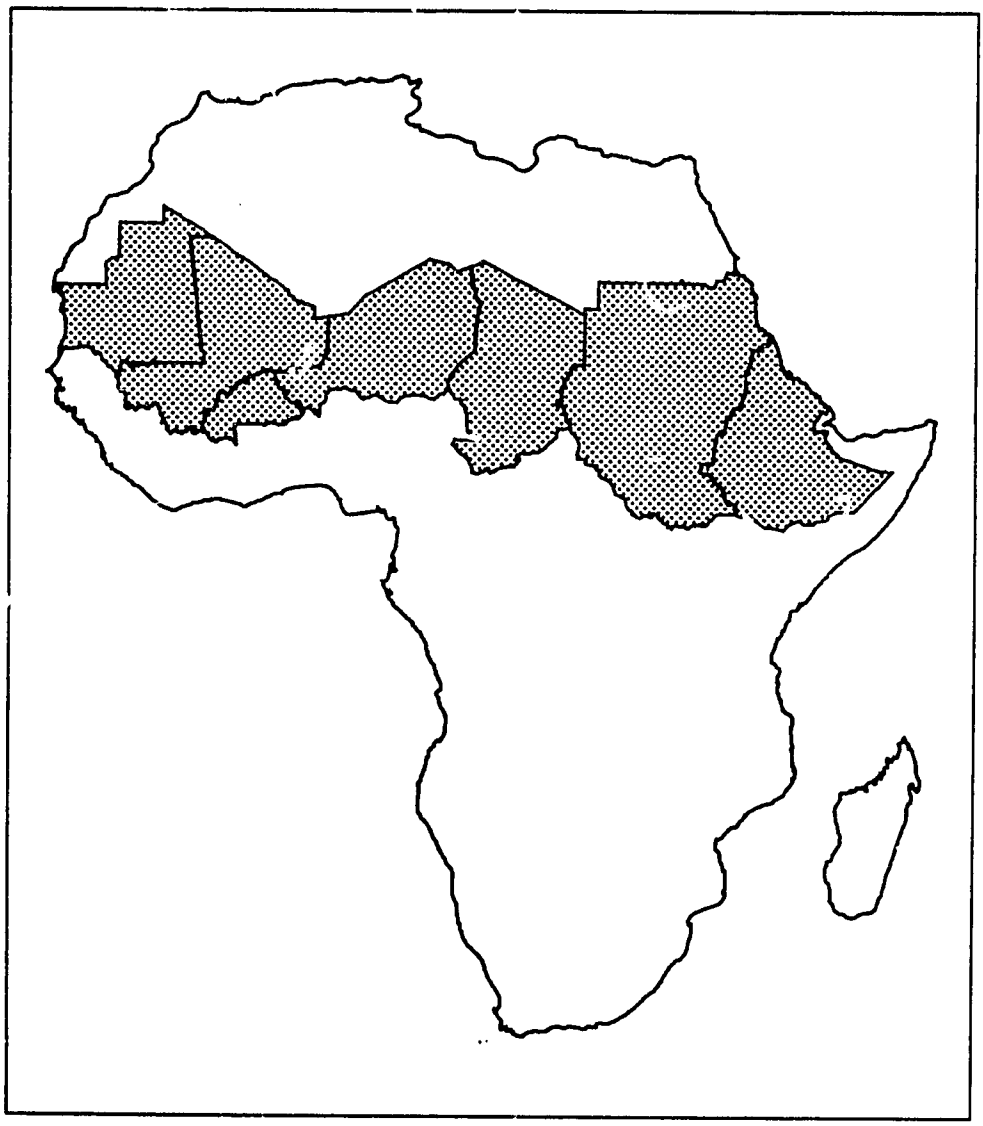
PN-ABI-164
70055

Famine Early Warning System
FEWS

January
1991

Harvest Assessment of Cereal Production



Contains reports on:

Mauritania

Mali

Burkina

Niger

Chad

Sudan

Ethiopia

Country Assessments prepared by USAID Missions and FEWS Field Representatives in each FEWS-monitored country during the month of December, 1990. Published by FEWS/Washington for the Agency for International Development, Bureau for Africa.

PN-ABH-164

Harvest Assessment of Cereal Production

January 1991

Published for:

Agency for International Development, Bureau for Africa

Office of Technical Resources

Published by:

FEWS Project, Tulane/Pragma Group

1611 N. Kent St., Suite 201

Arlington, VA 22209

(703) 243-1070

Table of Contents

Executive Summary 1

FEWS Region: Second Year of Mediocre-to-Poor Harvests 2
- Map 1: Regional Summary Map 2
- Table 1: Comparison of Cereal Production Balances 3
- Table 2: Comparison of 1990 Per Capita Cereal Production 4
- Table 3: Comparison of Percent of 1990/91 Needs Met by Production 4
- Figure 1: Monthly Millet Prices in Selected Sahelian Markets (1984-90) 4

Mauritania: Harvest Expected to be Worst of Four Years 6
- Map 2: Mauritania Reference Map 6
- Table 4: ABS and FEWS Provisional Estimates of the 1990-91 Agricultural Campaign 8
- Table 5: Food Stocks On-Hand as of October 1, Compared to 1989/90 8
- Table 6: Projected Cereal Consumption Requirement for 1990/91 9
- Table 7: Provisional 1991 Cereal Balance 9
- Appendix 1: Notes for FEWS Preliminary 1990/91 Cereal Production Estimate 10
- Appendix 2: 1990/91 Programmed and Conceivable Food Aid 11

Mali: Good Harvest Not Shared by All 12
- Map 3: Mali Reference Map 12
- Table 8: 1990 Gross Cereal Production Compared to 1989 and 10-Year Average 13
- Table 9: Regional Coarse Grain and Rice Production Balances 14
- Table 10: National Cereal Balance 15
- Figure 2: Nominal Monthly Millet Prices, Mopti, 1987-90 15
- Figure 3: Terms of Trade between Millet and Goats, Average over SAP Markets 15
- Map 4: Vulnerable Populations in Mali 16

Burkina : Emergency Food Aid Required 18
- Map 5: Burkina Reference Map 18
- Table 11: Commitments of Emergency Aid 20
- Table 12: GOB National-level Cereal Balance Estimate, 1990/91 20
- Table 13: Provincial Cereal Balance Comparisons 20
- Figure 4: Nominal Monthly Millet Prices, Ouagadougou, 1984-86 and 1990 21

Niger: A Second Poor Harvest: Food Assistance Required in Several Regions 22
- Map 6: Niger Reference Map 22
- Table 14: 1990/91 Rainy Season Production Estimates for Millet and Sorghum 23
- Table 15: Department-levell Percentages of Cereal Requirements Met by Production 24
- Table 16: National Cereal Balance for Millet and Sorghum 25
- Map 7: Vulnerable Populations in Niger 27
- Appendix 3: Arrondissment-level Cereal Production 29
- Appendix 4: 1990/91 Cereal Requirements Met by Production 30

Chad: Production Shortfalls and Armed Conflict Increase Food Insecurity 32
Map 8: Chad Reference Map 32
Table 17: Gross 1990/91 Cereal Production 33
Table 18: Annual Cereal Production Since 1983 34
Figure 5: Nominal Monthly Millet Prices, N'Djaména, 1983 and 1987-90 35
Figure 6: Terms of Trade between Millet and Sheep, Average over SAP Markets in Biltine and Ouaddaï 35
Map 9: Vulnerable Populations in Chad 36
Table 19: SAP/Chad Food Aid Distribution Plan 37

Sudan: Food Deficit of 1.2 Million Tons Threatens 9-10 Million 38
Map 10: Sudan Reference Map 38
Table 20: Comparisons of Gross Cereal Production in North Sudan 39
Table 21: Regional Production Balances for 1990/91 41
Table 22: Donor Pledges as of January 2, 1991 41

Ethiopia: Consecutive Year Crop Failure in North 44
Map 11: Ethiopia Reference Map 44
Table 23: 1990/91 National Food Balance 48
Table 24: Comparison of Relief Estimates 49

Key Terms **Inside Back Cover**

Executive Summary

Mauritania

A maximum of 33% of Mauritania's cereal consumption requirement will be met by domestic agricultural production this year. Using the highest preliminary estimates of production available (109,030 metric tons net) and including expected commercial imports, cereal stocks available within Mauritania would still fall short of the consumption requirement by more than 100,000 metric tons. Regardless of the estimate used, 120,000 people will be extremely vulnerable to food stress in 1991. As of October 1, deliveries and firm pledges of food aid totaled 43,500 metric tons. Immediate action by donors is necessary to avoid imminent food shortages and severe food stress, possibly resulting in famine.

