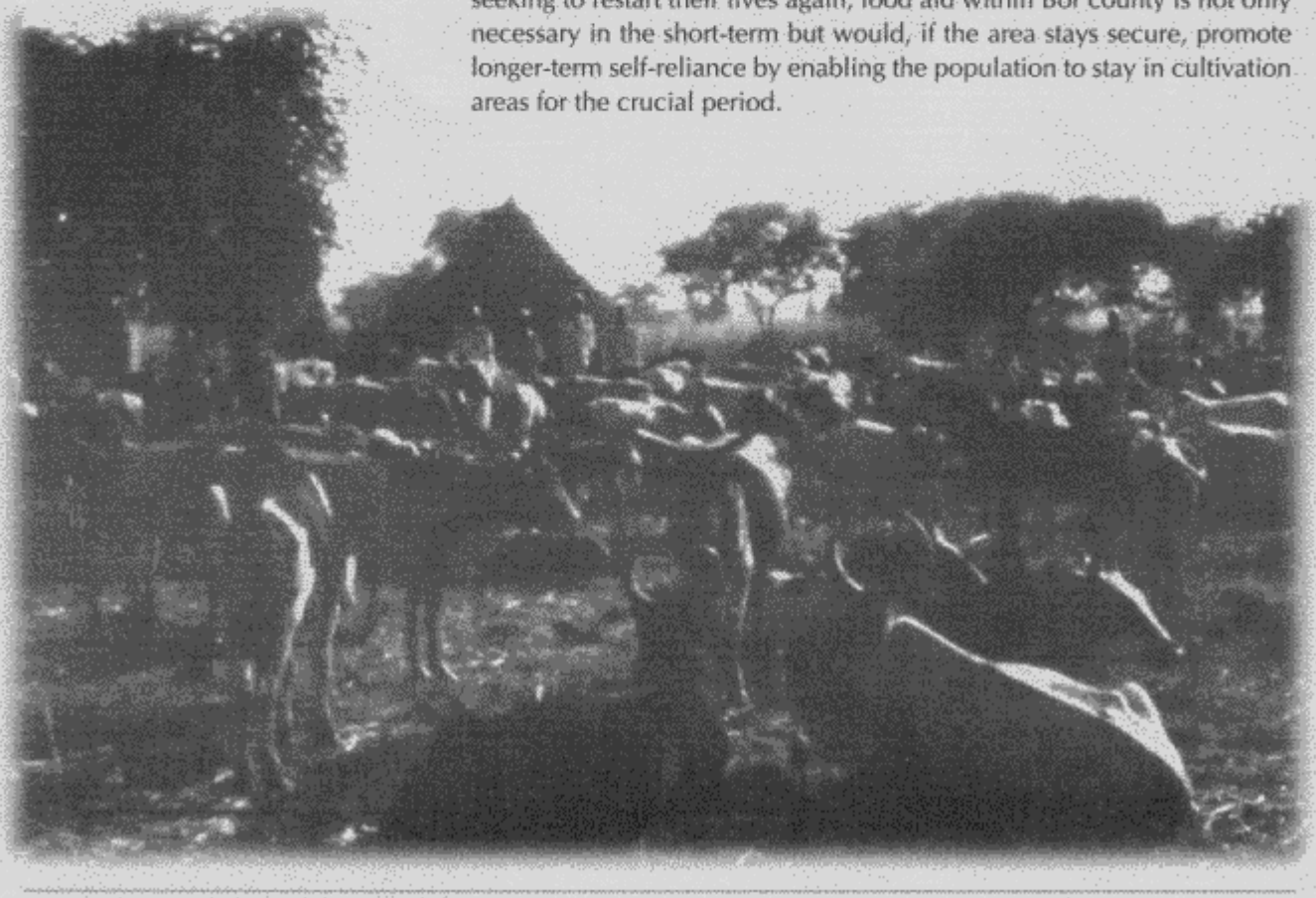
Relief food

Bor county has been more reliant on food aid than other parts of the Nile Corridor area, especially the four payams of north Bor depopulated by raids in 1991 and 1992. Since late 1993, households have begun to return to the area both from Bor South, across the Nile and from Equatorian camps.

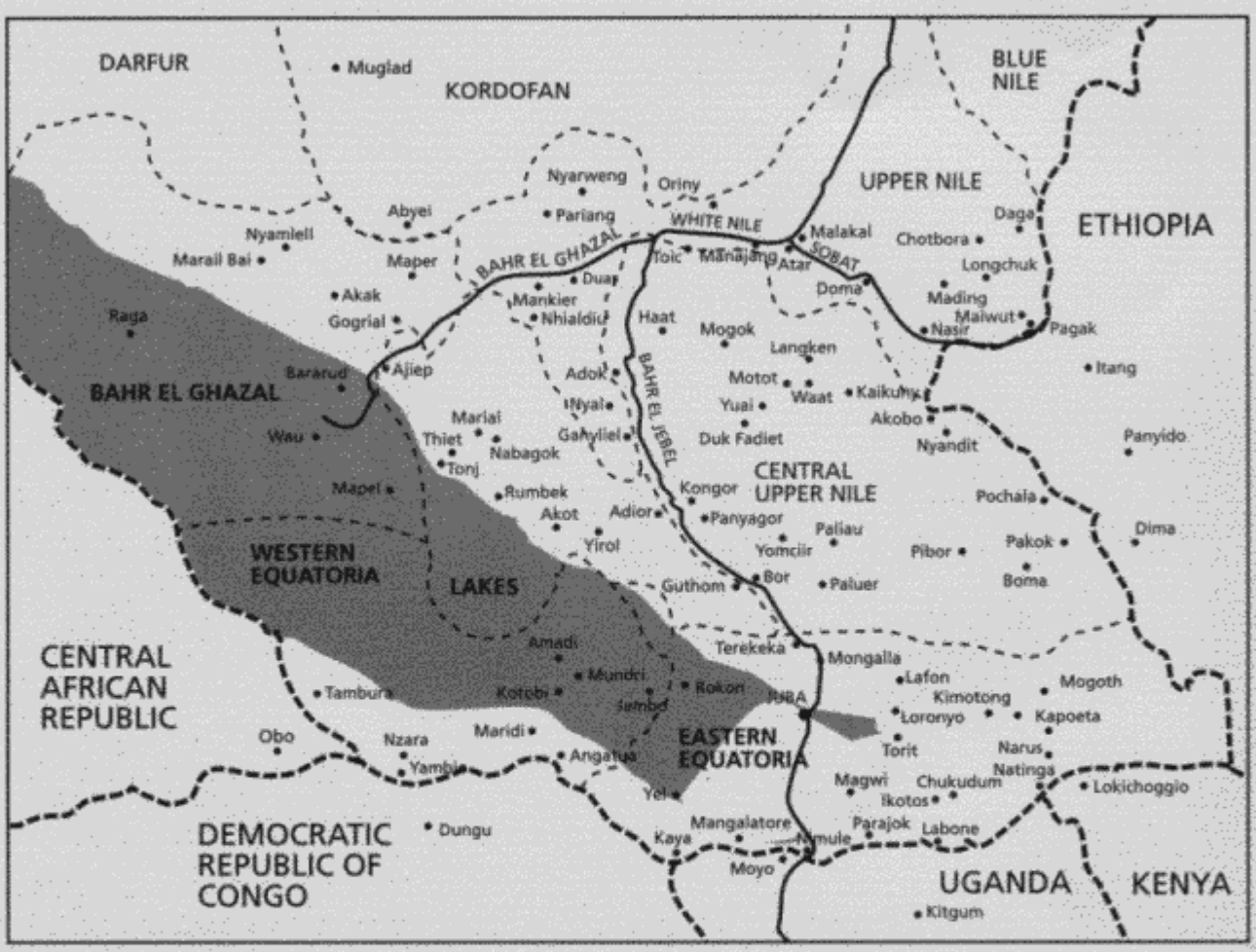
From the end of 1993, relief food delivered by LWF covered 80% of recent returnees' food needs for the year. Other food options were extremely limited as households had lost their cattle, had no goods to trade, had few neighbours to trade with who were not either hostile or equally impoverished, and had not had the chance to clear more than a small portion of land to farm.

The harvest in 1994 was extremely poor, and WFP undertook to provide food aid until the 1995 harvest. Although the 1995 harvest was the best since 1991, there was still a need for food aid - initially for recent returnees who did not cultivate, and later, due to lack of cattle, for the whole population. In the period when food was not distributed—between March and September 1996—most families resorted to living in *toic* areas, two or three days' walk from highland areas of cultivation, and it is thought that 70% of households abandoned their farms to look for food.

Given the relatively small population living in a confined area and seeking to restart their lives again, food aid within Bor county is not only necessary in the short-term but would, if the area stays secure, promote longer-term self-reliance by enabling the population to stay in cultivation areas for the crucial period.



THE IRONSTONE PLATEAU FOOD ECONOMY ZONE



SEASONAL CALENDER

Ironstone Plateau Area

KEY

Planting —— Harvesting/Usage ▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Sorghum	Long Term							Short Term				Long Term
Millet												
Maize												
Groundnuts												
Sesame												
Cassava	Harvesting All Year Round											
Sweet Potatoes	Harvesting All Year Round											
Yams	Harvesting All Year Round											
Wild-food	Yams & Lalop			Lulu								
Game Meat	Dry Season											
Fishing		Fishing Camps in Bahr el Ghazal										

BACKGROUND TO THE AREA

The Ironstone Plateau extends across the west and south-west of Bahr el Ghazal, and the northern part of western Equatoria. This area is sometimes differentiated into the Ironstone Plateau and the Agricultural Plains, but for the purpose of this document the area is treated as one food economy area. It is characterised by the area from the border with Central African Republic, through Wau county and part of Rumbek into Mundri county. Where the soils are deeper, they tend to be of a red laterite type, although they become shallower and more yellowish in northern Bahr el Ghazal where there is less ironstone. Rainfall averages between 950 to 1,300 mm annually. Due to widespread tsetse infestation, few households own cattle and crops are the most significant components of agriculture.

