

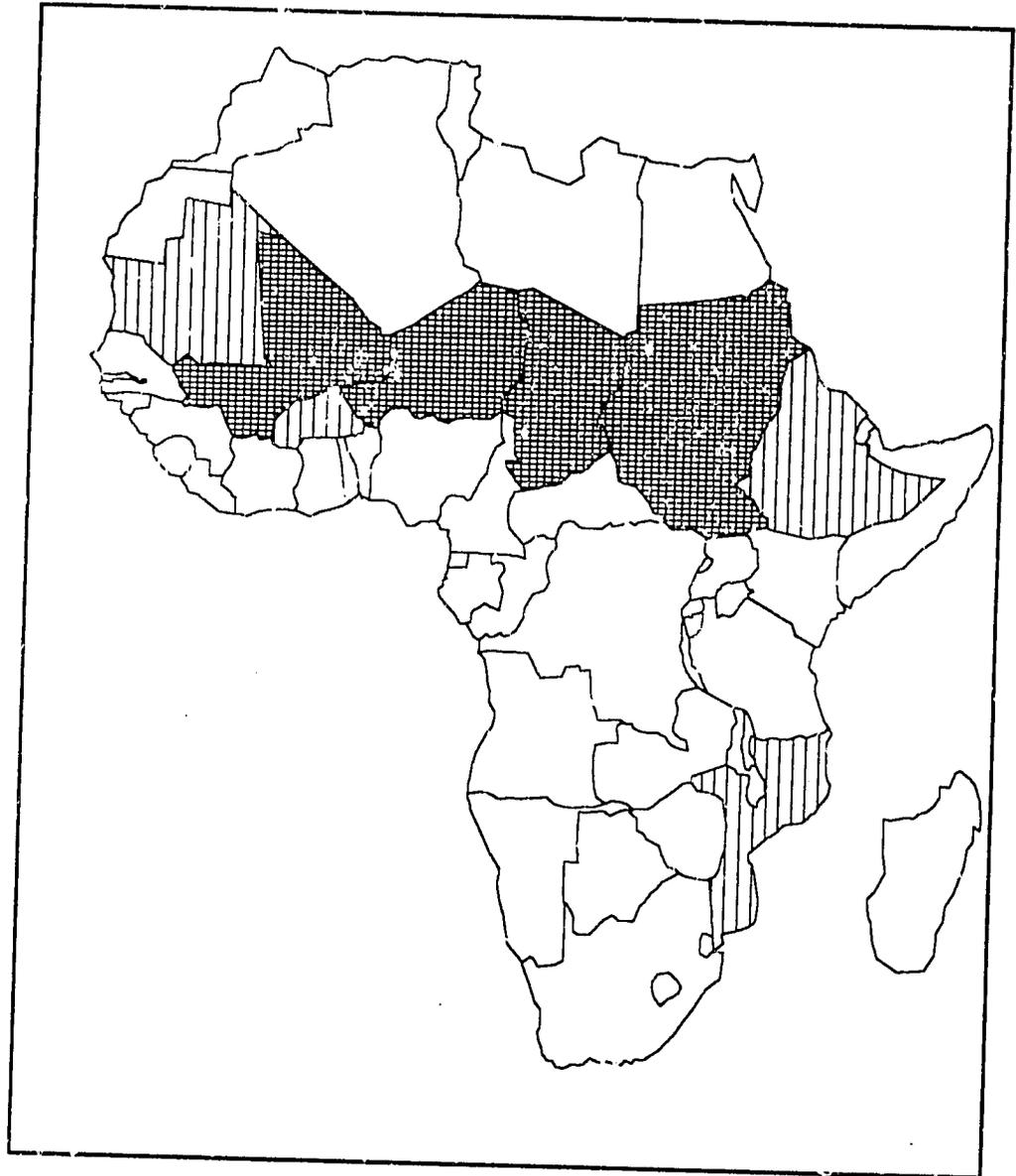
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# FEWS Country Reports

## CHAD, MALI, NIGER

### and SUDAN

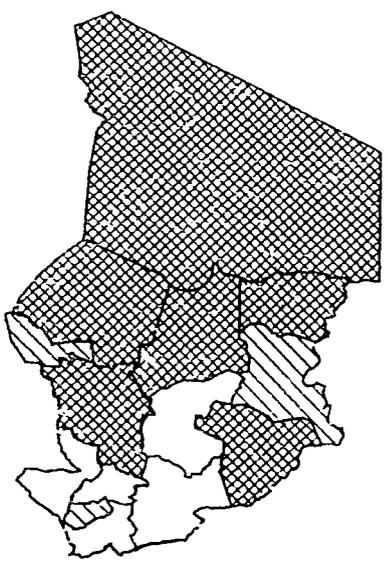


Africa Bureau  
U.S. Agency  
for International  
Development

*OTIC-0020-C-00 0017-000*

# Summary Maps

MAP 1: CHAD, MALI, NIGER and SUDAN



CHAD

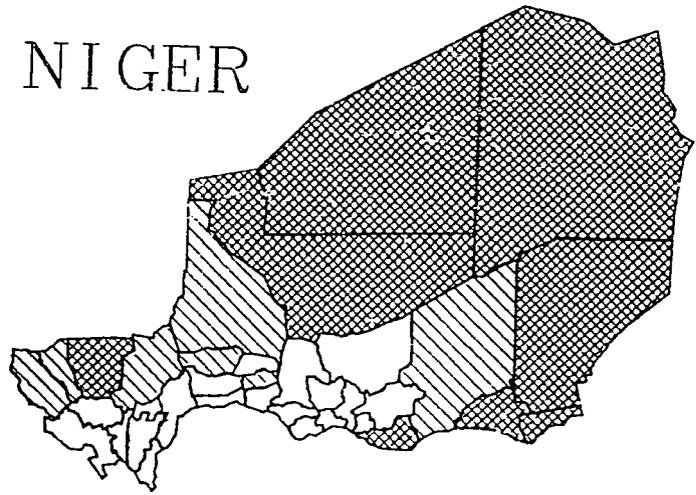


MALI

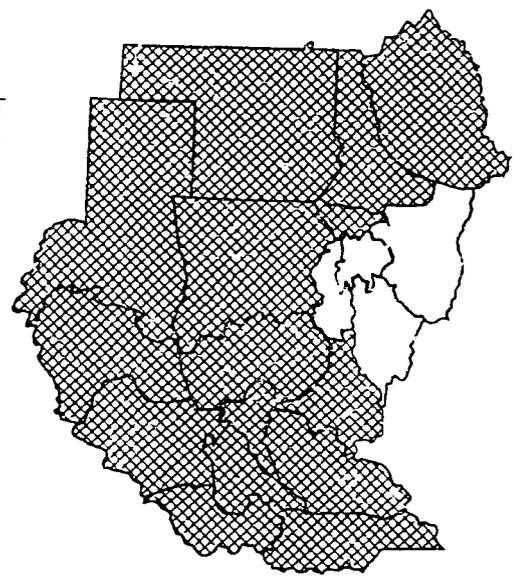
Percent of 1988 needs met by local cereal production in 1987/88

	0 to 50
	50 to 75
	70 to 170

NIGER



SUDAN



Little cereal production occurs in the northern areas of each of these countries

FEWS/PWA, December 1987

Famine Early Warning System Country Report

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CHAD, MALI, NIGER and SUDAN

1987 Production Plus Stocks  
Versus Needs

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Prepared for the  
Africa Bureau of the  
U.S. Agency for  
International Development

Prepared by  
Price, Williams & Associates, Inc.  
December 1987

Contents

Page

1	Summary
2	Chad
10	Mali
17	Niger
22	Sudan

## List of Figures

<u>Page</u>		
3	Table 1	Chad: Production Balance By Prefecture
5	Table 2	Chad: FEWS Preliminary Cereal Balance for 1988
6	Map 2	Chad: Cereals Available in 1988
7	Map 3	Chad: Areas At-Risk in 1987 and 1988 (East)
9	Map 4	Chad: Vulnerable Areas in 1987 and 1988 (West)
11	Table 3	Mali: Population and 1987/88 Cereal Requirements
12	Figure 1	Mali: National Cereal Production and Needs
12	Table 4	Mali: Net Cereal Production
13	Table 5	Mali: Cereal Surplus/Deficit
14	Figure 2	Mali: 1988 Regional Cereal Production and Needs
15	Table 6	Mali: Needs Met By Local Production
16	Table 7	Mali: 1987-88 Cereol Needs Assessments
18	Table 8	Niger: Cereal Balance Estimates
20	Map 5	Niger: Local Cereal Supply Picture
23	Table 9	Sudan: Preliminary 1988 Grain Balance
24	Table 10	Sudan: Area Planted By Crop
25	Table 11	Sudan: Estimates of Cereal Production
25	Table 12	Sudan: Estimates of Production and ABS Stocks
27	Map 6	Sudan: Net Per Capita Grain Availability
29	Table 13	Sudan: Production As Percentage of Requirements Compared to Nutrition Levels 1985-1987
Appendix		
30	Map A1	Chad: Administrative Units
31	Map A2	Mali: Administrative Units
32	Map A3	Niger: Reference Points

## SUMMARY

**Chad** cereal production will fall short of national food requirements for 1988. Whether localized deficits in the northern Sahelian zone can be made up from surplus stocks in the Sudanian zone should be known by the end of December, in time to request and receive further food aid imports before such aid is needed. Net cereal production in **Mali** will meet a smaller portion of the national cereal requirement this year than in either of the preceding two years. Once cereal stocks, imports and food aid are included, the Government of Mali estimates the national uncovered deficit will be 14,200 metric tons (MT), while USAID/Mali estimates it at 113,300 MT. A worst case scenario would result in a national deficit of 287,400 MT. **Niger's** 1987 harvest produced mediocre results -- better than 1984, but much worse than 1985 and 1986. A net cereal production shortfall of 200,000 to 400,000 MT will force Niger to rely heavily on cereal stocks to make up the difference. While the level and distribution of such stocks in country are uncertain, it is likely that only low levels of emergency food imports could be justified, and those would not be needed until late in the year. *Identified emergency needs in Sudan are amplified by what appear to be inadequate food resources for the country as a whole. If this fear is well founded, malnutrition rates and rural population displacement could increase to pre-harvest 1985 levels. All of Sudan's resources would be required to meet the grain requirements of just its northern provinces.*

### Key Events

- By late December or early January, the outcome of the Government of **Chad**/donor agency campaign to purchase surplus grain (to be used for food aid distribution in Sahelian deficit areas) should clarify whether further food aid imports will be required for 1988.
- The Government of the Republic of **Mali** (GRM) has requested donors to supply 10,000 MT of cereals (to maintain its National Security Stocks at 58,000 MT) and 30,000 MT of rice to cover the expected shortfall between now and the harvest/millir of this year's crops.

### Issue

- At least two different official estimates of Agricultural Bank of **Sudan** (ABS) stocks and reports of ABS stock spoilage, alongside denials by the ABS of any spoilage, suggest that stocks might be less accessible than official statistics would lead one to believe.

## CHAD

Chad's 1987/88 harvest will be insufficient, by itself, to meet consumption requirements for the 1988 food-aid year<sup>1</sup>. The shortfall is caused by poor yields in the Sahelian<sup>2</sup> zone and reduced area cultivated in the Sudanian zone. The assessment of whether current food aid stocks and commercial stocks plus currently expected food aid and commercial imports will cover the national production deficit depends mainly on which population and production estimates are used. In the Sudanian zone, stocks from the excellent harvests of 1985/86 and 1986/87 should be substantial, and will probably at least meet the remainder of local consumption needs for 1988. In the northern Sahelian zone, however, poor harvests were experienced in isolated localities even during the two generally good years, so that certain areas lack the reserves to weather this year's poor harvest. While this year's situation is worst in the eastern Sahel (Map 3, below), parts of the western Sahel also experienced extreme rainfall deficits, leading to poor crops and pasturage (Map 4, below). The Government of Chad (GOC) and the donor community hope to make up any 1988 shortfall in these areas with surplus stocks from the southern Sahelian zone and from the Sudanian zone, rather than by importing food aid beyond the amount already scheduled. The size of the southern surplus remains in question; observers disagree on yield and acreage estimates. This ambiguity should disappear as the GOC/donor buying campaign gets underway and the amount of grain available for purchase becomes clear. If, by the end of December, purchases from the south prove insufficient to fulfill all of the 1988 food aid needs in Chad's Sahelian zone, there will still be time to request and import food aid before in-country stocks are depleted (assuming the security situation in B.E.T. Prefecture remains quiet, precluding any need for emergency aid in that area).

### Agricultural Production

Poor rainfall and pest damage in Chad's northern Sahel have combined with decreased area planted in grains in the south to lower Chad's overall 1987/88 cereal harvest below the levels of 1985/86 and 1986/87 (although the harvest is still well above the food crisis levels seen in 1982/83 and 1984/85). The only preliminary estimate of Chad's 1987/88 cereal harvest that has been published is that of the GOC Ministry of Agriculture's (MINAG) Division of Agricultural Statistics (DSA) and National Office of Rural Development (ONDR), shown in Table 1. The yields estimated by the GOC/MINAG for the Sudanian zone seem low, considering how similar the 1987 rainy season in this area was to that of last year. FEWS calculated a "best case" estimate using the GOC/MINAG figures for area planted, but substituting 1986/87 yields for all crops in the Sudanian zone and for recessionary crops<sup>3</sup> in the Sahelian zone (Table 1).

<sup>1</sup>Chad's food-aid year runs from November 1 to October 31.

<sup>2</sup>By custom, Chad's 14 prefectures are divided into three climate zones: Borkou-Ennedi-Tibesti (B.E.T.) in the Saharan zone; Batha, Biltine, Chari-Baguirmi, Guera, Kanem, Lake, Ouaddai, and Salamat in the Sahelian zone; and Logone Occidental, Logone Oriental, Mayo-Kebbi, Moyen-Chari, and Tandjile in the Sudanian zone.

<sup>3</sup>Crops planted on flood plains as the annual floods recede.