Mali

A modest national food surplus is expected for the 1990/91 agricultural year. However, highly localized crop failures and disruptions in herd movements make 1.78 million people moderately vulnerable to food stress and another 71,000 people extremely vulnerable. Most emergency food needs could be met through local stocks as long as surplus-producing farmers make their stocks available on the market.

Burkina

Cereal production was poor for the second consecutive year over most of Burkina's densely populated Central Plateau. Emergency food aid will be required to cover a national cereal deficit (cereal production plus imports plus change in stocks minus consumption requirements) of about 127,000 metric tons. The Government of Burkina and donor organizations are cooperating to reduce the exposure of approximately 2.6 million people, who are now moderately vulnerable to famine.

Niger

Despite a projected net cereal surplus, regional food shortages will be severe in Niger and will require external assistance. These shortages are the result of two poor harvests in a row combined with a lack of economic means to purchase cereal through the commercial supply system. Pasture, water and economic conditions are also poor for many livestock owners.

Chad

Inadequate and irregular rainfall in agricultural producing areas north of the 13th parallel have placed more that 500,000 persons at risk. Drought-induced food shortages will be exacerbated as a result of the recent armed hostilities which resulted in some pillaging of public sector food stocks and increased needs due to returning refugées. In-country food reserves will be insufficient to meet feeding requirements, thus necessitating outside assistance from the donor community.

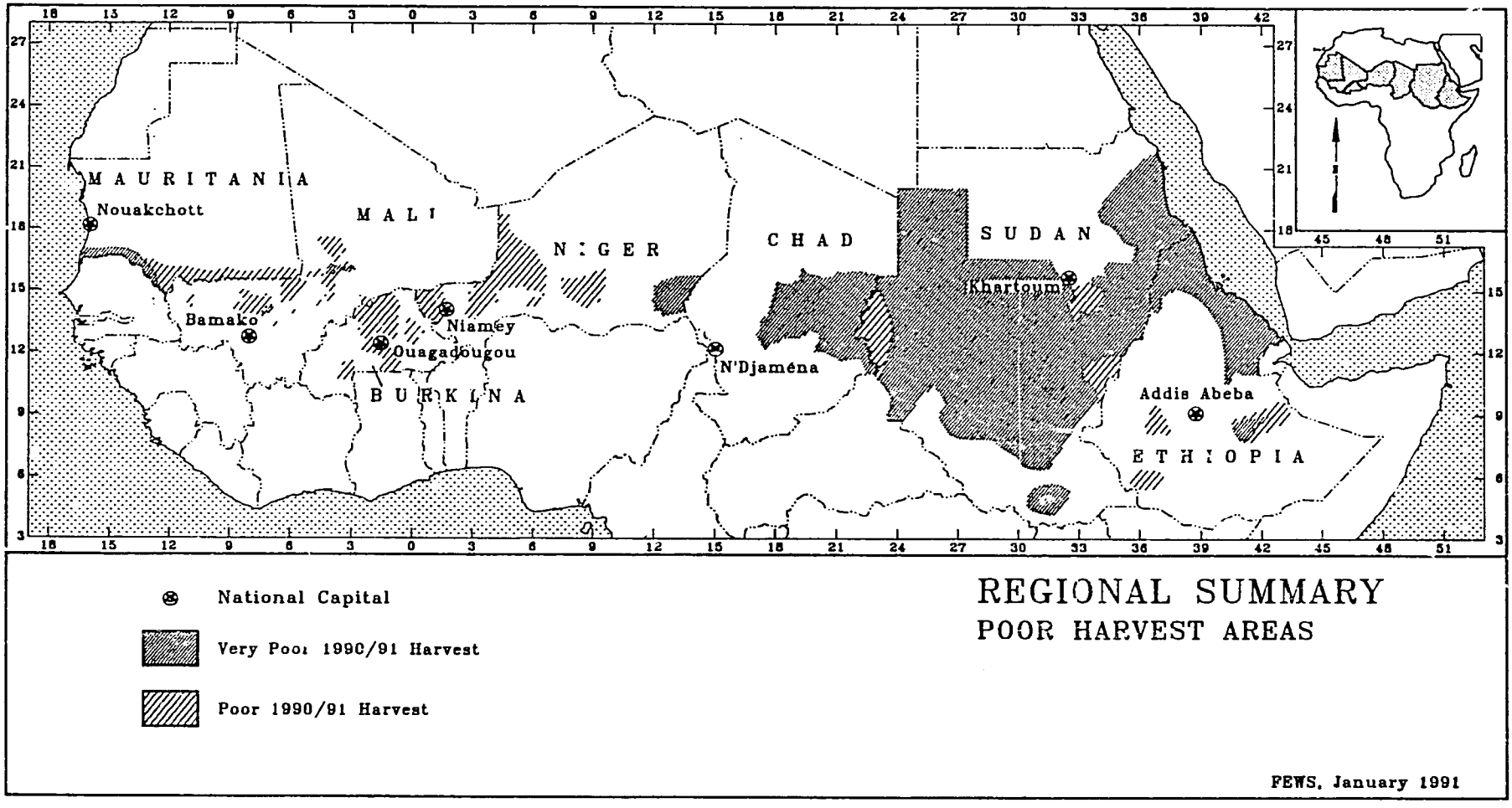
Sudan

USAID, the Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), and the World Food Program (WFP) concur that the food security situation in Sudan is now an emergency, requiring immediate and massive relief assistance to make up a 1.2 million metric ton food deficit. Donors are awed by the "magnitude of the possible calamity." The 1.2 million metric ton deficit affects 9-10 million people.

Ethiopia

For the second year in a row, severe drought has caused significant crop failures in northern and eastern Ethiopia. Record agricultural production in other parts of the country will do much this year to alleviate some regional shortages. Nevertheless, the continuing widespread civil strife and an almost total breakdown of traditional coping mechanisms in Eritrea will raise the country's emergency relief requirements to nearly one million metric tons.

Map 1: Regional Summary Map



FEWS REGION

Second Year of Mediocre-to-Poor Harvests

FEWS/Washington report prepared January 15, 1991

Summing Up

The 1990 main-season harvests in the FEWS-monitored countries were generally similar to, or worse than, the mediocre 1989 main-season harvests. Areas within each country that had the worst harvests last year have generally been hard-hit this year as well. Coping mechanisms and reserves have already been drawn down in dealing with the poor 1989 harvest. Scarcity of surface water in the northern Sahel is preventing herders from taking advantage of dry season hay stock in that zone. Affected people will be hard pressed to compensate again for extremely poor production. Some of these local and sub-national problems are not apparent from seemingly favorable national circumstances; Mali's harvest produced a national-level surplus and Ethiopia's harvest was a new aggregate record, yet one of Mali's *cercles* contains 71,000 people who are extremely vulnerable to food crises before the next harvest, and Ethiopia's Eritrea and Harerghe regions contain several million people at-risk of famine. Sudan's poor harvests and extreme food insecurities are now found nationwide and are unlikely to be held in check by even the most ambitious level of assistance (see Map 1).

The multiple causes of Sudan's problems reflect an unfortunately common pattern. The problems of drought and poor agricultural production are being matched in their impact on food security by civil conflict, indifferent or hostile local authorities, and deteriorating economic environments. Sudan, Ethiopia, Chad, Mauritania, and, to a lesser extent, Mali are affected by some or all of these problems. Nevertheless, where there are current problems, the immediate impacts are but a pale shadow of what would occur should the 1991 agricultural season be poor. One more poor harvest in northern and eastern Ethiopia, the Sahelian areas of Chad, Niger, Burkina, or Mali, or the Senegal River Valley in Mauritania may elevate these local problems to national disasters in the same way they have in Sudan.

How far have we come since 1984?

The Sahel and Horn-wide harvest failures of 1984, which followed poor harvests in 1983 and led to hundreds of thousands of famine-related deaths, have become a point of reference for many in conveying the gravity of more recent food crises. The severe problems looming in Sudan, in northern Ethiopia, and even in smaller areas such as Yatenga (see Burkina report), the Senegal River Valley (see Mauritania report), and elsewhere, beg for comparison with this touchstone. Within the restrictions of data available, the following measures try to situate the national 1990 harvests in a context that includes 1984 and a recent period of "average" production.

