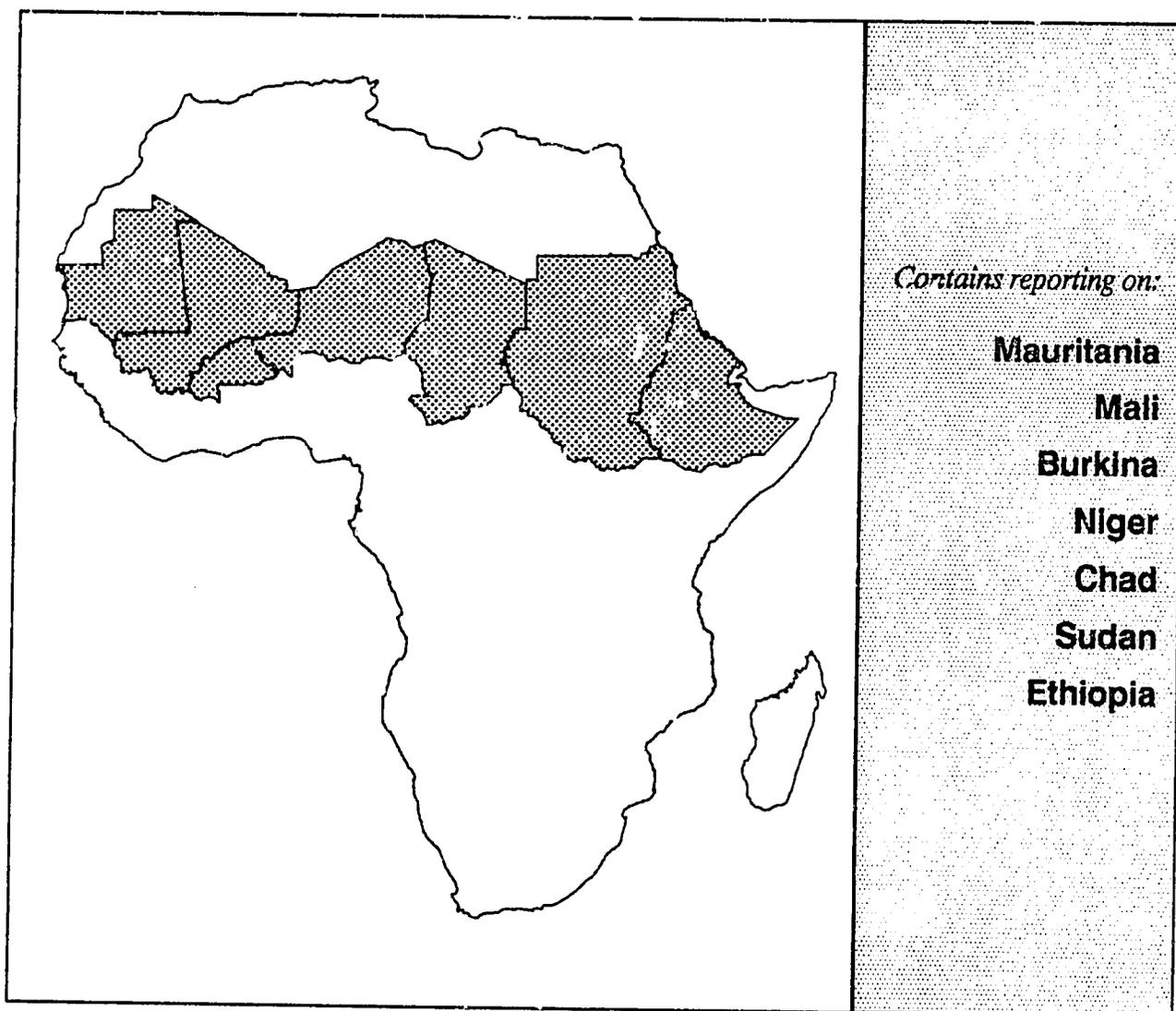


## Pre-Harvest Assessment of Cereal Production



Country Assessments prepared by USAID Missions and FEWS Field Representatives in each FEWS-monitored country during the month of September 1989. Published by FEWS/Washington for the Agency for International Development, Bureau for Africa.

# Pre-Harvest Assessment of Cereal Production

October 1989

*This pre-harvest assessment provides an early indication, even if only qualitative, of whether emergency food assistance will be required in any FEWS-monitored country. Interpretations of conditions may have changed in response to subsequent events since the late September preparation of these assessments. A January FEWS Harvest Assessment will provide a quantitative assessment of cereal production in each FEWS-monitored country.*

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## Executive Summary of Reports

Across the region, cumulative 1989 rains are the third best since 1970. A delayed start of the rainy season in some areas was compensated by heavy and prolonged rains later in the season. National harvests are projected to range from average to better-than-average. As always, localized production problems can be found in each country. The immediate and most severe problem in 1989 is in northern Ethiopia, where a need for at least a quarter of a million tons of food assistance is envisioned. In countries other than Ethiopia, high levels of grain stocks from the excellent 1988 harvest will help cover food needs. Desert Locusts will cause no significant crop damage in 1989. However, the extent of grasshopper damage to the harvest remains to be seen. See Map 1 for a Regional Summary of Pre-Harvest Trouble Spots.



### MAURITANIA

Cereal production prospects for this chronically deficit country are good to excellent in 1989/90. No emergency food aid is envisioned to supplement planned United States Public Law 480 (PL-480), Section 206 program assistance. However, questions remain concerning the impact on food production of civil disturbances and grasshopper infestations.

### MALI

Good to excellent cereal production prospects for 1989/90, coupled with carry-over stocks from 1988/89, may cause problems of oversupply. Falling cereal prices reflect marketing of 1988/89 surplus stocks and expectations of a good to excellent harvest in Mali. No need for emergency food aid is envisioned.

### BURKINA

Imports, programmed food aid, and in-country stocks are sufficient to cover a slight cereal production deficit. Cereal production for 1989/90 is projected to cover 85% of needs. No need for emergency food aid is envisioned.

### NIGER

Any national or local cereal production deficits projected for 1989/90 would appear to be covered by 1988/89 carry-over stocks. However, due to economic and cultural constraints on cereal marketing in Niger, it is likely that a future request for food aid assistance will be made by the GON. Late grasshopper damage may also affect production levels.

### CHAD

Government, commercial, and on-farm cereal stocks are sufficient to cover reductions in production. Cereal prices in N'Djamena are the lowest since 1983 and livestock herds have been reconstituted to pre-1984 size insuring access to marketed cereals. No need for emergency food aid is envisioned.

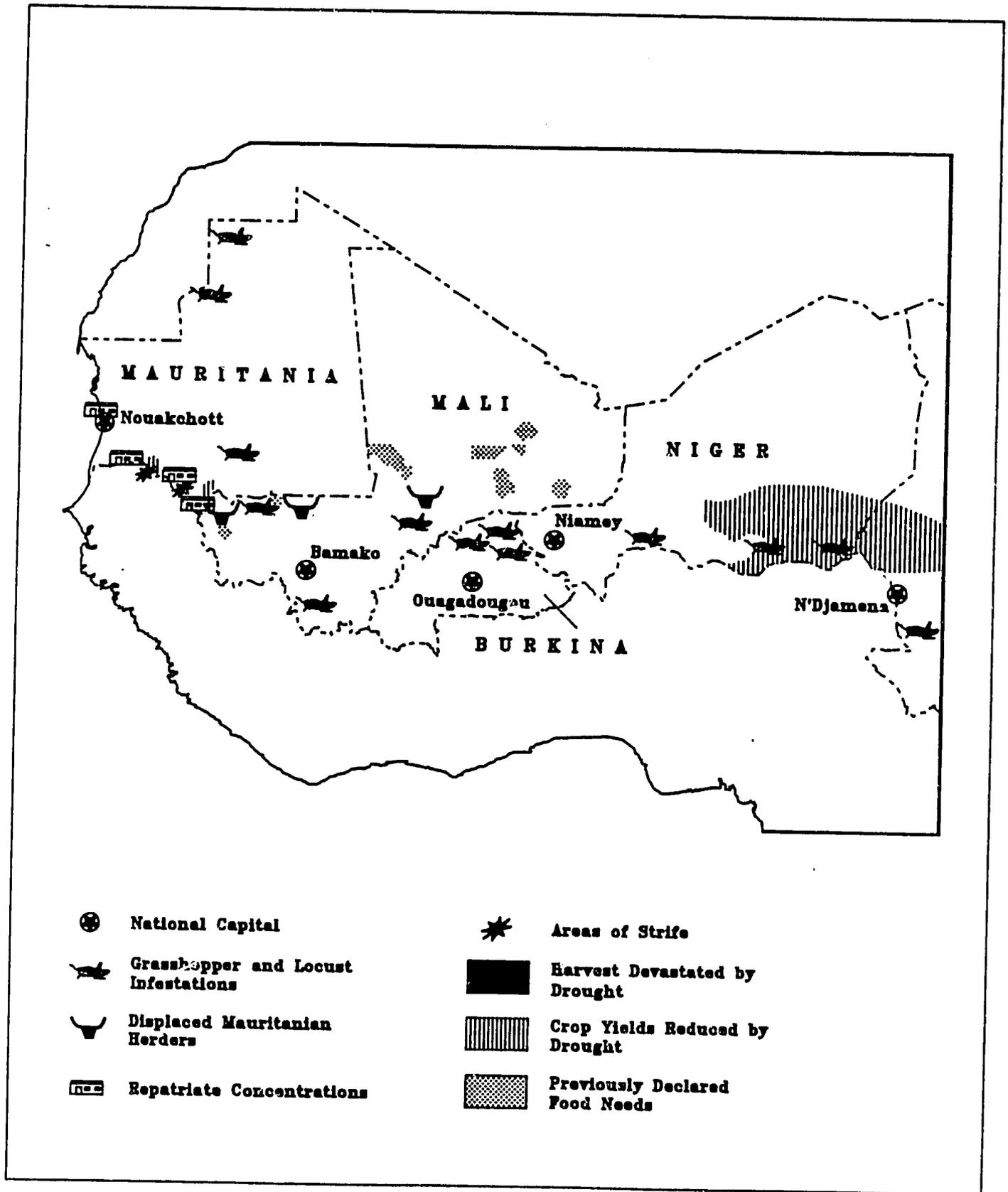
### SUDAN

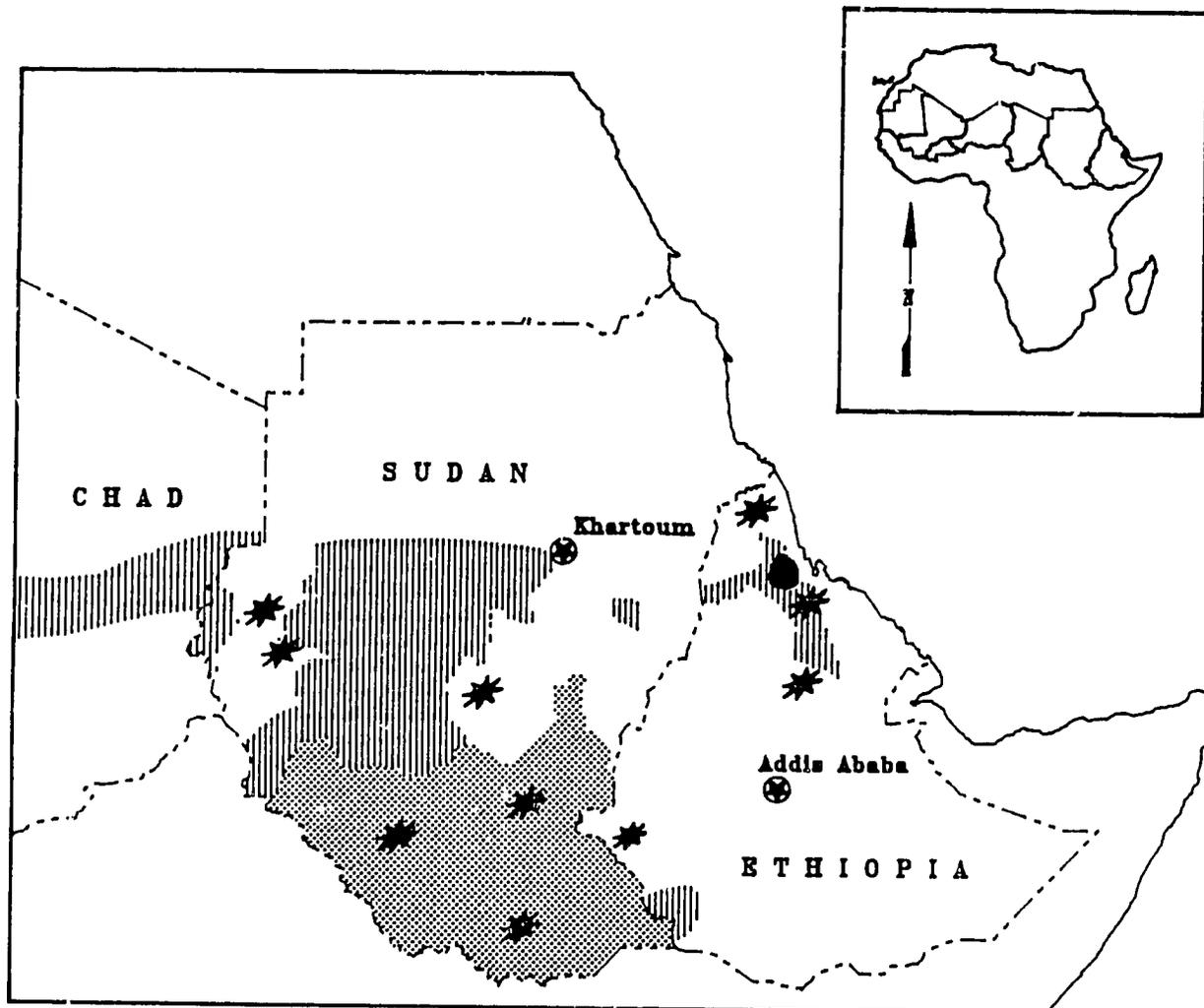
Combined 1989/90 cereal production, programmed food aid, and 1988/89 stocks should cover consumption needs in Sudan this year. Aside from scheduled relief activities in the South, no need for emergency food aid assistance is envisioned.

### ETHIOPIA

There is a severe and immediate need for shipment of emergency food assistance to northern Ethiopia. After the new year, approximately 1.7 million people in Eritrea and Tigray will require over 250,000 metric tons (mt) of assistance for at least the nine months that follow.

Map 1





## REGIONAL SUMMARY

### PRE-HARVEST TROUBLE SPOTS

FEWS, October 1989

## Regional Issues

### Five regional questions arise when examining information from the 1989 FEWS Pre-Harvest Assessment:

(1) Are regional rain patterns returning to normal?

Although immediate evidence might suggest a return to "normal" rainfall in the region, climatologists warn that it is "too early to tell".

(2) Why has the threat of Desert Locust invasion disappeared?

Fortuitous global weather in 1988 and human control efforts in 1988 and 1989 may have averted a major invasion of Desert Locusts in 1989.

(3) What will be the impact of grasshopper incursions into crop areas?

The impact of grasshoppers on harvests is uncertain, because it depends on the timing of their switch from range to croplands. However, recessional crops, important to Mauritania, Mali and Chad, are certainly threatened.

(4) What is the extent and impact of commercial and private cereal stocks?

Commercial and on-farm stocks from 1988 are assumed to offset a substantial portion of the production deficits in each country. However, hard information does not exist concerning the quantity and impact of cereal stocks. Attempts to quantify stock information must be reinforced in order to create a better understanding of the role they play in food security issues.

(5) How should one view the recent "better-than-average" and "record" regional harvests?

In spite of improved harvests over recent years, there are still structural problems in the region's agricultural sector that continue to cause vulnerability to famine.

1975 and 1988 were better. This is also the first year since 1967 that there have been two consecutive years close to the 30-year (1951-80) seasonal rainfall average (1989 rainfall is roughly 97% of the 30-year norm from Senegal to Chad). Early October rains are better than average for so late in the season (see Map 2 for a regional Rainfall Summary through 30 September).

The better than average rains have had a positive impact on vegetation. Most of the region shows normal vegetative growth. Extreme exceptions exist in western Sudan and Eastern Ethiopia, with notable exceptions in southwestern Burkina and the northern fringe of Chad's agricultural zone, extending partially into eastern Niger (see Map 3 for the Vegetative Index Summary).

The Inter-Tropical Convergence Zone (ITCZ, this term is explained on the inside back cover) is more than a degree further north in the West and three degrees further north in the East when compared to 1988 (see Map 4 for a regional ITCZ summary). The late rains and more northerly ITCZ appear to have resolved agricultural problems arising from the late onset of the 1989 rainy season.