Table 1: Chad, FEWS Preliminary Production Balance by Prefecture

	1988 Population		Net Production					Production Balance (6)					Further (7)						
	GOC Est (000s)	FEWS Est (000s)	Food Needs		GOC Est MT	Best	Worst	Food Aid Stock	Production Balance (6)					Aid & Buffer Proposed	Production Balance after Proposed Distribution				
			MT	FEWS Est MT		Case	Case		Scenario	Scenario	Scenario	Scenario	Scenario		Scenario	Scenario	Scenario	Scenario	
								1	2	3	4	5		1	2	3	4	5	
					MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	
B.E.T.	106	96	8,480	7,680	-	-	-	-	(8,480)	(8,480)	(7,680)	(7,680)	(7,680)	-	(8,480)	(8,480)	(7,680)	(7,680)	(7,680)
Batha	422	381	56,970	51,435	17,040	17,040	17,040	1,078	(38,852)	(38,852)	(33,317)	(33,317)	(33,317)	5,720	(33,132)	(33,132)	(27,597)	(27,597)	(27,597)
Billine	211	191	28,485	25,785	7,870	8,350	8,350	-	(20,615)	(20,135)	(17,915)	(17,435)	(17,435)	3,640	(16,975)	(16,495)	(14,275)	(13,795)	(13,795)
Chari Baguirmi	824	744	111,240	100,440	43,710	44,220	44,220	21,023	(46,507)	(45,997)	(35,707)	(35,197)	(35,197)	10,000	(38,507)	(35,997)	(25,707)	(25,197)	(25,197)
Gera	248	224	33,480	30,240	43,400	45,190	45,190	1,612	11,532	13,322	14,772	16,562	16,562	2,000	13,532	15,322	16,772	18,562	18,562
Kanem	239	216	32,265	29,160	5,840	5,840	5,840	2,734	(23,891)	(23,891)	(20,786)	(20,786)	(20,786)	4,000	(19,891)	(19,891)	(16,786)	(16,786)	(16,786)
Lake	161	145	21,735	19,575	12,500	12,500	12,500	-	(9,235)	(9,235)	(7,075)	(7,075)	(7,075)	-	(9,235)	(9,235)	(7,075)	(7,075)	(7,075)
Ouaddai	412	372	55,620	50,220	29,530	30,460	30,460	1,561	(24,529)	(23,599)	(19,129)	(18,199)	(18,199)	14,215	(10,314)	(9,384)	(4,914)	(3,984)	(3,984)
Salamat	120	108	16,200	14,580	6,700	6,700	6,700	1,049	(8,451)	(8,451)	(6,831)	(6,831)	(6,831)	-	(8,451)	(8,451)	(6,831)	(6,831)	(6,831)
Sahelian	2,637	2,381	355,995	321,435	166,380	170,100	170,100	29,057	(160,548)	(156,838)	(125,988)	(122,278)	(122,278)	39,575	(120,973)	(117,263)	(88,413)	(82,703)	(82,703)
Logone Oriental	369	328	55,350	49,200	62,630	60,940	62,320	1,526	8,806	7,116	14,956	13,266	14,646	-	8,806	7,116	14,956	13,266	14,646
Logone Occidental	357	317	53,550	47,550	23,050	29,740	55,920	-	(30,500)	(23,810)	(24,500)	(17,810)	8,370	-	(30,500)	(23,810)	(24,500)	(17,810)	8,370
Mayo Kebbi	632	740	124,800	111,000	89,300	104,980	48,280	88	(35,382)	(19,732)	(21,582)	(5,932)	(62,632)	-	(35,382)	(19,732)	(21,582)	(5,932)	(62,632)
Moyen Chari	631	561	94,650	84,150	82,880	80,680	20,650	1,363	(10,407)	(12,597)	93	(2,097)	(62,137)	-	(10,407)	(12,597)	93	(2,097)	(62,137)
Tandjile	363	323	54,450	48,450	62,020	81,970	57,260	-	7,570	27,520	13,570	33,520	8,810	-	7,570	27,520	13,570	33,520	8,810
Sudanian	2,552	2,269	362,300	340,350	319,910	358,320	244,430	2,977	(59,913)	(21,503)	(17,463)	20,947	(92,943)	-	(59,913)	(21,503)	(17,463)	20,947	(92,943)
Total	5,295	4,746	747,275	669,465	486,300	528,420	414,530	32,034	(228,941)	(136,821)	(151,131)	(109,011)	(222,901)	39,575	(189,366)	(147,246)	(111,556)	(69,436)	(163,326)

Source: GOC/MINAG/DSA & ONDR; US Bureau of Census (BUCEN); FEWS/Chad; USAID/Chad

(1) FEWS Population Estimate: 1986/87 USAID estimate increased by BUCEN growth rate of 2.8%

(2) Best Case Net Production Estimate: USAID/Chad 1986/87 yields for Sudanian zone and all recessional sorghum applied to GOC estimate of area planted.

(3) Worst Case Net Production Estimate: USAID/Chad 1986/87 yields for Sudanian zone and all recessional sorghum applied to GOC estimate of area planted in Sahelian zone and low estimate of area planted in much of the Sudanian zone.

(4) FEWS Food Need Estimate: per USAID/Chad 1986/87, food needs were estimated using an annual per capita consumption rate of 80 kg for the Saharan zone, 135 kg for the Sahelian zone, and 150 kg for the Sudanian zone.

(5) Stock distribution is correct as of September 30, 1987, but does not include all of the ONC (locally purchased) stock. While stock has been drawn down since September 30, FEWS does not know from which storage sites the stock was taken. FEWS will therefore use the September figures until further prefectural detail is obtained.

(6) Scenario 1: GOC Production Estimate minus GOC Food Needs Estimate; Scenario 2: Best Case Production Estimate minus GOC Food Needs Estimate; Scenario 3: GOC Production Estimate minus FEWS Food Needs Estimate; Scenario 4: Best Case Production Estimate minus FEWS Food Needs Estimate; Scenario 5: Worst Case Production Estimate minus FEWS Food Needs Estimate

(7) Level of aid and buffer stock proposed by the EEC-funded AEDES early warning team in Chad.

A second issue, raised prior to publication of the GOC production estimate, is the increase this year in the area planted in cash crops in the Sudanian zone (and concomitant decrease in area planted in grains), owing to depressed grain prices following the great production surplus experienced there in 1986/87. Some observers suggest that an even smaller area in the Sudanian zone was planted in grains than estimated by the GOC/MINAG. A smaller area planted was combined with the higher yield estimate to form an overall "worst case" production estimate, as shown in Table 1 (Logones Oriental and Occidental appear to do quite well under these last assumptions, however).

Chad has never had a census, and in the past seven years has experienced fairly large drought and security induced population shifts<sup>1</sup>. Estimates of cereal requirements are therefore subject to error. While the GOC estimates its 1988 population to be 5.295 million people, FEWS uses a population estimate of 4.746 million, projected from USAID/Chad's official 1987 estimate of 4.617 million people. The two population estimates are integrated with the three production estimates to form five production balance scenarios (net production minus food needs, Table 1). Table 2 combines all of the currently quantifiable factors under the five scenarios to arrive at national cereal balance estimates. Only Scenario 4 shows a positive balance. Both the GOC estimate (Scenario 1) and the "worst case production" estimate (Scenario 5) would require on-farm stocks of some 110,000 MT to balance Chad's domestic food needs. In the Sudanian zone, however, there should be sufficient on-farm and commercial stock to make up prefectural shortfalls at least under Scenarios one through four.

Map 2 shows the best case (Scenario 4), worst case (Scenario 5), and the GOC (Scenario 1) per capita production balance estimates, after accounting for currently placed food aid stock and proposed aid and buffer increases. The range breaks (40, 80, 135, and 150 kg per capita) reflect the customary annual consumption rates for Chad's three climate zones (80, 135, and 150 kg per capita for the Saharan, Sahelian, and Sudanian zones, respectively).

### **Vulnerable Populations**

Discussion of national, or even prefectural, cereal balances hides the very real, localized production deficits that will occur during 1988. The European Economic Community (EEC) funded European Agency for Health and Development (AEDES) Systeme d'Alerte Precoce (SAP) team in Chad has determined that about 143,000 people are at risk of food crisis in Chad's Sahel during 1988. AEDES/SAP/Chad has identified specific communities in the in the eastern Sahel where crops have failed, food reserves are low, and the prospects for income production are poor enough that food aid will be needed immediately or by the start of the 1988 lean season (Map 3). Note that the eastern areas at-risk have shifted between 1987 and 1988. The area that was most at-risk during 1987 received food aid (which replenished stocks) and this year has had a reasonable harvest. Areas that were only marginally at-risk last year lack the reserves to cope with the very poor harvests this year.

<sup>1</sup>In fact, USAID/Chad at one point last year gave the population estimate as 4.6 million plus or minus 2 million.

**Table 2: FEWS Preliminary Cereal Balance for 1988**

	Scenario 1 <sup>1</sup>	Scenario 2 <sup>1</sup>	Scenario 3 <sup>1</sup>	Scenario 4 <sup>1</sup>	Scenario 5 <sup>1</sup>
<b>1988 Population</b>	5,295,000 <sup>2</sup>			4,746,000 <sup>2</sup>	
<b>Net Production</b>	486,300 <sup>3</sup>	528,420 <sup>4</sup>	486,300 <sup>3</sup>	528,420 <sup>4</sup>	414,530 <sup>5</sup>
<b>Stock In-Country</b>					
<b>Food Aid<sup>6</sup></b>	22,900	22,900	22,900	22,900	22,900
<b>Locally Purchased Grains<sup>6</sup></b>	16,700	16,700	16,700	16,700	16,700
<b>Commercial Stock<sup>7</sup></b>	80,000	80,000	80,000	80,000	80,000
<b>Food Aid Pipeline<sup>8</sup></b>	12,000	12,000	12,000	12,000	12,000
<b>Commercial Imports<sup>9</sup></b>	75,000	75,000	75,000	75,000	75,000
<b>Commercial Exports<sup>9</sup></b>	(60,000)	(60,000)	(60,000)	(60,000)	(60,000)
<b>Total Supply<sup>10</sup></b>	632,900	675,000	632,900	675,000	561,100
<b>Consumption<sup>11</sup></b>	(747,300)	(747,300)	(669,500)	(669,500)	(669,500)
<b>Cereal Balance</b>	(114,400)	(72,300)	(36,600)	5,500	(108,400)

Source: GOC/MINAG/DSA & ONDR; US Bureau of Census (BUCEN); USAID/Chad; FEWS/Chad

<sup>1</sup>Scenario 1: GOC Production Estimate used with GOC Population and Consumption Estimates  
 Scenario 2: Best Case Production Estimate used with GOC Population and Consumption Estimates  
 Scenario 3: GOC Production Estimate used with FEWS Population and Consumption Estimates  
 Scenario 4: Best Case Production Estimate used with FEWS Population and Consumption Estimates  
 Scenario 5: Worst Case Production Estimate used with FEWS Population and Consumption Estimates

<sup>2</sup>The first estimate, 5,295,000, is from the GOC/MINAG/DSA & ONDR; the second estimate, 4,746,000, equals the 1986/87 USAID estimate increased by the BUCEN growth rate for Chad of 2.8%.

<sup>3</sup>GOC estimate is from MINAG/DSA & ONDR.

<sup>4</sup>Best case net production estimate is the USAID/Chad 1986/87 yields for Sudanian zone and Sahelian recessional crops applied to the GOC estimates of area planted.

<sup>5</sup>Worst case net production estimate is the USAID/Chad 1986/87 yields for Sudanian zone and Sahelian recessional crops applied to GOC estimates of area planted in the Sahelian zone and low estimates of area planted in the Sudanian zone.

<sup>6</sup>Figures for food aid stocks and locally purchased stocks are from Mission cable NDJAMENA 07419 of December 7, 1987.

<sup>7</sup>From GOC/MINAG/ONC.

<sup>8</sup>Food aid pipeline figure (as of September 30, 1987) is from Mission cable NDJAMENA 06550 of October 26, 1987.

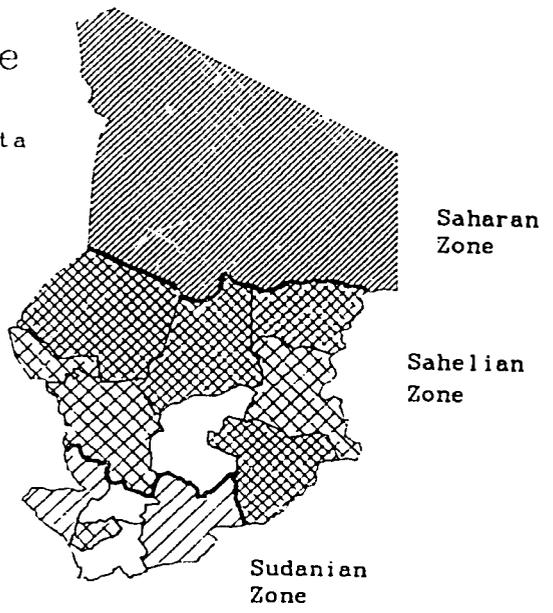
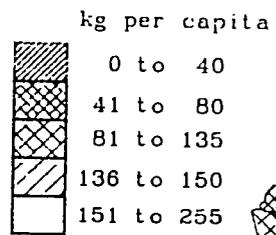
<sup>9</sup>USAID/Chad figures for 1987 used as rough estimate of 1988 values.

<sup>10</sup>On-farm stock data were unavailable for this analysis.