Table 1: Comparison of Cereal Production Balances

	Net Cereal Production Balance	
	1990 (mt)	1984 (mt)
Mauritania	-233,336	-258,697
Mali	+120,000	-418,225
Burkina	-244,932	-528,514
Niger	-197,081	-551,274
Chad	-233,364	-346,353
Sudan	-1,212,000	-1,636,531
Ethiopia	-1,038,000	-2,400,987

Sources: See country chapters for sources. 1984 data from same sources where possible, otherwise FEWS or USAID estimate.

Table 1 compares national net cereal production deficits (net cereal production minus annual consumption requirements) for 1990 with those of the 1984 harvest. At least at a national level, and disregarding for a moment any other available resources (food stocks, livestock, relief, etc.), the 1990 production deficits appear quite smaller than those of 1984, except in Mauritania where the absolute deficit is almost as large this year, and in Sudan where the 1990 deficit is approximately 75% of that of 1984. A cautionary note, however; the impact that a production deficit will have depends on how narrowly or broadly it is spread among the population and the coping capacities of the people affected.

On a per capita basis, the 1990 harvests were also generally better than in 1984. Net harvest production in 1990 provided between 47 kilograms of cereal per person in Mauritania and 70 in Sudan, to 199 in Mali and 187 in Niger (see Table 2). Except for Chad and Mali, this is less than in a "normal" period, but certainly more than in 1984 in all cases. Notably absent in this subset of cereal production data (and even in the complete year-by-year figures) is any evidence of sustained gains in food

Table 2: Comparison of Per Capita Cereal Production

	Per Capita Net Cereal Production (kg)*		
	1990	1984	Reference Period
Mauritania	47.2	11.1	45.8
Mali	199.4	126.4	184.7
Burkina	164.8	121.1	172.4
Niger	187.3	128.9	208.9
Chad	108.1	65.2	103.0
Sudan	70.0	53.1	111.4
Ethiopia	123.8	89.2	130.3

Sources: See country chapters for 1990 production and population sources and detail. Notes: *Net cereal production divided by population. Reference periods: Mauritania, Chad: 1983-89; Mali, Niger: 1980-89; Burkina, Sudan:1984-89; Ethiopia 1980-84. Production estimation methodology changed significantly during reference period in Burkina and Mauritania.

production that are larger than the normal growth in population, thus supporting the widely held belief that per capita production in the Horn and Sahelian Africa is declining.

Table 3 compares how well each harvest (1990, 1984, and "normal") met the annual per capita cereal requirement. Again, almost every country (except Mali and Chad) shows that 1990 production met less needs than during a "normal" year, but substantially more than was met by 1984's harvest. Nevertheless, the impact of the poor 1990 production will be significant. One should appreciate that a typical Sudanese will have to find a way to acquire 60% more food/income from non-farm sources during 1991 than in a "normal" year. In the present environment (see Sudan chapter), that is a frightening task.

Table 3: Comparison of Percent of Needs Met by Production

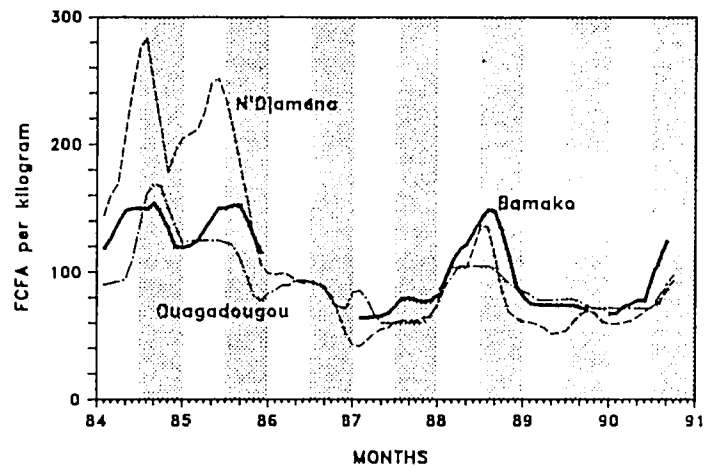
	Annual Needs Met by Net Cereal Production		
	1990/91 %	1984/85 %	Ref. Period %
Mauritania	28	11	37
Mali	107	68	99
Burkina	86	63	89
Niger	88	60	98
Chad	76	45	72
Sudan	54	41	86
Ethiopia	85	61	97

Sources: See country chapters for 1990 sources and detail. Notes: Annual cereal requirements (kg) used: Mauritania 165; Mali 185; Burkina 190; Niger 212 as an average between 190/220 rate used by USAID/Niger; Chad 142; Sudan 130 as an average of 141/90 rate used by FEWS/Sudan; Ethiopia 145. Reference periods as found in Table 2.

Cereal Prices Suggest Potential Problems

Cereal price levels and trends in the FEWS-monitored region have taken a significant upturn over the last several months when compared to previous years. Figure 1 presents millet price data from Chad, Burkina and Mali that reflects market perceptions of a poor 1990/91 harvest and reduced cereal availability in 1991. The shaded vertical bars highlight the harvest period (July through December) when markets normally react to information concerning the outcome of the ensuing harvest. Prices drop in anticipation of a "good" harvest (for example, 1985/86 and 1988/89) and remain stable or increase in response to "average" or "poor" harvests (for example, 1987/88 and 1989/90) depending upon other supply factors (carryover stocks, public stocks, external sources of supply, etc.). Note that the rising prices seen in the last half of 1990 have not been seen since the last half of 1984, and follow an "average" 1989/90 season. Prices may still decline in 1991, but it would likely be late and not as significant as in recent years (see Figures 2, 4, and 5 in the Mali, Burkina, and Chad chapters, respectively).

Figure 1: Monthly Millet Prices in Selected Sahelian Markets (1984-90)

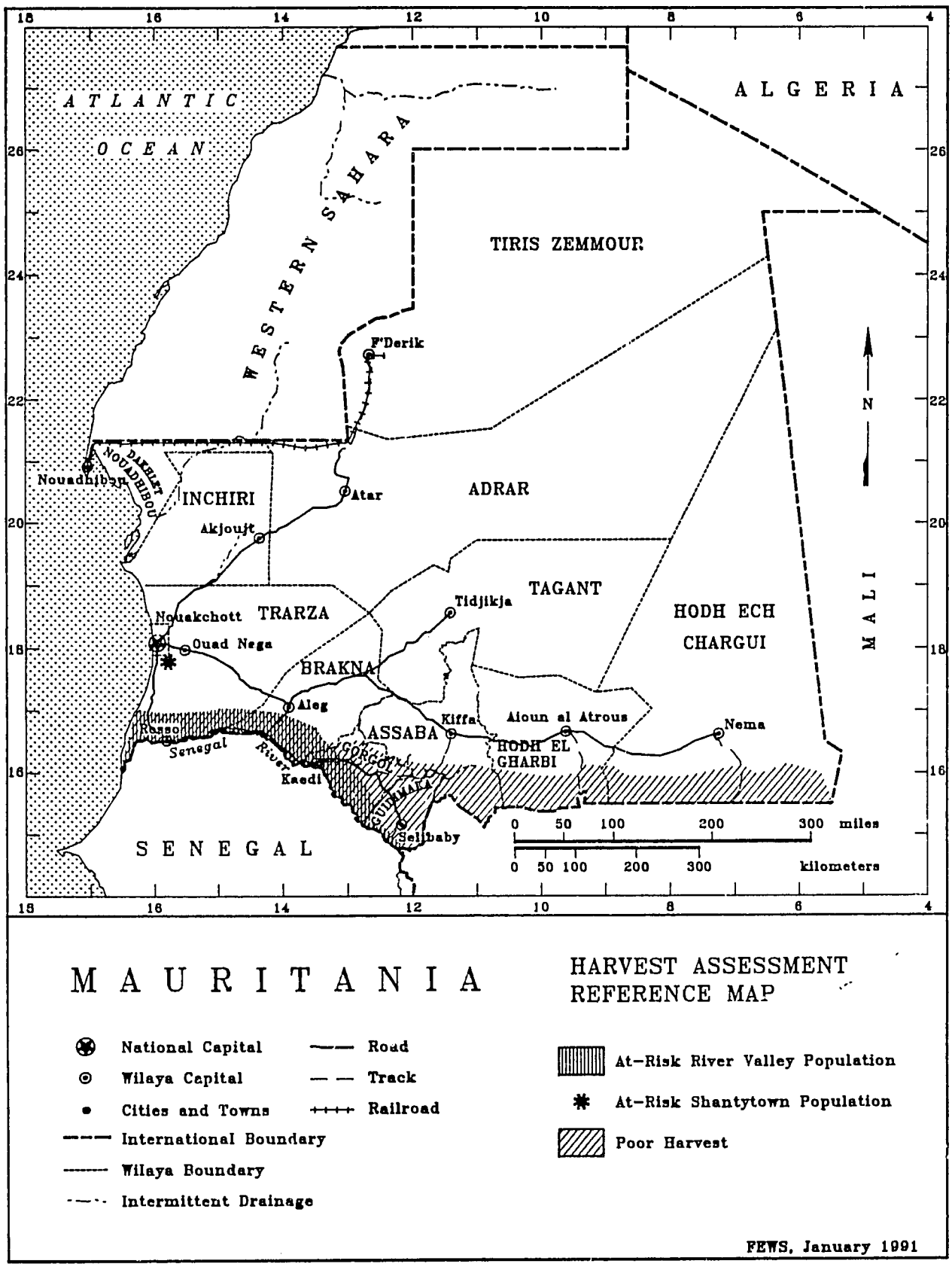


Sources: Chad: USAID/ADO/PUFF; Burkina: GOB/INSD; Mali: GRM/DNSI; FEWS/W. Notes: Data are average monthly prices smoothed over three-month periods. July-December harvest periods highlighted by shaded bars