When viewed against the historical "dry" 1930s and 1940s, "wet" 1950s and 1960s, and recurring drought of the 1970s and early 1980s, it is tempting to assume a return to "normality", particularly with better rains since 1984. Nevertheless, several climatologists, including experts at the Joint Agriculture Weather Facility (JAWF) in Washington, state that it is "too early to tell". Recent higher rainfalls are not necessarily predictive of future rainfall. For example, the "wet" years of 1974-76 gave no indication of the droughts that would appear in the 1980's. Interestingly, researchers have identified intriguing similarities between rainfall returning to the Sahel and the number and intensity of hurricanes reaching the Western Hemisphere. Many of these storms arise from squall lines, Easterly Waves, that have previously crossed the Sahel.

(2) **Locust Threat Disappears** Locusts failed to pose a threat to the region that many had feared prior to the agricultural season. The Agriculture and Natural Resources Division of the Office of Technical Resources within the Bureau for Africa at the United States Agency for International Development (USAID/AFR/TR/ANR) reports that Desert Locusts appear

(1) **Regional Rains Return to Normal?** Rainfall across most of the Sahel during 1989 approached the excellent levels of 1988. For the region, 1989 rains have been much better than all but two of the last 20 years. In the intervening period, only

to be in recession throughout Africa. Although rainy season ecological conditions have been highly favorable for locusts in the Sahel, only rare reports of bands or swarms have been received (see the Chad section in this report). If there were large undetected populations in the Sahel, northward migrations to winter breeding grounds in Morocco and Algeria would be seen during October and November 1989. As of mid-October, no major movements had been reported.

An explanation for the disappearance of the suspected Desert Locust threat may reside in two events of 1988. First, in mid-1988, a 1,000 kilometer Easterly wave (which eventually created Hurricane Joan) moved westward across the Sahel and into the Atlantic. Large numbers of locusts were caught up in this squall line and perished in the ocean. In support of this theory, some locusts were eventually spotted on islands in the Caribbean. Experts estimate that more than 40% of the Desert Locust population was lost as it was blown across the Atlantic.

The second event involved extensive treatment programs during late 1988 and early 1989 in Morocco, Mauritania, Senegal, and Saudi Arabia. This intervention played a major role in reducing the size of potential winter breeding populations in North Africa and the Middle East that would have menaced Sahelian Africa in the Spring and Summer of 1989. ANR, and others, suggest that these events may have finally broken the back of the multi-year Desert Locust plague.

**(3) Grasshoppers Return in Force** While the threatened locust problem never materialized, grasshoppers continue to threaten crops in the Sahel. Senegalese Grasshoppers, known for their locust-like mobility, are present in large numbers in areas stretching from Mauritania to Chad. Late rains in these same areas may maintain enough grassland cover to entice grasshoppers away from croplands, limiting damage to crops while the harvest is completed.

Recessional crops will still be at risk to grasshopper damage as they mature after the rains have stopped. Mauritania, Mali, and Chad would be most vulnerable to grasshoppers because of the extent of recessional agriculture in these countries. Eradication and control operations are underway and the situation must be continuously monitored. Reports arriving at the time this report goes to press mention grasshopper incursions that may inflict serious losses on a localized basis. These same reports emphasize that monitoring and control efforts must be reinforced.

**(4) No Solid Information About Commercial and Private Cereal Stocks** While data relevant to aggregate agricultural supply has improved and efforts are underway to standardize data from the demand side of food security, no hard information is available concerning agricultural stocks carried-over across years. Little progress has been made in quantifying the contribution and levels of commercial and privately held cereal stocks in meeting annual food needs. Such stocks are important, because in years following good harvests (for ex-

ample, 1989) the amount of stocks may be enormous. In recent years, unofficial estimates of on-farm stocks have ranged as high as 30 to 40 percent of the net grain harvest).

It is assumed, by FEWS-country governments and donors alike, that 1989 areas of production deficit are less critical than they might otherwise be due to the excellent harvests recorded in 1988 (see Mali, Burkina, Niger, Chad, and Sudan reports ahead). On-farm, commercial, and government stocks are assumed to be plentiful and expected to soften the impact of any local crop failures. However, as unanimous as all are on this point, there is no hard data to support this assumption.

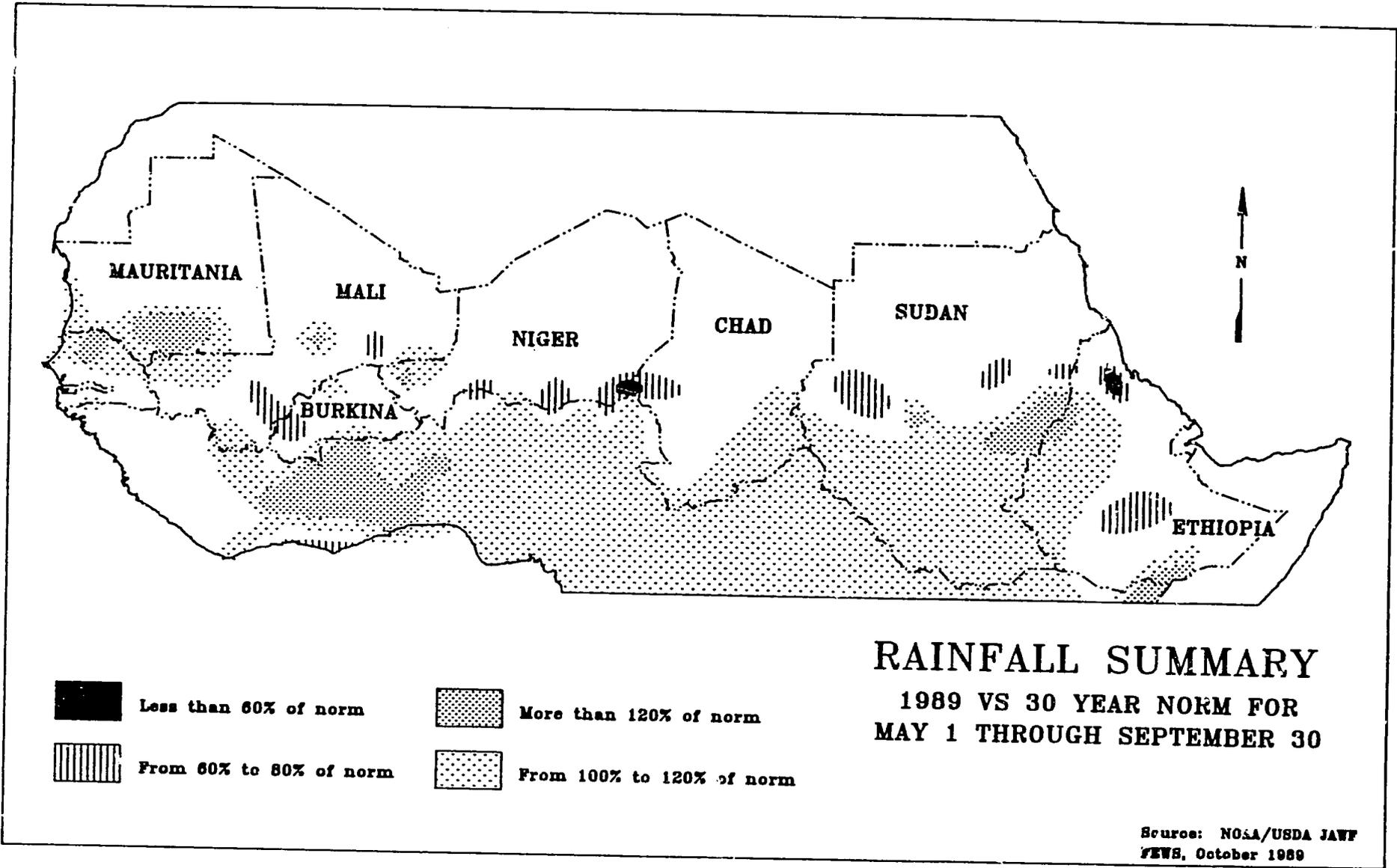
Although regional data on supply and demand still pose considerable problems with regards to reliability, timeliness, degree of spatial resolution and presentation, the absence of any hard data on stocks can hinder appropriate decision making. In lieu of reliable data on stocks assumptions will have to suffice and be recognized for the limitations they place on exact analysis. Efforts to collect reliable information on cereal stocks must be reinforced in order to fill in this important piece of the food security puzzle.

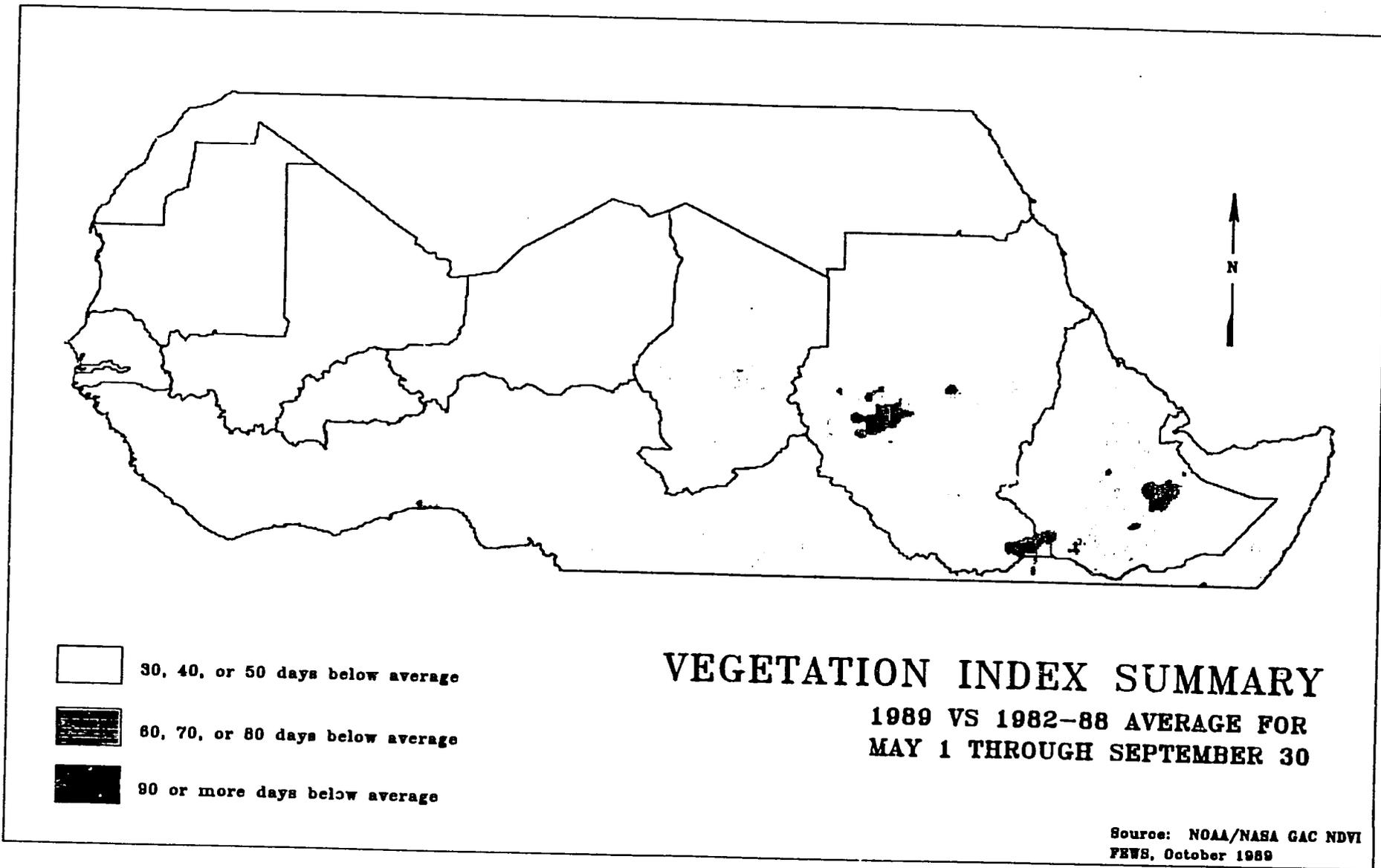
**(5) The other side of "better-than-average" and "record" regional harvests** The recent string of good regional harvests (in 1985, 1986, 1988, and probably 1989) may lead to over-optimistic views of food self-sufficiency in this region of the world. As the drought and famine years of the mid-1970s recede and emergency programs are limited to Ethiopia and Sudan, a level of comfort built upon record and near-record regional harvests may be growing.

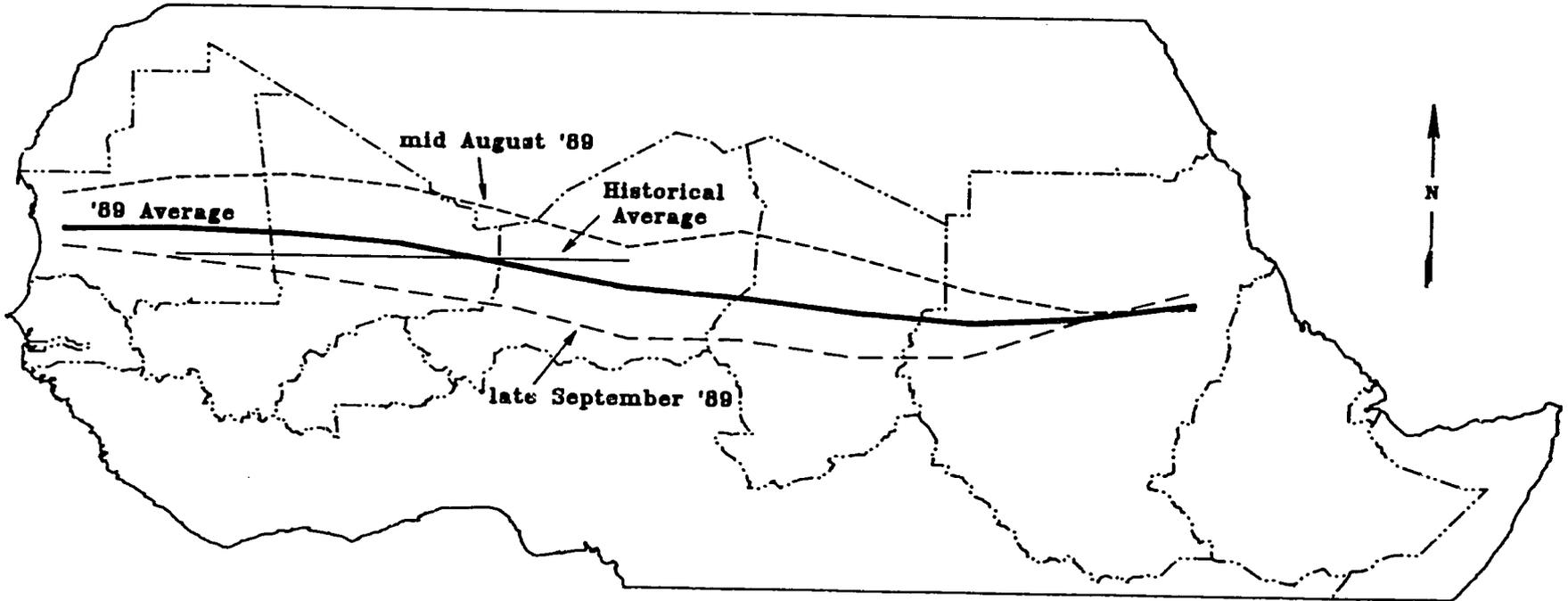
Nevertheless, behind the recent "better-than-average" and "record" regional harvests one still finds:

- national-level cereal production deficits
- significant localized cereal production deficits
- impeded access to other sources of food
- declining per capita agricultural production
- reliance upon regular food assistance and commercial imports
- nominal production increases due to intensified use of marginal lands.

Concrete examples of these concerns are evident in the FEWS countries: A near-record 1989/90 harvest will not resolve serious food access problems in the southern or western regions of Sudan; Mauritania's record 1989 cereal harvest will only cover 40-50% of national needs; Mali's near-record harvest will not resolve critical food deficits in its eastern areas; and even last year's excellent Ethiopian harvest could not cover a "structural" deficit that is greater than one quarter million tons per year and projected to increase to approximately two million tons by the 1990s. There is no short-term solution in sight to these persistent national and local food production deficits.