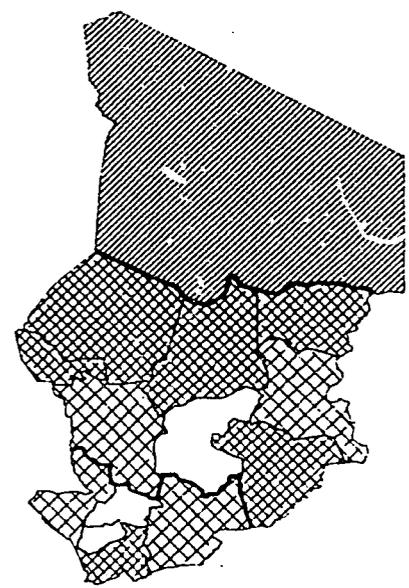
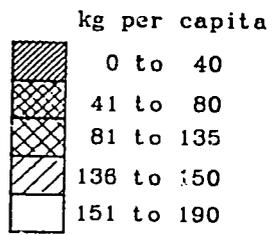
<sup>11</sup>Per USAID/Chad's estimate for 1987, 1988 consumption was estimated using an annual per capita consumption rate of 80 kg for the Saharan zone, 135 kg for the Sahelian zone, and 150 kg for the Sudanian zone. The GOC food needs estimate utilizes the GOC population figure; the FEWS food needs estimate utilizes the second population figure.

# Cereals Available in 1988\*

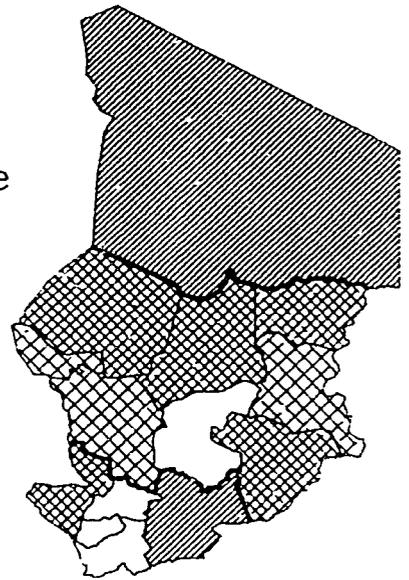
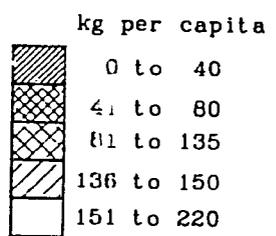
## Best Case



## GOC Case



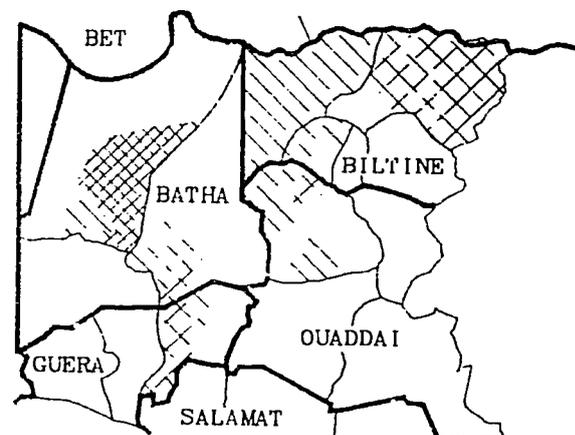
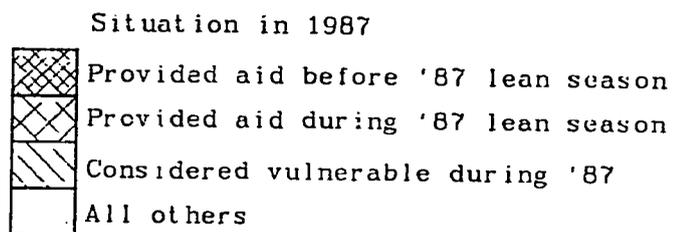
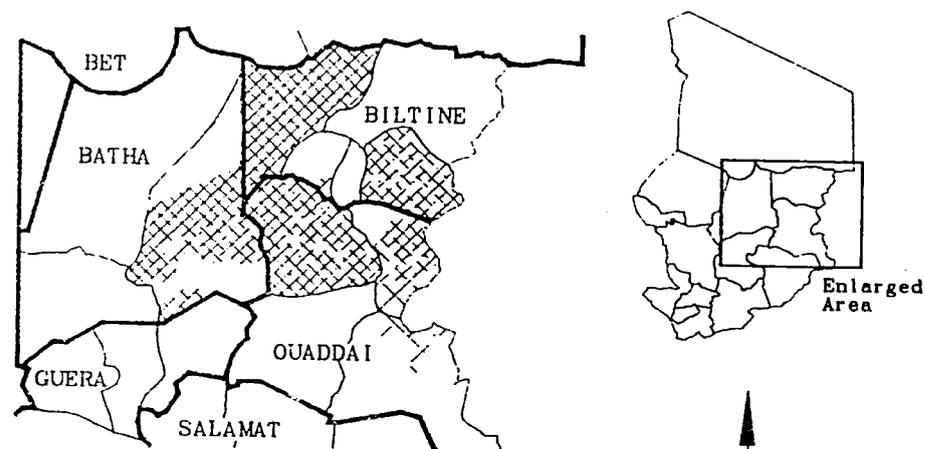
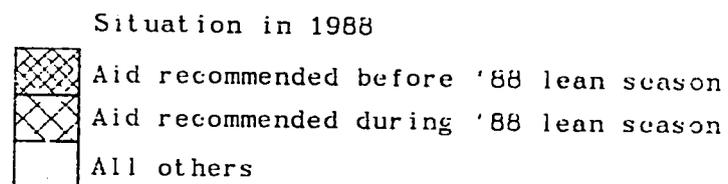
## Worst Case



\*From local production, food aid stocks, and currently proposed food aid and buffer stocks

Source: GOC/MINAG; US BUCEN; AEDES/SAP/Chad; USAID/Chad; FEWS/Chad FEWS/PWA, December 1987

# Eastern Chad: Areas At-Risk 1987 and 1988



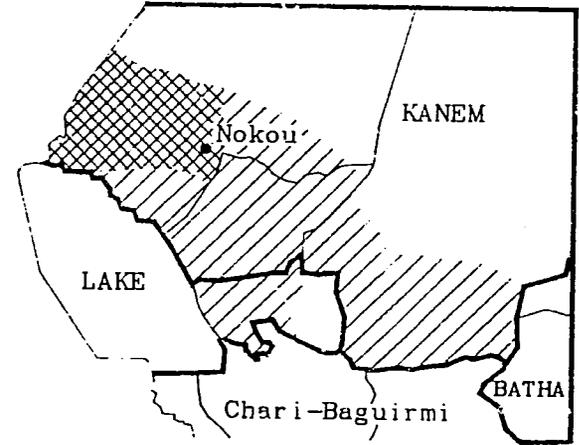
Source: AEDES/SAP/Chad  
FEWS/PWA, December 1987

Map 4 shows the situation in the western Sahel. While no crop failure related food aid was required for this area during 1987<sup>1</sup>, this year's extremely meager rains, combined with repeated pest damage to crops and the slow rebuilding of area herds, places much of the population in a far more vulnerable position. The people of the cantons considered most vulnerable during 1987 were able to cope with 1986 crop loss through animal husbandry, cottage industries and remittances (young men in the southern part of this zone have traditionally been able to find employment in N'Djamena or around Lake Chad after the harvest). The area that is vulnerable this year is farther from the jobs and markets of N'Djamena and other towns in Chari-Baguirmi Prefecture, and observers disagree as to how much people in the north (especially around Nokou) can depend on their herds, which are much reduced from pre-1984 levels. Food aid was distributed in Nokou Sub-prefecture (in the north of this zone) during October and there is a proposition (by AEDES/Chad) to place buffer stock in this area on the chance that it might become needed.

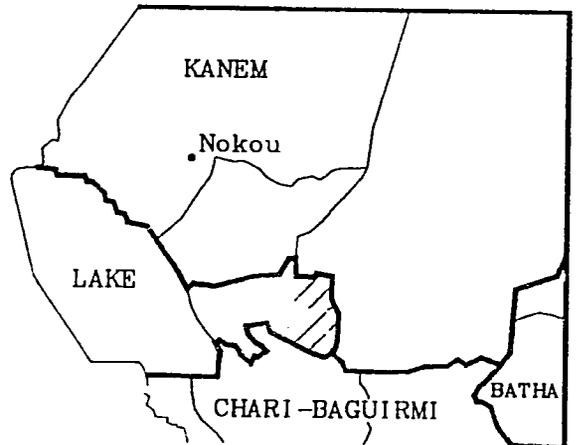
One final group that potentially could become at risk of food crisis during 1988 (if displaced by armed conflict) is the population of B.E.T. Prefecture. There has been little news from that area since the September 1987 battle over Aouzou. While it is possible that further conflict with Libya could occur during 1988 within the Prefecture, the probability of such an event is entirely unknown to FEWS. Should further conflict take place, however, only localized populations would be affected.

<sup>1</sup>During 1987, food aid was distributed in this area to families displaced by the fighting in Borkou-Ennedi-Tibesti Prefecture, just to the north.

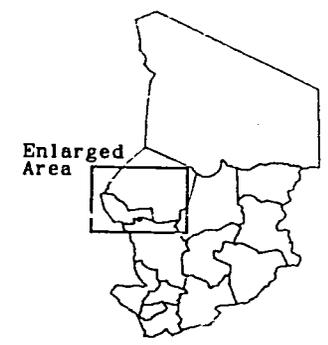
# Western Chad: Vulnerable Areas 1987 and 1988



- Situation in 1988
-  Provided aid during '87 harvest
  -  Areas vulnerable to food crisis during '88
  -  All others



- Situation in 1987
-  Provided aid before '87 lean season
  -  Provided aid during '87 lean season
  -  Considered vulnerable to food crisis in '87
  -  All others



Source: AEDES/SAP/Chad;  
 NASA, NDVI Imagery; CARE  
 FEWS/PWA, December 1987

## MALI

Mali's 1987 cereal production plus stocks, imports, and food aid will fall 14,200 MT short of meeting 1987/88 national cereal requirements, according to estimates made by the Government of the Republic of Mali (GRM) Department of Information and Statistics (DNSI) and Department of Agriculture (DNA). Using a higher per capita consumption rate, USAID/Mali estimates a cereal deficit of 113,300 MT. Both assessments rely upon crop appraisals, made at the end of September, which assumed that adequate rains would continue through October. In Kayes, Tombouctou, and Mopti Region, some field reports maintain that rainfall was not adequate during October and that the GRM DNSI/DNA estimates are high. If these reports are correct, the national cereal deficit could be as high as 242,400 MT (see Table 7). Despite a potentially high national deficit, and serious cereal shortages expected in Mopti, Tombouctou, and Gao Regions, there does not appear to be any unanticipated causes for concern. National Security Stocks, totaling 58,000 MT, should cover any immediate cereal deficits, and the GRM has already planned to distribute 10,000 MT of cereals from these stocks to Mopti, Tombouctou, and Gao Regions.

### Population Estimates and Cereal Requirements

Preliminary results from the 1986 census suggest a 1988 national population of 7,816,000 people. This is approximately 1 million less than estimates projected from the 1976 census.<sup>1</sup> According to the DNSI, the new figures do not represent a real change in population, but reflect improved methodology used in the more recent census. Because estimated population has decreased, USAID/Mali has increased its estimate of per capita cereal consumption from 167 kg/year to 188 kg/year.<sup>2</sup> At this higher rate, the 1988 national cereal requirement is 1.47 million MT. The GRM, which still adheres to the lower per capita cereal requirement (see Table 3), estimates the 1988 national cereal requirement at 1.31 million MT.

### Agricultural Production

1987 net national production is estimated at 1.19 million MT according to both the GRM, Committee for Aid and Rehabilitation (CNAUR) and by USAID/Mali. This is less than 1985 and 1986 production levels (both excellent years), but 287,000 MT above the 1984 drought year (see Figure 1 and Table 4). Because the

<sup>1</sup>Because regional breakdowns are not yet available, Alan Hill's estimated regional growth rates (in "Revised Population Figures for Selected Cercles in Mali"), derived from the 1976 census and the 1985 survey, were reduced by 62% so that the aggregated regional 1988 population projections equal the 1988 national population estimated from the 1986 census.

<sup>2</sup>USAID/Mali calculates cereal consumption in Mali by averaging, over a five year period, yearly net national production minus net change in stocks plus net food imports and total food aid. It is assumed that average national consumption is Mali's cereal requirements. A decline in the population estimate would result in a rise in average per capita consumption, and, therefore, an increase in per capita cereal requirements.

**Table 3: Population (000s) and 1987/88 Cereal Requirements (000s MT)**

Region	Population	Cereal Requirements	
		@188 kg/person/year	@167 kg/person/year
Kayes	917	172	153
Koulikoro	1,074	202	179
Sikasso	1,556	292	260
Segou	1,483	279	248
Mopti	1,319	248	220
Tombouctou	505	95	84
Gao	320	60	53
Bamako (city)	642	121	107
<b>Total</b>	<b>7,816</b>	<b>1,469</b>	<b>1,305</b>

Source: National Population -- GRM DNSI 1986 census; Regional population -- FEWS estimates (see footnote 1 on page 10).

assessments were made in September on the assumption of adequate rains through October, estimates are probably high in areas where rains failed late in the season. Some field reports suggest that the GRM net cereal production estimate could be as low as 1.06 million MT.

According to people visiting and working in Mopti Region, the GRM gross cereal production estimate of 155,000 MT (net cereal production is 128,000) is high. One agricultural expert believes that gross cereal production in Mopti Region falls between 90,000 and 100,000 MT. If this is the case, net cereal production would probably fall between 74,000 MT and 83,000 MT, which would be the worst year in the historic (1975-86) record.

Although the GRM DNSI/DNA net cereal production estimate for Kayes Region (142,000 MT) is a record high, some field reports suggest that net production may be as low as 68,000 MT, which is close to the record low<sup>1</sup>. According to a Systeme d'Alerte Precoce (SAP) report, crop conditions in Kayes at the end of October were generally average in the north except for western Diema and central Kayes Cercles where conditions were poor. Seasonal trends of vegetation conditions, derived from satellite imagery, suggest that the agricultural season in Kayes began late and ended abruptly, but that the condition of vegetation within this period was normal. This implies that crops planted with the beginning of the rains probably developed normally, while crops planted later or earlier were probably stressed. Cereal production in Kayes, therefore, is probably midway between the high and low estimates.