In a "poor" agricultural season, Sahelian households will have to make reallocation decisions in response to reduced cereal availability and reduced cereal access brought about by increased prices and stagnant or declining incomes. These decisions will include reduced purchases, reduced number of meals, substitution into other foodstuffs, increased seasonal migration and sales of household assets. Higher cereal price levels can have a dramatically negative impact on the exchange ratio ("terms of trade") of livestock assets for cereals, particularly when livestock prices are declining. Such conditions make

it difficult for people to purchase grain to substitute for failed harvests. The Market Conditions sections of the Mali and Chad chapters graphically present declining small livestock-for-cereal exchange ratios (see Figures 3 and 6, in the Mali and Chad chapters, respectively). In both countries, revenue from the sale of livestock obtains less than half the quantity of millet than one year ago. Households that regularly obtain access to cereal through such exchanges (agropastoralist and pastoralists) will be particularly affected.

The upcoming six months and the 1991/92 harvest will be crucial in determining whether the FEWS-monitored region moves into famine conditions, as in 1984/85, or rebounds from current conditions, as in 1988/89. A "good" 1991 harvest would result in increased supply and declining prices, thereby averting further deterioration in the food security status of the region. A "mediocre" or "bad" 1991 agricultural season would have the opposite result.



Map 2: Mauritania Reference Map

MAURITANIA

Harvest Expected to be Worst of Four Years

USAID/Mauritania and FEWS/Mauritania report received in Washington on December 11, 1990

SUMMARY

Harvest prospects range from poor to catastrophic throughout the agricultural belt, which lies along Mauritania's southern border owing, to poor rains, non-flooding of the Senegal River, and pest damage (see Map 2). While 43,500 mt of food aid for use in 1991 have already landed or are on the way, further food aid decisions must be made immediately so that arrivals can be scheduled in time to avert famine conditions. Such conditions could appear as early as March 1991. The estimated 120,000 people at-risk populations will require at least six months of emergency food aid. FEWS believes that the 109,030 metric tons (mt) of net cereal production estimated by the Bureau of Agricultural Statistics (ASB) in October will be revised sharply downwards in the ASB's next evaluation. According to FEWS analysis, only 28% of Mauritania's global cereal consumption requirement will be met by production (93,572 mt net), and cereal production deficits will extend to all regions (wilayas). In the Senegal River Valley, the significantly below-average harvest is compounded by restrictions to food access that have been in effect for over a year. The 1990/91 before-food aid cereal deficit, in excess of 100,000 mt, is being reassessed by the donors and the Government of the Islamic Republic of Mauritania's (GIRM) Food Security Commission (CSA).

FACTORS AFFECTING FOOD AVAILABILITY

Harvest Outcome

The most optimistic preliminary estimate of Mauritania's 1990/91 cereal harvest is quite similar to the mediocre harvest of 1987/88. A revised estimate, based on more recent information, shows 1990/91 to be the worst agricultural year, by far, since the current system of harvest estimation began in 1986/87 (see Appendix 1 for notes on estimation methods).

Cereal production in Mauritania depends upon planting schemes that include rainfed (*dieri*), river recessional (*walo*), lowland (*bas-fonds*), and irrigated agriculture. As mentioned in the FEWS Pre-Harvest Assessment (September 1990), all four schemes were adversely affected by a late and weak start of the 1990 rainy season. Preliminary production estimates published by the Agricultural Statistics Bureau (ASB) and accepted by the annual joint United Nations Food and Agriculture Organization/Permanent Inter-State Committee to Combat Drought in the Sahel (FAO/CILSS) mission (undertaken in October) put this year's net cereal production at 109,030 mt. The ASB is currently in the process of a second evaluation of the 1990/91 campaign and has admitted that results will probably be revised significantly downwards.

Especially in the Senegal River Valley, estimates of the 1990/91 harvest may rival those of 1987/88, when the river last failed to flood and *walo* production was minimal. This year, however, the traditional farmer in the valley faces additional factors that multiply both food stress and food-access-related stress to a level which surpasses anything experienced since the drought years of the early eighties. The reasons for this are many: farmers traditionally cultivated land on both sides of the Senegal River -- this has been forbidden since the start of the dispute between Senegal and Mauritania, in April 1989; all river fishing and cross-river trade has ceased; and on-farm stocks were depleted following the poor harvest in 1989/90.

All rainfed crops (*dieri*) have been harvested. Reported production has fallen 20% below that of last year. Harvesting of irrigated rice was ongoing at mid-December, but many small perimeters reported about half of last year's yield (one to two metric tons per hectare (mt/ha), down from three to four mt/ha) owing to the following factors: late planting, losses to birds, lack of seeds, and use of unskilled labor (repatriates and refugees from Senegal). Lowland recessional crops (*bas-fonds*) were still in maturing stagesat mid-December, but reports on the harvest outcome are becoming more pessimistic because of progressively less sufficient soil moisture. River recessional crops (*walo*) are almost non-existent this year due to negligible Senegal River flooding.

During a visit to the Senegal River valley in December 1990, FEWS/Mauritania collected harvest information through interviews with *wilaya* agriculture agents, representatives from the private sector, and various *wilaya* officials and village farmers. This data was applied to the previous production estimate, deriving an estimate of 93,572 mt net. The most notable differences between ASB and FEWS analyses of production are found in estimates of the *walo* crop. The field trip confirmed reports that the Senegal River was extremely low throughout the rainy season, and that as a consequence the majority of *walo*

land did not flood at all. The only *wilaya* reporting surface area inundated by river flooding is Gorgol (*walo* land is found in Trarza, Brakna, and Gorgol *wilayas* and in small areas of Guidimaka Wilaya).

Two production scenarios are presented in Table 4, below. The preliminary production estimates provided by the ASB can be used as a high estimate. The FEWS figures show a more pessimistic estimate of production, based on the more recent field observations. The difference in net production between the two estimates is 15,458 mt. Both estimates may be revised as more information about the ongoing harvest becomes available.

Table 4: ABS and FEWS Provisional Estimates of the 1990-91 Agricultural Campaign (mt)

Agricultural Scheme	ABS Estimated 1990/91 Production		FEWS Estimated 1990/91 Production	
	Gross	Net	Gross	Net
Dieri	51,178	43,501	51,178	43,501
Bas-fonds	18,592	15,803	14,873	12,642
Walo	20,081	17,069	9,987	8,489
Irrigated	53,819	32,657	47,623	28.939
Total	143,670	109,030	123,661	93,572

Source: Bureau of Agricultural Statistics provisional results for ABS statistics; FEWS field review for FEWS statistics. Notes: A 15% loss was applied to sorghum, millet and maize, and 40% to rice to arrive at net production. Production statistics by administrative levels were available only for rainfed (*dieri*)crops at mid-December, so it is not yet possible to provide a *wilaya-by-wilaya* production estimate. See Appendix 1 for explanation of percentages applied to derive FEWS production.

Pastoral Conditions

The poor spacing of the rains this year made for spotty pasture green-up. In general, the greening of pasture lands as measured by the Normalized Difference Vegetation Index (NDVI -- see inside back cover) was not as good or as far reaching as in 1989, but remains better than historical averages. Certain pastures did green-up quite well, notably in northern Trarza Wilaya, but there are reports that overgrazing and crowding is becoming a problem around existing water points.