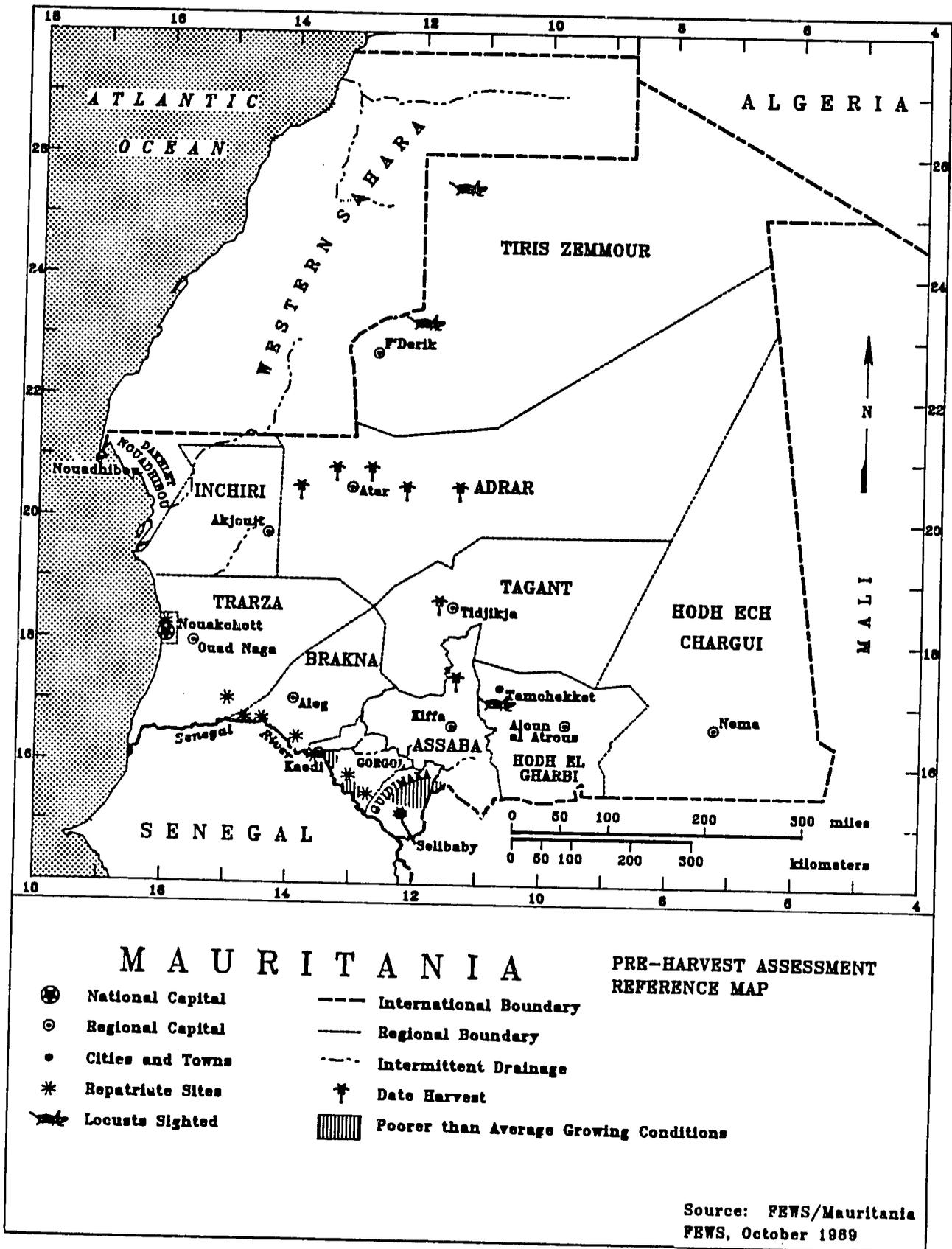


- Aug 11-20, 1989 (in the west, this was the northernmost position this season)
- - - Sep 21-30, 1989 (the eastern extent is remaining farther north than usual)
- Season average for 1989 (May 1-September 30)
- Average season position, 1979-1988 (only summary data is available)

**ITCZ SUMMARY**  
**1989 VS 10 YEAR AVERAGE FOR**  
**MAY 1 THROUGH SEPTEMBER 30**

Source: NOAA/USDA JAWF  
 FEWS, October 1989

Map 5



## Questions Concerning Unrest and Pest Impact

### SUMMARY

*There are no famine conditions in Mauritania. Current and soon-to-arrive food aid will cover Mauritania's needs through the end of 1989, as well as the emergency needs of the 102,000 repatriates that arrived at the end of April. Rainfall has been very good in most parts of the country throughout the last three months and should insure that production will be at least as good as 1988/89, if not better. Early predictions for Mauritania's 1989/90 cereal crop vary considerably. It is still too early for clarification, but high estimates show production equalling last year's announced figures (net 1988/89 production at 136,951 metric tons, thus covering approximately 43% of national food needs). However, while environmental conditions are optimal, the civil disturbances in April caused many demographic and economic changes, especially along the Senegal river, and they will probably have a significant negative impact on this year's food production.*

### At-Risk Populations

The only emergency donor assistance planned, or foreseen, between now and the harvest is for repatriates from Senegal (22,000 repatriates in camps; 80,000 assimilated into families; figures are currently being revised by a census team). This assistance is scheduled to be distributed over the next four to six months by the Mauritanian Food Security Commission (CSA). The following assistance has been planned:

- **World Bank:** 7,300 metric tons (mt) of wheat and 3,670 mt of oil
- **EEC:** 760 mt of rice
- **USAID:** 3,500 mt of sorghum (sorghum for general humanitarian needs, with priority to Nouakchott centers).

Distributions will be closely monitored and should cover most of the repatriate food needs until the harvest.

### Agricultural Conditions

**Rainfed Agriculture** - Cumulative rainfall for most agricultural areas, with the exception of Guidimaka and a small area in west-central Gorgol, remains better than both the 20-year average and last year. Rains started early this year, but unequal distribution forced a second planting by farmers in parts of Guidimaka and Gorgol. A dry spell in these areas, at the end of July and into early August, was evidenced in the Normalized Difference Vegetative Index (NDVI, this term is explained on the inside back cover) satellite imagery (see "Poorer than Average Growing Conditions" in Map 5).

In contrast, areas in Brakna and Assaba have had plentiful rain causing floods that forced many farmers to replant up to four times. Because of heavy rainfall, it appears that many of the farmers who planted rainfed crops last year will shift to *bas fonds* (low-lying moist, sometimes dammed areas) cultivation this year.

A preliminary estimate of rainfed agricultural production should be available from the Bureau of Agricultural Statistics by the end of September. A joint crop assessment mission of the United Nations Food and Agriculture Organization (FAO) and the Interstate Committee to Fight Drought in the Sahel (CILSS) is planned for mid-October.

**Irrigated Agriculture** - Cultivation of irrigated crops is reported to be between one and two months behind schedule in most regions. Due to the civil disturbances in April, many irrigated perimeters have lost a large percentage of their skilled labor and/or inputs. In 1988/89, 13,320 hectares were planted under irrigation. The private sector planted 7,150 hectares while the State-run M'Pourie perimeters planted a total of 730 hectares. Almost all of these perimeters are located in the Trarza Region. The remaining irrigated perimeters are managed by the Societe Nationale du Developpement Rural (SONADER) (4,350 hectares of rice, and 1,090 hectares of cereals). About 2,000 hectares of Societe Nationale du Developpement Rural (SONADER) perimeters lie in the Trarza Region, with the remainder in Brakna, Gorgol, and Guidimaka. A World Bank representative, who recently made a field trip through the Trarza region, reported that both the private and State perimeters have completed planting the equivalent hectareage of last season. However, the SONADER

perimeters in Trarza have suffered extreme losses of both labor and other inputs. Thus, SONADER is planting approximately 50% of last year's hectareage.

The Government of the Islamic Republic of Mauritania (GIRM) has made irrigated agricultural production a priority this year. It is offering medium and long-term credit under very favorable terms to insure that this year's crop is successful. The GIRM is also offering free input support to some of the small SONADER perimeters in Trarza in response to reports of labor shortages, maintenance problems, and technical resource limitations. However, a significant number of small SONADER perimeters in Brakna and Gorgol are not now being worked. Hence, while irrigated rice production for the private and state sectors will most likely equal or exceed last year's output, SONADER's total production may be significantly reduced (up to 50%). It is possible that some of the SONADER perimeters, while not being exploited for rice this year, may be used to plant corn, millet, or sorghum when recessional crop planting begins.

**Flood Recessional Agriculture** - Due to the control of the Manantali Dam in Mali and the very good rains this year, the Senegal river is flooding at a higher stage than it was last year. In 1988/89, the river set record flow levels (about 4,000 cubic meters per second), and 24,080 hectares of cereals and 8,785 hectares of beans were planted. It is too early to estimate recessional hectareage for this year, because the full extent of the river flood is uncertain. Another potential limitation of recessional (*walo*) hectareage is due to Pulaar farmers who fled across the river. Their land is now the home of repatriates who have been relocated to the evacuated Pulaar villages. In this tense situation it is neither clear how many of the repatriates will farm the land, nor how much of it they will farm.

**Date Harvest** - This year, oases in the Adrar, Tagant, and Assaba regions have done very well. The date harvest was especially good, although no specific figures are available that permit description of how much economic advantage is gained from this activity. Due to abundant rains, the oases have optimal conditions to begin off-season gardening (see "Date Harvest in Map 5).

### **Pastoral Conditions**

Mauritania's 1989 growing season has seen abundant biomass development. Greening of pasturelands is better than last year and, in parts of the Assaba and the Hodhs, has surpassed historical NDVI averages. Consequently, herders have been able to bring their animals farther north than last year. There is plenty of fodder contributing to the animal herds' revitalization after several years of poor conditions prior to 1988. At the time of this writing, vegetation indices are beginning to show their normal decline as the rainy season is coming to a close.

### **Pests**

**Locusts** - Unlike last year, few locusts have been reported by the Mauritanian Crop Protection Service (CPS) during the

summer months of 1989. During August, scattered individuals were noted in the southeastern regions near the Mali border. Early September reports indicated the presence of adults just west of Tamchekket. During the last decade of August, nomads reported locust larvae in northern Mauritania, near the Western Sahara border (see "Locust Sighted" in Map 5). This last report has yet to be confirmed.

**Grasshoppers** - Grasshoppers continue to be found in high numbers in green areas throughout southern and southeastern Mauritania. The most prominent species, in regard to population density and extent of infestation, is *Oedaleus senegalensis* (OSE), with the *Aiolopus*, *Anacridium castaloipus*, and *Kraussaria* species also noted in high numbers. The majority of the grasshoppers are currently in pasturelands, with densities of 5 to 100 individuals per square meter. To date, grasshopper related damage has been low. However, as the pastureland grasses dry, grasshoppers will move to the greener croplands, and may cause moderate to high crop damage. The extent of damage and yield loss will depend on the crop stage as pastures dry. If rainfall continues late in the season, it may be possible to harvest rainfed crops with minimal loss.

### **Food Security**

It is still too early to predict with any accuracy what the 1989/90 harvest will be. The potential for an excellent harvest exists (due to favorable environmental conditions), but the strained situation along the river basin and the significant loss of skilled expertise in the country will play a major role in this season's outcome. There are several studies and surveys presently underway that, when completed, will enlighten decision-makers as to the extent of food needs and security for 1989/90. The Center of Demographic Studies is currently doing a Census Survey of displaced persons (repatriates) for the Ministry of Plan and Employment. Results should be available in October. A technical consultant for OAR/M has recently completed a preliminary 1989/90 food needs assessment for Mauritania that is reproduced in Table 1.

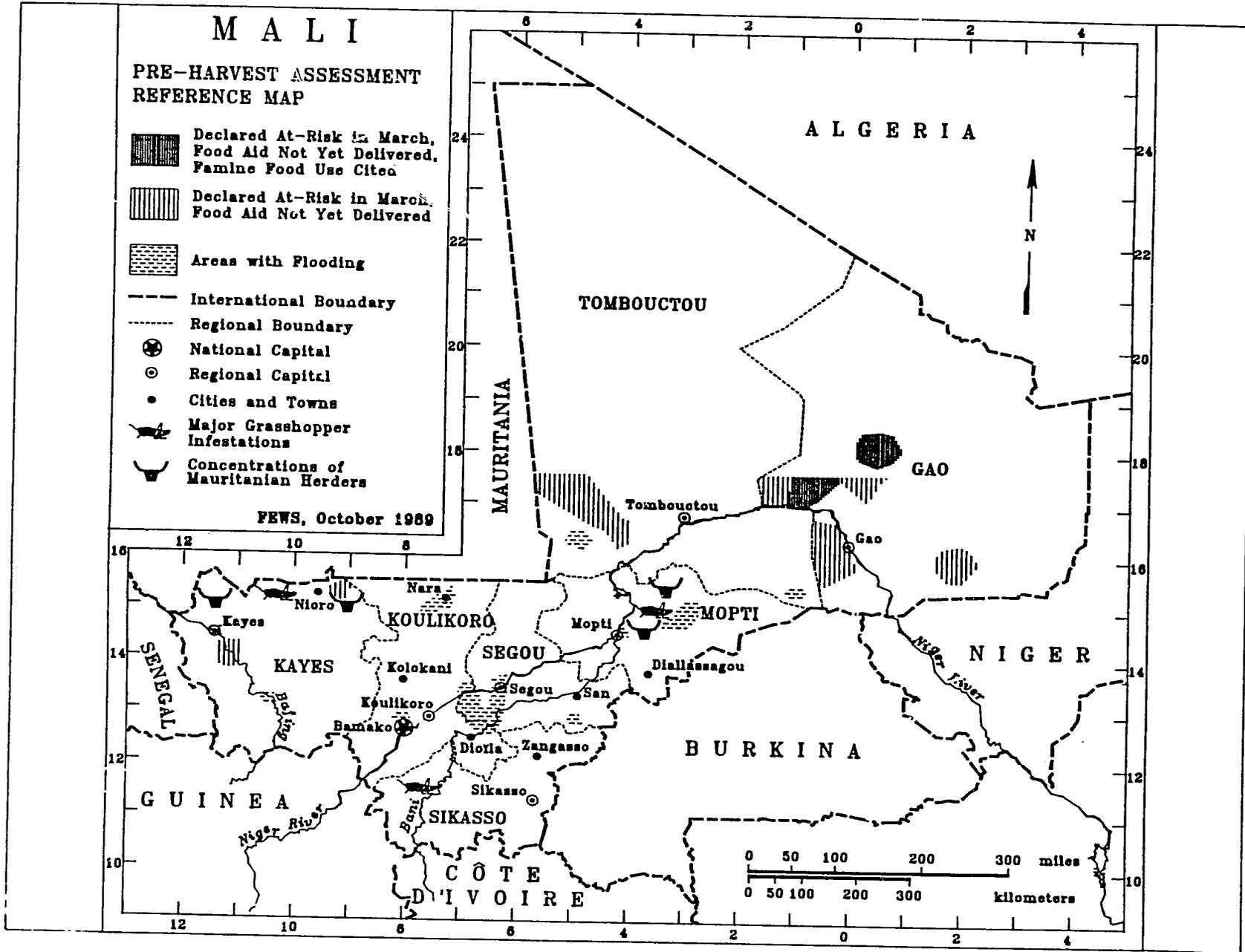
**Table 1: Preliminary Mauritania Food Balance Sheet for 1989/90 (mt)<sup>1</sup>**

	<b>Wheat</b>	<b>Rice</b>	<b>Sorghum</b>	<b>Millet</b>	<b>Maize</b>	<b>Beans</b>	<b>All Cereals</b>
Consumption (total requirement) <sup>2</sup>	123,082	130,226	65,803	8,771	5,836	6,152	333,718
Production (domestic)	0	33,341	82,278	5,536	6,200	7,987	127,355
Carryover Stocks (net change)	4,555	818	-11,580	0	0	0	-6,207
Food Supply (domestic)	4,555	34,159	70,698	5,536	6,200	7,987	121,148
Imports (commercial food)	46,389	87,223	0	0	0	0	133,612
Food Surplus/Deficit (unmilled)	-72,138	-8,844	4,895	-3,235	364	1,835	-78,958
Food Aid Commitments	25,000	8,333	3,000	0	0	0	36,333
Per-Commodity Food Balance	-47,138	-511	7,895	-3,235	364	1,835	
<b>Overall Cereal Balance</b>							<b>-42,625</b>

Source: AID/W Food Needs Assessment Project in conjunction with USAID/Mauritania

<sup>1</sup>All figures are unmilled values.

<sup>2</sup>The consumption requirement was calculated using a national population of 1,879,000 and an annual per capita consumption rate of 178 kg, based on the average per capita availability over the five-year 1984-1988 base period.



Map 6

## Possible Oversupply Problem

### SUMMARY

Mali received excellent rains in August as a result of the deep penetration and stabilization of the Inter-Tropical Convergence Zone (ITCZ) in the north of the country (see Map 4). The heavy rains, while enhancing plant growth, prevented farmers from keeping up with weeding activities. The most abundant August rainfall in recent history resulted in a sharp rise of river flow, particularly on the Senegal and Bani rather than the Niger. Pastures are in excellent condition and the National Livestock Service has reported no major outbreaks of disease. Cereal prices throughout the country are reported to be dropping during a period of the year that is traditionally characterized by grain scarcities and rising prices. Reducing prices also reflect farmers' and merchants' expectations of a good harvest.