Some field reports suggest that gross cereal production in Tombouctou may be 28,000 MT, rather than the 36,000 MT estimated by the GRM. Net cereal production

<sup>1</sup>This estimate of 68,000 MT is only 4,000 MT above net cereal production in 1984.

in this case would be approximately 19,000 MT, as opposed to 24,000 MT derived from the higher gross estimate.

Figure 1:

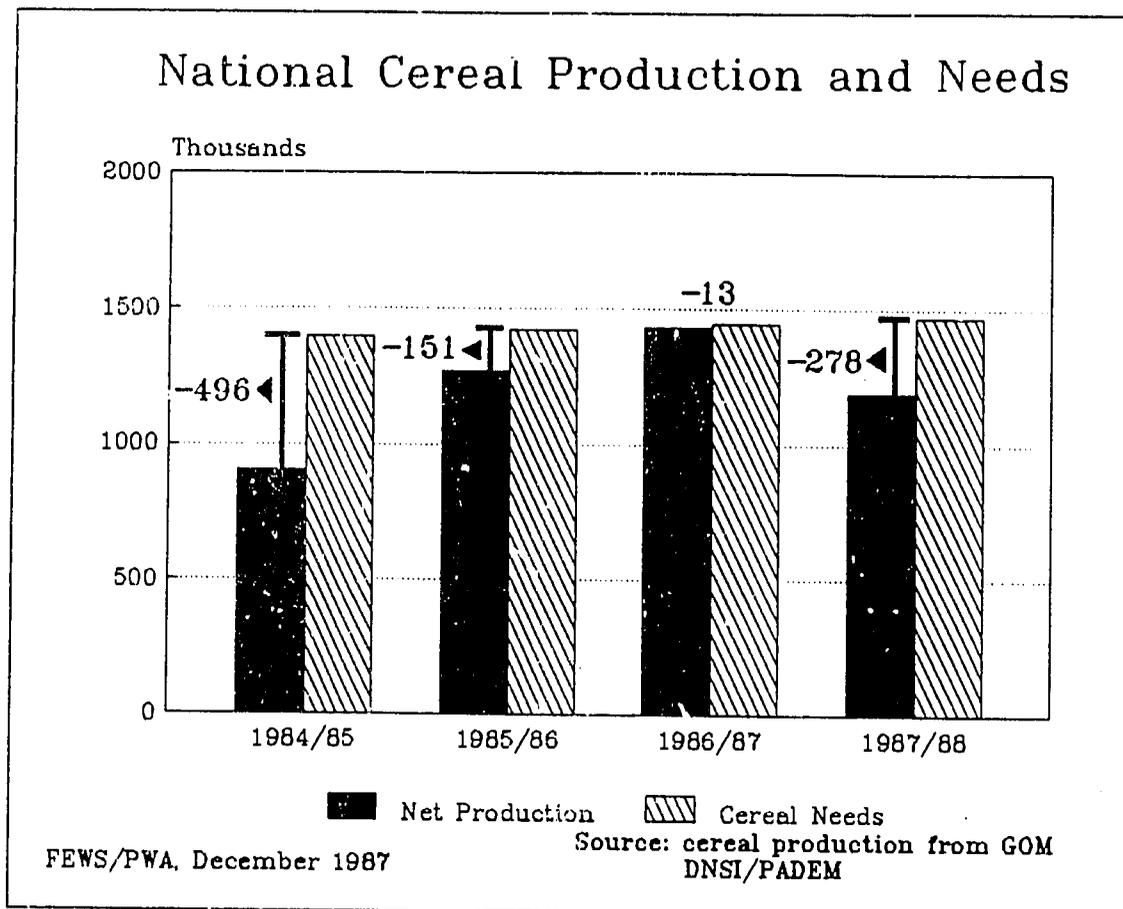


Table 4: Net Cereal Production. (000s MT)<sup>1</sup>

Region	1984	1985	1986	1987
Kayes	64	94	101	142
Koulikoro	203	263	301	284
Sikasso	321	361	456	339
Segou	227	364	353	269
Mopti	83	157	184	128
Tombouctou	2	24	25	24
Gao	1	7	11	5
<b>Total</b>	<b>902</b>	<b>1,270</b>	<b>1,432</b>	<b>1,191</b>

Source: Gross cereal production -- GRM DNSI/DNA; Loss rates -- USAID/Mali

<sup>1</sup>Net cereal production estimates assume the following loss rates due to seed, feed, waste, loss and milling: millet/sorghum/wheat = 15%; maize = 20%; rice = 48 %; and fonio = 10%.

## Cereal Surplus/Deficit

Table 5 shows that at USAID/Mali's per capita consumption estimate of 188 kg/year, the GRM DNSI/DNA cereal production estimate would result in a national grain deficit of 278,000 MT. At the lower per capita consumption rate (167 kg/year), national grain production would fall approximately 116,000 MT short of cereal requirements. Depending upon which consumption estimate is used, the 1987 harvest meets either 81% (at 188 kg/year) or 91% (at 167 kg/year) of national cereal requirements. A worst case scenario, using the higher consumption rate and the lower production estimates from field reports, would result in a national deficit of 409,000 MT. In this case, national cereal production would meet only 72% of national cereal requirements.

**Table 5: Cereal Surplus/Deficit (000s MT)<sup>1</sup>**

Region	1984/85	1985/86	1986/87	1987/88
Kayes	(107)	(77)	(71)	(31)
Koulikoro	7	65	101	82
Sikasso	54	86	172	47
Segou	(30)	100	81	(10)
Mopti	(156)	(86)	(61)	(120)
Tombouctou	(93)	(71)	(70)	(71)
Gao	(62)	(55)	(50)	(55)
Bamako (city)	(109)	(112)	(117)	(121)
Total	(496)	(151)	(13)	(278)

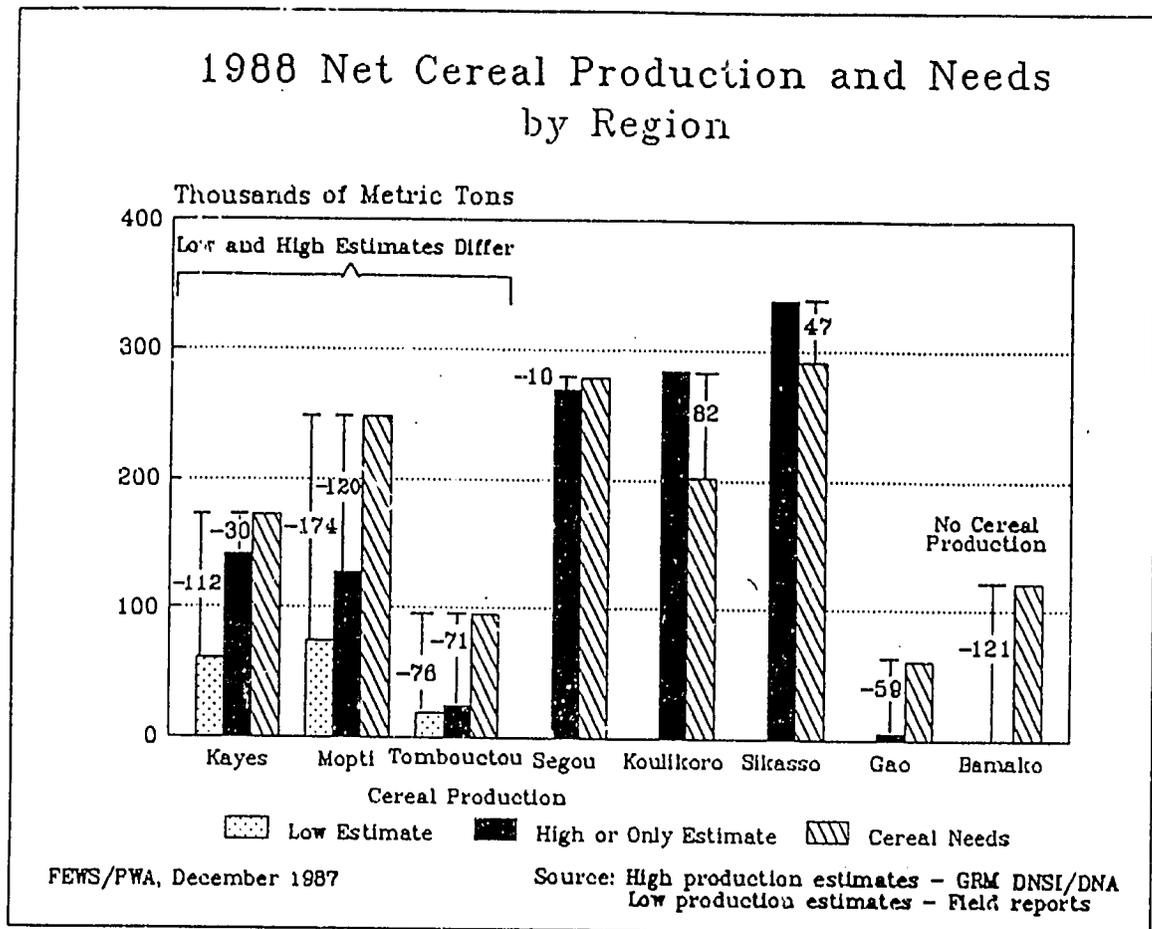
Source: Cereal production -- GRM DNSI/DNA; National population -- GRM DNSI 1986 census; Regional population -- FEWS/PWA estimate; Cereal requirements -- USAID/Mali.

The largest cereal shortfall (outside of Bamako, the capital city<sup>2</sup>) is in Mopti Region, where the cereal requirements (at 188 kg/person/year) exceed production by at least 120,000 MT. (This deficit could be as high as 174,000 MT if cereal production is as low as some field reports suggest.) The next largest cereal deficits are likely to be in Tombouctou and Kayes Region. In Kayes Region, the cereal deficit could fall between 31,000 MT and 104,000 MT (see Figure 2). Both satellite imagery and the October SAP report suggest that, with revised estimates, the shortfall in Kayes could be close to levels experienced during the previous two years. In Tombouctou Region, the net production estimates (24,000 MT and 19,000 MT) suggest that the cereal deficit could fall between 71,000 MT and 76,000 MT.

<sup>1</sup>( ) denotes deficit. Surpluses/Deficits are based on a per capita consumption rate of 188 kg/year. Due to rounding, regional figures may not equal the total exactly.

<sup>2</sup>Although the cereal deficit in Bamako is large, it is not as serious a concern as deficits in other areas, because most of the population is not reliant upon agriculture as a primary source of income, and cereal trade into Bamako is lively.

Figure 2:



Although cereal production in Segou and Koulikoro Regions was relatively good (cereal production met 96% and 141% of requirements, respectively), some localized cereal deficits are expected. According to the SAP October report, cereal production was poor in northern Niono Cercle (Segou Region) and in northern Banamba and Kolokani Cercles (Koulikoro Region).

Regions that will experience the most serious relative shortfalls in 1987/88 are Gao, Tombouctou and Mopti, where cereal production, as estimated by the GRM, meets only 9%, 26%, and 51% of cereal requirements, respectively (see Table 6). Although the percentage of cereal needs met by local production is very low in these regions, pastoralism provides an important alternative source of food and income.

In comparison to the drought year 1984, cereal production in Gao and Tombouctou Mopti should meet a higher percentage of cereal requirements in 1987/88. In Mopti Region, however, revisions of gross cereal production toward the lower estimate of 90,000 MT could mean that only 30% of cereal requirements will be met, which would place most of this region in straits similar to 1984. An exceptionally poor harvest in Mopti Region is likely to affect Tombouctou and Gao Regions adversely, because most cereals consumed in Tombouctou and Gao traditionally come from Mopti. The GRM, in anticipation of severe cereal shortages in these regions, plans to distribute 10,000 MT of grain from the National Security Stock.

**Table 6: Percent of Cereal Needs Met by Local Production  
(@ 188 kg/person/year)**

Region	1984/85	1985/86	1986/87	1987/88
Kayes	38	55	59	82
Koulikoro	104	133	151	141
Sikasso	120	131	161	116
Segou	88	138	130	96
Mopti	35	65	75	51
Tombouctou	2	25	27	26
Gao	2	11	17	9
Total	65	89	99	81

Source: Cereal production -- GRM DNSI/DNA; National population -- GRM DNSI 1986 census; Regional population -- FEWS/PWA estimate; Cereal requirements -- USAID/Mali (188 kg/person/year).

### Imports and Cereal Deficit Scenarios

The GRM/CNAUR estimates that Mali will import 38,500 MT of cereals, while USAID/Mali estimates that imports will be 83,500 MT. The major difference in assumptions is that USAID/Mali has projected that commercial imports will rise to 75,000 MT if the moratorium on commercial imports is lifted. USAID/Mali expects that this will occur several months into 1988. The GRM estimate of commercial imports (20,000 MT), is based on import levels with the ban in place.

A likely scenario using USAID/Mali's national cereal consumption estimate of 1,469,400 MT and total imports estimate of 83,500 MT, would result in a total deficit of approximately 165,700 MT (assuming that net cereal production estimates will be revised downward to approximately 1,137,000 MT<sup>1</sup>). If the same USAID/Mali imports and net cereal production estimates are subtracted from the GRM national cereal consumption estimate of 1,305,300 MT, the total cereal deficit would be only 1,600 MT. Even if the total deficit were as high as 165,700 MT, Mali's 1987/88 grain production and current cereal stocks could probably cover any immediate requirements at least through the first quarter of 1988.

An unlikely, but worst case scenario, in which national cereal production estimates are reduced to 1,060,300 MT, imports total only 38,500 MT, and cereal consumption is 1,469,400 MT, would result in a total 1987/88 national deficit of approximately 287,400 MT. If this occurred, 1987/88 grain production and current stocks could still probably cover any immediate requirements.

<sup>1</sup>This estimate assumes that gross cereal production in Mopti, Kayes and Tombouctou Region was 90,000 MT, 125,000 MT, and 24,000 MT, respectively. This is the lowest production estimate in Mopti, between the high and the low estimates in Kayes, and the highest estimate in Tombouctou.