The lateritic soils do not hold water well, so dry periods within the rains can be particularly significant on crop production. The distribution of rainfall may thus be more significant than the total rainfall. Although some of the risk minimising practices may help conserve soil moisture, the wider introduction of water conservation measures may be an important strategy for increased food security.

The Ironstone Plateau is sparsely populated and contains a range of ethnic groups. Wau county, with an estimated population of 140,000[23], is dominated by a Nilotic group, the Jurchol (commonly known as the Jur Luo) with some Dinka. The main tribes in Mundri County, estimated population between 120,000[24] - 140,000[25], are the Moru to the south of Mundri town and the Jur cluster[26] to the north, dominating Mvolo and Yeri payams, with some Avokaya in Bangolo payam. Wulu payam in Rumbek County is mainly populated by the Jur Beli (and related Jur Moda and Jur Wetu).

The exact demarkation of what areas fall within the Ironstone Plateau food economy area may be questioned. Although Marial Baai payam (Achong chong) is part of Wau county, and the Jurchol who live there generally have access to sufficient or surplus food, it is not normally considered to form part of the Ironstone Plateau food economy area because it lies on the edge of the plateau and its population own a significant number of cattle. Crops are however similar to those grown in other areas of Wau county, as is the variety and quantity of wild foods available. Although the population of Achong chong fish in two rivers, fish are of less significance than in other parts of Wau County.

Although the Ironstone Plateau is normally a self-sufficient or surplus producing area, grain is often redistributed within the community. For example, following a bad harvest at the beginning of 1996 the population of Udici payam in the east of Wau county were able to gain access to grain from western areas, and thus to meet all of their food needs. Dinka communities from the Flood Plains area are also able to trade their cattle in Wau county, to work there or to ask relatives and friends for grain.

Wau county can normally absorb demands put upon them when parts of northern Bahr el Ghazal are affected by a bad harvest, but in 1996 the recurrent displacement of Dinka into Wau county put an additional strain on the food economy and it was difficult for Dinka to obtain food outside the harvesting season. This may have contributed to the Dinka's desire to move back to their home areas to cultivate. It seems that few Dinka have settled permanently in Wau county, although 9,000 displaced people still remained when the wet season of 1996 began. Early in 1998, Wau became a contested area and large numbers of this group and the resident population fled to the surrounding areas.

Mundri county has seen much disruption, but most of the displaced

[23] From SRRA.

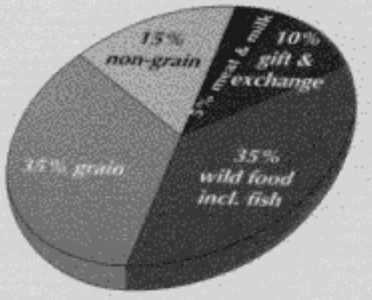
[24] From MSF.

[25] From SRRA.

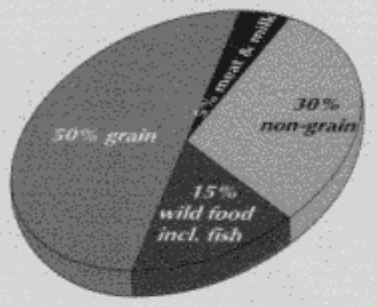
[26] The Jur cluster in Mundri district includes the Jur Modo, Jur Sopi, Jur Lori, Nyamusa, Wira and Morokodo.

Figure 5:

Normal year food economy



Households with few cattle



were gathered together in camps where they are still able to cultivate. These include Gulu and Bari camps, established in 1994 when displaced people were moved from Amadi and Kediba camps. Four camps on the east bank of the River Yei were established to house Moru who had been displaced from their villages by government attacks. The population of the most recently established camp, Gaya—estimated at 8,000—was expected to remain relatively food insecure until they had been able to receive two harvests.

OVERVIEW OF THE FOOD ECONOMY

The relative importance of different food options to the normal year household food economy of Wau County is represented in Figure 5, comparing normal and bad years. During a bad year, only three to five sacks of sorghum are harvested. This may only account for a quarter of annual household food needs taken on its own, but reaches 35% in combination with the short-term sorghum harvested and eaten earlier. The bad year food economy is similar to that of poor households in a normal year, who harvest less grain and rely more on wild foods and fish than rich households do.

Rich households, who have more labour, cultivate larger areas and have some access to cattle, make up only a tenth of the population in Udici and Kajiena payams of Wau county, and about one fifth of Mundri's population. Rich households, who cultivate a relatively large area, can in good years produce a large surplus of crops which they can then trade. In a bad crop year the poor rely more on wild foods and gifts from kin than the rich, who have access to both a larger harvest and to livestock products. As Figure 5 illustrates, the importance of both grain and non-grain crops in the household food economies in Wau county drops significantly in bad years. Wild foods and fish become much more important in bad years, and foods received through gifts and exchange enter significantly into the household food economy.

PRODUCTION AND COLLECTION

CROPS

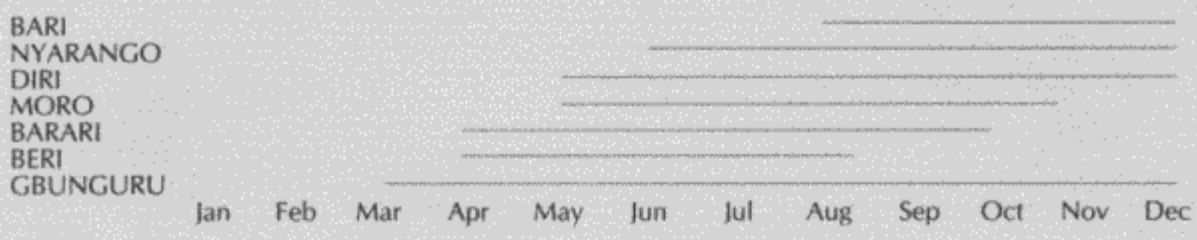
Households plant an average area of 4 feddans with crops. Sorghum is the main crop throughout the Ironstone Plateau, but sesame and groundnuts are also of significant importance. Other important crops include cowpeas, green gram, maize, millets (both finger and bulrush), okra, sweet potatoes and cassava[27], together helping make up the 70-80% contribution for crops to the household's diet during a normal year.

Different crops, and varieties of each crop, are planted and harvested at different stages of the rains in recognised mixtures or field types. This minimises the risk of severe production losses and also spreads crop availability and labour requirements more evenly throughout the year. The main sorghum harvest is from eight month varieties, such as Ullelo, Mabior (Dinka)[28], Diri or Nyarango (Moru), which are harvested in December or January and threshed soon afterwards, though other shorter term varieties are also grown to spread the risk[29]. Millet is also harvested towards the end of the year in November, and sesame in September and October. Groundnuts are mainly of short-growth varieties, which can be harvested between July and September, some 3-4 months after planting.

[27] The variety of crops grown is considerable. Other minor crops of some importance include aerial yams, earth nuts (Bambarra Groundnuts), hyptis, pigeon peas, pumpkins and squashes.

[28] Duncan states that 5-6 varieties may be sown in one household's fields, including short term, a medium term and long term types.

[29] Sharland notes four main sorghum varieties grown by the Moru, and a number of other minor ones, which are planted in different field types and have different roles in spreading the risk. . . .



The crop mixtures and field types traditionally used are significant. Different crop and variety mixtures are planted on second year land from those on newly cleared land. When households are disrupted therefore they do not have second year land, which is already cleared, available and this greatly reduces their options and ability to produce the full needs of the family, and thus spread risk. They also probably lack the variety of seed types which contribute to spreading the risk. The land immediately round a homestead which receives all the household waste is a particularly fertile area which is important for growing small amounts of quick yielding crops like maize and pumpkin, which help in the hungry gap. Where families are continually disrupted and have to move, this fertile area is also not available. Cassava is commonly planted as a famine reserve but this has not been possible for many households facing repeated disruption.

Cassava, sweet potatoes and yams can all be harvested year round[30]. This means that even when grain and pulses are not available, some food can be obtained from own crops if the household is stable. Where cassava is planted in significant quantities - such as in Mundri county - it becomes an important food source when grain crops yield a poor harvest. Households facing a bad year as a result of displacement, who have not been able to plant cassava, will tend to fill this crop gap more with wild foods.

Exotic fruit trees, particularly mangoes, guavas and pawpaws grow extensively in Mundri county, often being self seeded and growing almost wild. Mangoes in particular provide an important source of calories in the hungry gap.

LIVESTOCK

Livestock have traditionally been of relatively low importance to both the household food economy and local socio-cultural systems in the Ironstone Plateau. They however appear to have gained in importance over recent decades. Some families in two out of the five main Moru sections are cattle owners[31], and also have sheep and goats. The most significant domestic animals are poultry, which are kept by most households, though their importance in the food economy has not been ascertained.

The Jurchol and Jur Beli, who have traditionally not valued cattle as do the Dinka[32], have also increased their cattle ownership and consumption of milk. However, as Jurchol cattle are looked after by Dinka, it is the Dinka who consume most of their milk. For the Moru, Jurchol and Jur Beli, meat forms a more important part of household diet than milk[33], though much of the meat eaten is wild meat. Most meat, except that eaten as part of ceremonies is bought, rather than culled from their own herds.

[30] Cassava and sweet potato are both American origin crops, and were pushed strongly in the 1940s to increase food security, as they are resistant to locust attack, the biggest threat to food security at that time.

[31] The five main divisions of the Moru are Miza, Agyi, Moroandri, Kediro and 'Bali'ba. It is the last two of these who have some cattle.

[32] Jur is a Dinka name for what they consider to be lesser people without cattle.

[33] The Moru type of cattle are better milk producers than the Nilotic, but their numbers are small.

FISH

In Wau county fishing is carried out between February and April. During this time more than half the population move to fishing camps along rivers. Part of the fish caught during this time is dried and brought back to permanent settlements, to be consumed during the cultivation season.

The Moru appear to spend less time fishing than the Jurchol, although the Yei, Naam and Tapari rivers all run through Mundri County, and men and boys carry out dry-season fishing close to settlements.