### At-Risk Populations

Mali has several population groups at risk. In March 1989, the SAP (Système d'Alerte Précoce - the Malian Early Warning System) identified locations and numbers of populations at-risk based on the results of the 1988/89 harvest (see Table 2). SAP recommended that 2,784 metric tons (mt) of grain be distributed to the affected populations starting in May and June. As of mid-September, these distributions have not taken place because of logistical problems. At-risk populations in these areas have turned to traditional coping mechanisms. They are presently harvesting wild *fonio* which should tide them over until the regular harvest or food aid distributions begin. The total number of people affected is approximately 125,000.

Mauritanians who have left Mauritania due to the civil disturbances along the Senegal River basin (see Mauritania section in this report) represent a potential at-risk population. These Mauritanians currently have their own food supplies and animals to support their presence in Mali. However, they have abandoned their home villages in Mauritania and could, at some point, be considered displaced. SAP reports concentra-

Table 2: Mali, At-Risk Populations

Region	Cercle	Arrondissement	At-Risk Population
Kayes	Kayes	Diamou	12,802
	Nioro	Touroungoumbé	8,000
Tombouctou	Goundam	Gargando	5,842
	Goundam	Raz-el-Ma	7,068
Gao	Ansongo	Talataye	14,186
	Bourem	Almoustarat	15,146
	Bourem	Bamba	18,104
	Bourem	Téméra	9,322
	Gao	N'Tillit	9,466
	Ménaka	Inekar	10,715
Ségou	Ménaka	Tidarméné	7,995
	Ségou	Central	5,000
<b>Total At-Risk Population</b>			<b>123,646</b>

Source: Système d'Alerte Précoce/Mali

tions of Mauritanian herders in Ambidedi and Aourou (Kayes Cercle), Yélimané Central, and Touroungoumbé (Nioro Cercle) (see "Concentrations of Mauritanian Herders" in Map 6.)

A final group of at-risk populations includes people who have lost their homes, possessions, and, in some cases, their agricultural fields to flooding. The Ministry of Territorial Affairs reported losses due to flooding in Kayes, Koulikoro, Ségou, and Mopti regions (see "Areas with Flooding" in Map 6). Donors and Non-Governmental Organizations (NGOs) responded by donating food, blankets, tents, and medicine to the flood victims.

### Agricultural Conditions

**Seasonal Rainfall** - August rains were exceptionally heavy and rainfall over the last 20 days of August was substantial, with many stations reporting daily rains. Subsequently, the 1989 cumulative rainfall (since May 1) is approximately the same, or slightly above, 1988 levels. Stations in the Sahel such as Mopti and Nioro reported over 200 millimeters (mm) of rain during August, while stations further south reported as much as 300 to 400 mm.

The Director of Mali's National Meteorological Service has noted the similarity between the progression of the rains this year and in 1988. He particularly commented on similar rainfall totals to date and position of the inter-tropical convergence zone (ITCZ). He further observed, however, that the rains started much later this year than in 1988. Although the meteorological service is not equipped to make long-term projections, the National Director of Meteorology stated that an analysis of the prevailing moisture conditions would indicate a favorable progression of the agricultural season.

Despite other threats to crops (see Pests section below), the biggest question is the probability of continued rainfall. First decade of September rains abated to a disturbing level. For example, Mopti recorded only 4.2 mm from September 1 to 10 versus 62.5 mm during the previous decade. Continued monitoring of rainfall and its subsequent impact on cereal production will be important, particularly in the transitional agro-climatic zones bordering the Sahel. For example, due to the late start of the planting season, good rains in September and early October are necessary for grain maturation in Ségou and Mopti.

**Crop Conditions** - The 1989/90 harvest promises to be better than most previous years, but will probably not equal last year's record harvest. The harvest of early varieties of millet (*sunan*) has already begun in northwestern Mali, while elsewhere most crops are reported at the stage of flowering or panicle formation. The heavy, uninterrupted rains in the month of August have in some cases adversely affected cropping activities, especially weeding. However, fields are reported in good condition in most of the agricultural regions. Late season threats to the 1989/90 harvest include the possibility of a protracted, disastrous dry spell, an abrupt end to the rainy season and pests, particularly grasshoppers.

The National Agricultural Service (DNA), in its 1989 mid-season (as of July 31) agricultural conditions report, notes that "the present condition of crops and the general outlook of fields are good". Table 3 below presents the DNA information on projected production by region.

DNA warns that such early season figures are preliminary. These figures, compiled by teams sent throughout the country,

are essentially furnished by Regional Agricultural Services (DRA) and Agricultural Development Projects (ODRs). They do not include statistics from vast areas not covered by ODRs, or too remote for DRAs. For these reasons, the figures in Table 3 should be considered conservative (i.e., lower than average production). The DNA notes that the end of July 1989 figures represent an improvement over the same period last year. These preliminary estimates are close to 1988 end of season figures and surpass them for maize and rice.

**River Levels** - The potential rice harvest should continue to improve with the powerful flood rise on the Bani River and its tributaries. This river system feeds the submersion-control irrigated perimeters of the two major rice projects at Mopti and Ségou. It is also the source for numerous, small (150 ha to 300 ha), high-yielding rice perimeters in the south at Niéna, Kléla, Kouniana and Sorobasso. After a slow start, by August the Bani and its tributaries swelled to the point of reaching and sometimes exceeding their levels of last year. This occurred at the exact time for admitting water into the perimeters in late August through mid-September. This favorable occurrence should be indicative of a good rice harvest.

#### Pastoral Conditions

Pastures are in good shape throughout Mali with water points well replenished. Animals are reported in excellent condition.

#### Pests

**Grasshoppers** - Seasonal agricultural prospects appear optimistic but a large threat remains. Significant infestations of grasshoppers causing minor damage to crops have been reported from northwestern Mali in Yélimané and Nioro, to central and eastern Mopti Region, especially around Douentza (see "Major Grasshopper Infestations" in Map 6). Grasshoppers have been spotted as far south as Bougouni in the Sikasso Region, far from their normal areas of infestation. This situation is worsened by a reported local shortage of pesticides to treat the infested areas. The Crop Protection Service (CPS) reports that, as of early September, 500,000 hectares were infested by grasshoppers, of which 131,000 had been treated. For the most part, damage to crops has been limited, but as natural vegetation dries up, grasshoppers will move into crop areas and could cause serious losses if control measures are not reinforced. The CPS estimates potential crop losses as 15 to 25 percent of total national production. The Ministry of Agriculture has called a meeting of donors for late September to ask for additional donations to increase aerial spraying efforts.

**Locusts** - The Desert Locust situation has been calm to date. A few solitary locusts have been reported in Gao and Ménaka. CPS officials anticipate an in-

Table 3: Mali, Projected Production from the 1989/90 Agricultural Campaign (mt)<sup>1</sup>

Region	Millet & Sorghum	Maize	Rice	Cowpeas	Peanuts
Kayes	178,311	54,339	3,613	31	72,347
Koulikoro & Sikasso	367,998	166,723	30,560	11,362	27,727
Ségou	294,340	2,244	114,592	3,247	10,643
Mopti	165,166	162	49,866	2,945	6,074
Tombouctou	22,878	132	28,640	703	204
Gao	1,240	-	3,880	-	-
Total	1,029,933	223,600	231,151	18,288	116,995

Source: "Physionomie de la Campagne Agricole 1989/90 au 31 Juillet 1989," GRM/National Agricultural Service (DNA)

<sup>1</sup>These figures are subject to change as more reliable data becomes available.

vasion of locusts from Niger between now and the end of October.

### Food Stress Indicators

SAP reported the consumption of famine foods in Tidarméné (Ménaka) and Témera (Bourem) in its August Bulletin. Both of these areas were scheduled to receive food distributions, but have not. The AGRHYMET Group reported villagers abandoning 300 hectares in the cercle of Ségou because grasshoppers destroyed the crops. Throughout Mali, it can be assumed that localized crop damage by grasshoppers will create pockets of people who will not meet their food needs through own production in 1989/90, as occurred last year.

### Market and Economic Data

Consumer and producer prices for the major grains have fallen in many markets across Mali. In some markets prices fell by 25 percent between the end of July and the end of August. Grain prices in other markets have remained stable, and only a handful of prices have risen. The falling prices tend to be located in a belt that runs from Kolokani and San in the north to Dioila and Zangasso further south (see "Cities and Towns" in Map 6). It appears that farmers and merchants are unloading large stocks of reserves, because of their expectations of a good to excellent harvest. Even in large consumer markets like Tombouctou, Sikasso, Mopti, and Koulikoro prices are falling. Millet and sorghum prices vary across Mali from a low of 25 FCFA per kilogram in Diallassagou to a high of 80 FCFA per Kilogram in Niore du Sahel.

### Food Stocks

Adequate food stocks exist at all levels in Mali. Rural extension agents in Kayes Region, quoted by the FEWS Field Representative, noted that peasant stocks have lasted much longer than normal. Very few people have had to turn to the market to meet their grain needs in 1988/89. Producer cooperatives that participated in donor-sponsored grain storage programs are now faced with a problem of oversupply. The majority of producer cooperatives and merchants who participated in the programs still have stocks on hand and loan repayments due on September 30.

The latest information (as of 31 August) from the National Commercialization Committee on producer and commercial stocks is presented in Table 4.

### Projected Cereal Needs Estimate

While it is premature to make a quantitative production estimate, it appears that grain production will exceed levels of the good 1985 and 1986 harvests and may approach 1988 levels.

**Table 4: Mali, Cereal Stocks as of 31 August 1989 (mt)**

Structure	Sub-Structure	Millet, Sorghum, and Maize	Rice	Paddy	Total
OPAM	SNS	55,876	-	-	55,876
	Commercial	4,664	-	-	4,664
Private	CCIM	17,503	660	-	18,163
	OPAM Guarantee	10,446	-	-	10,446
Other		-	-	3,539	3,539
Co-operatives	DNACOOP	13,786	-	380	14,166
	CMDT	5,892	-	2,266	8,158
	ODIPAC	862	-	-	862
	OHV	1,215	-	-	1,215
Office du Niger		-	6,320	34,620	40,940
Operation Riz Ségou		-	1,119	1,470	2,589
Operation Riz Mopti		-	453	-	453
<b>Total Stocks</b>		<b>110,245</b>	<b>8,551</b>	<b>42,275</b>	<b>161,071</b>

Source: National Commercialization Committee on Producer and Commercial Stocks

At the aggregate level, Mali is likely to be either self-sufficient or surplus in cereals in 1989/90 (see the Rice Balance Sheet in Table 5 below). Even under a reduced production scenario Mali would hold considerable cereal stocks (see Table 4) to meet domestic consumption needs.

### Projected Food Aid Requirements

No emergency food aid will be needed by the Government of Mali that cannot be met by currently available National Security stocks.

### Non-Food Needs

Pesticide powder shipments to deal with the grasshoppers must be expedited on an emergency basis. Late arrival of these shipments would still be valuable to recessionary farmers.

**Table 5: Mali, Preliminary Rice Balance Sheet (mt)**

Consumption (total requirement)	247,629
Net Production (domestic rice) (assuming a 51% milling rate)	146,215
Stocks (net change)	15,111
Rice Supply (domestic)	161,327
Anticipated Imports (commercial rice)	86,760
Rice Balance	458
Food-Aid Rice Commitments (U.S. contribution)	6,000
<b>Overall Rice Balance</b>	<b>6,458</b>

Source: Food Security Operations Cable (USAID/Mali)



## Stocks Cover Slight Production Deficit

### SUMMARY

*A September assessment of cereal production by USAID/Burkina indicates that, barring a premature end of the rainy season, Burkina will not need any emergency food aid in 1989/1990. Following late planting, growing conditions have been better than average, with no economically significant pest attacks. Production will be above average in the north and southeast, and below average in the center and southwest. Due to surplus production last year, government, commercial and on-farm stocks are adequate to offset any small localized deficits resulting from an early end of the rains or late season pest attacks.*

### National Agricultural Conditions

Rainfall was not well established in Burkina this year until July, causing late planting of cereals in all regions of the country. However, August and early September growing conditions have been excellent with well distributed and adequate rainfall, no significant crop pests and no other significant constraints to production. Forage and crop production conditions in the north and southeast regions of Burkina have been good. However, the late planting in the Central Plateau will negatively impact on cereal production this year. In the southwest, low rainfall during July caused reseeding and stress that further delayed cereal development to the point where usual surpluses from that region are not expected.

### Agro-Climatic Zone Conditions

This pre-harvest assessment is based on a division of Burkina into four "1989 agro-climatic zones". These zones were created from provincial boundaries, information from the multi-disciplinary field teams (GTP) of the Ministry of Agriculture, rainfall reported from 40 stations and the difference between the Normalized Difference Vegetative Index (NDVI) greenness in the third decade of July and the 1982-1988 average (see Figure 1). The third decade of July is the latest period in which planting can reasonably occur. Thus, areas with significantly

lower than average NDVI in the third decade of July this year, when rains started late, can be considered at risk of moisture deficits and reduced yields at the end of the growing season.

*In Zone 1, the North, general NDVI values for 1989 indicate average to above average bio-mass production as of late July. Rainfall began late but was above average during late July and early August and average during late August and early September, creating excellent conditions for livestock and cereal production.*

*In Zone 2, the Central Plateau, NDVI values are generally much lower than average, supporting other information that planting was very late in this intensely cropped and degraded zone. Rainfall data from several stations show below average rainfall for May, June and July which caused planting dates 20 to 40 days later than usual (mid-June) and caused stress on young plants. Rainfall in August and September has been average to above average. The late start is of concern due to the low water holding capacity of Central Plateau soils and the medium cycle (100-day) cereals that are normally planted in this region. The moisture stress, plant mortality and resulting low plant densities will certainly lead to less than average yields, even if rains continue into October.*

*In Zone 3, the Southeast, made up of mixed fertile cropland and forest, rains began somewhat late but have been well distributed throughout the season. Crops were planted within the "planting window", are well developed and in no danger from rains ending early. This region is expected to have above average yields.*

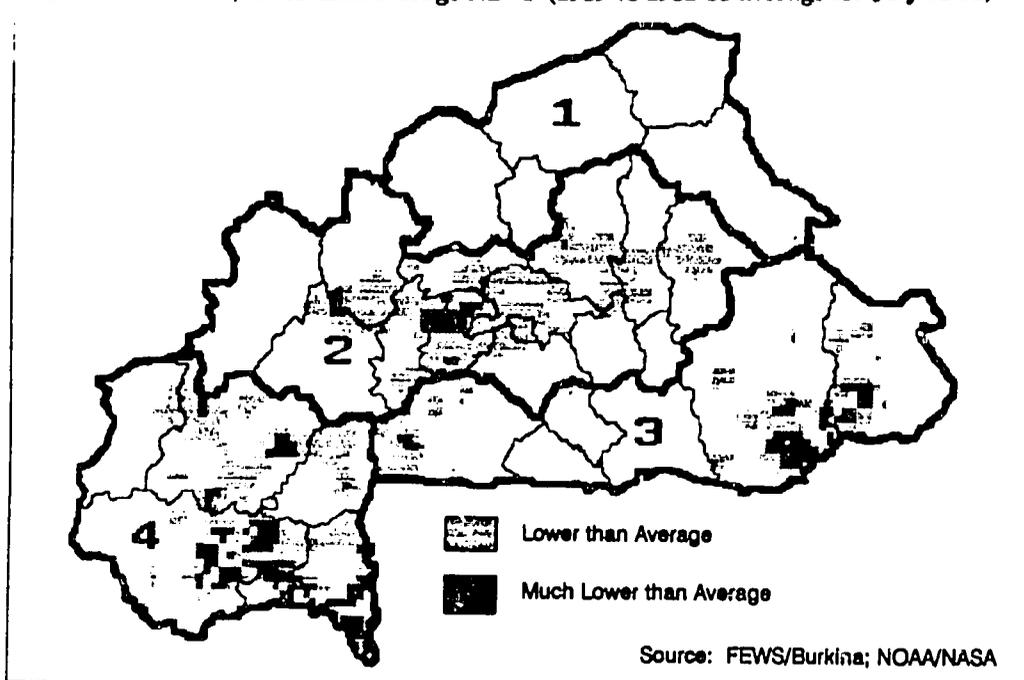
*Zone 4, the Southwest, the breadbasket of Burkina, normally produces large surpluses of cereals with high yielding, late maturing varieties. This zone was planted 20 to 35 days later than the norm (late May). There were drought conditions in the second and third decade of July which reduced sorghum plant densities and retarded the development of millet. The long cycle (120-140 days) cereals grown in this region are very productive when the rains last long enough. However, this year there is concern that should the rains end at, or before, their average (first week of October), yields would be only 70% of their potential. Under this scenario the Southwest zone would not produce its normal surpluses.*