Food Stocks

The Office of the AID Representative to Mauritania (OAR/M) continues to believe that household-level food stocks are minimal at best and likely to be depleted in most of the country. Other donors who participate in deriving the annual cereal balance have adopted an on-farm stock figure of 5,000 mt (half of the 10,000 mt figure adopted for the 1989/90 cereal balance exercise). The stock estimates in Table 5, below, use the 5,000 mt figure for on-farm stocks.

Table 5: Food Stocks On-Hand as of October 1, Compared to 1989/90 (mt)

Stocks Available	1989/90	1990/91
On-farm Stocks	10,000	5,000
CSA Stocks	38,200	12,347
Private Sector (Commercial)	6,000	6,000
SONIMEX	19,700	10,300
Total	73,900	33,647

Source: USAID/Mauritania. Notes: 1. The Food Security Commission (CSA) stock figure does not include the recently arrived 20,000 mt of U.S. wheat now awaiting distribution. 2. SONIMEX is the National Import/Export Company. 3. Private sector stock is a constant figure adopted for the cereal balance exercise and considered unchanged from last year. The 20,000 mt shipment of U.S. wheat arrived in October. Of this amount, 12,000 mt (destined for free food distribution as soon as possible) is currently being stored at the CSA warehouse in Nouakchott, while 8,000 mt is being auctioned to the private sector. The funds generated from sales will be used to finance the implementation of the free distribution program.

Projected Food Aid and Commercial Imports/Exports

The annual cereal balance exercise is currently ongoing among the major donors and the CSA. Projected 1990/91 commercial imports total 119,000 mt (private sector importing 10,000 mt of wheat and 45,000 mt of wheat flour; SONIMEX importing 64,000 mt of rice). No official cereal exports are expected (considering the poor harvest prospects, border closure with Senegal and economic stress, even unofficial cereal exports are expected to be negligible this year).

Early estimates of Mauritania's before-food aid cereal deficit surpass 100,000 mt. The committee currently working on the annual cereal balance has created two preliminary scenarios of cereal deficit following donor pledges. Both scenarios use the current ASB estimates of production (which most likely will be revised downwards) and a population estimate that is higher than that used by FEWS (2,091,000 versus 1,981,257).

The committee's first scenario considers only food aid that has arrived since October 1990 or has been officially pledged and scheduled for delivery before September 1991. In this scenario, food aid totals 43,500 mt (including the recently arrived 20,000 mt of U.S. wheat), and would leave the post-food aid cereal deficit at 86,560 mt.

The committee's second scenario adds in food aid recently requested by the GIRM (totaling 8,500 mt), and a further request totalling 63,000 mt expected from the GIRM soon (includes an additional request of the U.S. for 20,000 mt). In this scenario, food aid would total 115,000 mt and the post-food aid cereal deficit would be reduced to 15,060 mt. See Appendix 2 for a detailed table of both requested and envisioned 1990/91 food aid pledges.

Projected Food Consumption Needs

FEWS has changed October 1990 projections of the cereal deficit following updated information on harvest prospects. Disaggregated production data remains unavailable, however, since the ASB has not yet released statistics concerning surface area cultivated per *wilaya*. FEWS expects that this information will differ significantly from the 1989/90 breakdown of *wilaya* production, and so has not applied 1989/90 *wilaya*-by-*wilaya* harvest percentages to this year's total production estimate. This has prevented calculation of a *wilaya*-level cereal production balance.

Table 6 shows the FEWS estimate of Mauritania's cereal consumption requirement. Population figures were calculated by applying a 2.7% annual growth rate to the official 1988 census figures. Cereal needs were calculated using the official consumption figure of 165 kilograms (kg) per person per year.

Table 7 presents a provisional national cereal balance for 1991, comparing both ASB and FEWS preliminary production estimates. Regardless of the production estimate used (ASB or FEWS), Mauritania will have a serious uncovered cereal balance, even after expected food aid and commercial imports are considered. Appendix 2 shows the amount of additional food aid the GIRM is expected to request and the cereal balance implications of fulfilling the new request. Consumption needs are calculated using Table 6 figures rather than using those of the technical committee responsible for calculating the cereal balance rations (noted in Projected Food Aid and Commercial Imports/Exports, above).

Table 6: Projected Cereal Consumption Requirement for 1990/91 (mt)

Wilayas	1991 Population	Cereal Requirement
Hodh ech Chargui	203,204	33,529
Hodh el Gharbi	157,748	26,028
Assaba	171,986	28,378
Gorgol	185,679	30,637
Brakna	203,377	33,558
Trarza	253,657	41,853
Guidimaka	121,280	20,011
Total for Agricultural Wilayas	1,296,931	213,994
Total for other 6 Wilayas	684,326	112,914
Total	1,981,257	326,908

Source: Census Bureau (CEDES); Bureau of Agricultural Statistics (ASB); FEWS/Mauritania.

Table 7: Provisional 1991 Cereal Balance (mt)

1990/91 Cereal Balance	FEWS (ASB Production)	FEWS (Reduced Production)
Total Population	1,981,257	1,981,257
Cereal Requirement	326,908	326,908
Net Cereal Production	109,030	93,572
Production Shortfall	-217,878	-233,336
Seed and Feed Loss	-10,720	-10,720
Stock Replenishment	-2,353	-2,353
Import Requirement	-230,951	-246,409
Commercial Imports	119,000	119,000
Cereal Balance	-111,951	-127,409
Pledged and Landed Food Aid	43,500	43,500
Uncovered Cereal Balance	-68,451	-83,909

Sources: Population: CEDES, FEWS/Mauritania. Production Estimates: ASB; FEWS/Mauritania. Stocks: USAID/Mauritania. Food Aid: Food Programming Technical Committee. Note: The technical committee responsible for calculating the cereal balance scenarios adopts a higher population figure than the one used by OAR/M for calculating cereal consumption requirements (population: 2,091,000 versus 1,981,257; consumption requirement: 345,015 mt versus 326,907 mt). This explains the differences between the cereal balances shown in this table and those reported in Projected Food Aid and Commercial Imports/Exports, above. The higher population figure was adopted by the technical committee to accommodate an influx of Mauritanian repatriates returning from Senegal in 1989. OAR/M believes this is negated, however, by an equal or larger population leaving the country during the same period.

FACTORS AFFECTING FOOD ACCESS

Market Conditions

Food stress is considered high throughout Mauritania. Cereal prices remain much higher than average almost everywhere in the interior of the country. The mediocre *dieri* and catastrophic *walo* harvest outlook provides a key in explaining these high cereal prices. Traditional cereals, such as sorghum, are reporting price jumps of up to triple what was reported at the beginning of the planting season. The CSA *wilaya* warehouse stocks are minimal, and in some *moukhaatas* (formerly called departments), supplies are already depleted.

UPDATE ON VULNERABILITY

The two groups deemed extremely vulnerable in the June 1990 FEWS Vulnerability Assessment (urban poor displaced from Nouakchott and Senegal River Valley farmers) continue

to be considered extremely vulnerable (at risk) to famine. The 1990/91 poor harvest outlook significantly increases the vulnerability of the 25% of farmers already noted to be at-risk in the June report. FEWS predicts that the impact of this second poor season will raise the number of those extremely vulnerable to food crises to approximately one third or more of the River Valley farmers (100,000 or more). These farmers should be targeted for at least six months of food aid. Once disaggregated harvest figures are available, it may be found that the extremely vulnerable status extends even to farmers further east, in Hodh el Gharbi and Hodh ech Chargui *wilayas*.

In addition to the poor harvest, there are continuing hardships (reported on a regular basis) that exacerbate the river farmers' vulnerability over time. On-farm stocks are completely exhausted almost everywhere and reports continue of high emigration to urban centers in search of employment. Disruption of the border trade with Senegal, which traditionally has been an important part of the unofficial economy, has had an enormously negative impact on food security. The effects of the current ban on river fishing, which always complemented agriculturally-derived food supplies, cannot be underestimated when analyzing changes in food access. Other indicators of stress include reports of herd reduction and increased animal sales at lower than average prices by both agropastoralists and pastoralists (signaling a need to sell even at a loss to obtain food).

The second extremely vulnerable group consists of approximately 20,000 people living in shantytowns outside of Nouakchott, who were relocated to areas 9-16 kilometers south of the city along the road to Rosso. Infrastructure and support mechanisms such as adequate water supply, waste disposal, housing and electricity are still not in place. Almost one year has passed since the involuntary displacement began, yet living conditions continue to be deplorable. The high cost of transportation into Nouakchott remains a major obstacle to both work and continued schooling. Reported malnutrition levels are alarming.