Dry-season fishing gains in importance in bad harvest years, when fish are consumed to save grain stocks.

WILD FOODS

Wild foods are plentiful in the Ironstone Plateau area, and are a significant part of the diet. They include nutritionally important foods such as Shea Butter Nut (*lulu*), Desert Date (*lalop*), Borassus Palm (*Borassus aethiopum*) and a variety of wild yams and other tubers. Some of the roots and tubers have poisonous toxins, requiring complex and time consuming preparation, so are only eaten in times of famine. Many other wild foods such as fruits, mushrooms, termites and honey are important in the diet[34].

Shea Butter Nut (*Lulu*) is of particular significance partly because it is easily traded, and so has commercial significance, and partly because it is generally easy to obtain. It is reported that two people can gather up to 200 kgs of *lulu* in April and May, and in a good harvest year may sell more than half of this. In Wau county, there are large unsettled areas containing many lulu trees to which people travel when sources of *lulu* closer to their homes produce poor yields.

Both the Jurchol and Moru hunt wild game in Wau and Mundri counties. In Mundri county, relatively large amounts of wild meat are harvested, permitting a surplus for sale. Although wild animal populations have fallen since the war started, it is still common for young men to go out in hunting parties during the dry season. Game animals include bush rat, dik-dik, gazelle and bushbuck, which are hunted using spears, bows and arrows and nets and are also trapped using a variety of snares.

EXCHANGE

Trade and Exchange

Surplus grain production is an important trade item, especially for rich households who receive larger harvests, and is used to obtain both cash and goods such as clothes and tobacco. Delayed reciprocal exchange also takes place between the Dinka and Jurchol. The Jurchol "borrow" grain from Dinkas when they harvest in September, paying it back at the time of their own harvest in January. The Jurchol also employ Dinka for harvesting and planting generally paying in kind rather than in cash.

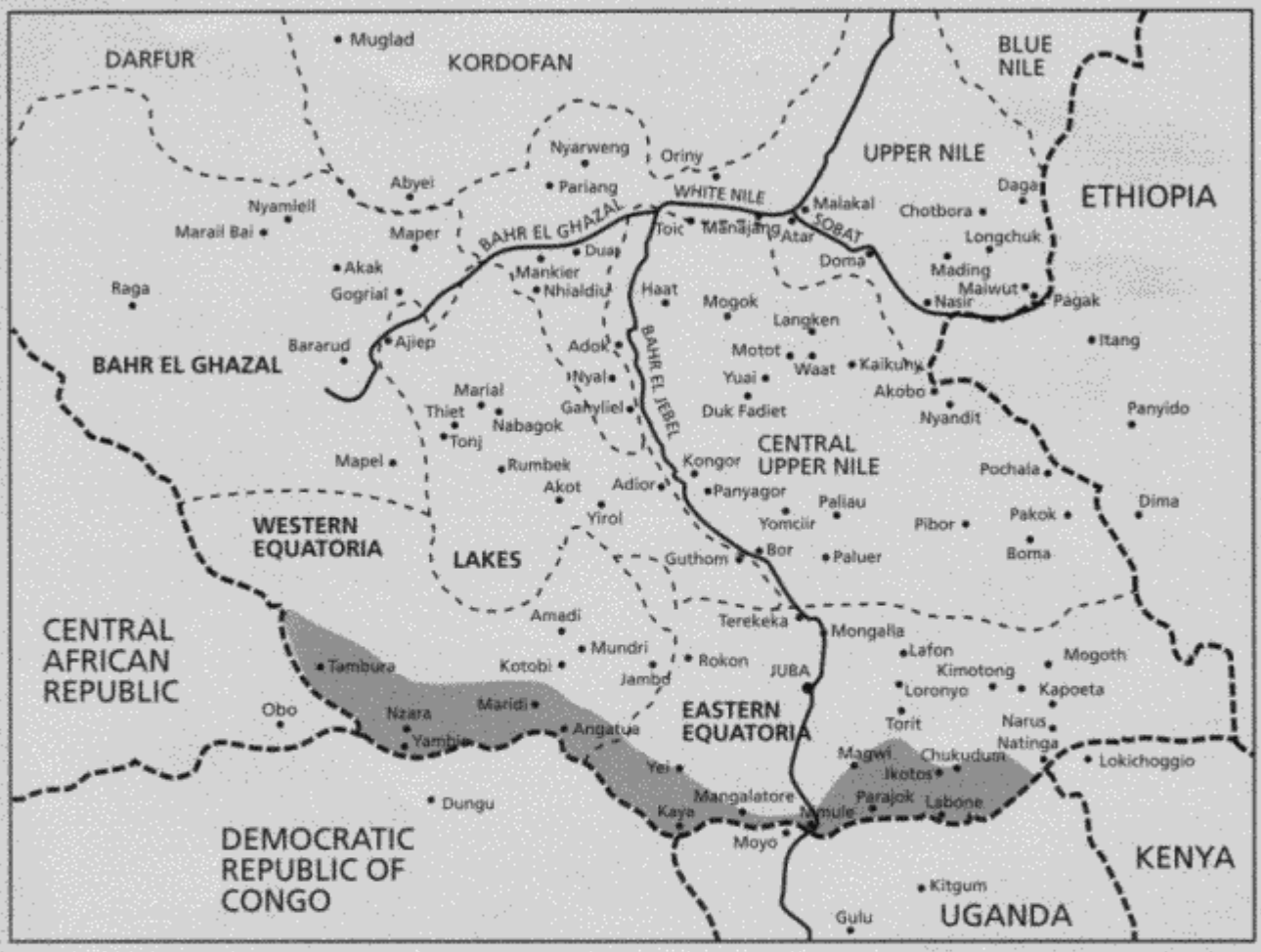
Honey is a significant product in Mundri county and is often exchanged for cash, which can be used to buy milk or meat or to meet other household needs. Several wild foods are considered desirable enough to enter local markets in small amounts when they are abundant.

Relief food

Within the Ironstone Plateau food aid has only been necessary for displaced, mainly Dinka and Moru, populations. In 1997/98 returnees from neighbouring countries from the East increased demand on local resources.

[34] Sharland (1989) has identified 37 fruits, 12 tubers and 23 wild vegetables, as well as a wide variety of other wild foods, commonly eaten by the Moru.

THE GREEN BELT FOOD ECONOMY ZONE



SEASONAL CALENDER

Green Belt Area

KEY

Planting —— Harvesting/Usage ▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Cassava	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬	▬▬
Sorghum (Dura)					▬▬						▬▬	▬▬
Maize				1st Plant ▬▬	▬▬	2nd Plant ▬▬	1st Harvest ▬▬	▬▬	▬▬			2nd Harvest ▬▬
Groundnuts			▬▬	▬▬	▬▬	▬▬		2nd Plant ▬▬				2nd Harvest ▬▬
Simsim						▬▬					▬▬	▬▬

BACKGROUND TO THE AREA

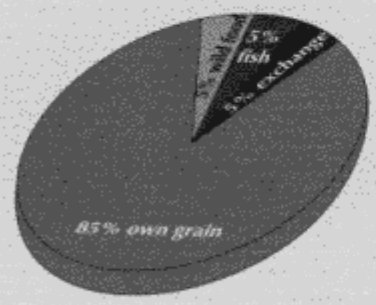
The Green Belt is the traditional surplus-producing area of southern Sudan. It is the high potential area covering the extreme southern parts of western and eastern Equatoria along the Central African Republic, Democratic Republic of Congo and Uganda borders, and a similar area around the Acholi mountains in Torit county. Mean rainfall is between 1,350 - 1,600 mm. Vegetation includes luxuriant broadleaf woodlands, thinning out in the northern half of Tambura county and into Mundri County, where the Green Belt borders the Ironstone Plateau.

The Green Belt area includes Yambio county, Maridi county, Yei county, part of Tambura and the southern tip of Mundri county. The predominant tribe in Yambio and Tambura counties is the Zande, who are agriculturalists prevented from owning cattle because of the presence of tsetse fly. In Yei county the predominant tribe is the Kakwa although both there and in Maridi county there are a number of smaller agricultural tribes. As World Food Programme southern Sudan has had very little involvement with the Green Belt area, the following section is brief. There is an abundance of literature about the Zande and their agriculture[35], and much research data stemming from Yei[36], which can be accessed from other sources. Further information, especially relating to sources of income and socio-economic differentiation, needs to be gathered.

There has been some localised displacement from areas around towns, such as Yei, which was held by the Government of Sudan, and as a result of offensives and counter-offensives along the border areas. Families have also had to flee to Uganda, Zaire (now Democratic Republic of Congo) and Central African Republic at various times. A number of displaced person's camps have been established, in Maridi and Mundri in particular, and especially in 1991 and 1992 following the displacement of Dinka from Bor county.

Figure 6:

Normal year food economy



OVERVIEW OF THE FOOD ECONOMY

The relative importance of different food options to the normal year household food economy of the Green Belt area is represented in Figure 6.

As Figure 6 illustrates, the food economy of the Green Belt area is dominated by crops, which contribute 85% of annual household food needs. Fish, wild foods and exchange, each of which contribute 5%, form a less important part of the normal year food economy.

OWN CROPS

Own crops make up the bulk of the household food economy in the Green Belt area, even in bad harvest years. It has been estimated that in good years households may generate a surplus of up to 150%[37], so in bad years there is still adequate own crop production. Each household - comprising a woman and her dependents - has its own plots where farming is carried out. Agriculture rarely depends on household labour alone, and communal labour is commonly used for planting and weeding, working together for the benefit of individual families.

Despite their capacity to produce surpluses, most farmers in the Green Belt area still employ a range of risk-minimising practices, using subsistence values in production, though expecting to produce a surplus for sale. These include growing a wide variety of crops, and different varieties of each crop,

[35] A particular detailed study is Pierre de Schlippe's classic book "Shifting Cultivation in Africa - The Zande System of Agriculture", printed in 1956.

[36] A large number of research and survey reports were written in the 1970s and 1980s by the Project Development Unit (PDU) and its successor Equatoria Region Agricultural Programme (ERAP), and consultants that they contracted for particular surveys.