Table 7: 1987/88 Mali Cereal Needs Assessments

	GRM/CNAUR	USAID	Worst Case without import ban	Worst Case with import ban	Conservative Estimate	
<b>CEREAL REQUIREMENTS</b>						
(1) Human consumption	1,305,300	1,489,400	1,489,400	1,469,400	1,489,400	(1) The GRM/CNAUR figure is based on per capita cereal requirements of 187 kg/year. The USAID/Mali figure is based on per capita cereal requirements of 188 kg/year.
Reconstitution of Stocks						
OPAM Stocks	20,000	0	0	0	0	(2) The worst case estimate of 1,321,600 MT assumes that gross cereal production in Mopti, Kayes, and Tombouctou will be the lowest field estimates -- 90,000 MT, 81,000 MT and 28,000 MT, respectively. The Conservative estimate of 1,417,100 assumes that gross cereal production in Mopti, Kayes and Tombouctou was 90,000 MT, 125,000 MT and 24,000 MT, respectively. This is the lowest production estimate in Mopti, between the high and the low estimates in Kayes, and the high estimate in Tombouctou.
National Security Stocks	58,000	58,000	58,000	58,000	58,000	
Farmers	337,800	0	0	0	176,000	
Total Stocks	415,800	58,000	58,000	58,000	58,000	
Total Food Requirements	1,721,100	1,527,400	1,527,400	1,527,400	1,703,400	
<b>DOMESTIC RESOURCES</b>						
(2) Total Gross Production	1,482,500	1,482,500	1,321,600	1,321,600	1,417,100	(3) This GRM estimate of 337,800 is based on the amount of food that should have been consumed in 1988/87 at a rate of 187 kg/person/year minus total amount of food available in 1987/88. USAID/Mali acknowledges that some on-farm stocks exist, but because the exact figure is unknown, has decided not to include them in their food balance sheet for Mali. The Conservative estimate of 176,000 is based on the amount of food that should have been consumed in 1988/87 at a rate of 188 kg/person/year minus the total amount of food available in 1987/88. All on-farm stock estimates balance each other out because each estimate of on-farm stock availability has an identical corresponding estimate for the need to reconstitute stocks (This assumes that on-farm stocks are a form of security stocks). Thus, in each case, on-farm stock availability minus need to reconstitute on-farm stocks equals zero.
Seed, waste, milling losses	293,100	293,100	281,300	281,300	280,200	
Total Net Production	1,189,400	1,189,400	1,080,300	1,080,300	1,138,900	
Stocks						
OPAM Stocks	84,700	84,700	84,700	84,700	84,700	
National Security Stocks	50,000	50,000	50,000	50,000	50,000	
Rural Development Operations	15,800	15,800	15,800	15,800	15,800	
Commercial Stocks	9,200	9,300	9,300	9,300	9,300	
(3) On-farm Stocks	337,800	0	0	0	176,000	
Donor Stocks	1,400	1,400	1,400	1,400	1,400	
Total Stocks	479,000	141,200	141,200	141,200	317,200	
Exports	0	0	0	0	0	(4) Before imports, the GRM/CNAUR estimates that there will be an 83,000 MT deficit of rice, and a 30,000 MT surplus of coarse grains. Of the 198,700 MT deficit estimated by USAID, 123,000 MT of this is expected to be rice, with the remainder being cereals.
Total Resources	1,668,400	1,330,600	1,201,500	1,201,500	1,454,100	
(4) Total Gross Deficit	52,700	198,800	325,900	325,900	249,300	(5) This USAID/Mali and Conservative estimates assume that there will be a lifting of the moratorium on commercial imports several months into 1988. If the GRM projected imports according to USAID/Mali's assumptions, they would estimate a total surplus of 30,800 MT.
<b>IMPORTS</b>						
Government Imports	0	0	0	0	0	
(5) Commercial Imports	20,000	75,000	75,000	20,000	75,000	
Food Aid Imports	18,500	8,500	8,500	18,500	8,500	
Total Imports	38,500	83,500	83,500	38,500	83,500	(6) According to the World Food Program (WFP) Representative in Mali, the total uncovered deficit will more likely approach the GRM/CNAUR figure of 14,200 MT mainly because WFP adheres to a per capita consumption rate of 167 kg/year, which they consider a regional norm.
(6) Uncovered Deficit	14,200	113,300	242,400	287,400	165,800	

## NIGER

The 1987 harvest produced mediocre results: better than 1984, but much worse than 1985 and 1986. Estimates of 1987 net cereal production show a gap of from 200,000 MT to 400,000 MT between what was produced and what will be needed in 1988. This shortfall will force Niger to rely heavily on cereal stocks to make up the difference. The levels of such stocks, particularly those held on-farm, are not known. While the Government of Niger (GON) feels that they are negligible and certainly not available to those who most need them, others believe that such stocks are considerable, and that their presence explains the continuing very low grain prices in Niger. It is certain that sizeable local deficits will be found in several parts of the country; many of these same areas have suffered from deficit production for the last three years. The infrastructure for emergency distributions is thus present in most, and the provision of emergency food, if it is available, should not be a major problem. Areas with the most severe deficits will have immediate access to food from GON stocks. Domestic purchase of surplus cereal stocks could be an option to consider first for redistribution to deficit areas, but it is possible that modest amounts of imported relief food will be required later in 1988 to smooth the inevitable problems involved in purchasing and distributing domestically-produced surplus grains.

### Cereal Balance Estimates

The general consensus of donors and the Government of Niger concerning the national cereal balance seems to be that: (1) 1987 cereal production was much worse than in 1985 and 1986, but much better than in 1984, (2) net cereal production will fall short of meeting 1988 cereal needs for the country, and (3) possibly severe local cereal deficits may necessitate the immediate provision of emergency food assistance. There is less of a consensus regarding the role that locally-held cereal stocks will be able to play in reducing the production deficit, and regarding the appropriate per capita yearly cereal requirement figure to use in determining the national cereal requirement. Table 7 displays three estimated cereal balances as seen by the Government of Niger, USAID, and by the World Food Program (WFP).

The major differences between the estimates reflect uncertainty as to the size and cereal needs of the population<sup>1</sup>, and the amount of grain held in-country. The GON's insistence that on-farm stocks should not be counted in this calculation stems from a belief that such stocks are not significant, particularly in the deficit areas, and will not be available to help meet the deficits of others. Nevertheless, the practical impact of sizeable on-farm stocks (as estimated by others) would be a reduction in the demand for purchased grain, a scenario which seems to be reflected in the continuing low grain prices found on the market.

<sup>1</sup> USAID/Niger indicates there is a strong possibility that the population size is greater than the 6,703,000 used in their cereal balance calculations.

Table 8: Niger Cereal Balance Estimates (December 10, 1987)

	GON	USAID	WFP
Population	6,951	6,703	6,951
Per Capita Requirements	200/250	190/220	210
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Food Requirements	1,648	1,403	1,459
=====			
Net Cereal Production	1,223	1,193	1,223
Total Cereal Stocks	51	200	101*
Off-Season Production	50	83	50
Domestic Cereal Supply	1,324	1,476	1,374
Imports	130	130	130
-----			
Deficit	194	NA	NA
Surplus	NA	203	45
-----			
Food Aid	0	15	0
Uncovered Deficit To Reconstitute Security Stock	80	80	80
-----			
Deficit w/Stock Adjustment	274	NA	35
Surplus w/Stock Adjustment	NA	138	NA
=====			
=====			

\* WFP estimates informally that on-farm stocks are at least 50,000 MT, and therefore that much higher than the GON estimate.

If the production estimates, as they are currently shown, are correct, and there appears to be consensus that they are<sup>1</sup>, the national cereal balance is probably most accurately reflected by the USAID and WFP calculations presented above. The only factors that might change the relatively unworrisome situation shown by these figures would be a complete failure of off-season food production, or a change in judgement about the ability of the GON and donors to handle the somewhat severe local deficits found in various parts of the country.

### Local Cereal Supply Issues

In general, the areas facing the most severe cereal deficit in 1988 have been in similar straits for at least the last three years: Diffa and northern Niamey Departments, much of Tahoua Department, and most of the pastoral parts of Agadez Department (Map 5 shows various aspects of local cereal production in Niger and its relation to local cereal requirements). The story of these areas is thus a "good news/bad news" type of situation, in that: (a) distribution of emergency food assistance is not new to these areas, and the infrastructure and experience required for such work is available, and (b) those least able to absorb the impact of a poor harvest are the ones affected.

Nevertheless, a significant difference from this habitual picture emerges in Zinder Department. The USAID figures cited above indicate that the difference between the national cereal requirement and net cereal production is approximately 210,000 MT; fully half of this difference, 108,000 MT, represents the shortfall from average found<sup>2</sup> in the two arrondissements of Magaria and Mirria in Zinder Department. In the case of Magaria, this change in fortunes has turned a usually self-sufficient arrondissement into one facing a cereal deficit of over 50,000 MT<sup>3</sup>. The provision of emergency food assistance, if needed for either of these areas, should not be a major problem, as access to them from the city of Zinder is not particularly difficult, and many farmers in these areas may still have substantial stocks remaining from the previous two good crop years.

Another curious feature of this season involves Tanout Arrondissement (just north of Mirria and Magaria), which has apparently produced a record net harvest that will yield the largest surplus of any arrondissement (36,000 MT). To some degree, this unusual geographic pattern may simply represent the vagaries of Sahelian rainfall, but it may also reflect a unique and likely short-lived event for Tanout's growing population of farmers, who have been forced into the area by population pressure in the southern, and usually better, farming lands.

The general outlook for the provision of emergency food assistance in Niger is generally a good one. The Nigerien infrastructure for providing such assistance

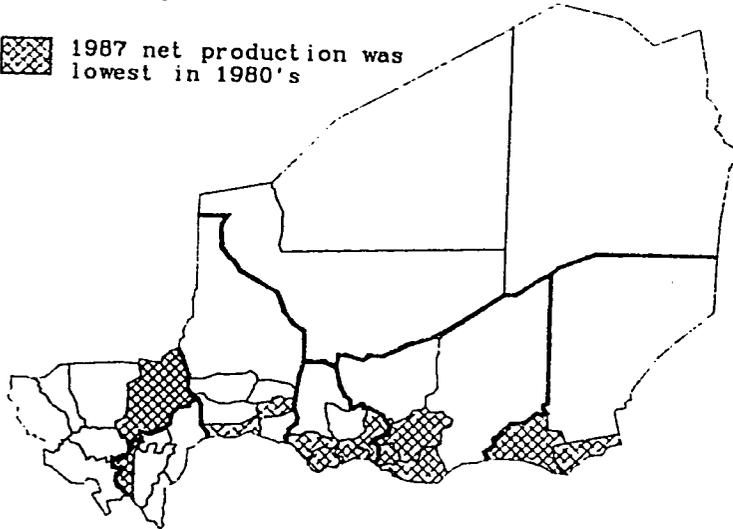
<sup>1</sup> Nevertheless, an FAO crop assessment survey may occur early in 1988.

<sup>2</sup> Average production was calculated from GON Ministry of Agriculture estimates of production and cereal requirements, using a 190/220 kilogram level for urban dwellers and pastoralists/agropastoralists, respectively.

<sup>3</sup> Consumption requirement was calculated using a per capita yearly cereal requirement of 220 kg for agro-pastoralists, and 190 kg for pastoralists and urban residents.