**Table 6: Early Assessment Cereal Balance Sheet for Burkina Faso, September 1989**

1989 Zone	Province	Estimated Net Production (A) mt	Juze 1990 Population	Needs (190 kg/ person) (B) mt	Surplus or Deficit (C) mt	Cereal Need Satisfied (A)/(B) %
1	Bam	48,103	171,543	32,593	15,509	148
1	Oudalan	12,805	120,257	22,849	-10,044	56
1	Seno	31,242	259,218	49,251	-18,009	63
1	Soum	23,883	211,551	40,195	-16,312	59
1	Yatenga	96,353	556,171	105,673	-9,320	91
	<b>Zone Total</b>	<b>212,386</b>	<b>1,318,741</b>	<b>250,561</b>	<b>-38,175</b>	<b>85</b>
2	Bazega	63,737	342,685	65,110	-1,373	98
2	Boulkiemde	51,776	388,812	73,874	-22,098	70
2	Gnagna	40,815	264,080	50,175	-9,360	81
2	Kadiogo	6,595	618,585	117,531	-110,936	6
2	Kossi	67,906	378,709	71,955	-4,049	94
2	Mouhoun	60,421	328,407	62,397	-1,977	97
2	Namentenga	26,178	211,736	40,230	-14,051	65
2	Oubritenga	48,674	323,917	61,544	-12,870	79
2	Passore	52,588	232,003	44,081	8,507	119
2	Sanguie	38,349	231,310	43,949	-5,600	87
2	Sanmatenga	58,863	398,478	75,711	-16,848	78
2	Sourou	45,036	304,946	57,940	-12,904	78
	<b>Zone Total</b>	<b>560,938</b>	<b>4,023,668</b>	<b>764,497</b>	<b>-203,559</b>	<b>73</b>
3	Boulgou	96,511	453,510	86,167	10,344	112
3	Ganzourgou	56,521	218,663	41,546	14,975	136
3	Gourma	91,159	339,084	64,426	26,733	141
3	Kouritenga	31,285	221,830	42,148	-10,862	74
3	Nahouri	16,895	118,437	22,503	-5,608	75
3	Sissili	41,705	287,216	54,571	-12,866	76
3	Tapoa	53,871	183,073	34,784	19,087	155
3	Zoundweogo	32,027	171,814	32,645	-618	98
	<b>Zone Total</b>	<b>419,973</b>	<b>1,993,627</b>	<b>378,789</b>	<b>41,184</b>	<b>111</b>
4	Bougouriba	40,980	239,369	45,480	-4,500	90
4	Comoe	54,676	288,068	54,733	-57	100
4	Houet	91,040	694,143	131,887	-40,847	69
4	Kenedougou	34,304	157,816	29,985	4,320	114
4	Poni	42,306	255,174	48,483	-6,178	87
	<b>Zone Total</b>	<b>263,306</b>	<b>1,634,570</b>	<b>310,568</b>	<b>-47,262</b>	<b>85</b>
	<b>TOTAL</b>	<b>1,456,604</b>	<b>3,970,606</b>	<b>1,704,415</b>	<b>-247,811</b>	<b>85</b>

Source: FEWS/Burkina; CRPA

Figure 1: Burkina, lower than average NDVI (1989 vs 1982-88 average for July 21-31)



zonal demand. The probability of this occurring is less than 50% based on an analysis of historical rainfall patterns for Ouagadougou.

*In Zone 3*, 1989 growing conditions have been very favorable and the high 1986 yields were used. This region is expected to produce a surplus.

*In Zone 4*, 1989 yield estimates are 15% less than 1986 due to poor growing conditions in 1989 and the high probability of drought stress at the end of the season. The normal surpluses are not expected from this zone.

#### Pests

In late September, heavy infestations of grasshoppers in the northern Provinces (see "Major Grasshopper Infestations" in Map

#### Yield Estimates

The Centres Régionaux de Promotion Agro-pastorale (CRPA) estimates of area under cereal cultivation (1986) were used to develop a harvest projection (see Table 6). Population estimates for 1989 were derived from linear projections of census data (December 1985) under provincial growth rates.

Yields (kilograms per hectare) for millet, sorghum, maize and rice were estimated by comparing 1989 rainfall conditions, GTP field reports and NDVI satellite imagery with those of 1986. In 1986 cereal production in Burkina was better than normal with well distributed rainfall and above average cereal yields throughout the southern and central areas of the country; conditions similar to 1989. In the north, however, the 1986 harvest was very poor. Ministry of Agriculture yield estimates for 1986 for each province were adjusted to reflect the similarities or differences with the growing conditions of 1989. Although provincial data were used, estimates are for the four zones.

*In Zone 1*, which includes both cropping and pastoral regions, 1989 provincial yields were increased by 25% over 1986 because growing conditions in 1989 are considerably better. The resulting production figures underestimate production in the predominantly pastoral provinces of Soum, Oudalan and Seno, and overestimate the production in Yatenga and Bam. However, the 85% average food needs satisfied for this chronically cereal deficit zone is better than any recent year except 1988.

*In Zone 2*, 1989 yield estimates are 20% less than 1986 due to low plant densities and the high probability of drought stress at the end of the season. This zone has the highest population-density and subsequently highest cereal demand. Rains must last until the end of September in this zone to meet this year's

7) were reported by the Burkina Crop Protection Service. Reported areas infested and treated are reproduced in Table 7. Although the Government of Burkina has not declared an emergency situation, as of late September resources have been committed by donors in support of a pest control program (see Table 8 below).

Infestation has been primarily limited to rangelands, but grasshoppers will move to crop land as the natural vegetation begins to dry out. Although pesticide supplies are generally adequate, there is still a need for fixed wing and helicopter aircraft.

Table 7: Grasshopper Infestation and Control

Province	Area Infested	Area Treated
Seno	496,000	5,619
Yatenga	300,000	2,272
Soum	151,090	8,254
Oudalan	56,575	5,035
Bam	6,430	419
<b>Total</b>	<b>1,010,095</b>	<b>21,599</b>

Source: Ouagadougou Cable 89-05087

Table 8: Donor Commitments to Pest Control Program

Donor	Resource	Quantity
OAU	operational costs	CFA 45.0 million
Italy	operational costs	CFA 9.0 million
France	operational costs	CFA 5.0 million
FED	pesticides	150,000 liters
West Germany	pesticides	50,000 liters
FAO	hand spray equipment	n/a

Source: Ouagadougou Cable 89-05087

## Food Stocks, Food Deficit, Food Needs

Under the above projections and assuming no significant crop losses to pests a national cereal production deficit of 248,000 metric tons, or 15% of Burkina's cereal needs, is projected (see Table 6). However, no severe food security problems are foreseen at the zonal level, in spite of the reduced harvests expected in the southwest and central areas of Burkina. The Sahelian provinces should have an above average harvest this year. The high projected deficits for Oudalan, Seno and Soum in Table 6 are probably overestimates due to the very poor 1986 yields on which the calculations were based. In addition, the 1988 cereal harvest in these provinces was the best experienced in many years; Seno and Soum even produced cereal surpluses. The population in these areas is in a better position to cope with a poor or mediocre harvest in 1989 than it has been in many years.

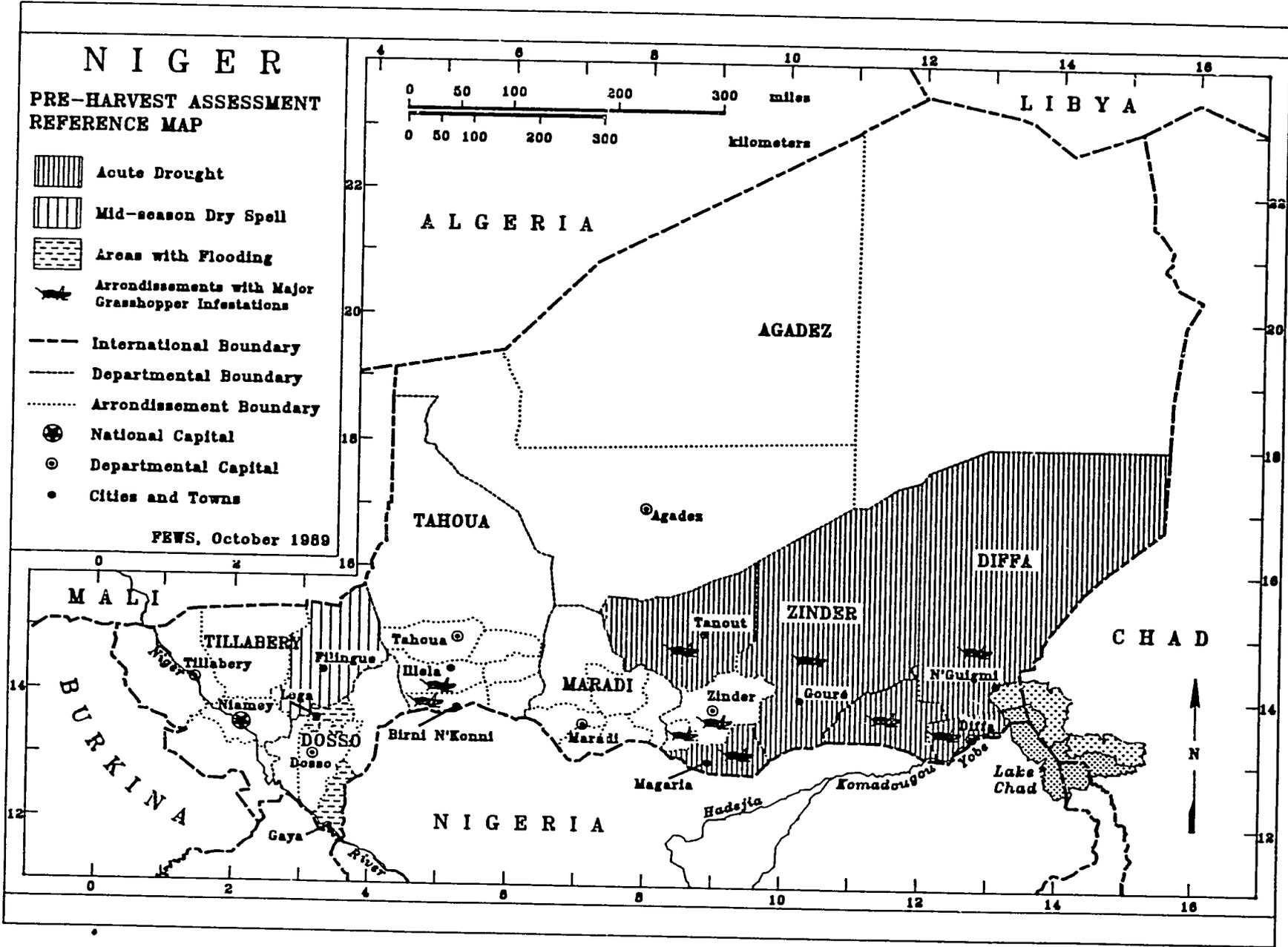
At a national level, a 15% cereal production deficit should not pose serious problems to Burkina's ability to feed its population this year. The projected deficit of 248,000 metric tons (mt) is reduced to 29,000 when current government stocks, planned regular program food aid and commercial imports for 1989/90 total are considered (see Table 9). A 29,000 mt deficit is less than one-fourth of the 1988 cereal production surplus -- a surplus which was not exported. This cereal deficit could be covered by on-farm and commercial stocks carried over from Burkina's record 1988 harvest. Therefore, apart from the 17,000 tons of cereal imports already programmed for the regular 1989/90 United States Public Law 480 (PL-480) program, no need for additional United States Government food aid is anticipated.

**Table 9: Initial Assessment of 1989/90 Existing Stocks and Planned Imports (mt)**

<b>OFNACER STOCKS 8/3/89</b>			
Security	Sorghum, millet, corn, and rice	35,000	
Stabilization	Sorghum, millet, corn, and rice	26,500	
			61,500
<b>FOOD AID</b>			
CRS	Cornflour	14,500	
			14,500
WFP <sup>1</sup>	Sorghum	7,600	
	Rice	800	
			8,400
<b>PLANNED COMMERCIAL IMPORTS<sup>2</sup></b>			
	Wheat	35,000	
	Rice	100,000	
			<u>135,000</u>
<b>TOTAL STOCKS</b>			<b>219,400</b>

<sup>1</sup>WFP food aid will be contributed by as-yet-unspecified donors.

<sup>2</sup>Of the commercial wheat imports, 2,500 tons are a US contribution, provided through the PL480 monetization program. Japan will finance a portion of the commercial rice imports.



## Local Problems May Spur GON Assistance Request

### SUMMARY

*In the absence of quantitative data on current area planted, yield, or production figures, the following qualitative assessment is based on historic information. A high estimate of over 1,400,000 metric tons (mt) reflects average net production from the 1980-89 period. The low estimate of approximately 1,150,000 mt reflects net production similar to the 1987/88 year. Based on extrapolated 1988 population census figures and the USAID millet and sorghum per capita consumption figures, the projected consumption requirement for 1989/90 is approximately 1,600,000 mt. Under these scenarios there would be a production deficit of approximately 200,000 mt under the high estimate and approximately 450,000 mt under the low estimate; deficits of 11 and 27 percent, respectively, relative to estimated consumption requirements for 1989/90. Given the level of public stocks and assumptions concerning private stocks discussed below, Niger would appear to have the capacity to meet most of its food needs in the 1989/90 year. However, due to economic and cultural constraints in moving surplus stocks to deficit areas, it is likely that external food assistance will be requested.*

### Agricultural Conditions

In general, rainfall is greater than the 20-year average, despite localized deficit areas. On average, 20 percent above normal rainfall was received in widespread areas of northern Tillabery and Tahoua departments, southern Dosso, Tahoua, and Maradi departments, and central Zinder Department (see Map 8 for locations). However, rainfall patterns throughout Niger have been less than optimum, both spatially and temporally. Rains must continue through September in much of Niger for crops to develop normally. In some areas that experienced delayed planting (late July/early August) rains would need to continue into October (not a strong likelihood) for crops to mature.

Uneven national growing conditions produced mixed crop development across Niger, with zones of good crop stands interspersed with zones of poor crop stands. Respective zones roughly correspond with surplus and deficit rainfall patterns (see Map 9). In addition, late and scattered rains, followed by late planting, have aggravated this situation. The largest rainfall deficit areas are centered around Abala (Tillabery), Loga and Dogondoutchi (Dosso), Dakoro (Maradi), Magaria (Zinder), and N'Guigmi (Diffa).

FEWS and USAID/Niger estimate cereal production levels to be between 1,150,000 and 1,400,000 mt. These levels take into consideration the localized stress described below. Only millet and sorghum production is considered because available consumption requirements for Niger are based uniquely on these two cereals. USAID/Niger's year-end food needs assessments for the 1987/88 and 1988/89 seasons included estimations of food availability from commodities such as rice and cowpeas, plus off-season production. This pre-harvest food supply report does not include harvest estimates for these crops, of potential contribution to food availability, since no production figures, provisional or otherwise, are yet available. It is anticipated, however, that this year's rice and cowpea production will be less than in 1988/89.