CONCLUSIONS

The harvest outlook for 1990/91 is poor. Although final estimates will not be available for several months, preliminary figures provide a baseline for provisional cereal balance estimates. The 109,030 mt net figure previously released by the ASB is accepted as optimistic. More recent evidence suggests that production will be closer to 93,572 mt net. Depending on the production estimate used, Mauritania will only cover between 28 and 33% of it's 1991 cereal consumption requirement with domestic production.

In the June 1990 Vulnerability Assessment, approximately 25% (75,000) of the population living in the Senegal River Valley and 25% (5-6,000) of the inhabitants in Nouakchott shantytowns were classified as at risk of famine in 1990. As 1991 begins, OAR/M estimates that up to a third (100,000) of the traditional farmers in the River Valley, and possibly some farmers further east, will be at risk of famine as a result of catastrophic harvest results for the second year in a row. The number of shantytown inhabitants who are under extreme duress has also increased (to 20,000) owing to a continuation of conditions noted in June. The extremely vulnerable farmers and shantytown dwellers require at least six months of food aid.

In order to avoid or at least minimize widespread hunger and possible famine, this situation must be addressed without delay. Emergency donor assistance will be required earlier in 1991 than in other years (Mauritania is a chronic food deficit country, even a good harvest only covers around 40% of it's food needs). All donor food pledges should be made as quickly as possible with scheduled arrival in Mauritania before May 1991.

APPENDIX 1

Notes for FEWS' Initial 1990/91 Cereal Production Estimate:

DIERI - All figures remain unchanged from those estimated by the ASB in their preliminary 1990/91 assessment.

BAS-FONDS - Updated *wilaya* information and qualitative surveillance during a December 1990 field mission suggested a significantly less optimistic crop. FEWS reduced the ASB preliminary *bas-fonds* crop estimate by 20%.

DECRUE (a type of *bas-fonds*) - Following extensive talks with several officials in the effected *wilayas* (Trarza and Brakna), all data and estimates report a maximum of half the production reported for 1989/90. FEWS estimates are 50% of those reported by the ASB last year.

WALO - Both field verification and updated *wilaya* reporting confirm that there was no river recessional planting in either Trarza or Brakna this season. Information provided by *wilaya* officials in Gorgol led FEWS to estimate *walo* production at approximately 30% of last year. All other *wilayas* are considered to have no *walo* production this year.

IRRIGATED:

(SONADER) - FEWS used the preliminary figures given by the SONADER home office (accepted by the ASB), reduced only with updated information on production in Gorgol Wilaya (provided by SONADER representatives). SONADER is the parastatal for rice production.

(M'POURIE) - FEWS analyses included surface area equal to that provided by the ASB but yield per hectare was cut in half (from 4 mt to 2 mt), owing to late planting and pests. This information was provided by M'pourie Scheme representatives during the field trip.

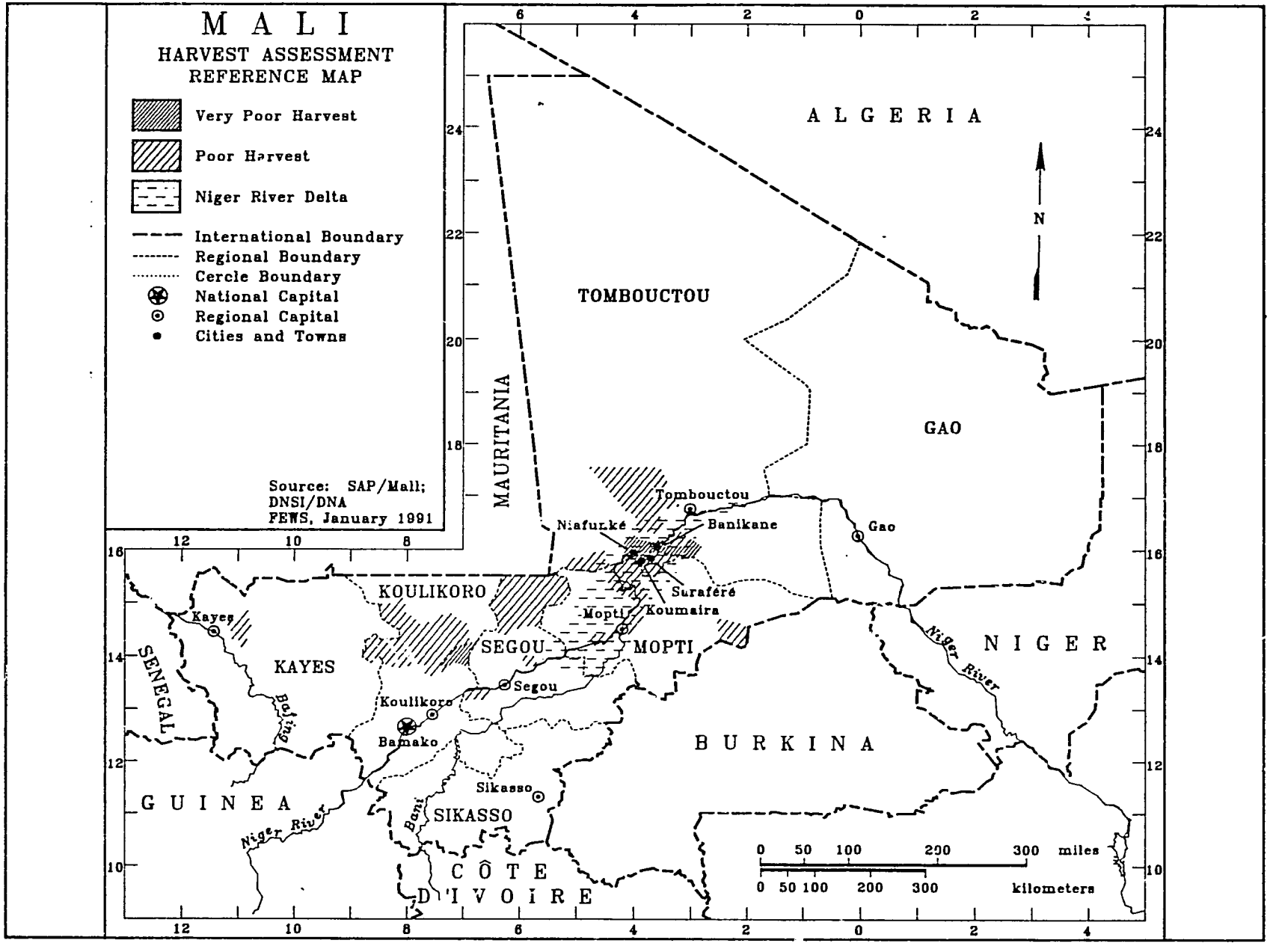
PRIVATE SECTOR IRRIGATION - FEWS used the Agriculture and Livestock Federation estimated production figure of 16,000 mt of paddy rice.

Appendix 2: 1990/91 Programmed and Conceivable Food Aid (mt)

Food Aid	Sales	Free	FFW	Total	Uncovered Deficit	
					ABS	FEWS
Arrived	10,000	12,000	0	22,000		
Enroute	19,000	0	2,500	21,500		
Sub-Total	29,000	12,000	2,500	43,500	-68,450	-83,909
Recent GIRM Requests	2,500	4,000	2,000	8,500		
Sub-Total	31,500	16,000	4,500	52,000	-59,951	-75,409
Possible GIRM Requests	41,000	22,000	0	63,000		
Total	72,500	38,000	4,500	115,000	3,049	-12,409
of which: Wheat	66,000	38,000	4,500	108,500		
Rice	6,500	0	0	6,500		

Source: Food Programming Technical Committee. Note: FFW is Food-for-Work.

Map 3: Mali Reference Map



MALI

Good Harvest Not Shared by All

USAID/Mali and FEWS/Mali report received in Washington December 18,1990

SUMMARY

A modest national food surplus is anticipated. Crop harvests were good in the South but poor in localized areas of the Sahelian Zone (see Map 3). Access to the surplus may be limited for vulnerable populations, because of low food reserves and decreased purchasing power from declining livestock prices. This will make 71,000 people extremely vulnerable to (at risk of) food shortages as early as February 1991. A further 1.54 million rural residents will be moderately vulnerable to food stress because of poor harvests. In addition, civil unrest in and outside of Mali has made about 238,000 persons moderately vulnerable. Of these, 218,000 are nomadic pastoralists in Gao Region and 15,000 are Mauritanians in Kayes Region. Approximately 5,000 refugees from Liberia are located in Bamako. Nevertheless, most emergency food needs could be met locally if donors support purchase and transport of in-country supplies, and if such supplies remain available on the market.