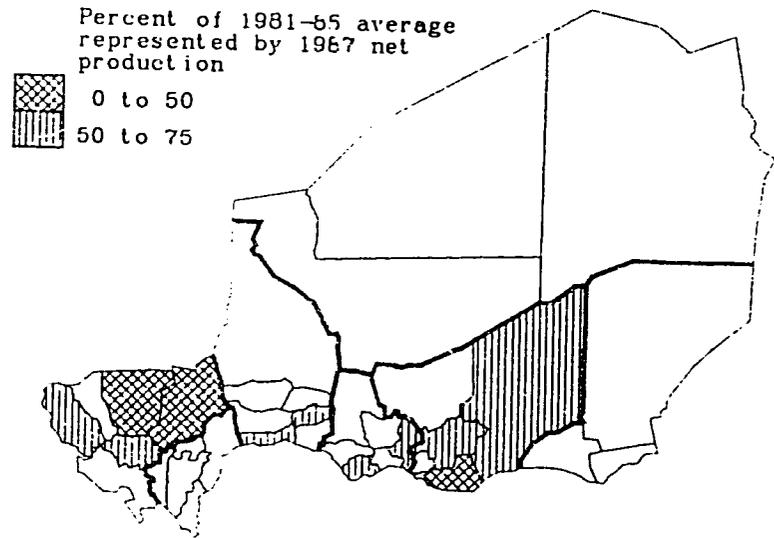
# Local Cereal Production and Supply

1987 net production was lowest in 1980's

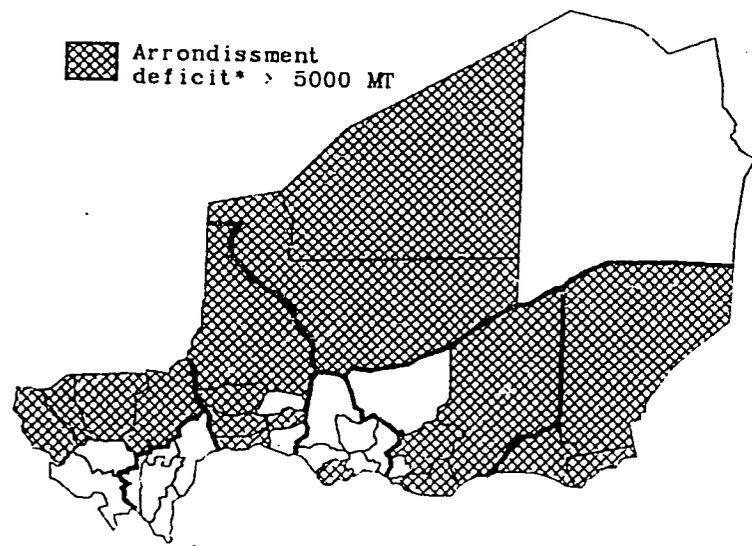


Percent of 1981-85 average represented by 1987 net production

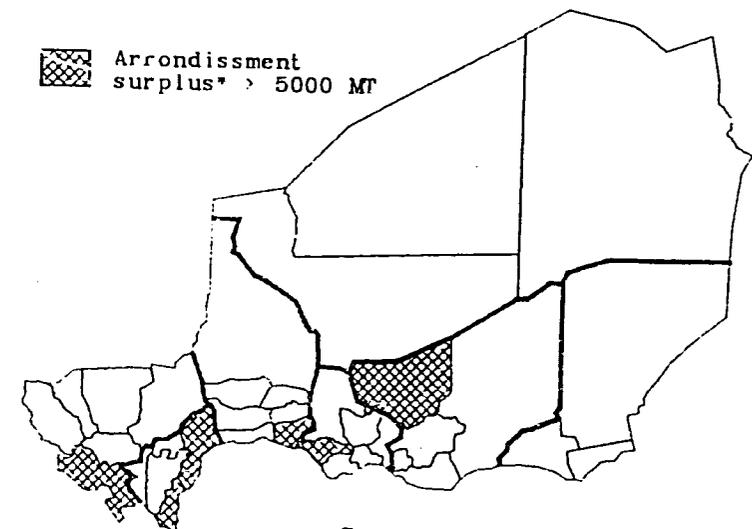
0 to 50  
50 to 75



Arrondissement deficit\* > 5000 MT



Arrondissement surplus\* > 5000 MT



\*Net production minus cereal requirements at 190/200 kg/person/year

Source: GON Ministry of Agriculture FEWS/PWA, December 1987

is relatively better than in neighboring countries. The source of emergency food assistance is, however, yet to be finally determined. The stocks held by the GON would go a considerable way toward meeting some of the most immediate needs of those areas facing the largest deficits. It would, nevertheless, appear that some cereal will either have to be purchased for redistribution, or will have to be imported for that purpose. The very low relative cereal prices in Nigerien markets would indicate that cereal is apparently available for sale at a good price. Whether it could be purchased in the quantities, and at the locations necessary to make it feasible as a source for emergency feeding programs, is open to question. At this point, a convincing case could be made by the GON for a request to the international community for a modest amount of emergency food supplies. So far, most of the GON's attention has been focused on acquiring external funding for increased off-season food production projects.

### **Locusts**

Treatment of small locust populations in the Air Mountains and in the Tamesna region west of these mountains, near the Malian border, continued into early December. While these populations currently pose little threat for Niger, they do represent some threat to Niger's northern neighbors, and, to a lesser degree, to Nigerian agriculture during the next rainy season. The current locust populations can be expected to breed and move generally northward in the coming winter months. Several generations and many miles still lie between present populations and the Nigerien farming season.

## SUDAN

Nationally, Sudan will experience a grain production deficit. The grain requirements of the northern provinces of Sudan, however, could be met by Local production plus available stocks and planned concessional food aid deliveries. Meeting these northern requirements will tax the economic, political and infra-structural resources of the Sudanese. Planning is currently underway to obtain and transport necessary food from government stocks to North Darfur and North Kordufan Provinces, but additional stocks must be transferred to South Darfur and South Kordufan, Northern Region and Red Sea Province. Meeting northern requirements will leave no resources to cope with emergency needs of the Southern Region, or those of any new refugees from Ethiopia. Nor does it leave Sudan with any stocks to meet either local or national food deficits during 1989. Regardless of the exact magnitude of the national shortfall, or the technical "balance" of grain and grain requirements in the north, much of the rural population of Sudan could become at-risk of a food crisis and childhood malnutrition could increase to pre-harvest 1985 levels. Given current economic, transport and political constraints, it is unlikely that all emergency needs will be met with Sudanese resources. Sudan's gross production of sorghum and millet in 1987 is estimated at only 1.5 million MT, the lowest since 1984. It is unlikely that rural people in general hold significant stocks from previous years' production. In any case, Sudan as a whole will be without any stocks come harvest 1988. Previous warnings of poor rural employment opportunities, reductions in rural purchasing power, rural impoverishment and increasing childhood malnutrition are now reiterated for all of Sudan. Displaced people can be expected to migrate to urban centers, initially seeking employment, and later seeking emergency food aid distributions.

- Issue**
- At least two different official estimates of Agricultural Banked Sudan (ABS) stocks and reports of ABS stock spoilage, alongside denials by the ABS of any spoilage, suggest that stocks might be less accessible than official statistics would lead one to believe.

### National Production

Current estimates of production, consumption, stocks and potential food aid flows to Sudan are extremely fluid. The USAID Mission, in cooperation with the Sudanese government, is gathering the best information available and is monitoring the food supply situation.

Table 9 summarizes the national grain balance, using the most current information available. It is widely believed that food grain needs of the northern provinces will be met through northern production, all ABS and private stocks, all commercial imports, all food aid stocks, and all concessional imports. The computed net deficit of 301,000 MT is only for the nation as a whole.

Using all of Sudan's potential resources to meet the grain needs of the northern provinces leaves no margin for other relief activities. Under this strategy, no food would be available for shipment to the south, where new population displacements seem likely. Nor would it be possible (either practically or politically) to use stocks to assist either current or future Ethiopian refugees.

Of equal concern is the state of Sudan's food security buffer come harvest 1989. If stocks are drawn down to zero, Sudan will be unable to respond to local or national grain deficits, should the 1988 growing season be poor. Even if production is good nationally, local crop failures could be mitigated only by immediately shipping newly harvested grain.

The concern over national food supplies in Sudan was triggered by a report of a massive decrease in the acreage dedicated to sorghum and millet production. National sorghum and millet production will total only 43% of last year's near record total. This is attributable to a net decrease of 31% in total acreage dedicated to the production of these grains, as well as poor yields in both western Sudan and the usually highly-productive, eastern mechanized farms. Poor yields in these areas had been previously noted by FEWS; it is the recent news of a gross decrease in the acreage devoted to food crops, that is surprising.

**Table 9: Preliminary 1988 Grain Balance For Sudan, Most Recent Assessments (as of 12/15/87)**

1.	Population (1988)	23,680,000 <sup>1</sup>
2.	Cereal Requirement (MT)	3,194,240 <sup>2</sup>
3.	Gross Production (MT)	1,506,000 <sup>3</sup>
4.	Net Production (MT)	1,208,200 <sup>4</sup>
5.	(2-4) (Deficit) (MT)	(1,986,040)
6.	Gross ABS Stocks (MT)	650,000 <sup>5,6</sup>
7.	Gross Private Stocks (MT)	500,000
8.	Net Stocks (MT)	931,500 <sup>7,8</sup>
9.	(5-8) Import Need (MT)	(1,055,540)
10.	Gross Imports 1988 (MT)	932,000 <sup>9</sup>
11.	Net Imports 1988 (MT)	754,920 <sup>10</sup>
12.	Surplus/(Deficit) (MT)	(301,620) <sup>11</sup>

<sup>1</sup> Cable KHARTOUM 14816 (10 December, 1987) similar to FAO estimates.

<sup>2</sup> @ 133 kg/person/year (146 kg in northern provinces, 91 kg in the Southern Region), FEWS, FAO (August 1987). Cable KHARTOUM 14816 uses 157 kg/person/year. A recent FVA assessment uses 152.7 kg/person/year in the northern provinces.

<sup>3</sup> Cable KHARTOUM 14816 (10 December, 1987).

<sup>4</sup> Using crop specific loss rates (seed, feed, waste, and milling losses).

<sup>5</sup> Cable KHARTOUM 14816, (800,000 MT less export commitments of 150,000 MT)

<sup>6</sup> A recent FVA assessment uses 720,000 MT less export commitments of 150,000 MT and 20% spoilage for a gross ABS of 426,000 MT.

<sup>7</sup> Computed as gross stocks less 19% for milling and other losses.

<sup>8</sup> A recent FVA assessment would add 300,000 MT of on farm stocks to the analysis.

<sup>9</sup> Cable KHARTOUM 18416 report of possible imports:

1988 Commercial Imports	170,000 MT
Carryover food aid (stocks)	250,000 MT
Possible 1988 Title 1 Wheat	351,000 MT
1988 Other Donor Food Aid	161,000 MT

<sup>10</sup> Computed as gross imports less 19% for milling and other losses. Normal wheat milling losses alone are usually counted at 20%, but these imports include some proportion of already milled flour.

<sup>11</sup> Cable KHARTOUM 14816 reports a net deficit of 284,576 MT.

While the estimates of acreage, presented in Table 10, are clearly preliminary, those from the mechanized sector should be relatively accurate, as the managers of mechanized schemes and the Mechanized Farming Corporation have an early and accurate picture of area planted and crop conditions. Mechanized farming usually provides 85% of total sorghum production. While estimates of traditional rainfed agriculture this early in the season could easily be inaccurate, this agricultural sector's relatively minor contribution to the national total diminishes the importance of any inaccuracy in preliminary estimates of its production.

**Table 10: Area Planted By Crop in 1986 and 1987, in the Three Sectors of Sudanese Agriculture (000 Feddan, 1 Feddan = 1.035 Acres).**

		Irrigated	Mechanized	Traditional	Total
Cotton	86	828	0	0	828
	87	825	14	35	874
	Change	-3	+14	+35	+46
Sorghum	86	830	8,190	2,793	11,813
	87	603	5,000	2,200	7,803
	Change	-227	-3,190	-593	-4,010
Millet	86	15	17	3,590	3,676
	87	15	17	2,100	2,132
	Change	0	-54	-1,490	-1,544
Sesame	86	233	0	1,056	1,289
	87	320	0	1,000	1,320
	Change	+87	0	-56	+31
Wheat	86	282	0	0	282
	87	400	0	0	400
	Change	+118	0	0	+118
Peanuts	86	0	1,296	1,316	2,612
	87	0	762	1,300	2,062
	Change	0	-534	-16	-550

Source: The Sudan Early Warning System of the Relief and Rehabilitation Commission (RRC) citing the Mechanized Farming Corporation and the Agriculture Statistics Office of the Ministry of Agriculture.

Tables 11 and 12 show the relative provincial and regional distribution of food production and stocks. Other information (primarily historical) has been used to disaggregate sectoral production estimates for a first look at the geographic distribution of food availability. Table 11 shows the FEWS preliminary estimate of provincial and regional production, and the net surplus or deficit over the estimated cereal requirement. Table 12 presents those same estimates, but includes Agricultural Bank of Sudan (ABS) stocks -- apportioned to the regions where they are located. Both calculations assume an average annual cereal requirement of 146 kg/person in northern Sudan and 91 kg/person in the

Table 11: GOS/MDA Based Estimate of Cereal Production and Requirements for Sudan by Province 1987-88 FEWS December 3, 1987, Preliminary Estimate

Province(s)	Estimated 1988 Pop.	Cereal Reqd. (000)MT	Sorghum Caloric Equivalents				Per Capita Surplus/(Deficit) kg
			Gross	Net	Surplus/(Deficit) (000)MT	% Of Req	
Central Region	4,749,920	693	885	705	26	102	5
Kassala	1,799,194	263	325	261	0	99	0
Khartoum	2,257,574	330	29	23	(308)	7	(138)
Nile	721,393	105	18	14	(91)	13	(126)
Northern	476,348	70	34	25	(40)	36	(85)
Northern Darfur	1,331,771	194	20	8	(178)	8	(134)
North Kordufan	1,956,411	286	67	54	(232)	19	(118)
Red Sea	854,073	125	14	11	(113)	9	(133)
Southern Darfur	2,135,603	312	59	48	(264)	15	(124)
South Kordufan	1,493,040	218	88	69	(146)	32	(100)
SUBTOTAL							
Northern Sudan	17,775,327	2,595	1,537	1,226	(1,348)	47	(76)
Southern Region	5,879,748	535	138	107	(426)	20	(73)
TOTAL	23,240,019	3130	1675	1333	(1,774)	43	(76)

TABLE 12: GOS/MDA Based Estimate of Cereal Production, Agricultural Bank of Sudan Stocks, and Requirements for Sudan by Province 1987-88 FEWS December 3, 1987, Preliminary Estimate

Province(s)	Estimated 1988 Pop.	Cereal Reqd. (000)MT	Sorghum Caloric Equivalents				Per Capita Surplus/(Deficit) kg
			Gross	Net	Production & Stocks Surplus/(Deficit) (000)MT	% OF REQ	
Central Region	4,749,920	693	1,345	1,076	397	155	84
Kassala	1,799,194	263	631	508	248	194	138
Khartoum	2,257,574	330	29	23	(308)	7	(138)
Nile	721,393	105	18	14	(91)	13	(126)
Northern	476,348	70	34	25	(40)	36	(85)
Northern Darfur	1,331,771	194	20	16	(178)	8	(134)
North Kordufan	1,956,411	286	70	56	(229)	20	(117)
Red Sea	854,073	125	14	11	(113)	9	(133)
Southern Darfur	2,135,603	312	59	48	(264)	15	(124)
South Kordufan	1,493,040	218	140	112	(105)	52	(71)
SUBTOTAL							
Northern Sudan	17,775,327	2,595	2,360	1,890	(683)	73	(38)
Southern Region	5,879,748	535	277	219	(314)	41	(53)
TOTAL	23,240,019	3130	2637	2110	(998)	67	(43)

SOURCES: Sorghum and millet production estimates are derived from Ministry of Agriculture (MOA) and Relief and Rehabilitation Commission (RRC) data from November 1987. Wheat production estimates are based on RRC acreage forecast (November 1987) and historical yield figures. Rice and Maize estimates are derived from historical production figures. Net production is calculated by deducting crop specific loss factors based on milling losses, waste, industrial uses and seed stocks. Cereal requirements are based on FAO and GOS per capita estimates of 146 kg/year in the north and 91 kg/year in the Southern Region. ABS stocks reported by the RRC (November 15, 1987).

Southern Region. These figures were used in 1986 and again in 1987 by FEWS, the FAO and the Government of Sudan to assess food need and can be considered the minimum necessary to maintain the status quo levels of nutrition observed in Sudan. These tables show production higher figures than Table 9 as they are based on earlier information. The estimates of ABS stocks in Table 12 are also higher than in Table 9, due to the availability of older estimates disaggregated as to location. ABS stocks reported in Table 12 are probably a good approximation of the ABS plus private stocks shown in Table 9.