[37] OLS Southern Sector Needs Assessment 1995.

planted at different times during the rains in different field types, so as to take advantage of peaks in rainfall, and to spread the labour requirements. All households also cultivate at least a small area of cassava in case other crops fail. Cassava has been increasing in importance in recent years, especially in Yambio county.

Unlike other parts of southern Sudan, the Green Belt is increasingly becoming dependent on crops not indigenous to the area (mainly those of American origin). Maize, finger millet, cassava, groundnuts and rice are the main crops planted, and sesame and sorghum are also common. Maize is planted twice, with the first planting at the start of the rains in April or May and harvesting around August. Several different varieties of maize are planted. There are also several varieties of groundnuts, planted in April or May and, for the short-term varieties, again in September. Cassava is planted at the start of the rains and harvested all year round.

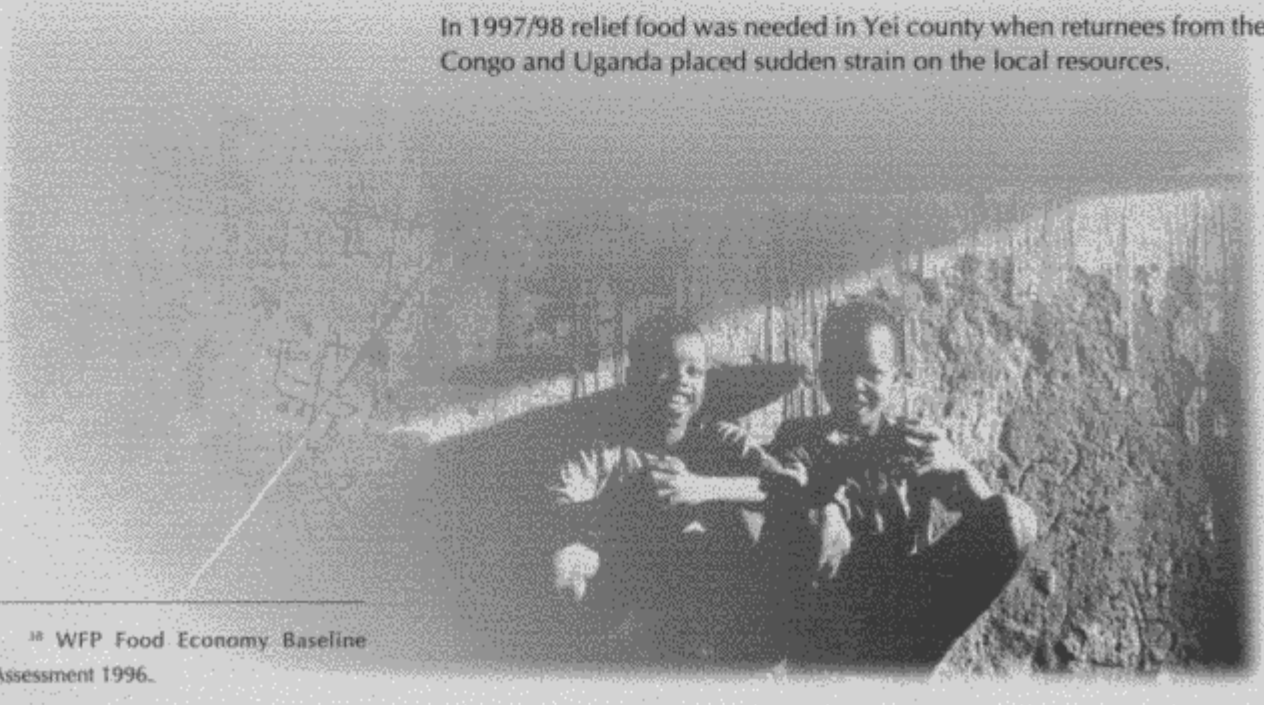
OTHER FOOD SOURCES

Fish and wild foods are also available to the Green Belt population, and will generally account for about 15% of annual household food needs. In east Mundri, immediately to the east of the Green Belt area, over 20 wild foods are commonly collected, including yam, mango and honey[38]. Although species available in the Green Belt may be different, availability will be similar and therefore wild foods may potentially contribute about one third of a household's food needs, although they are seldom required to do so. Wild foods are often some of the most prized and sought after parts of the diet and many are not seen as second best. They are particularly significant in providing a variety of relishes, which may have little calorific value, but are of significant nutritional value.

Markets are also active, with Tambura bordering both Democratic Republic of Congo and Central African Republic, Yambio and Maridi bordering Congo, and Yei bordering Uganda. Both meat and fish may be bought from markets.

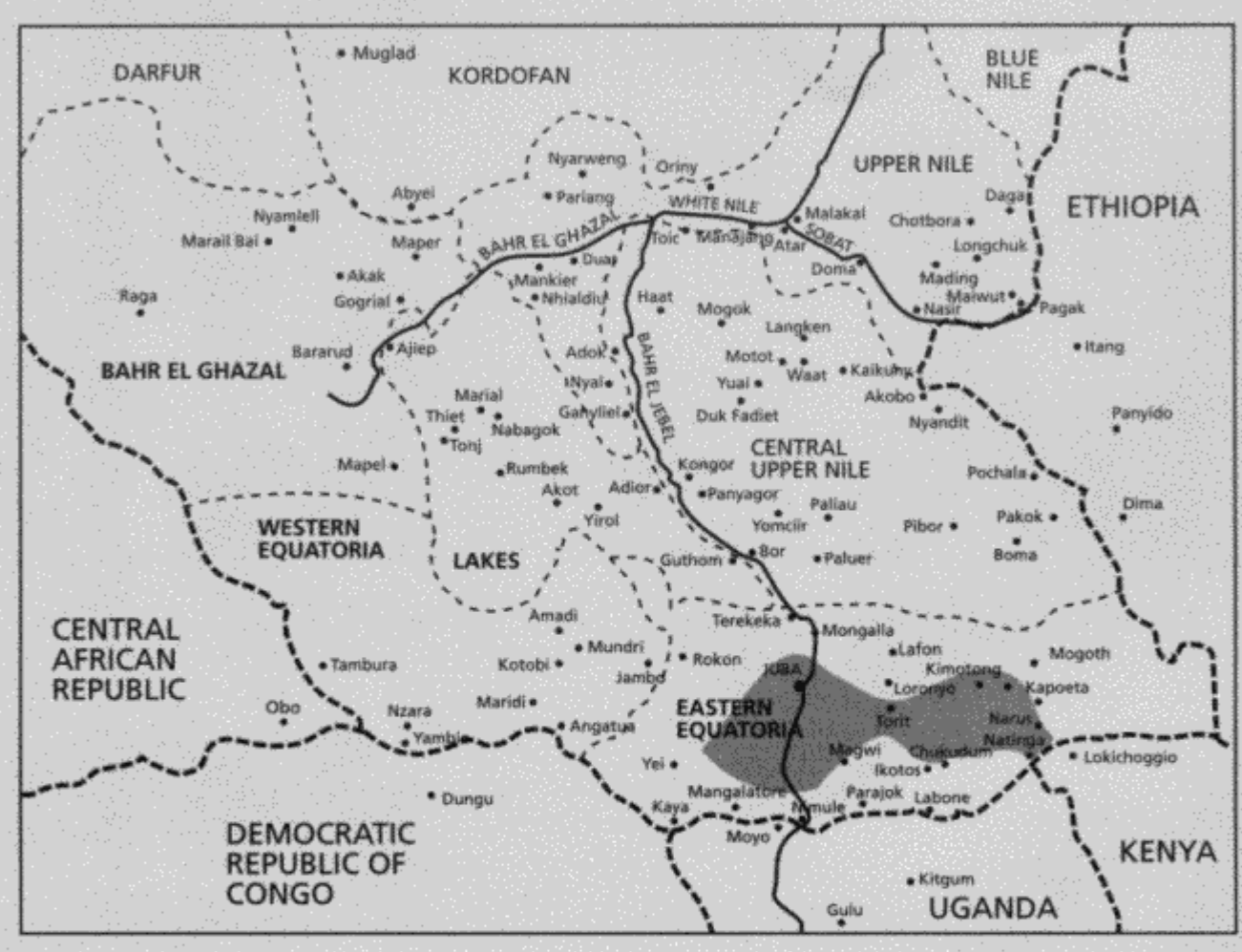
Relief food

In 1997/98 relief food was needed in Yei county when returnees from the Congo and Uganda placed sudden strain on the local resources.



[38] WFP Food Economy Baseline Assessment 1996.

THE HILLS AND MOUNTAINS FOOD ECONOMY ZONE



SEASONAL CALENDER

Hills and Mountain Area

KEY

Planting ——— Harvesting/Usage ▬▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Mountain Crops		———	———				▬▬▬	▬▬▬				
Plain Millet				———	———			▬▬▬	▬▬▬			
Sorghum				———	———						▬▬▬	▬▬▬
Simsim				———	———			▬▬▬	▬▬▬			
Bleed Livestock				▬▬▬	▬▬▬	▬▬▬						
Hunting Wild Game	▬▬▬	▬▬▬	▬▬▬									
Exchange				▬▬▬	▬▬▬	▬▬▬	▬▬▬					
Wild-food		▬▬▬			Wet Season ▬▬▬	▬▬▬	▬▬▬					▬▬▬

BACKGROUND TO THE AREA

The Hills and Mountains food economy area covers a large proportion of eastern Equatoria east of the Nile, merging with the flood region to the north and the Arid Zone to the east, and overlapping with the Green Belt. It covers parts of Torit and Kapoeta counties, which have a combined population of about half a million[39]. Because of the topography, the area is agro-climatically diverse, and includes the Didinga and Imatong Hills which have an annual rainfall of 1,500 - 2,200 mm per year, their lower slopes with rainfall of 750 - 1,200 mm per year, and plains such as Loronyo.