FACTORS AFFECTING FOOD AVAILABILITY

Agrometeorological Conditions in 1990

Precipitation was near or above average in much of the South and Southwest of the country. These areas account for most of the national crop production. Nevertheless, highly localized areas in the Sahelian Zone suffered below average rainfall, particularly during August when water requirements were greatest. Below average rainfall in the North has also resulted in early drying of water points used by livestock.

METEOSAT and Normalized Vegetation Difference Index (NDVI -- see Key Terms) images indicate that late September and early October rainfall spurred vegetative growth throughout the Sahelian and lower Saharan zones. Previously (from mid-August to mid-October), vegetative conditions as indicated by NDVI images had been below the 1982-89 average along the northern fringes of the Sahelian Zone.

River levels along the upper Niger were satisfactory. Low river levels along the Bani, however, have reduced the rice yield in major rice producing zones along its course and along the lower Niger (north of the Bani-Niger confluence at Mopti).

Harvest Outcome

The 1990/91 cereal harvest will be slightly less than that of 1989/90 (see Table 8). Preliminary estimates from the National Directorate for Statistics and Informatics and the National Directorate of Agriculture (DNSI/DNA) joint agricultural survey show a total cereal production of 2.06 million metric tons (mt). The 2 million mt estimate has been supported by estimates calculated by the United Nations Food and Agriculture Organization/Permanent Inter-State Committee to Combat Drought in the Sahel (FAO/CILSS) Sahelian Agricultural Production Survey, based on rainfall, temperature, and plant growth data.

Table 8: 1990 Gross Cereal Production Compared to 1989 and 10-Year Average (000 mt)

Region	Average	1989	1990	% of Avg	% of 1989
Kayes	112	165	126	113	76
Koulikoro	215	373	347	161	93
Sikasso	327	536	497	152	93
Ségou	448	659	640	143	97
Mopti	189	239	273	144	114
Tombouctou	33	134	127	385	95
Gao	13	33	48	369	145
Total	1,337	2,139	2,058	154	96

Source: 1990 harvest estimate is based on the 1990 DNSI/DNA Agricultural Survey.

In spite of 1990/91 being a generally good crop year, scattered areas throughout the Sahelian Zone experienced major crop losses. A major infestation of blister beetles combined with the mid-August dry spell had adverse effects on the corn and millet crop in localized spots in *cercles* in northern Koulikoro and Ségou regions (Mali's primary administrative units are regions, secondary units are *cercles*, and tertiary units are arrondissements). Significant losses also occurred because of grasshopper infestations in several localized areas of Mopti and Koulikoro regions. Low river levels in the Bani and lower

Niger reduced rice production. Many of these areas suffered crop losses in 1989/90 and have depleted food stores.

Pasture Conditions

Mid-August drought resulted in a decrease in range quality throughout the Sahelian Zone. September rainfall spurred late season growth and improved range quality. The primary limiting factor for pastoral activities may be water availability, which declined following poor rainfall in pastoral zones.

Drought conditions and civil unrest in Gao and Tombouctou regions have spurred unusual herd movements. Herds moved early into the Delta region and across the Niger River from the North. Civil unrest in Mauritania also resulted in extensive herd concentrations in Kayes.

The establishment by the Government of the Republic of Mali (GRM) of zones over the northern two-thirds of Gao Region in which travel is prohibited has forced the pastoral population to concentrate in a relatively small area in the southwest of the region. These areas may not support livestock for more than a few months.

Food Stocks

Food stocks remain low in Mali. On-farm stocks average about 67 kg per rural resident, or about a 4.3-month supply. National security stocks have remained about 30,000 mt from August through November. Efforts to bring the stocks up to their 58,500 mt maximum began in December with a call for bids on grain delivery. The ability of the GRM to reconstitute these stocks will be a good indicator as to whether a food surplus indeed exists. So far, the number of submissions in response to the GRM's call-for-bids is good.

Projected Cereal Consumption Requirements

USAID/Mali completed an assessment of food needs in November using estimates of on-farm stocks from the DNSI, production from the DNSI/DNA joint agricultural survey, and average per capita consumption rates based on aggregate food availability from prior years. Using a per capita consumption rate of 185 kg, cereal balances show a before-import deficit of 24,000 mt for rice and a coarse grain surplus of 144,000 mt. Consolidating rice and coarse grain statistics, Table 9 shows the region-by-region cereal production balance for 1990 (net production minus cereal consumption requirement).

Table 9: Regional Coarse Grain and Rice Production Balances (000 mt)

Region	1990 Population (000)	Cereal Requirement (kg)	Gross Production	Net Production	Balance
Kayes	1,157	214	126	107	-107
Koulikoro	2,013	372	347	294	-78
Sikasso	1,747	323	497	418	95
Ségou	1,453	269	640	504	235
Mopti	1,391	257	273	202	-55
Tombouctou	498	92	127	101	9
Gao	41	8	48	29	21
Total	8,300	1,535	2,058	1,655	120

Source: Population is based on the 1987 census and adjusted for a 2.5 percent annual growth rate. The annual consumption requirement is based on the USAID-calculated 1981-87 per capita consumption rate of 185 kg per person. The 1990 harvest estimate is based on the 1990 DNA/DNSI Agricultural Survey.

Total imports could reach 86,760 mt of rice and 40,000 mt of coarse grain, particularly since bans on rice importation are being selectively lifted. Mali's cereal production balance of 120,000 mt could therefore result in a cereal surplus of about 247,000 mt (see Table 10).

It is unknown if the overall surplus will be available to meet critical food needs in some areas. Farmers may use the surplus to build on-farm stocks or for exports. If this happens, it will not be available for purchase and subsequent distribution to needy populations. Foreign food aid and emergency food shipments from the National Security Stock would then be necessary to meet these needs.

Update

On January 7, the GRM announced a 400,000 mt cereal deficit and requested 190,000 mt in food assistance from the donor community to cover the anticipated shortfalls. Of the request, 5,000 mt is to be programmed for immediate delivery to Gao and Tombouctou regions, while the remaining 185,000 mt would be pre-positioned in production deficit areas in anticipation of problems during the year. The deficit is based on a revised harvest estimate of 1.798 million mt gross and a per capita annual consumption rate of 212 kg. Following a January 9 regular meeting of food aid donors, USAID/Mali reported "consensus among the donors that the situation remained unclear and that further GRM-donor dialogue was needed to arrive at a consensus view of the current situation and the more appropriate and effective response to it."

FACTORS AFFECTING FOOD ACCESS

Market Conditions

Cereal prices have increased throughout calendar 1990. In GRM Famine Early Warning System (SAP/Mali)-monitored regions (mostly deficit zones), prices in October are at a higher absolute level than in any of the previous three years. Figure 2

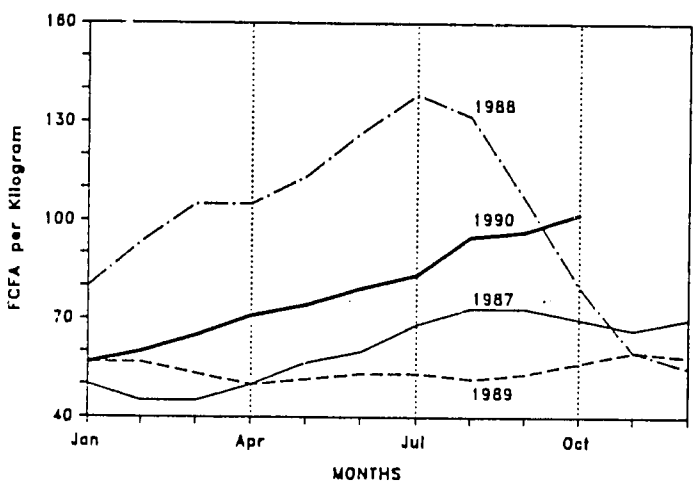
Table 10: National Cereal Balance (mt)

Commodity	Rice	Coarse Grains	TOTAL
Consumption Req't (kg/year non-milled)	30	155	185
Population			8,300,000
Consumption Requirement	249,000	1,286,500	1,535,500
Gross Food Production	375,682	1,682,722	2,058,404
Non-food Uses	150,273	252,408	402,681
Net Food Production	225,409	1,430,314	1,655,723
Production Balance	-23,591	143,814	120,223
Commercial Imports	86,760	40,000	126,760
Cereal Balance	63,169	183,814	246,983

Sources: USAID/Mali; FEWS/Mali

presents millet price in Mopti, which demonstrates this general trend and the elevated price level. Part of the increase is normal seasonal behavior for cereal prices at the approach of the harvest. However, market expectations for the 1990 harvest have neither stabilized the price trend nor caused a significant decline in that trend, implying less confidence in the harvest than in previous years. In addition, the higher price level suggests reduced access to cereals, assuming static or declining incomes.