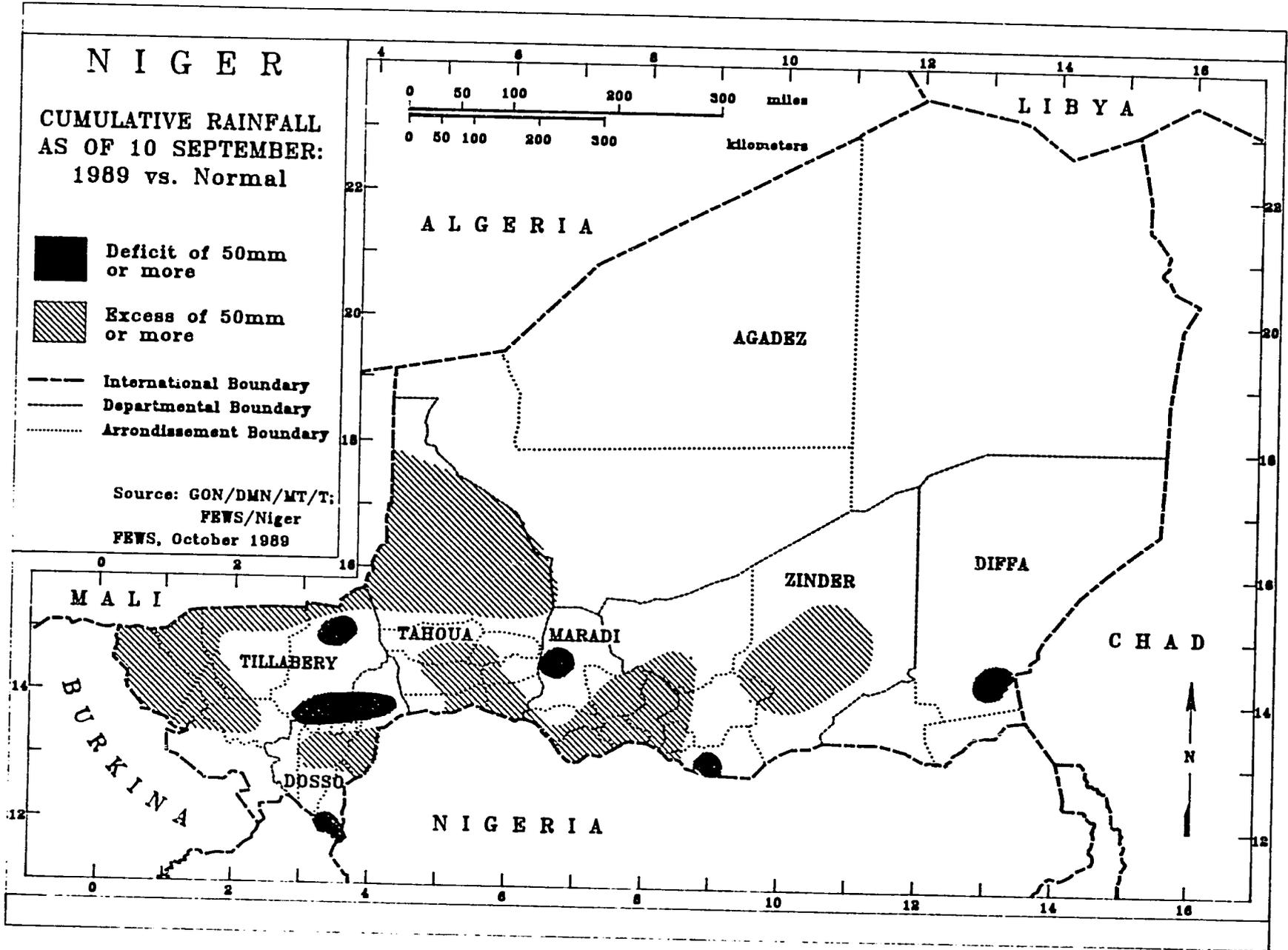
### Localized Stress

The departmental condition information provided below comes from current Government of Niger (GON) bulletins, anecdotal field reports collected by USAID/Niger through staff travel, and discussions with other donors and NGOs (see Map 8 for locations highlighted below).

**Tillabery:** A long dry spell after crop establishment in late August and early September reduced harvest prospects to below-average in Filingué arrondissement.

**Dosso:** Despite a deficit in cumulative rainfall, Loga and Gaya arrondissements have had periods of heavy rain and brief flooding causing an as yet unquantified yield reduction.

**Tahoua:** Expectations for a good harvest have recently fallen due to serious grasshopper infestations covering over 4,000 square kilometers of maturing cereals in Konni and Illéla arrondissements.



**Zinder:** Late planting, scattered areas of insufficient rainfall and greater than normal grasshopper infestations have greatly reduced crop prospects throughout the department. Drought stress has been particularly acute in Magaria, Tanout, and southern Gouré arrondissements.

**Diffa:** Drought stress, late planting, and above normal grasshopper populations characterize most of the department, especially N'Guigmi arrondissement where rainfall is less than 70% of the 20 year average.

### **Food Deficit, Food Needs**

In the absence of quantitative figures on area cultivated and yield, a projected cereal (millet and sorghum only) balance is presented in Table 10. The first column of Table 10 gives the "high" production estimate as the average of 1980-88 millet and sorghum production by arrondissement. The second column indicates 1989/90 projected consumption requirements. GON consumption rates are 250 and 200 kg per person per year for agropastoralists and pastoralists/urban dwellers, respectively. In contrast, the United Nation's Food and Agriculture Organization (FAO) rates are 220 and 190 kg, respectively. The present report, consistent with USAID/Niger's food needs assessment for the 1988/89 season, uses the more conservative FAO rates. The third column shows this year's projected cereals balance as the difference between average production in the first column and this year's consumption requirement in the second column. Similarly, a "low" estimate was computed using the 1987 cereal production levels. Production levels for 1987 were considered to be reasonable "low" estimate proxies for 1989 due to similar uneven growing conditions between 1987 and 1989. However, the location and size of deficit pockets are not necessarily the same as in 1987.

The projected balance suggests a nation-wide production deficit of 11 percent based on 1989/90 consumption needs versus average production for the 1980s. Considering the "low" production estimate of 1,150,000 mt, the estimated deficit ranges from 11 to 27 percent. Given 1988/89 surplus production, however, carry-over stocks may reduce this deficit range. Assuming a 50 percent carry-over, the potential deficit range would become 0 to 15 percent. However, deficit pockets will continue to exist at the department and arrondissement levels.

From Table 10 the departments of Agadez, Diffa, and Tillabery can be found to be in deficit of consumption requirements by 98%, 53%, and 22%, respectively. These are chronically deficit departments, even under the best of conditions. In addition to these departments, several arrondissements in Tahoua and Zinder departments are, on average, chronically deficit by more than 10 percent. Conditions particular to the current growing season, however, do not necessarily bear out these patterns. Previous information indicates that Loga arrondissement in Dosso Department, Illéla and Konni arrondissements in Tahoua, Filingué in Tillabery, and Magaria and Tanout in Zinder may join the ranks of deficit areas.

### **Food Stocks**

Stocks on hand from the National Cereals Office (OPVN) and the National Rice Parastatal (RINI) totalled 83,230 mt as of September 10, 1989. By donor and GON agreement, no more than one third of the national stock should be used per year. Therefore, potential cereal availability from public stocks would be approximately 28,000 mt.

No attempt has been made to estimate the level of on-farm stocks. GON food balance calculations typically set private and commercial stocks to zero. In their 1988 assessment of the 1987/88 growing season, a joint FAO/donor mission attempted to estimate stocks from the previous growing season by carrying forward the surplus in self-sufficient zones. In the present analysis, the surplus stocks from 1988/89 are considered in a similar manner.

The last column of Table 10 presents 1988/89 surplus production relative to this year's cereal needs (1989/90). The figures represent the percent of 1989/90 cereal needs that could be satisfied by carry-over stocks in the event of a complete production failure. Cereal needs for 1988/89 were based on the USAID figure of 220 kilograms for sedentary farmers and 190 kilograms for nomads and urban dwellers. Available surplus from 1988/89 for consumption in 1989/90 was assumed to be 100%. Under these assumptions the figures in Table 10 suggest that 25% of the projected national deficit could be offset by carry-over stocks. If these assumptions are unrealistic and only half of last year's stocks remained, they would cover a deficit of up to 12.5 percent.

Disaggregation below the national level of assumed on-farm and commercial stocks is difficult. However, even if ample stocks remain from last year, it cannot be assumed that surplus households are willing to sell those stocks or that deficit farmers have adequate buying power to access commercial stocks.

### **Food Assistance**

During the last three years regular World Food Program (WFP) assistance has averaged 17,000 mt of sorghum and other commodities. Expected annual tonnages and delivery schedules for a new multi-year program, scheduled to begin early in 1990, are not known at this time.

Small quantities of food assistance is provided through religious groups for specific segments of the population. At present, no consolidated records are kept on this assistance.

### **Mission Comments**

Qualitatively, crop conditions in 1989 have not been as good as 1988, or as bad as 1984. Crop development is continuing throughout most of the major production zones and late season phenomena, such as end of season rains or pest damage, will have a significant impact on local food production. USAID/Niger will continue to monitor the situation closely and provide updated reports with revised production and stock estimates as available.

It is too early to quantify any potential deficit for the 1989/90 growing season. An accurate quantitative harvest assessment for Niger is not possible without hard figures on area cultivated, at least. Figures on area under cultivation are normally available by the end of September. Given the abnormally late planting dates this year, these figures will not be available until early October. Due to the lack of reliable quantitative estimates, the Mission does not endorse release of official production or deficit figures at this early date. The estimates in this report are based on historical data and should not be taken as official pronouncements.

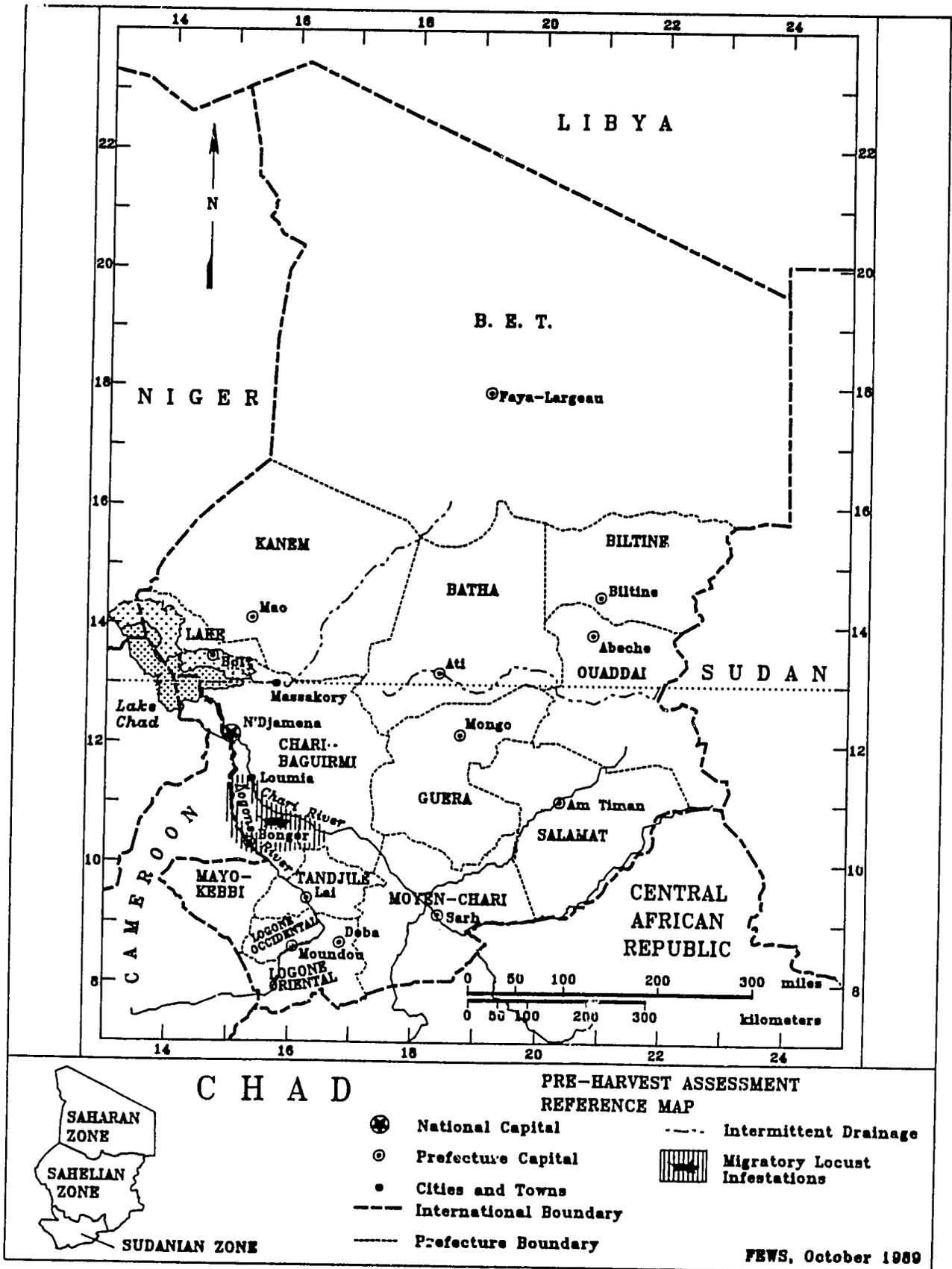
**Table 10: Preliminary Niger Cereal Balance Projection for 1989/90 (mt)**

<b>DEPARTMENT Arrondissement</b>	<b>Average Production<sup>1</sup></b>	<b>Consumption Projection (1980-88)</b>	<b>Cereal Balance</b>	<b>% of Consumption Needs Met by 89/90 Production</b>	<b>% of Consumption Needs Met by Est. 1988/89 Carryover Stocks</b>
<b>AGADEZ</b>	707	42,361	-41,654	2	0
Agadez-Commune	0	11,215	-11,215	0	0
Arlit	76	15,617	-15,541	0	0
Bilma	0	1,735	-1,735	0	0
Tchirozérine	631	14,671	-14,040	4	0
<b>DIFFA</b>	18,380	39,040	-20,660	47	0
Diffa	8,622	13,322	-4,700	65	9
Diffa Commune	105	3,244	-3,139	3	0
Mainé Soroa	6,562	16,870	-10,308	39	0
N'Guigmi	3,091	5,889	-2,798	52	0
<b>DOSSO</b>	237,577	228,108	9,469	104	22
Boboye	45,895	46,303	-408	99	12
Dogondoutchi	70,194	71,035	-841	99	29
Dosso	58,386	48,954	9,432	119	25
Dosso Commune	0	6,179	-6,179	0	0
Gaya	41,883	36,635	5,248	114	23
Loga	21,219	19,781	1,438	107	39
<b>MARADI</b>	308,895	307,001	1,894	101	56
Aguié	40,953	37,842	3,111	108	14
Dakoro	51,790	56,986	-5,196	91	56
Guidan Roumji	55,970	47,867	8,103	117	137
Madarounfa	51,999	42,635	9,364	122	33
Maradi Commune	0	25,429	-25,429	0	0
<b>TAHOUA</b>	244,588	280,558	-35,970	87	19
Bouza	36,459	39,295	-2,836	93	13
Illéla	35,127	38,246	-3,119	92	47
Keita	27,889	34,510	-6,621	81	2
Konni	58,470	54,593	3,877	107	44
Madaoua	42,556	47,060	-4,504	90	18
Tahoua	33,546	41,761	-8,215	80	22
Tahoua Commune	0	10,742	-10,742	0	0
Tchiu Tabaraden	9,923	15,135	-5,212	66	0
<b>TILLABERY</b>	294,295	378,707	-84,412	78	0
Filingue	62,141	63,894	-1,753	97	13
Kollo	64,153	54,092	10,061	119	53
Niamey Commune	1,624	82,784	-81,160	2	0
Ouallam	31,519	42,092	-10,573	75	0
Say	44,170	37,932	6,238	116	27
Tera	60,173	64,218	-4,045	94	34
Tillabery Commune	30,517	34,256	-3,739	89	6
<b>ZINDER</b>	303,873	306,584	-2,711	99	56
Gouré	24,993	34,655	-9,662	72	0
Magaria	85,779	75,363	10,416	114	43
Matameye	36,984	36,467	517	101	51
Myrriah	96,718	93,225	3,493	104	47
Tanout	57,908	40,603	17,305	143	243
Zinder Commune	1,491	26,670	-25,179	6	0
<b>NIGER TOTAL</b>	<b>1,408,316</b>	<b>1,581,737</b>	<b>-173,421</b>	<b>89</b>	<b>25</b>

Source: FEWS/Niger (using historical production averages)

<sup>1</sup>Cereals reported are millet and sorghum only.

Map 10



## Stocks and Low Prices Insure Access to Food

### SUMMARY

*Chad will have a cereals production deficit in 1989/90 due to below normal rains in most of the country. Crop prospects are poor in areas north of the Massakory-Ati-Abéché axis (13 degrees north). South of that axis, crop conditions are generally good due to regular rainfall since mid-June. However, the late start of the rainy season necessitates rainfall through September and into October for crops to reach maturity. Cereal prices during August remained stable and significantly below the August 1988 prices. Indeed, August 1989 prices are the lowest since 1983 when USAID began collecting price data. Moreover, in the northern Sahelian zone, where the crop outlook is poor, livestock investments by agro-pastoralists should compensate for the poor harvest and insure access to cereals on the market. The Ministry of Livestock reports that herds have been reconstituted to their pre-1984 drought size. Should localized shortages become acute during the 1990 lean period (May-July) the Government of Chad's Food Security stock, currently at 10,000 metric tons, will be sufficient to meet feeding requirements. Thus, emergency food aid imports will be unnecessary for the 1989/90 post-harvest period.*

### At-Risk Groups

**Drought-affected populations** - The 1989 harvest will approximate that of 1987 with a cereals deficit in the northern Sahelian Zone. In 1987, there was a significant difference in perception between the Donor/Private and Voluntary Organizations (PVO) Community and the Government of Chad (GOC) regarding the existence of "at-risk" groups. There will almost certainly be a similar difference of perception this year. The GOC Ministry for Food Security and Disaster Victims (MSAPS) has already begun making predictions about generalized crop failure in the Sahelian Zone and possible need for emergency feeding. The Donor/PVO Community believes that crop failure in the agriculturally marginal north-

ern fringe of the Sahelian Zone does not automatically create at-risk groups. Successive years of poor rainfall can lead to severe dislocation of the population in this zone, however, this is not the case in 1989. Nonetheless, a more detailed assessment of crop conditions and possible at-risk groups will be performed by Système d'Alerte Précoce (SAP) during September and will be reported in the October Food Security Operations Cable.