The population of the Hills and Mountains area are mostly agro-pastoralists who are sometimes trading and supporting each other and at other times raiding cattle from each other. Wealth is primarily measured by the number of cattle a family owns, and most of the population have therefore become poorer since the advent of the war and the increase in inter-tribal fighting, which has also crossed the border into Uganda. Contact with Uganda is a significant factor in this area.

OVERVIEW OF THE FOOD ECONOMY

The relative importance of different food options to the normal year household food economy of the Hills and Mountains area is represented.

As Figure 7 illustrates, own crops form the bulk of household food economies in the Hills and Mountain area, contributing just under half of annual food needs. Milk, wild foods and exchange are of equal, but lesser importance, and meat contributes the smallest proportion - just over a tenth - to the annual food economy.

PRODUCTION AND COLLECTION

CROPS

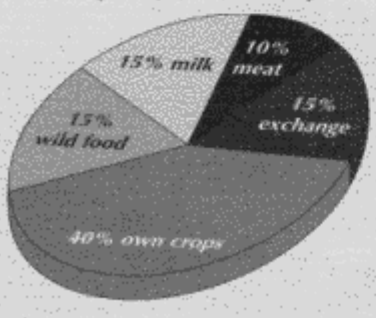
Insecurity in areas such as the Lopit Mountains and Didinga Hills has led to households having to adapt their cultivation practices. Whereas some households still have farms in both hills and plains areas, others now cultivate in only one area.

Many villages have been moved up to the hills areas, where sorghum, beans and maize are cultivated. In plains areas farms have moved closer to the foot of the hills. The major plains crop around Lopit (Lotuka) is millet, which has staggered planting, and the Didinga favour a long-term sorghum variety, mocca. Groundnuts are also planted in the plains where there are suitable soils. The grain harvest in the plains is generally between one and a half to four times higher than it is in the mountains.

Approximately two sacks of grain is considered sufficient to see a household through the year, provided that other crops such as groundnuts and pumpkin yield enough to contribute 10% to the household food economy, and the household can expand food income from exchange of both cattle and other trade items.

Figure 7:

Normal year food economy



LIVESTOCK

Wealth is primarily defined in terms of livestock ownership. Rich households

[39] OLS Southern Sector Needs Assessment 1995.

are currently said to have access to 20 cattle, although they used to own larger numbers before the war. Poor households own no cattle, although it is uncommon for households not to have some degree of access to milk and meat except among the Didinga.

FISH

Fish seldom forms part of the household diet, even though rivers in the area - such as the River Hoss - contain fish.

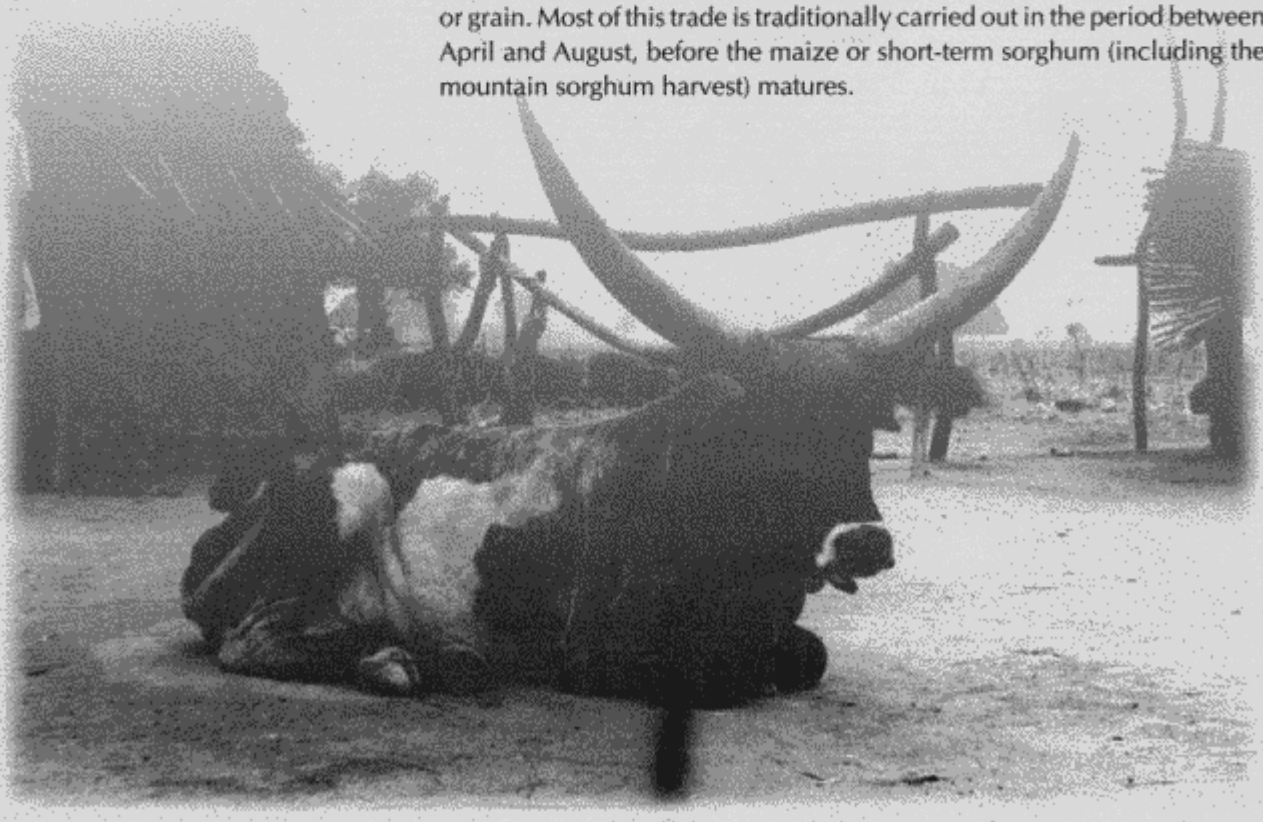
WILD FOODS

Wild foods of calorific significance are not consumed in large quantities in good years, although greens and mushrooms are regularly collected and eaten as relishes during the wet season. In a bad year the population increases its intake of all wild foods, particularly relying on roots and tubers, and other nutritious foods such as Desert Date (*lalop*) and honey.

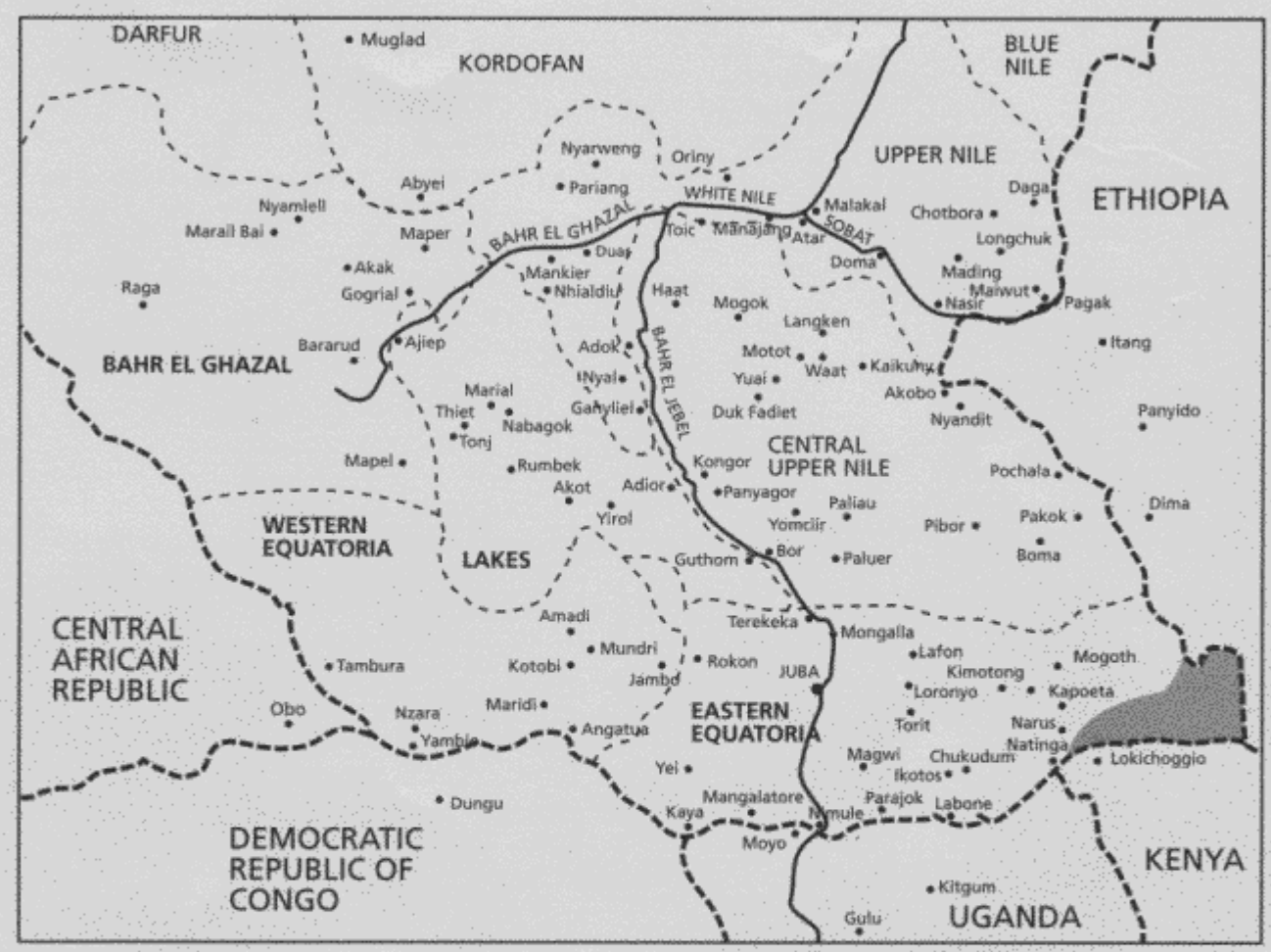
EXCHANGE

Exchange is a significant factor in the food economy. Before the war, Torit and Kapoeta were both major trading centres. Exchange routes between the Didinga and Kenya are open, and there are several reliable surplus areas within Didinga—such as Nagichot. Around Boya and Lopit, exchange has been constrained due to insecurity. Although the Didinga have fewer cattle than the Boya or Lotuka they produce surplus crop harvests more frequently, and therefore in times of peace, exchange is common between the two groups.