The overall picture shown in these tables is compounded by the paucity of stocks in the traditional rainfed agricultural sector, the record harvests of the last two years having been confined largely to the irrigated and mechanized sectors. Traditional production of sorghum and millet approximated the five year average in 1985 but fell short of it in 1986. Given the limited food supplies available to rural people (both from stocks and 1987 production) and the expected increase in prices due to shortfalls in national production, the bulk of Sudan's rural population, even in grain surplus regions, could be at-risk sometime in 1988.

Market analysis by the Department of Agricultural Economics of the Ministry of Agriculture (MA) shows that the prices of sorghum and millet in November continued to climb at a steady rate. It is usually at this time that prices begin to stabilize and even fall as harvesting has already begun by November.

Wheat production in Sudan as well as commercial and food aid imports of wheat, are destined for the urban markets. Wheat, unlike sorghum and millet, is subsidized by the government of Sudan. USAID plans on requesting 351,000 MT of Title I wheat for 1988, which when combined with commercial imports, carryover stocks of food aid, and other donor aid, should provide a gross 932,000 MT toward that urban need.

Grain production was abysmally low in western Sudan. While people are at risk because of crop failure in North Darfur and North Kordufan Provinces, people in South Darfur and South Kordufan also lack sufficient grain. Cash crop production does not replace subsistence grain production when the cash cannot purchase enough grain. Massive quantities of grain, reasonably priced grain must move west to supply the not-yet-emergency needs of people in these provinces too. A similar case can be made for the needs of people in Nile and Northern Provinces, while inhabitants of Red Sea Province will again require food aid. The rural population (including Ethiopian refugees) in Kassala Province is of some concern, despite near self sufficiency in production; this production is concentrated on large mechanized schemes and so is of limited availability to the rural population.

The Southern Region can be treated separately from the rest of Sudan. While there is some belief that the figures in the tables do not reflect that region's 1987 agricultural potential, it is also true that warfare has limited production there -- to an unknown extent. Displaced people in cities, enroute to sanctuary, or in northern shanty towns cannot add to agricultural production. The grain shortfall estimated here is, therefore, reflective of the seriousness of the situation.

# SUDAN:

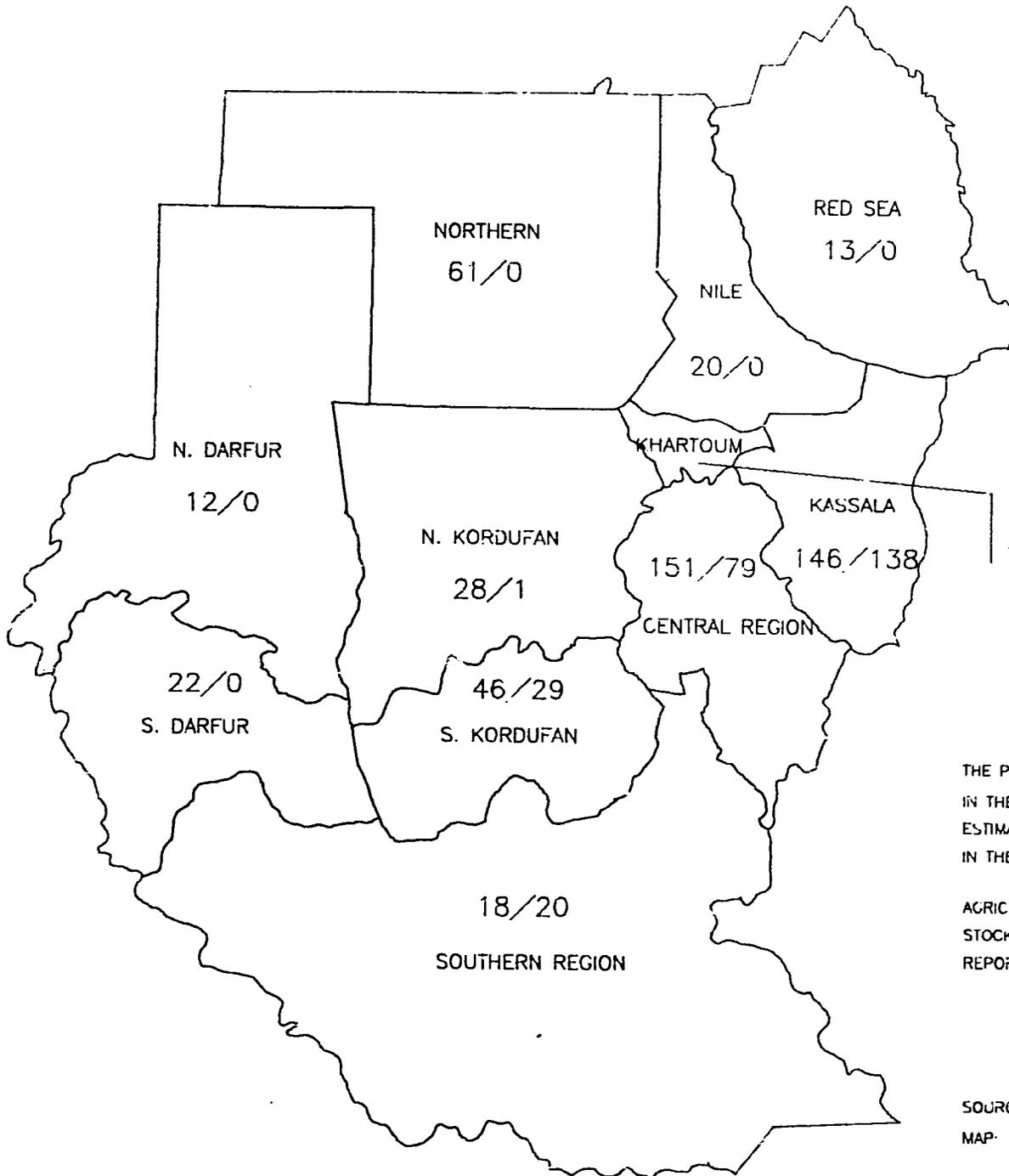
## NET PER CAPITA GRAIN AVAILABILITY

57/33  
PRODUCTION/ABS STOCKS  
(KILOGRAMS)

THE PER CAPITA CONSUMPTION OF GRAIN  
IN THE NORTHERN PROVINCES IS  
ESTIMATED AT 146 KG/YEAR.  
IN THE SOUTHERN REGION 91 KG/YEAR.

AGRICULTURAL BANK OF SUDAN (ABS)  
STOCKS COULD BE LOWER THAN  
REPORTED HERE.

SOURCE: RELIEF AND REHABILITATION COMMISSION, FEWS  
MAP: FEWS, DECEMBER 1987



## Stocks

If the quantity and quality of ABS stocks (as reported in official Government of Sudan (GOS) reports) is at all exaggerated, the magnitude of the estimated cereal deficit would increase dramatically. The GOS publishes reports of ABS stocks that total approximately 964,000 MT. All known analyses of the food situation in Sudan assume that these stocks are in excellent condition and that there is no waste inherent in their use. However, these estimate should be reduced by 15% (at a minimum) to account for ordinary losses such as occur in milling. This leaves a net 819,400 MT available for consumption.

The head of the ABS stated, in an interview, that stocks totalled 650,000 MT after deducting 150,000 MT in export commitments. After deducting for ordinary losses, this estimate would leave 552,000 MT available for consumption. The head of the ABS declares there is no spoilage in his stocks. Reports locating and enumerating large quantities of spoiled ABS grain limit the credibility of ABS estimates.

A recent USAID/FVA assessment estimated total ABS stocks at 720,000 MT, less the 150,000 MT still committed to export. This assessment also estimated spoilage at 20%, leaving a gross ABS stock level of 426,000 MT available for consumption.

The USAID Mission, along with the Government of Sudan (GOS) and various donor and non-government agencies (NGOs) have been closely monitoring the developing food security crisis. It has been widely believed that sufficient in-country stocks are available through the Agricultural Bank of Sudan (ABS) to make up for any deficit in production this year. However, because of the political sensitivity of the situation, no validation or evaluation of ABS stocks has been conducted, and the true status of government stocks is unknown. The condition of the public food supply is a critical issue, as it is assumed these stocks will be relied upon to avoid massive starvation during 1987. Although the GOS has officially halted grain exports, many believe that sorghum continues to flow out of the country.

## Nutrition

Regional shortages in supply could result in increased levels of childhood malnutrition, especially in the rural areas of Sudan. Table 13 shows 1985, 1986 and 1987 grain production (as a percentage of requirements) and nutrition levels found during the May-June rounds of the Sudan Emergency Rehabilitation Information and Surveillance System (SERISS) nutrition survey in 1986 and 1987.

The picture of relative nutrition presented by Table 13 is cloudy, at least in part because of massive food aid distributions, especially in Kordufan Region in 1986 and sporadically in Red Sea Province in 1987. Nonetheless, the massive surpluses produced by in the mechanized schemes in 1985 are not especially evident in nutritional levels during the following year. A second excellent harvest for Sudan in 1986 was followed by some improvement in nutrition and then a decline to the levels shown. Only once during the SERISS survey did any province experience good childhood nutrition (the international reference standard would predict just 2.25% of children. Relatively high levels of

childhood malnutrition are considered normal in Sudan. The impact of chronic malnutrition, however, on physical and mental development and on response to disease, is well known. The current food situation will do little to reduce malnutrition to acceptable levels.

**Table 13: Production as a Percentage of Grain Requirements in 1985, 1986 and 1987 With the Percent of Children Less Than Five Years of Age Found in the May-June 1986 and 1987 Rounds of the SERISS Nutrition Survey**

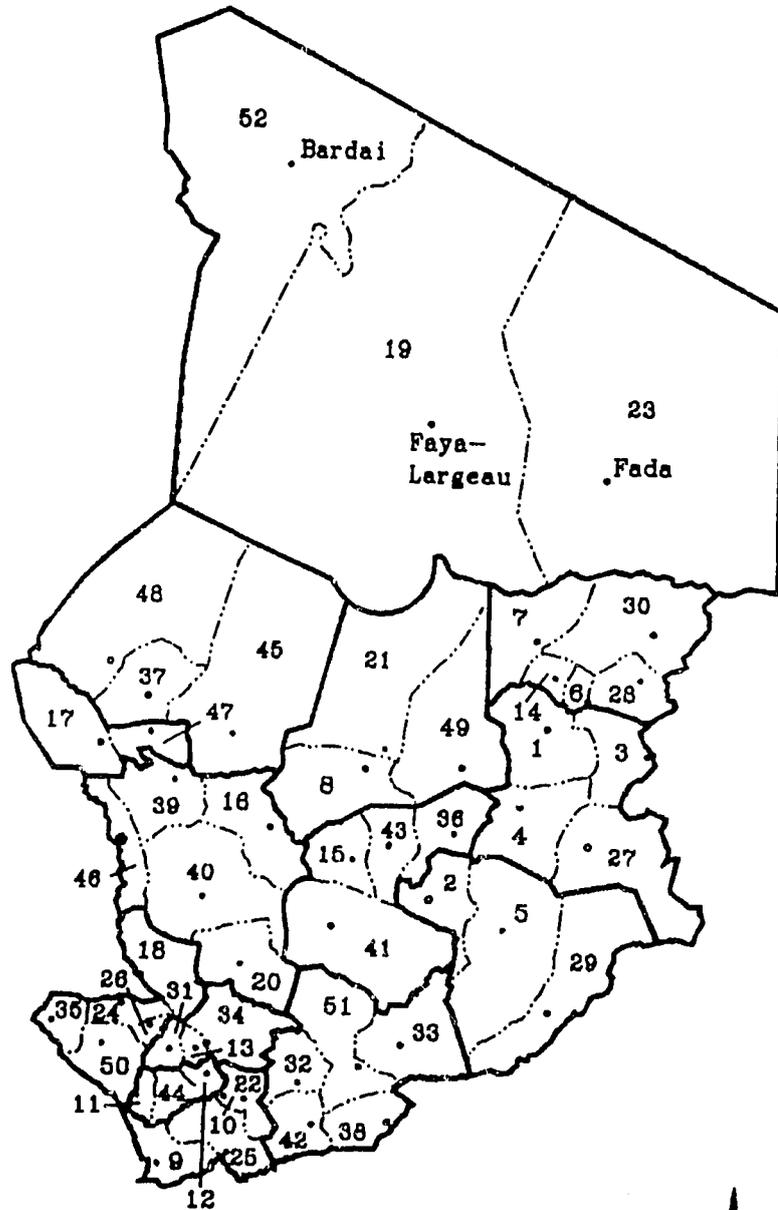
<b>Region/ Province</b>	<b>1985 Prod. as % Need</b>	<b>1986 Malnour- ished Children</b>	<b>1986 Prod. as % Need</b>	<b>1987 Malnour- ished Children</b>	<b>1987 Prod. as % Need</b>
<b>Central</b>					
<b>Gezira</b>	234%	18.2%	117%	9.1%	102%
<b>Blue Nile</b>	234	17.1	117	13.7	102
<b>White Nile</b>	234	22.1	117	14.2	102
<b>Kassala</b>	368	22.9	265	9.5	99
<b>Khartoum</b>	8	18.0	7	10.1	7
<b>Nile</b>	22	15.6	20	14.9	13
<b>Northern</b>	62	14.3	62	16.9	36
<b>North Darfur</b>	44	23.9	32	16.2	8
<b>North Kordufan</b>	48	16.4	32	13.4	19
<b>Red Sea</b>	16	16.1	11	9.0	9
<b>South Darfur</b>	67	21.1	32	12.4	15
<b>South Kordufan</b>	134	11.3	87	15.5	32

The distribution of food aid during 1986, coupled with the recovery of malnourished children, during that year, from the effects of previous years' droughts, limits the use of these data in modeling the nutritional effects of production in Sudan. Nonetheless, 1987 production could not reduce malnutrition levels in any of the northern provinces, and it is likely that malnutrition levels will rise above May-June 1986 levels, when a nutritional emergency was clearly in effect throughout Sudan. Even in the highly productive Central Region and in Kassala Province, areas where irrigated and mechanized schemes (and therefore grain production) are concentrated, childhood malnutrition is likely to reach emergency levels by mid-year 1988.