**Refugees and displaced persons** - Returnees continue to arrive in N'Djamena from Libya, while the number of returnees from a Sudan to the east has dropped off (529 during August). Transportation assistance has been provided to Chadian returnees from Libya desiring to return to their villages, as well as to other displaced persons from Borkou-Ennedi-Tibesti Prefecture (B.E.T.). Between August 10 and September 2, 794 men, women and children were transported to the B.E.T. aboard United Nations trucks. Fuel and associated costs for this repatriation effort were covered by the United States Public Law 480 (PL-480) counterpart fund.

### Agricultural Conditions

Cumulative rainfall as of August 31 was on average 20 percent below normal for the six northernmost prefectures in the Sahelian zone and 23 percent below normal for the five weather stations providing regular data in the Sudanian zone. Planting in the south was characterized by multiple sowings due to erratic rainfall during May and June. However, abundant and regular rains in July and August have favored crop development in the Sudanian zone and, to a lesser extent, in the Sahel-Sudanian zone south of the 13th parallel (see Map 10 for location of 13th parallel). Areas north of the 13th parallel, which are agriculturally marginal, will register poor harvests. Rainfall data indicate that most districts in Kanem and Biltine prefectures received insufficient precipitation for cereal production. In contrast, rainfall has been borderline in the other Sahelian prefectures. In areas with rainfall between 300 and 600 millimeters, the spacing of the rains and pest control efforts will determine the success or failure of the harvest.

Comparing 1989 rainfall data to that registered since 1985, USAID/Chad and the FEWS Field Representative estimate

that cereal production will fall between 500,000 and 600,000 metric tons (mt). Although this represents a significant reduction from the record 1988 harvest (808,000 mt), it approximates the 1987 harvest (572,000 mt), following which minimal amounts of food aid were required to meet feeding needs of at-risk groups. The current agricultural season follows a bumper harvest that provides a cushion for farmers registering poor harvests in 1989. It also follows several years during which livestock herds have been reconstituted, providing an increased measure of food security to agropastoralists.

### **Pests**

It should be noted that the potential for significant reductions in yield from grasshoppers/locust infestations remains high and could further reduce the above crop production estimate. Light to severe grasshopper damage was reported during July throughout the Sahelian zone. Grasshopper densities remained high (50-60 per square meter in grasslands, 15-30 per square meter in some fields) during the first week of September. A combination of aerial and ground control treated 59,500 hectares as of September 12.

In addition to the grasshopper problem, several swarms of African migratory locusts were spotted in the Chari-Logone river basin south of N'Djamena (see "Migratory Locust Infestations" in Map 10). An FAO consultant to the GOC Crop Protection Service confirmed the presence of at least four swarms covering 10,000 hectares and noted that the infestation was certain to cover a much wider area. Poor road conditions prevented the prospection team from verifying reports from agriculture extension agents and farmers that the entire Chari-Logone River basin, from Loumia to Bongor, is infested. Control efforts are underway, using a DC-3 and Cessna for aerial treatment. FAO is shortly expected to provide a helicopter for purposes of prospection and treatment. Nonetheless, the threat of significant crop damage exists.

### **Cereal Prices**

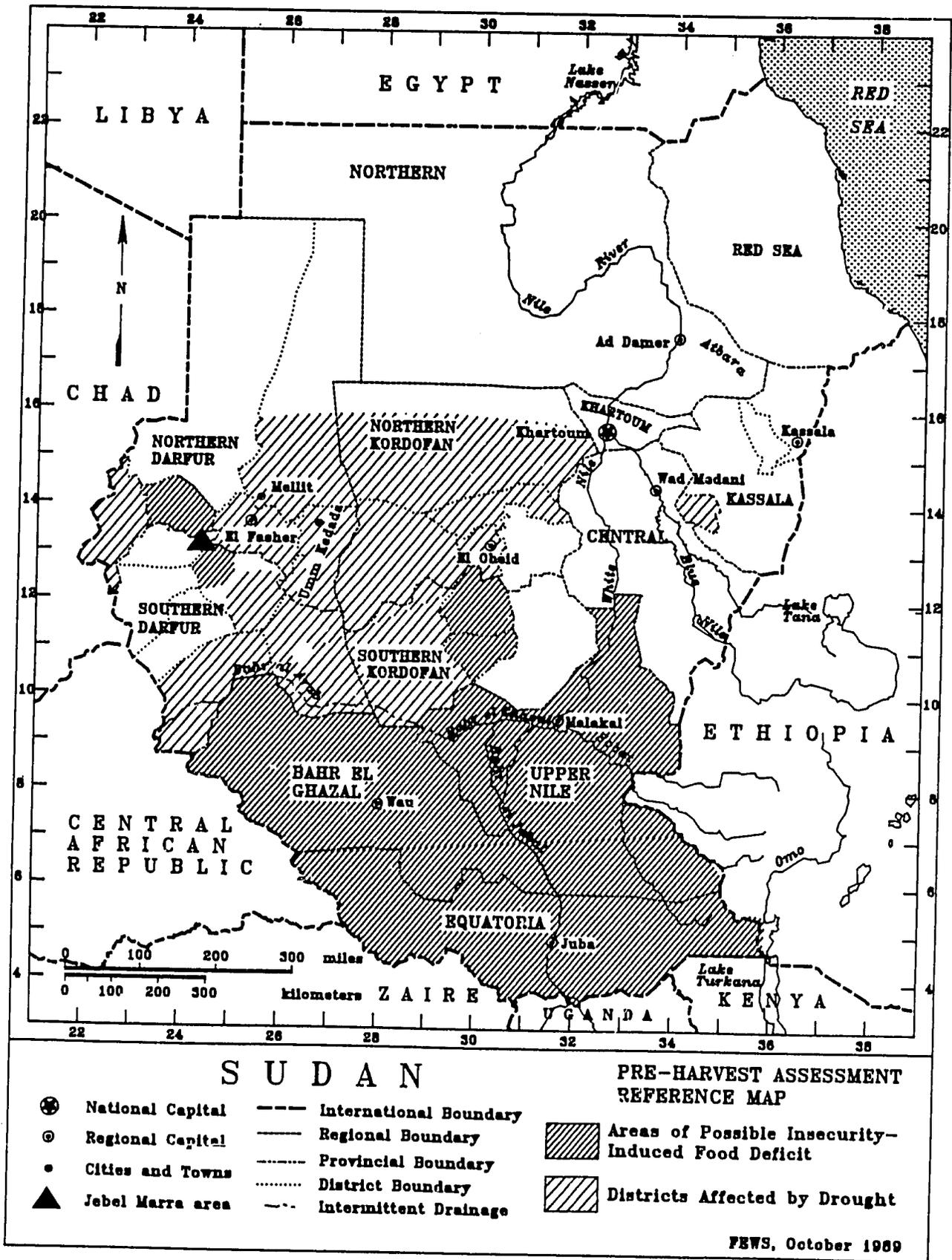
In both the Sahelian and Sudanian Zones, cereal prices remain extremely low reflecting high levels of on-farm and private sector stocks and expectations about this year's harvest. Prices are below those of the same period in 1988. The N'Djamena millet price for July/August is lower than it has been since 1983 when USAID began collecting price data. Price data for the Sahelian Zone, gathered since 1986 by SAP, confirms that prices have never been lower for this period. During the months of July and August, the average price of millet in the six Sahelian prefectures, where SAP conducts market surveys, remained stable at 40 FCFA per kilogram. August price data for the south have not yet been made available; however, June and July figures provided by the National Cereals Office (ONC) indicate a downward trend which is uncommon for that time of year. Thus, cereals appear to remain in abundant supply and accessible throughout Chad's rural and urban markets. There is no evidence of food-access related stress. Consumption information gathered by SAP indicates that

cereals continued to be the mainstay of the Sahelian diet during August.

### **Food Stocks**

As of August 31, in-country food aid stocks (cereals and non-cereals) totaled 11,641 mt, most of which are for World Food Program's (WFP) on-going projects. In addition, WFP is expecting a consignment of 2,020 mt of soya-fortified sorghum grits (SMSG), which was to have been provided in 1988 for flood victims and will now be available to meet any potential feeding requirements. Finally, the ONC has 14,500 mt of local cereals in stock, of which 10,000 mt have tentatively been earmarked for the Security Stock. The Mission's Section 206 program will begin generating sales proceeds in November/December. These funds can also be used for Security Stock purposes. Both USAID and SAP believe that the combination food aid stocks and ONC Security Stocks will be sufficient to meet any emergency feeding requirements which may arise during the coming 12-month period.

Map 11



## Beyond Scheduled Relief, Stocks Cover Local Production Deficits

### SUMMARY

*The 1989/90 agricultural season has been beset by a wide range of problems. Final production and harvest will be greatly reduced from the record production of 1988/89; however, it is likely that significant amounts of grain will be harvested. Furthermore, exceptionally large stores of sorghum from the 1988/89 harvest remain in the hands of private traders. It is unknown when these stocks will be released and how much will be available for local consumption. At the national level, considering expected harvest and potential marketable stocks, Sudan will have sufficient grain to feed its population in 1990. Problems may arise in the transportation of grain from surplus to deficit areas. In addition, many of the residents in the South remain dependent on food aid, and will continue to do so in the foreseeable future, because civil disturbances have hindered agricultural activity. The need to import food for emergency relief purposes is not anticipated at this time, except for ongoing relief activities in the South.*

1988/89. Thus, if farmers were to experience bad harvests this year, last year's surplus would get them through to the next agricultural season. Possible exceptions to this scenario are the towns in northern Mellit and Umm Keddada where 1988/89 harvests were poor. Non-Governmental Organizations (NGOs) working in Northern Darfur, such as the Sudanese Red Crescent (SRC) and Oxfam/UK, and the GOS Agricultural Planning Unit (APU) in El Fasher, have been closely monitoring these communities and can effectively provide highly targeted relief assistance when needed.

Areas that may be food deficit because of insecurity include (see "Areas of Possible Insecurity-Induced Food Deficit" in Map 11) :

- **N. Darfur Province:** Kebkabiya
- **S. Darfur Province:** northern Nyala, in and around the Jebel Mara area.
- **S. Kordofan Province:** Kadugli, Dilling
- **The South:** Upper Nile, Bahr El Ghazal and Equatoria Regions.

Some residents in the Kebkabiya and Jebel Mara enjoyed good harvests last year but lost everything as a result of the civil unrest which swept across this zone in March, April, and May of 1989. These populations have received assistance, even though they will produce some food in 1989/90, but may need more if their harvest fails this year. Violence in Southern Kordofan has prevented some people from planting. This may cause a harvest reduction this year, but production was excellent in these areas last year.

The South remains the most at-risk zone, as a high proportion of town-dwellers remain dependent on food aid. Under such tenuous conditions, even slight interruptions in the supply of relief food endangers food security. Some food has been procured locally for distribution in the South (mostly in Bahr El Ghazal and Upper Nile), but much food aid continues to flow into Equatoria from Kenya and Uganda. It is expected that these channels will have to remain open in the future to get adequate amounts of relief to affected populations in Equatoria.

### At-Risk Populations

At the local level, there will be some deficit areas in 1990. Those district councils that have been affected by drought conditions during the current season include (see "Districts Affected by Drought" in Map 11):

- **N. Darfur Province:** Mellit, Umm Keddada, El Fasher, El Geneina
- **S. Darfur Province:** southeastern Nyala, Ed Daein, Buram
- **N. Kordofan Province:** El Obeid, En Nahud, Umm Ruwaba, Sodari, Bara
- **S. Kordofan Province:** El Fula
- **Kassala Province:** El Fau.

Excepting isolated areas of Mellit and Umm Keddada, all of the above district councils enjoyed excellent harvests in

## Agricultural Conditions

According to various sources (including NDVI satellite imagery, METEOSAT rainfall interpretation, rainfall station data and field reports) the 1989/90 agricultural season has been mediocre. A number of factors have affected this year's production potential. These include weather, unavailability of fuel and oil, and insecurity.

**Weather** - Drought conditions have been observed in Northern Darfur, Northern Kordofan, and western Southern Kordofan. In addition, there was a dry area in the Fau region, northwest of Gedaref. Verbal reports claim that it has been raining in all of the affected areas since the last week in August, but it is unknown if these rains were sufficient and timely (see "Districts Affected by Drought" in Map 11).

**Unavailability of fuel and oil** - Most zones of the mechanized rain-fed agricultural sector have been greatly affected. Planting was late and production is expected to be much lower than last year (see "Areas of Possible Insecurity" in Map 11).

**Insecurity** - Conflicts in Northern and Southern Darfur, Southern Kordofan, and throughout the South, have reduced harvest potential in these areas.

At an aggregate level, Sudan will most likely produce between 1.8 and 2.6 million metric tons (mt) of grain in 1989/90. Besides the problem of sporadic rains, unavailability of fuel and oil, and insecurity, market forces lessened the incentive to plant. With the surplus harvest of 1988/89, Sudan effectively over-produced sorghum with the cost of production very nearly equalling the producer price. Profit margins were squeezed. Many farmers in the mechanized rainfed sector did not harvest their fields as it would have been too costly. This year, there has been some reluctance to plant, as returns on such labor were not good last year.

The combined amounts of stored 1988/89 sorghum and expected 1989/90 grain production will more than cover the projected domestic consumption of cereals in 1990 (approximately 2.6 million mt).

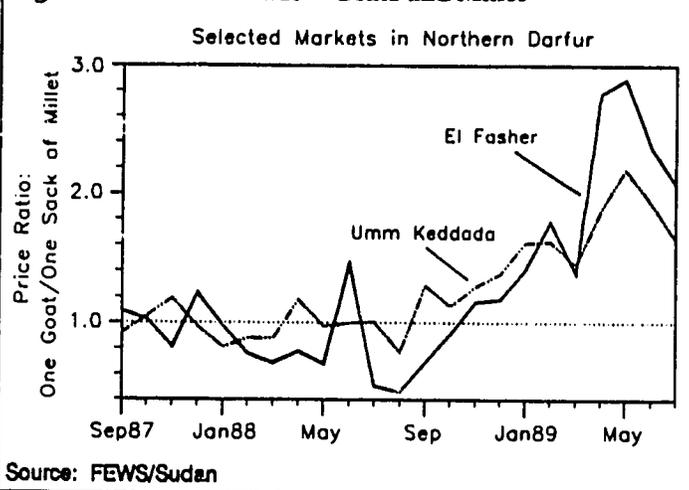
### Market Indicators

Scarce market data indicate that grain prices are beginning to rise sharply in the west. Farmers have realized that production will not be exceptionally good this year so they are more reluctant to release their grain to the market. However, livestock prices have also continued to climb which indicates that this resource base has not been eroded and there is no unusual surplus of animals on the market.

The grain and livestock data that are available from Northern Darfur indicate that the terms of trade between goats and millet are very favorable at present (see Figure 2). In fact, since April 1989, the terms of trade have been better than they have been in the past two years. This is a good sign for farmers and indicates continued recovery. Note that the terms of trade in El Fasher market reached a two-year low in July, August, and September of 1988 when it was well below parity (i.e. one goat

was worth less than one sack of millet). It had been hoped that the Western Relief Operation (WRO) of 1988 would prevent such an erosion in the resource base, but as the program failed, the negative impact was to be expected.

**Figure 2: Terms of Trade – Goats and Millet**



### Food Stocks

Late rains have persisted in northern Sudan, and it is likely that they will have a positive impact on crops in Darfur and Kordofan. However, in the unlikely event that there were a total harvest failure in the western areas, there are sufficient local food supplies to provide highly targeted assistance for the most needy populations. In addition, the European Economic Community (EEC) has agreed to stockpile some 2,000 mt of millet in El Fasher, 1,500 mt of millet in El Geneina and 1,500 mt of sorghum in Nyala. Much of this food has been procured and is available for distribution, should the need arise. Between on-farm stocks, and locally available foods, residents in the areas where there may be crop failure should be able to secure enough to eat.