Households who own no cattle or goats exchange beer and pots for cash or grain. Most of this trade is traditionally carried out in the period between April and August, before the maize or short-term sorghum (including the mountain sorghum harvest) matures.



THE ARID FOOD ECONOMY ZONE



SEASONAL CALENDER

Arid Area

KEY

Planting ——— Harvesting/Usage ▬▬

CROPS PRODUCTION	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Millet				▬▬	▬▬		▬▬	▬▬				
Sorghum				▬▬	▬▬			▬▬	▬▬			
Sesame				▬▬	▬▬			▬▬	▬▬			
Maize				▬▬	▬▬	▬▬		▬▬	▬▬			
Cattle Slaughter		Hunger Gap / Dry Season	▬▬	▬▬	▬▬							
Milk					Wet Season	▬▬	▬▬	▬▬	▬▬			
Blood Mixed Milk	Dry Season	▬▬	▬▬	▬▬	▬▬						Dry Season	▬▬
Livestock Movement	Faraway Camps	▬▬	▬▬	▬▬					Cattle Camps	▬▬	Faraway Camps	▬▬
Trade/exchange	▬▬	▬▬										▬▬
Wild-food		Lalop	▬▬									

BACKGROUND TO THE AREA

The Arid Zone food economy area lies within eastern Equatoria, bordering Kenya. It is inhabited by agro-pastoralist groups, mainly comprising the Toposa, the Anyangatong (in the south east) and Nyamatong (around Naita). The population of the Toposa is estimated at 175,000.

The zone is dry and can be characterised as Sahel Savannah, where the average annual rainfall is less than 200 mm. The soils of the large plain are predominantly sandy loam, with the clay fraction tending to be higher in the north, west and east of the area. There are few permanent rivers, and water points are scarce, although along the Ethiopian border there is a range of high country said to offer prime grazing and numerous water points.

Before 1985 the Toposa permanently inhabited and cultivated areas including Karukuonjie, Maachi, Mogos, Pongo and Riwoto. These areas contained heavy loam soils, tending to clay, which produced good harvests in most years. Since 1985 most of these communities - with the exception of Karukuonjie and Mogos - have resettled in what were previously dry-season grazing lands in the east of the county.

OVERVIEW OF THE FOOD ECONOMY

Livestock form the mainstay of the economy in the Arid Zone area. Some sectors of the Anyangatong and Toposa are said to eat grain only rarely, and are arguably the closest to pure pastoralists of any people in southern Sudan.

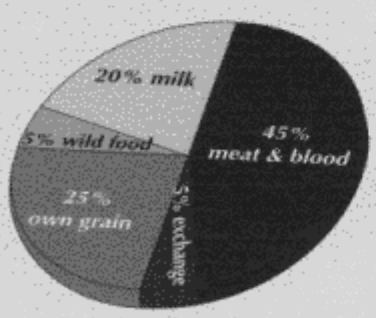
The relative importance of different food options to the normal year household food economy of Toposaland in the Arid Zone area is represented in Figure 8, comparing average households and households with low production. In a typical year, grain and wild foods only make up a third of a household's diet, with the rest comprised of livestock products.

This heavy reliance on livestock products means that a "bad" year in Toposaland can be characterised as a time when livestock are in poor health, die or are unproductive. Just before the rains in February and March, when livestock productivity is low, is the period of the year when the Toposa have least access to food sources.

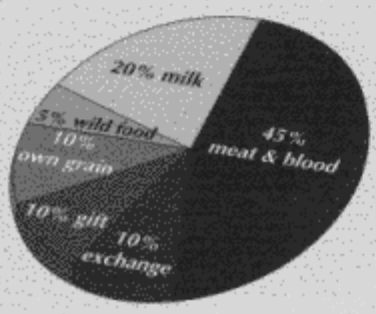
As illustrated in Figure 8, food economies of average and poor households in the Arid Zone area are broadly similar, and dominated by milk, meat and blood. The major difference between food economies of these different groups is that households with low production depend less on own grain, and more on gifts and exchange, than average households.

Figure 8:

Normal year food economy



Households with few cattle



PRODUCTION AND COLLECTION

CROPS

Both prior to 1983 and now, short and long-term sorghum are the major crops cultivated in the Arid Zone area. Other crops include sesame, pumpkin and beans and - where there is access to riverine black cotton soils - maize. Groundnuts are grown in some areas around Kalacha and Lolim.

Planting takes place between late April and June, with harvesting in August and threshing in October. In a good year a productive household will thresh around 500 kg of grain, although it will only consume about 300 kg of this and give most of the remaining 200 kg away.

Households do not necessarily plant their own farms every year. Rather

several wives in a family may share the produce of one farm and not every woman will help with the cultivation[40]. Kinship bonds are extremely strong, and even in normal years localised differences in production mean that redistribution takes place along kin lines.

LIVESTOCK

The Toposa own large herds of cattle, goats and sheep, upon which they rely heavily. Because of the importance of the livestock, families employ a risk-minimising strategy by keeping some of their livestock scattered throughout Toposaland with friends and relatives.

In order to optimise the grazing available, the Toposa maintain a high degree of mobility. Although communities have now moved closer to their traditional dry-season grazing lands, at the height of the dry season cattle may be taken four or five days' walk away from villages to seek pasture. The increased concentration of settlement in the east of the county has led to some overgrazing, resulting in both sheet and gully erosion. This has in turn caused a change in vegetation which compromises cattle production, although it has less effect on small stock. Herders, searching for better grazing, have begun taking their livestock closer to the Ethiopian border.

Milk yields in Toposaland have always been lower than in other areas of southern Sudan, and have declined still further as grazing movements have been constricted. Sheep and goat milk is an important part of the diet of household members who stay in the villages during the dry season, although they comprise less than half of the population.

In the dry season - October/November to April/May - blood from bulls is often drunk, alone or in combination with milk. Although bulls can be bled up to 12 times a year, the amount taken and frequency of bleeding depends on the availability of other food sources. Blood is seldom taken during the wet season, when milk is more readily available. Meat is primarily eaten in the dry season, and includes both cattle, and more commonly goats.

There is no available information about Toposa families who lack large livestock herds. However it appears that milk, meat and blood are always available, although they may become less accessible to some family members when herds move away from villages during the dry season. It is unlikely that family members would stay in villages if they did not either have access to food from the livestock remaining there, obtain ghee and dried meat from cattle camps or receive grain from either exchange or relief.

FISH

The Toposa do not eat fish.

WILD FOODS

A variety of wild foods are found year round in Toposaland. They include Desert Date (*lalop*), which is also sometimes stored, and is available just prior to the time of most food stress in February. Many of the other wild foods are also affected by drought conditions, and thus have limited potential to substitute for crops in drought years.

[40] So, if a household is defined as one wife and her dependents, then there are two types of household: those who produce more grain, and those who produce less grain but share with higher producers. The same type of analysis can be extended to the community level; in this case more productive households are found in areas around Kapoeta and less productive households in south eastern areas.

EXCHANGE

Trade and exchange

Although only small amounts of grain are obtained through exchange in a normal year, exchange gains in importance following a bad harvest. In such cases households are required to sell cattle to buy grain. Traditional trading centres for livestock-grain exchange included Kathangor with the Jiye, and others with the Didinga to the west and in Kapoeta town.

When Kapoeta became a government town, trade was reduced although there were still reports of households from the Mogos area taking surplus grain to trade. Trade routes with the Didinga and Jiye are also closed from time to time due to inter-tribal disputes and cattle raiding.

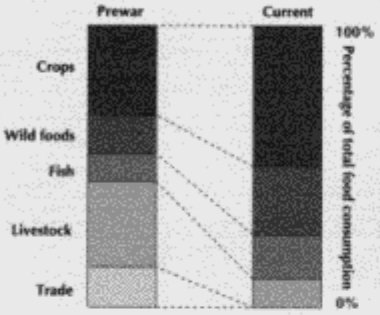
Relief food

The role of food aid in the Arid Zone is very complicated. Relief food is shared following its distribution. Given the active networks in the area, it also plays an important part of exchange patterns.

CONCLUDING OBSERVATIONS

Figure 9:

Percentage of total food consumption



The Food Economy Approach used to elicit most of the information in this document enables a wider picture of the various factors which contribute to the household food economy to be taken into account than just agricultural production. Of greatest significance for planners are probably those aspects which are unusual, or particular to the southern Sudanese situation. Once food sources are recognised to be more than just the familiar agricultural production, a clearer picture of what is actually happening emerges, and necessary interventions can focus on those areas where there really is a food deficit.

By comparing normal years or average households with bad years or poorer households the Food Economy Approach gives some idea as to the flexibility within the system, and what options may be available for making up deficits, before outside intervention is considered. The information that is gathered through this approach can thus be seen to be comparative, and its usefulness depends on clear understanding of the full picture.

The FEA picture not only shows the inherent flexibility of livelihoods, but can reveal trends and possible changing strategies resulting from the ongoing conflict.

ADAPTING FOOD STRATEGIES

How should this influence relief assistance? Should improved trade opportunities be considered as a priority?

Before the war, people in northern Bahr el Ghazal met their food needs mainly from crops and livestock, with less dependence on wild foods, fishing and trade. Civil conflict has curtailed trade, and households can no longer rely on markets for their food. With their herds destroyed by raiding, local residents have increased their reliance on fishing, wild foods and crops; including relief support. Figure 9 illustrates the rough magnitude of the strategic choices residents in one county have made in the last few years.

ISSUES FOR FURTHER COSIDERATION

THE CONCEPT OF FOOD

The word "food" in English does not necessarily mean the same semantically as the words which are used in local vernaculars. The concept of "food" used in this document relates to calorific requirements for survival, and uses 1,900 KCal per day as the minimum daily calorific requirement for an adult to survive. This is a very limiting, even if practical, definition of food.