# Administrative Units

## (Prefectures & Sub-prefectures)

<u>Sub-Prefecture</u>		<u>PREF</u>
1.	Abeche	OUA
2.	Abou Deia	SAL
3.	Adre	OUA
4.	Am Dam	OUA
5.	Am Timan	SAL
6.	Am Zoer	BIL
7.	Arada	BIL
8.	Ati	BAT
9.	Baibokoum	LOR
10.	Bebedjia	LOR
11.	Beinamar	LOc
12.	Benoye	LOc
13.	Bere	TAN
14.	Biltine	BIL
15.	Bitkine	GUE
16.	Bokoro	ChB
17.	Bol	LAK
18.	Bongor	MK
19.	Borkou	BET
20.	Bouso	ChB
21.	Djedaa	BAT
22.	Doba	LOR
23.	Ennedi	BET
24.	Fianga	MK
25.	Gore	LOR
26.	Gounou-Gaya	MK
27.	Gos Beida	OUA
28.	Guereda	BIL
29.	Haraze Mangueigne	SAL
30.	Iriba	BIL
31.	Kelo	TAN
32.	Koumra	MCh
33.	Kyabe	MCh
34.	Lai	TAN
35.	Lere	MK
36.	Mangalme	GUE
37.	Mao	KAN
38.	Maro	MCh
39.	Massakory	ChB
40.	Massenya	ChB
41.	Melfi	GUE
42.	Moissala	MCh
43.	Mongo	GUE
44.	Moundou	LOc
45.	Moussoro	KAN
46.	N'Djamena	ChB
47.	N'Gouri	LAK
48.	Nokou	KAN
49.	Oum Hadjer	BAT
50.	Pala	MK
51.	Sarh	MCh
52.	Tibesti	BET



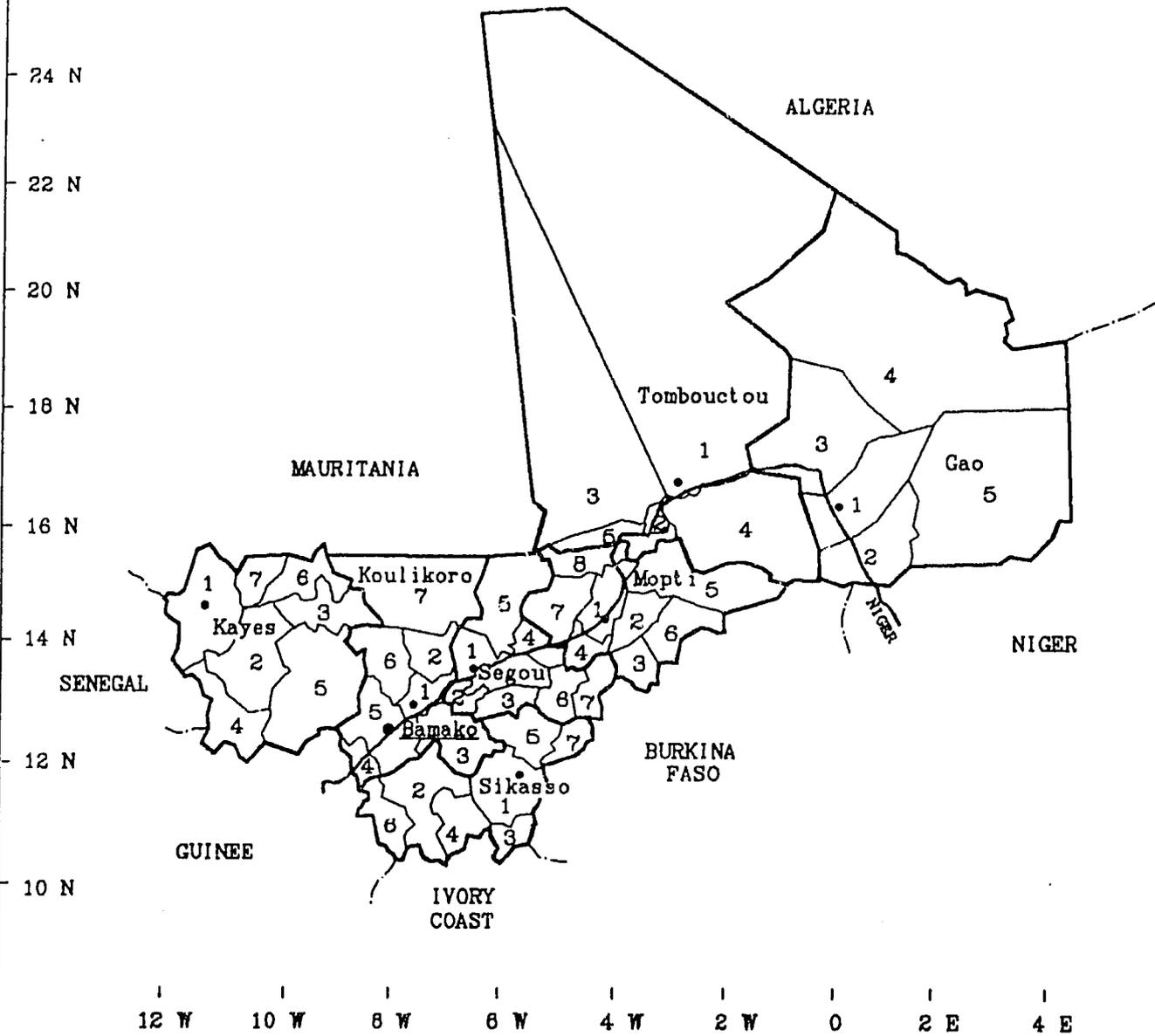
<u>PREF</u>	<u>Prefecture</u>
BAT	Batha
BET	Borkou-Ennedi-Tibesti
BIL	Biltine
ChB	Chari-Baguirmi
GUE	Guera
KAN	Kanem
LAK	Lake
LOc	Logone Occidental
LOR	Logone Oriental
MCh	Moyen-Chari
MK	Mayo-Kebbi
OUA	Ouaddai
SAL	Salamat
TAN	Tandjile

- Main Town in Sub-prefecture
- Prefectures
- - - - - Sub-prefectures

Source: Prefecture boundaries from 1980  
IGN-Brazzaville; Sub-prefecture boundaries  
from undated map in Fr., map author unknown

FEWS/PWA, June 1987

# Administrative Units: Regions & Cercles



### REGIONS and CERCLES

**KAYES**

1. Kayes
2. Hafoulabe
3. Diema
4. Kenleba
5. Kita
6. Niéro
7. Yelimane

**KOULIKORO**

1. Koulikoro
2. Banamba
3. Dloïla
4. Kangaba
5. Kati
6. Kolokani
7. Nara

**SIKASSO**

1. Sikasso
2. Bougouni
2. Kadiolo
4. Kolondieba
5. Koutiala
6. Yanfolila
7. Yorosso

**SEGOU**

1. Segou
2. Baraoueli
3. Bla
4. Macina
5. Niono
6. San
7. Tominian

**MOPTI**

1. Mopti
2. Bandiagara
3. Bankass
4. Djenne
5. Douentza
6. Koro
7. Tenenkou
8. Youvarou

**TOMBOUCTOU**

1. Tombouctou
2. Dire
3. Goundam
4. Gourma-Rharous
5. Niafunke

**GAO**

1. Gao
2. Ansongo
3. Bourem
4. Kidal
5. Menaka

Other Int'l Boundaries

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Region Boundary

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Cercle Boundary

● National Capital

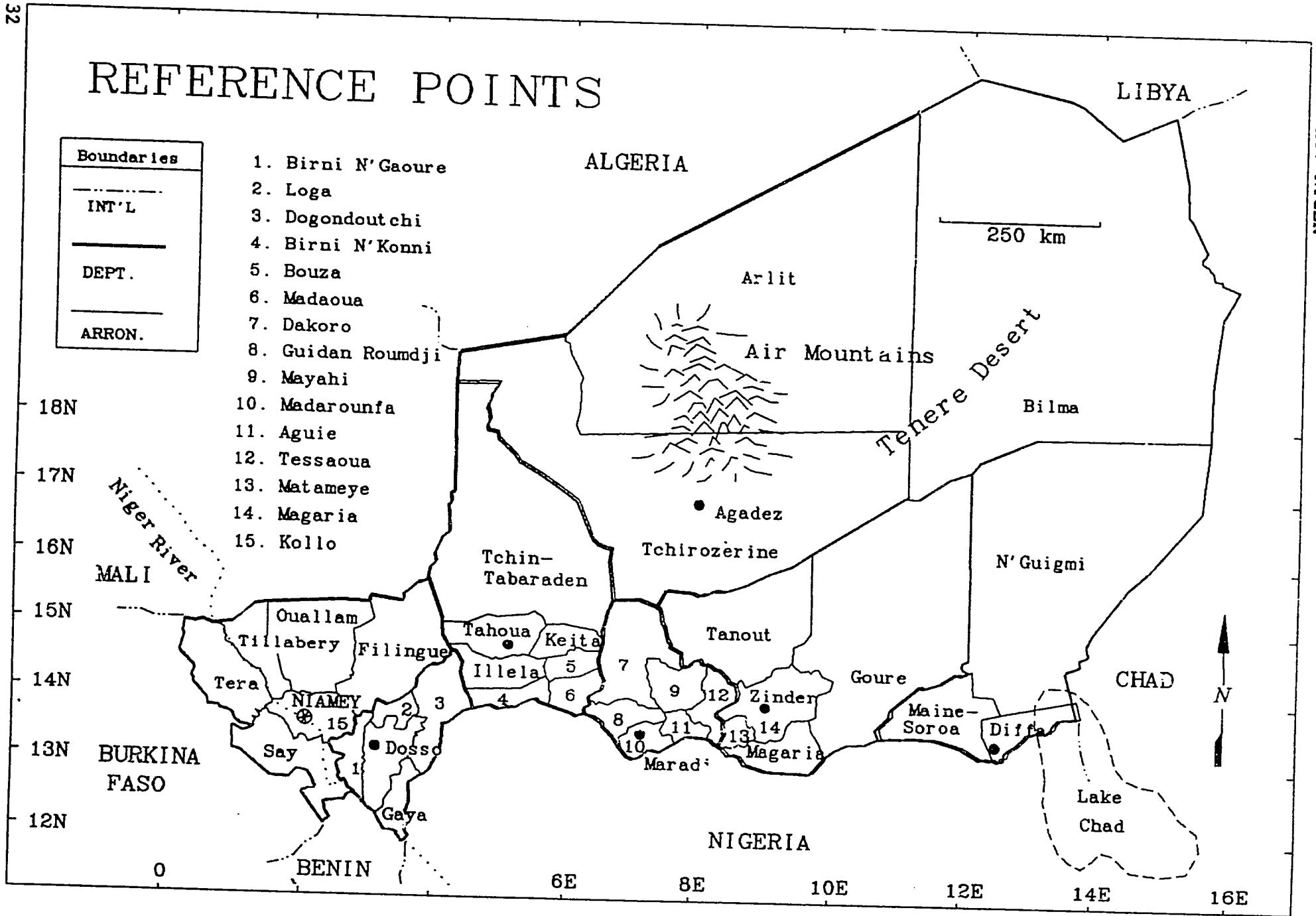
• Regional Capital

200 km

# REFERENCE POINTS

Boundaries	
---	INT'L
—	DEPT.
—	ARRON.

1. Birni N'Gaoure
2. Loga
3. Dogondoutchi
4. Birni N'Konni
5. Bouza
6. Madaoua
7. Dakoro
8. Guidan Roundji
9. Mayahi
10. Madarounfa
11. Aguié
12. Tessaoua
13. Matameye
14. Magaria
15. Kollo



## FAMINE EARLY WARNING SYSTEM

This is the eighteenth in a series of monthly reports issued by the Famine Early Warning System (FEWS). Chad, Mali, Niger and Sudan will be combined in one report until the crop cycle begins again in the Spring. This report is designed to provide decisionmakers with current information and analysis on existing and potential nutrition emergency situations. Each situation identified is described in terms of geographical extent and the number of people involved, or at-risk, and the proximate causes insofar as they have been discerned.

Use of the term "at-risk" to identify vulnerable populations is problematic since no generally agreed upon definition exists. Yet, it is necessary to identify or "target" populations in-need or "at-risk" in order to determine appropriate forms and levels of intervention. Thus for the present, until a better usage can be found, FEWS reports will employ the term "at-risk" to mean...

...those persons 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.

Perhaps of most importance to decisionmakers, the FEWS effort highlights the process underlying the deteriorating situation, hopefully with enough specificity and forewarning to permit alternative intervention strategies to be examined and implemented. Food assistance strategies are key to famine avoidance. However, other types of intervention can be of major importance both in the short-term and in the long run, including medical, transport, storage, economic development policy change, etc.

Where possible, estimates of food needs 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 the 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 estimates of food needs presented periodically in FEWS reports should not be interpreted to mean food aid needs, e.g., as under PL480 or other donor programs.

FEWS depends on a variety of US Government agencies, private voluntary organizations (PVO's), international relief agencies, foreign press and host government reports as sources of information used in the country reports. In particular, a debt of gratitude is owed to many individuals within various offices of the U.S. Agency for International Development (USAID) who routinely provide valuable information: the offices of Food For Peace and Voluntary Assistance (FFP/FVA) and the Office of Foreign Disaster Assistance (OFDA). Additional useful information is also provided by the Centre Agrhymet in Niamey, the National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NOAA/NESDIS), the Cooperative Institute for Applied Meteorology at the University of Missouri (CIAM), the National Aeronautic and Space Administration (NASA), the UN Food and Agriculture Organization (FAO) Global Information and Early Warning System (GIEWS), the World Food Program, and other U.N. agencies.

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