The Agricultural Bank of Sudan (ABS) reports having 367,580 mt of sorghum in stock (see Table 11). Informal estimates of private trader stocks from the 1988/89 harvest are set at some 2.5 million mt of sorghum. Therefore, domestic food stock

**Table 11: ABS Sorghum Stocks, 1 August 1989 (mt)**

Location	Amount
Gedaref	162,727
Kosti	21,169
Renk	43,128
Damazin	10,323
Sennar	123,934
Um Ruwaba	4,636
Dilling	1,663
<b>Total</b>	<b>367,580</b>

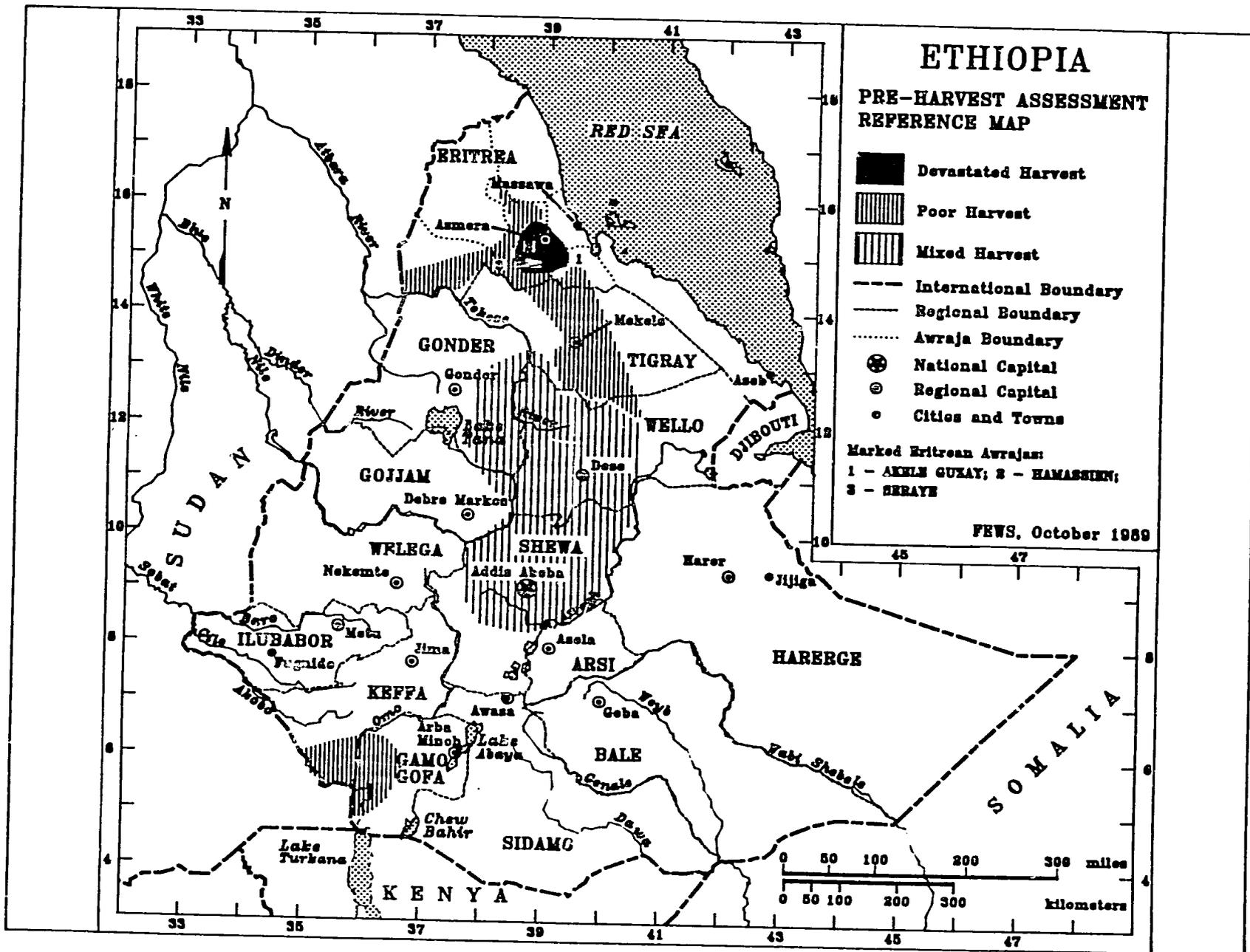
Source: Khartoum Cable 89-10514

amounts appear to be quite high. However, grain merchant intentions are unknown. There is speculation that some stocks will go out on trade (sale or barter), or that the merchants will hold their stocks until after the 1989/90 harvest. After harvest, grain prices are expected to be much higher than at present because of increased production costs and decreased supply.

Most traditional rain-fed cultivation also produced record harvests in 1988/89 which influenced on-farm stocks. Field work conducted in Darfur and Kordofan suggests that many farmers stored up to a two year supply of grain from the 1988/89 harvest.

### **Food Needs**

In conclusion, there have been some problems in this year's agricultural season that will cause reductions of the 1989/90 harvest. However, deficits due to the lack of rain in the traditional sector can be met by locally available food from 1988/89 stocks and the market. Reductions in production in the mechanized rain-fed areas have been brought about primarily by the lack of fuel and insecurity, but these will have little direct impact on local food supplies. However, these reductions will influence net domestic supplies. The only area where continued outside intervention will be required in 1990 is the South, where food and other assistance will be needed for populations suffering from the effects of civil unrest.



Map 12

## North May Again Require Emergency Assistance

### SUMMARY

*Poor rainfall in the North has severely affected the prospects for the harvest in Eritrea. Estimates are that more than 1,500,000 people in Eritrea will require at least 250,000 metric tons (mt) of emergency food aid during 1990. The situation in Tigray is less clear, but expectations are for a less than normal crop, though not as bad as in Eritrea. There are reports of late and irregular rainfall in parts of Wollo and Gonder. Rainfall is reported to be adequate in main crop growing areas in the rest of Ethiopia with some regional variations. Food stocks and the food aid pipeline for the North are seriously deficient, while those for the rest of the country are adequate for the foreseeable future. Refugee populations remain stable and their food aid pipeline is adequate into early 1990.*

### At-Risk Populations

The three million inhabitants of Eritrea are thought to be the most seriously at-risk population in Ethiopia. The rains in this area normally begin in late May or early June. This year, however, it was only in early August that good, consistent rainfall started, and the rains then stopped by the end of the month. The recent United Nations/Emergency Prevention and Preparedness Group (UN/EPOCHAL) report states that a severe reduction in overall crop production for Eritrea Region is expected. The report further states that the Relief and Rehabilitation Commission (RRC) and Non-Governmental Organizations (NGOs) in Eritrea now predict that one million people will need relief food assistance through the end of the traditional hungry months of September-November and that the number of people requiring such relief will increase to one and one half million by early 1990. The most recent EPOCHAL Field Officer report, with data through September 6, notes that the Joint Relief Program/Catholic Relief Services (JRP/CRS), the RRC, and the Ethiopian Red Cross Society (ERCS) have reduced relief distributions due to a shortage of relief food stocks in the area. In August, the three

agencies fed a combined total of 348,076 drought affected and 130,000 displaced people. This represents a drop of approximately 230,000 drought affected people since the month of July. Tonnage of aid distributed fell from 10,108 in July to 8,259 in August.

In Tigray, which is inaccessible from central government-held territories, satellite data indicates rainfall and crop production is likely to be better than in Eritrea but still less than normal (see "Devastated Harvest" and "Poor Harvest" in Map 12). There are still 12,500 displaced people from Tigray living in shelters in southern Eritrea and 7,000 in northern Wollo. The RRC is very concerned about a possible mass influx of people from Tigray into Eritrea in September and October.

There is no indication of specific Ethiopian populations at risk in the rest of Ethiopia, although there have been local rainfall deficiencies. The RRC is assisting 21,000 internally displaced people because of security problems in parts of Gonder.

Refugees from both Sudan and Somalia make up the balance of the at-risk populations. There are approximately 450,000 Sudanese refugees at four sites in the west and approximately 350,000 (as per recent re-registration) at two clusters - six camps - in the east.

### Agricultural Conditions

Ethiopia has two cropping seasons: The *belg*, or short season, is important in limited geographical areas; and the *meher*, or major growing season, which provides Ethiopia with 90 to 95 percent of its annual production. After a late start to the *belg* rains, there was a long dry spell in May that negatively affected the crop, as it had not yet reached the flowering stage in most areas. Most crops recovered when good rains resumed in June. No official figures are yet available on the 1989 *belg* crop, but the Food Information System Project estimates the total *belg* crop at 415,000 mt. This is slightly more than the FAO crop assessment mission forecast of 400,000 mt and better than last year's harvest of 315,000 mt, but not as good as the 1987/6 crop of 498,000 mt.

The *meher* crop is still in the field in most parts of Ethiopia. While it is too early to give a definitive judgement on *meher* production, certain patterns are beginning to emerge, some more clearly than others:

- In Eritrea, poor rainfall has severely affected the main harvest, particularly in Hamasen Awraja and around Asmara where early planted sorghum failed and the *teff* crop is now wilting following a cessation of the rains as of August 20.
- In western Ethiopia, the situation is very promising, with most areas receiving normal to above normal rainfall thus far in the season. The overall crop condition is good in Wellega, Illubabur, Keffa, Sidamo, Gojjam and Gonder for maize, sorghum, and short cycle crops sown in June and July (for instance, *teff*, wheat, and pulses). There are some pockets that have not received sufficient rainfall, such as Motta Awaraja in Gojjam, the northeastern part of Gonder, and the low- and mid-altitude areas of Gamo Gofa.
- In eastern Ethiopia, the situation is not as good as that in the West. Low- and mid-altitude areas of Shewa, Harerghe and Wello have received insufficient rainfall and the maize and sorghum crops show signs of stunting and wilting. Short-cycle crops may still ensure a reasonable *meher* in these regions.

### Pests

Locust problems remained insignificant in recent months. It is forecast that, by mid-September, there may be scattered concentrations in Eritrea and the Red Sea coast and that low level breeding is likely.

### Food Stress Indicators

In Eritrea, where the worst situation prevails, there have been as yet no reported indications of severe access-related stress. The EPOCHAL believes such stress will begin as the extent of the crop failure in that area becomes evident and current relief stocks continue to be less than relief population requirements dictate.

There have been no significant movements out of Tigray so far. There are no reports of stress from other areas of Ethiopia.

One reliable source of nutritional data, Save The Children/United Kingdom (SCF/UK), reports that nutrition levels remain at satisfactory or reasonable levels in surveyed areas of Harerghe, Wello, Shewa, northern Sidamo and Arssi. The data, however, was collected in July.

### Market Data

All available sources indicate no meaningful fluctuation in market prices of food or livestock, even in Eritrea.

### Food Stocks

As of September 1, all stocks held in Eritrea and the North total 16,786 mt. They are held by the RRC (12,687 mt), JRP/CRS (2,800 mt), and the ECRS (1,299 mt), of which 10,027 were cereals.

The Food Security Reserve of the RRC holds 5,000 mt in Dire Dawa; 5,000 mt in Kombolcha, and 51,053 mt in Nazareth/Addis Ababa. Note, however, that this level repre-

sents a Food Security Reserve deficit of almost 143,000 mt. The reserve is considered to be fully stocked when 204,000 mt are on hand.

The UN World Food Program (WFP) reports 126,631 mt of stocks in port and 8,360 mt at anchor for all consignees (as of September 2, 1989). 1989 food aid arrivals totaled 153,140 mt of emergency aid and 291,216 mt of regular aid. Regular aid included Food-for-Work and UN High Commission for Refugees (UNHCR) food shipments. There are no commercial food shipments expected.

### Food Deficit Estimation

There is an immediate deficit in Eritrea. With the 20,000 mt of wheat expected in October for the JRP, 5,000 mt from the UK for the JRP, and two shipments of 7,000 and 5,000 mt due RRC from the WFP, there is only an additional 37,000 mt available in the North to meet requirements through the end of 1989 and until the first shipments arrive in 1990. A further 16,000 mt, at least, are needed before December to meet the escalating emergency needs of the needy population. The needy population is expected to grow from 850,000 in September to one million by year end. If needs turn out to be greater, as some predict, then correspondingly greater amounts are needed. The likelihood is that distribution targets will not be met with a corresponding change in nutritional status.

For the North, in the longer term, it should be noted that both Eritrea and Tigray show a deficit of approximately 200,000 mt each, even in a normal year. Import food requirements for the North could be double this figure for 1990.

There are no emergency deficits anticipated for the balance of 1989 in the rest of the country, as the 1988 crop was good and carryover relief stocks are sufficient to meet 1989 needs until the crops are harvested. The picture for 1990 is less clear, pending the final assessment of the *meher* crop. There could be an important requirement for 1990 that will not be met by regular Food Aid or commercial imports.

Refugee food stocks are adequate through the end of the year. WFP projects an annual 1989 distribution of about 1,000 mt to both Somali and Sudanese refugees. Based on a planning figure of 420,000 Sudanese refugees, Calendar Year (CY) 1990 needs will be about 97,000 mt, less year-end stocks on hand and a pipeline of 14,000 mt for a total new pledge requirement of about 83,000 mt. The planning figure of 350,000 Somali refugees dictates a need of 82,000 mt, less year-end stocks on hand and a pipeline of 7,000 mt, for a total new pledge requirement of 75,000 mt. The total CY1990 refugee new pledge requirement will be about 158,000 mt.

### Projected Food Aid Requirements from the United States Government

For Eritrea, 25,000 mt of wheat has already been recommended for JRP/CRS for the earliest possible CY1990 arrival. A more precise assessment of food availabilities and requirements will be possible in November/December. At that time,

it will be possible to forecast overall requirements throughout CY1990 in the North. It is likely that additional United States Government (USG) Emergency Food Aid will be required.

For the rest of the country, at this time, the Mission does not anticipate an emergency requirement to be met from the US in 1990. This could change, however.

As noted above, approximately 150,000 mt will be required in CY1990 to cover continuing basic food needs of the 770,000 refugees from Somalia and Sudan living in camps in Eritrea. The Mission is not yet prepared to make a recommendation to Washington as to the USG Food Aid contribution against this anticipated need. The Mission awaits the formal and detailed CY1990 WFP/UNHCR request for assistance, including back-up documentation, before formulating its recommendation to Washington. However, based on traditional USG support for refugee feeding needs and the certainty of the need for such assistance here in CY1990, the Mission notes that it would be prudent to set aside or earmark against the emergency reserve to cover an anticipated USG commitment.

The USG has already approved a 1990 regular Food Aid program of 34,000 mt. The Food Aid commodities are used to support seven NGOs in Food-for-Work and Maternal and Child Health activities. The program has the primary purpose of mitigating the effects of future droughts and ensuring that the cooperating sponsors are in place and able to cope with future food-related emergencies.

#### **Non-Food Needs**

All Emergency Food Aid programs need a transportation subsidy equivalent to approximately US\$100 per metric ton. It is too early to estimate other potential non-food needs required next year, but it is clear that the transport fleet that supports Relief Food Aid distribution is aging significantly and that there will be proposals to replace a portion of it.

## Key Terms

**At Risk** - FEWS Reports employ the term "at risk" to describe those populations or areas either currently or in the near future expected to be lacking sufficient food, or resources to acquire sufficient food, to avert a nutritional crisis (i.e., a progressive deterioration in their health or nutritional condition below the status quo), and who, as a result, require specific intervention to avoid a life-threatening situation.

Where possible, food needs estimates are included in the FEWS reports. It is important to understand, however, that no direct relation exists between numbers of persons at risk and the quantity of food assistance needed. This is because famines are the culmination of slow-onset disaster processes which can be complex in the extreme. The food needs of individual populations at risk depend upon when in the disaster process identification is made and the extent of its cumulative impact on the individuals concerned. Further, the amount of food assistance required, whether from internal or external sources, depends upon a host of considerations. Thus the food needs estimates presented periodically in FEWS reports *should not* be interpreted to mean food aid needs, e.g., as under PL480 or other donor programs.

**ITCZ** - The Intertropical Convergence Zone (ITCZ) is where the high pressure system originating in equatorial regions of the Atlantic (the St. Helena's High) collides with the Azores High descending from the north. The ITCZ tends to move northward during the spring and summer in response to normal global weather patterns. The position of the ITCZ normally defines the northern limits of possible precipitation in the Sahel; rainfall generally occurs 100 to 300 kilometers south of the ITCZ.

**NDVI** - Normalized Difference Vegetation Index (NDVI) images are created at the laboratory of the National Aeronautic and Space Administration (NASA) Global Inventory Modeling and Monitoring System (GIMMS). These images are derived from Global Area Coverage (GAC) imagery (of approximately 4 km resolution) received from the Advanced Very High Resolution Radiometer (AVHRR) sensors on board the National Oceanic and Atmospheric Administration (NOAA) Polar Orbiting series of satellites. The polar orbiter satellites remotely sense the entire Earth and its atmosphere once each day and once each night, collecting data in 5 spectral bands. Bands 1 and 2 sense reflected red and infra-red wavelengths respectively, and the remaining 3 bands sense emitted radiation in 3 different spectral bands. The NDVI images are created by calculating

$$(\text{infrared} - \text{red}) / (\text{infrared} + \text{red})$$

for each pixel from the daytime satellite passes. Since chlorophyll reflects more in the infrared band than in the red band, higher NDVI values indicate the presence of more chlorophyll and, by inference, more live vegetation. A composite of daily NDVI images is created for each 10-day period, using the highest NDVI value for each pixel during that period. This technique minimizes the effects of clouds and other forms of atmospheric interference that tend to reduce NDVI values. NDVI is often referred to as a measure of "greenness" or "vegetative vigor." The NDVI images are used to monitor the response of vegetation to weather conditions.