In any society food actually has far more significance than just survival and is associated with many cultural factors, which are linked more with concepts of welfare than mere survival. The concept of food in most Sudanese cultures is associated with the availability of the staple, which for agricultural tribes is sorghum, millet or to some extent now, maize and cassava[41]. If the staple is not available people will feel and say that there is

[41] For example with the Moru of Mundri County, the word for food is Ngaonya. The is the same root as the work for sorghum, enya, which is the staple and normally eaten as the thick porridge called linya. If there is no linya people say they are hungry because there is no food.

no food. Even if they have been able to fill their stomachs on some available source they will still say they are hungry and there is no food if the staple is lacking.

As seen in this document wild foods, and other strategies of alternative sources of food, are very significant for supplying the total calorific requirements of the population, especially for poor families or in years of deficit. This is an important realisation, and needs to be taken seriously into account when seeking to understand the food situation in the region. However most wild foods are not generally considered to be 'food' by the population. They rather serve a number of important and wider roles:

1. Wild foods give variety to the diet and are frequently, especially in the ironstone plateau and green belt, a very significant part of normal year relishes, and are often constituents of favoured dishes;
2. They provide a famine source of nourishment in years of shortage, enabling the people to survive but not fulfilling cultural 'food' needs;
3. They are in many places a very significant part of the micro-nutrient supply to the population;
4. They provide snack and survival significance for those travelling, tending livestock etc. who are away from home for some reason. This leads on to the second important point, namely nutrition.

NUTRITION

Although calorie intake is useful for analysing the availability of food, it is inadequate as a full analysis. Balance in the diet is important both for health, and for effective absorption of the calories. This document does not attempt to look further than the calorific values of the food, but anyone looking at food security in the region does need to recognise the need for balance. In this respect the value of many of the wild foods and minor crops consumed in southern Sudan is perhaps under-realised. (SCF-UK has developed a database on indigenous wild food plants. Contact WFP/FEAU for further information on over 350 entries on identification, use, seasonal availability, preparation and collection and nutritional details.)

It has long been recognised that as a generalisation, those tribes with cattle tend to be short of various nutrients related to fresh fruit and vegetables, especially minerals and vitamins A and C, whilst the people along the Uganda/Congo border tend to be short of animal based nutrients and especially proteins.

POSTHARVEST AND STORAGE

One limiting factor of the Food Economy Approach is that it looks at the actual situation, and cannot focus on potential, including losses. In terms of food security, postharvest losses in stores affects the total amount of food available from production. (This can be taken into account if calorific values are adjusted for post harvest losses.) However, probably of greater significance in the present situation is the effect that insecurity has on the ability or desirability of keeping crops in store against a time of shortage.

As noted in the text, one of the strategies for reducing risk is to cultivate a variety of different crops and different varieties within each crop. One characteristic that varies between varieties is storability, and normally certain varieties which are known to store well are grown and kept in

storage for uncertain times ahead.

One of the significant effects of disruption and displacement is that people have lost their crops in storage. This has an immediate effect in terms of immediate needs, but also has effected people's ability and motivation to put aside some food for future use. Once a family has lost food from storage it will be less inclined to commit food to the store.

PROCESSING

The value of food is not just seen in terms of bulk, but also in absorption of the nutrients[42]. This is effected by processing. Various traditional practices in processing, such as fermentation, affect the calorific value of foods. One effect of disruption is that some aspects of food processing are not possible or are reduced. This factor should be taken into account in looking more deeply at food security.

One particular form of food processing that may be particularly significant nutritionally may be beer. There is no mention of this in the text except as a resource for hiring labour. Its consumption may be a significant factor in food security terms.

SEED AVAILABILITY

In a number of the food economy areas it has been noted that, especially after disruption, the availability of seeds may be a limiting factor in agricultural production. It should be noted that it is not just the quantity of seeds, but the type of seed that is significant. One of the strategies noted in the text for reducing risk is to grow a number of different varieties of the crop. southern Sudan is close to the centre of diversification of most of the traditional crops grown[43], and there are very many different local varieties which are finely adapted to local conditions[44]. This is especially the case for sorghum where there are both flood resistant and drought tolerant varieties, early and late varieties, and varieties for use on first year land and others for second and subsequent year land. The vulnerability of some populations to flooding may have increased during the war due to the lack of traditional varieties of sorghum that are flood resistant[45]. Since these varieties are locally developed by the farmers, they are not available outside the area. When an agency seeks to bring in seeds for relief or rehabilitation, the varieties available do not necessarily relate to local conditions. There is no mention in the text of the document to the effect of new seed varieties, but the overall impression is that local varieties are preferred and important for risk reduction. For American origin crops, such as maize and groundnuts, exotic varieties may be equally suited. However, it must be noted that the grains brought in as food aid are not normally suitable for seed. The effect of bringing in new varieties, and even crops, would warrant further study.

FOOD AID ENABLING CULTIVATION

A major factor contributing to the food security situation in southern Sudan is that of disruption. After disruption cultivation may be possible, but it may be limited by lack of seeds and tools or the lack of ready second year land. It may also be limited by lack of easily available food. The peak cultivation period often coincides with the hunger gap. Although food may be

[42] For example the addition of tamarind to porridge not only makes it more palatable but increases the absorption of carbohydrate by the body.

[43] Amongst others, Sudan is close to the centre of diversification for sorghum, finger millet, bulrush millet, cowpeas, hyptis, okra. This is reflected in the number of varieties used, and is also seen in wild related species common in the area.

[44] See also Appendix I.

[45] Mutwakil (1947) reports an incident of the variety Jak in Upper Nile surviving a total of 40 days continuous waterlogging in 1946.

available, if it requires a lot of processing, as with some wild yams, or is distant from the home, as with fish in some situations, it can be a very limiting factor in terms of cultivation.

A common concern about the use of food aid is that it can cause dependency and reduce the will of the population to cultivate for themselves in difficult circumstances. With a clear understanding of the situation food aid may also encourage cultivation. It may sometimes be appropriate to make some food aid available, even in situations where there are some wild food resources available, at the peak cultivation times, in order to facilitate people to stay in the agricultural areas and work on their farms and produce the food for the next season rather than spend their time and energy hunting and gathering.

THE IMPACT OF INSECURITY

Boosting agricultural production is frequently given priority by relief agencies wanting to improve food security. However, the ranking and prioritising of needs by communities has revealed greater concerns in a number of cases. Constraints and restrictions to trade and exchange, the loss of sustainable livestock herds, the undermining of some kinship support mechanisms, a reduced and weaker labour force, the over utilisation of wild foods and, in some cases, reduced catches of fish have all been mentioned in addition to restricted access to veterinary and health services. The overall analysis of food economy assessments revealed that people's greatest underlying fear is a further reduction of assets and restricted access to alternative food sources.[46]

THE IMPACT OF INSECURITY ON ASSETS AND COPING MECHANISMS

When many areas are constantly being contested, resident populations balance on the brink of survival and their problems are often compounded by the arrival of displaced people and returnees. The consequences of the continuing high level of political conflict and tribal disputes have eroded many people's ability to remain self sufficient, thus increasing the burden on the better off members of a community. Continuing insecurity has prevented the engagement of normal recovery strategies, leaving the general asset base of many households and communities at a dangerously low level. Where frequent displacement is experienced, the flexibility of the normal food economy is lost with greater competition for access to alternative food sources. An increasing number of the poor are having to find ways to access food through exchange of labour or through trade. In addition, the diversion of labour in search of other food sources reduces overall productivity from own cultivation thereby increasing the level of vulnerability. Different wealth groups engage different strategies to meet their needs in bad years. The noticeable polarisation of wealth in some of the hardest hit communities is obviously increasing competition for limited resources amongst the poorer. In a difficult year the normal strategy would be for all groups to increase purchases. However, this is restricted when there is very little available in markets as a result of reduced production and when households are not in a position to release stocks or further reduce assets.

In 1996 and 1997 the World Food Programme were only able to deliver close to 30 per cent of the total projected relief food needs. This attracted

[46]Recent displacement has also highlighted the need for access to water to be recorded and for estimates to be made as the size of population that accessible water sources are able to sustain.

some concern over the estimates of relief food needs as deaths and serious malnutrition were not widely observed. Although an explanation of logistical constraints including GOS flight bans, the nature of securing funds and time lags in pipeline supplies were given, the largest impact was felt by the southern Sudanese themselves who only managed to survive at the cost of further erosion of household and productive assets and an over dependency on traditional coping strategies. When this trend is forced to continue, normal coping strategies (those which are part of the flexible pattern within a food economy) become crisis strategies (those undertaken to ensure survival at the expense of a sustainable livelihood) and recovery strategies (i.e. producing surpluses to repurchase lost assets) become increasingly difficult to implement. Such a fragile existence is a reality for many living in Bahr El Ghazal in 1998, and continuing conflict will prevent normal livelihood systems from functioning.

THE IMPACT OF INSECURITY ON FOOD ACCESS

Insecurity affects agricultural production because of the resulting loss of labour, loss of trade, and loss of livestock. Labour is the single biggest constraint to agricultural production and has been affected by recruitment, death, displacement and disease, and the diversion of labour to other activities often associated with lower risk. The loss of trade seriously limits the engagement of several coping strategies. Increased opportunities to exchange reduce risk and allow recovery of assets. The loss of livestock has knock-on detrimental effects on trade and agriculture. The loss of manure in many places, particularly Bahr El Ghazal, has also had an impact on production. Equally important is the impact on social support mechanisms. Without cattle, kinship ties are weakened as they play a vital role in the redistribution of labour and food. A number of ceremonies strongly link and protect the extended family system including births, deaths and marriages. Insecurity originally caused a collapse in the cash economy. However, cash appears to have become increasingly tradable and even considered in bride price negotiations. This could be partly a result of the loss of cattle, although increased cross border trade may have also stimulated the use of cash in the economy.

Finally, there remains a hidden impact of insecurity which is promoting a downward spiral into more widespread poverty. Survival in southern Sudan is mainly about minimising risks. In the past, agro-pastoralists planted crops as much to minimise the risk on total dependence on cattle, as they own cattle to compensate for the vagaries of the weather. Crops were not planted to maximise production opportunities and cattle have never been viewed as a "units of production". Efforts to enhance agricultural production will meet this attitude as a major obstacle, yet relief efforts often fail to recognise this and need to look more closely at their audiences to identify incentives to adopt new or "improved" practices. It has traditionally been the needs of cattle that determine the seasonal patterns of human migration which in turn determined access to other important food sources such as trade , fishing and wild foods. In today's highly insecure environment only the wealthier can consider expanding crop production and risk limited resources to cultivate, weed and harvest. They can afford to take the risk of reaping some or no rewards for their efforts and investment. For those who have lost productive assets, seeking employment, fishing, the collection of wild foods, kin support and the chance of accessing some relief supplies are lower risk in a highly insecure environment. When these options become

increasingly difficult to access, a migration of the population to other areas may result, but this strategy may often also be obstructed.

PLANNING IMPLICATIONS

The best possible case scenario would be a period of stability and reconciliation to allow resources to be replenished . In the past, the surplus production of the Ironstone Plateau and the Green Belt food economies have been the safety-net to meet sudden demands to compensate for shortfalls in other areas. These days new arrivals or returnees will only find that the resources of such traditional havens have already been seriously stretched. Agro-pastoral groups that may move from and within the Flood Plains and the Nile Corridor food economy zones are likely to find that the auctioning of cattle for grain, or other exchange opportunities, are seriously limited with traditional traders especially on the western side of the Nile and in northern Bahr El Ghazal. Trade to the south and west is a second option but largely dependent on the demand from Uganda and Congo.

Because food economies are extremely dynamic, people use their inherent flexibility to adapt to climatic changes or loss of access through insecurity. As mentioned above, some communities may adopt new strategies to access food. (Groups of the Bor Dinka being an example expressing some permanency in adapting to life without livestock). No two communities will adapt their livelihoods in exactly the same way, hence the need for constant monitoring and community involvement in needs appraisal and analysis.

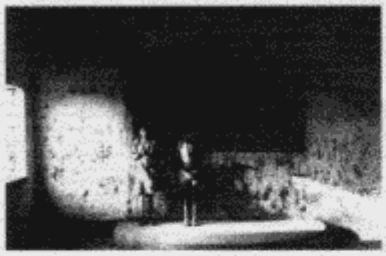
EFFECTS OF INSTABILITY ON FOOD SECURITY

A major concern of this document is the effect that the present conflict has had on the food security of the region. It recognises the ability inherent in the traditional food systems to bridge times of food shortage, and identifies some situations where the instability has reduced the effectiveness of traditional strategies.

As well as the disruption resulting from the war, there has been a breakdown in the services, and an increase in inter- and intra-tribal fighting resulting from the lack of one central government. This document does not go into the political implications of the present situation, but it is important to recognise that the disruption is more than a straight war situation. Another important aspect of the breakdown of services is the potential increase in disease and pest epidemics. This document is not able to address the details, and there is no mention of the effect of such diseases as Rinderpest on the cattle population. (For further information contact the Unicef livestock programme).

The breakdown of services has also effected the health of the human population. In looking at food security the emphasis is on survival, and as noted above, this has meant that the wider nutritional factors have to be passed over. However health has an important influence on factors like the absorption of the food that is available. In particular internal parasites can significantly effect the amount of food needed. These and other factors need to be considered if a full picture is to be seen, but are beyond the scope of this document.

APPENDIX I



Dinka Dura varieties. From 'Types of dura used by shilluk and Dinka' - Hasan Mutwakil - *Sudan Notes and Records* # 28 - 1947

The author was writing from Upper Nile Province.

Rwat (*Shilluk - Lwalli*) 'early red dura'. Sown earlier than others. Includes both quick and late maturing varieties. Many sub-varieties.

Toro, a tall plant, late maturing, seeds pink;
Othech, " " "
Nyalwalding, dwarf, quick maturing;
Nyakino, dwarf, quick maturing, seeds dark red;
Wer Jal Nyigara, dwarf, quick maturing;
Nyanwar, " "
Nyafirwat, " "
Nyanbar, " "
Nyachogo, " " , white
Yonongo, " " , brownish red
Chiat alij, " "

Jak (*Shilluk - Agono*) Heavy, late maturing dura. Dinka main crop. Several sub-varieties including:

Awet, seed colour white; Kuchuka, seed colour yellowish;
Kwayan, seed colour orange-red.

Usually sown in July, reaching maturity in about six months; harvest end of December.

Jak is the most flood resistant variety in the area. It tolerated continuous water-logging for more than 40 days in 1946.

Dinka dura varieties used in PDU trials 1979. From PDU Agronomy section Annual Report for 1979/80 season.

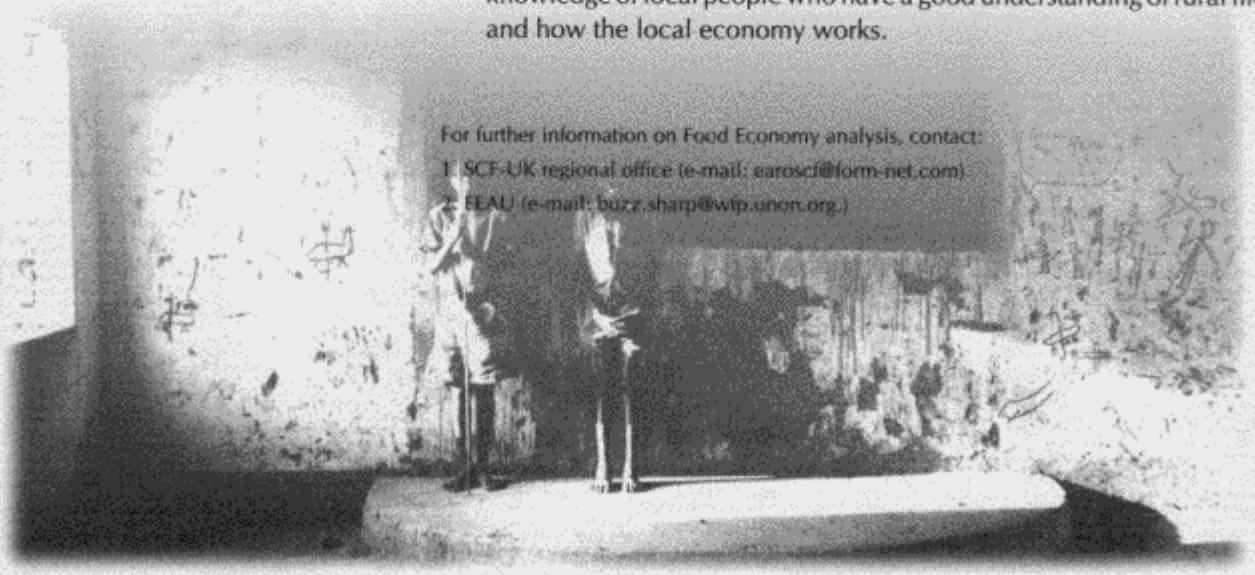
Variety	Height (m)	Days to flowering	Colour
Dur	2.9	68	white
Ayen	2.4	68	Pink white
Mattiang	2.3	61	Red brown
Youm Luac	3.0	76	Purple white
Mathok Kuac	2.7	68	Pink white
Ajak Ciek	2.5	67	Pink white
Yar	2.9	70	Chalk white
Werakasi	3.3	92	
Mobur Lual	3.7	133	
Malual	3.0	85	
Koth	5.4	127	
Mabior J11	4.2	120	
Nyandok J22	3.2	140	
Wuyo			
Luwaya J24	4.8	122	
Arumroor	3.8		
True Kec K11	3.8		
Nyibiec K4			
Luwaya E23	5.1		

APPENDIX II

THE SCF-UK HOUSEHOLD FOOD ECONOMY APPROACH TO FOOD SECURITY ASSESSMENT

KEY FEATURES

- Goes beyond crop production to tackle the fundamental question of how people survive; making livestock production, labour, wild foods and kinship or neighbour exchange amenable to analysis.
- Equally applicable to pastoral and agricultural economies. The principle underlying people's access to food apply across a changing landscape of national, regional, ecological and ethnic boundaries.
- Can be used to assess a wide range of food security problem, including the effects of drought and other natural disasters and the results of war, civil conflict, insecurity and displacement.
- Creates a logical and transparent link between problem definition and recommended response.
- Provides the quantitative estimates of food aid tonnages needed by decision makers. Answers the questions, who, what, where, when and how much?
- Household based, taking into account the unequal distribution of income within a population and the links within and between communities.
- Views those affected as active rather than passive victims. Seeks to understand how people respond to crisis, and to illuminate ways in which their own efforts might be supported by outside agencies.
- Provides a basis for interpreting early warning indicators such as rainfall, crop yields, market prices, security changes, etc.
- Does not require extensive additional data collection in the field.
- Exploits, via a 'key informant' approach, the largely undocumented knowledge of local people who have a good understanding of rural life and how the local economy works.



For further information on Food Economy analysis, contact:

1. SCF-UK regional office (e-mail: earoscf@form-net.com)
2. FEAU (e-mail: buzz.sharp@wfp.unon.org.)

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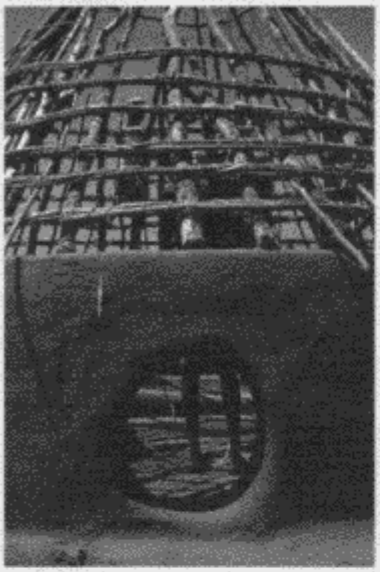

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