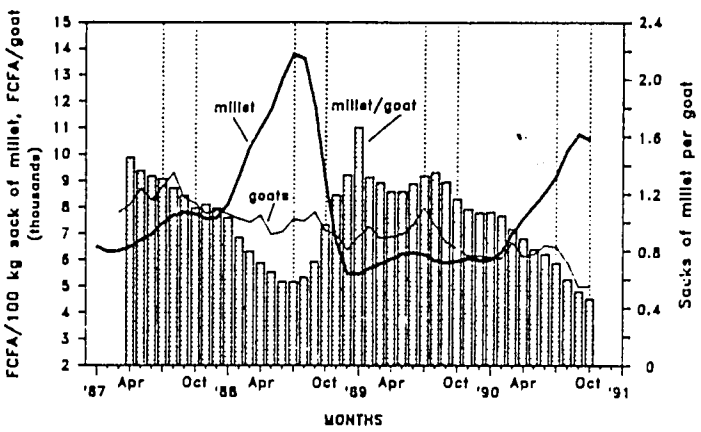
Figure 2: Nominal Monthly Millet Prices, Mopti, 1987-90



Source: SAP/Mali; FEWS/Mali. Note: three-month moving average used.

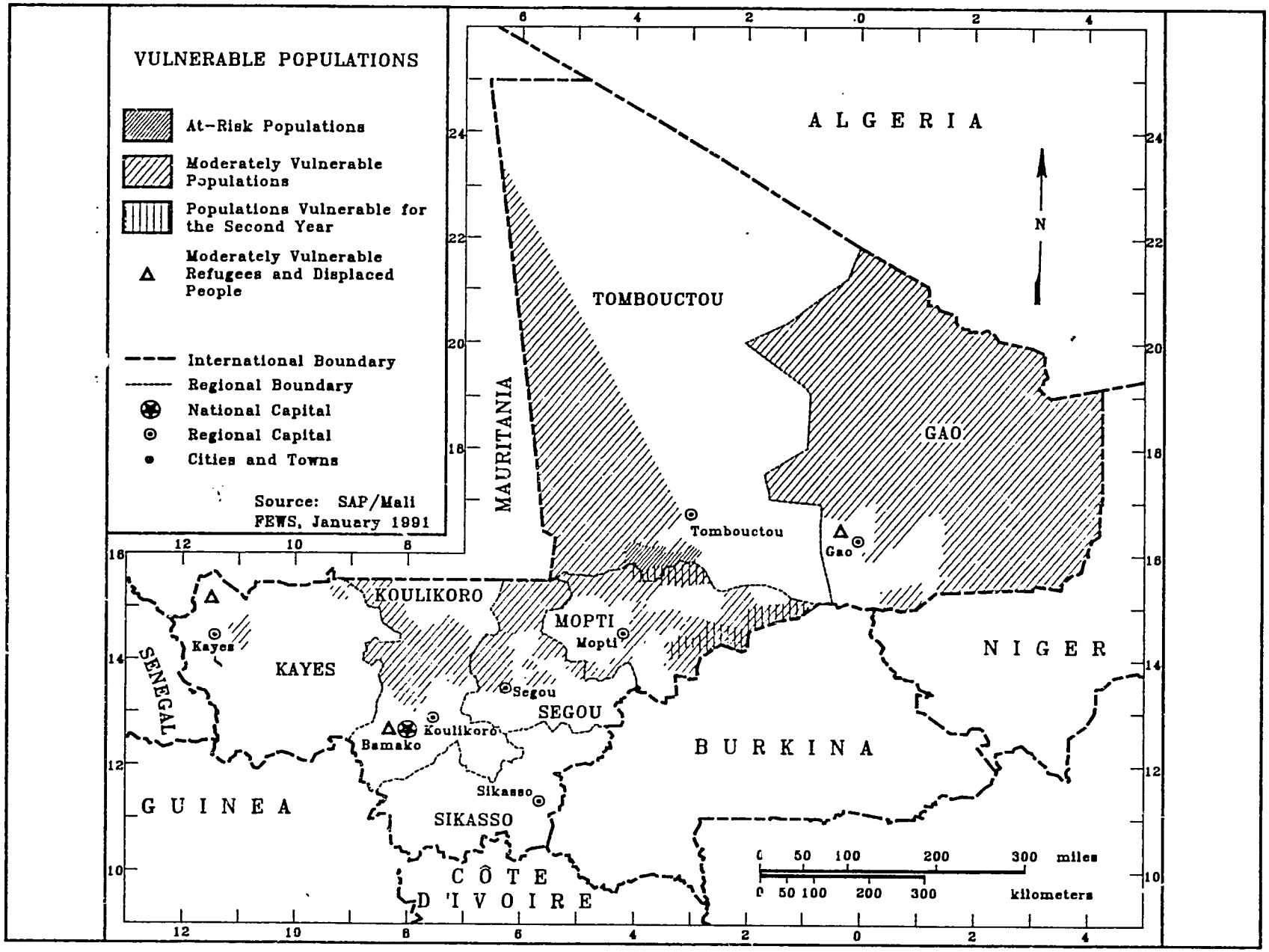
Average goat prices over SAP/Mali-monitored areas decreased by 42% from July 1987 to October 1990. Average millet prices exhibit similar behavior to that described above (see line graphs in Figure 3). The long-term decline in goat prices may indicate a more structural problem in the livestock markets. The slight October 1990 decline in average millet prices evident in Figure 3 is later than in previous years, which also reflects reduced confidence in the harvest. Note that the individual Mopti price from Figure 2 did not decline, whereas the average over many markets in Figure 3 declined slightly. This is probably due to different local conditions and the averaging of prices over many markets. Millet prices do not exhibit the same long-term trend as goat prices. Rather, millet price variation can be explained from seasonal and annual fluctuations.

Figure 3: Terms of Trade between Millet and Goats, Average of SAP/Mali-monitored markets



Source: SAP/Mali, FEWS/Mali. Note: Lines indicate prices of millet and goats. Bars indicate the number of sacks of millet that can be bought with the proceeds from selling one goat.

Declining goat prices are also significant in determining the terms of trade between cereal and livestock. Livestock are often sold by agropastoralist and pastoralist households in order to purchase grain. The purchasing power of these households, as reflected in the terms of trade between millet and goats, fell dramatically from October 1988 to October 1990 (see bars in Figure 3). These terms of trade have continued to decline since July 1990, rather than rebounding as in late 1988. As can be seen in Figure 3, the quantity of millet obtained in exchange for selling one goat in October 1990 is less than half that obtained for the same time in 1988 and 1989. Households that are dependent upon livestock-for-cereal exchanges for their cereal needs will experience decreased access, and can be expected to increase liquidation of their assets, substitute other food stuffs for their usual cereal consumption, increase migration in search of work, or otherwise attempt to cope.



Map 4: Vulnerable Populations in Mali

UPDATE ON VULNERABILITY

The same general areas identified as being either at risk of or moderately vulnerable to famine at the start of the 1990/91 agricultural season will continue to face food stress at its close (see Map 4). Two factors are behind the continuing food stress: transhumance disrupted by zones of civil unrest and poor crop harvests. In all, 1,849,000 people are vulnerable to food stress during the next year. More than 71,000 of these are extremely vulnerable, and will need food distributions starting in February.

SAP/Mali identified 60 arrondissements as being vulnerable due to poor harvests and range conditions. These have a total estimated rural population of 1,540,000 based on figures adjusted from the 1987 census. These areas have extremely limited commercial and private food stocks. Unusually large portions of the population are leaving these areas in search of work.

Four arrondissements in Niafunké Cercle (Tombouctou Region) have suffered massive crop failures caused by drought. SAP/Mali has classified them as being "at-risk." An estimated 71,200 to 75,600 people in these arrondissements will need food distributions starting in February 1991. SAP/Mali has recommended the distribution of 1,274 mt of grain in Banikane and Koumaira arrondissements. Recommendations on the amount of food distributions that are necessary in Niafunké and Saraféré arrondissements will be made at the end of 1990. Food stocks are dangerously low or non-existent in these areas and cereal is scarce on the market. Major portions of the rural population are migrating to urban centers or out of the country in search of work.

Up to 218,000 people in Gao are vulnerable because of civil unrest. GRM establishment of prohibited zones in the northern two-thirds of the region has disrupted and highly curtailed traditional transhumant patterns in the Saharan Zone.

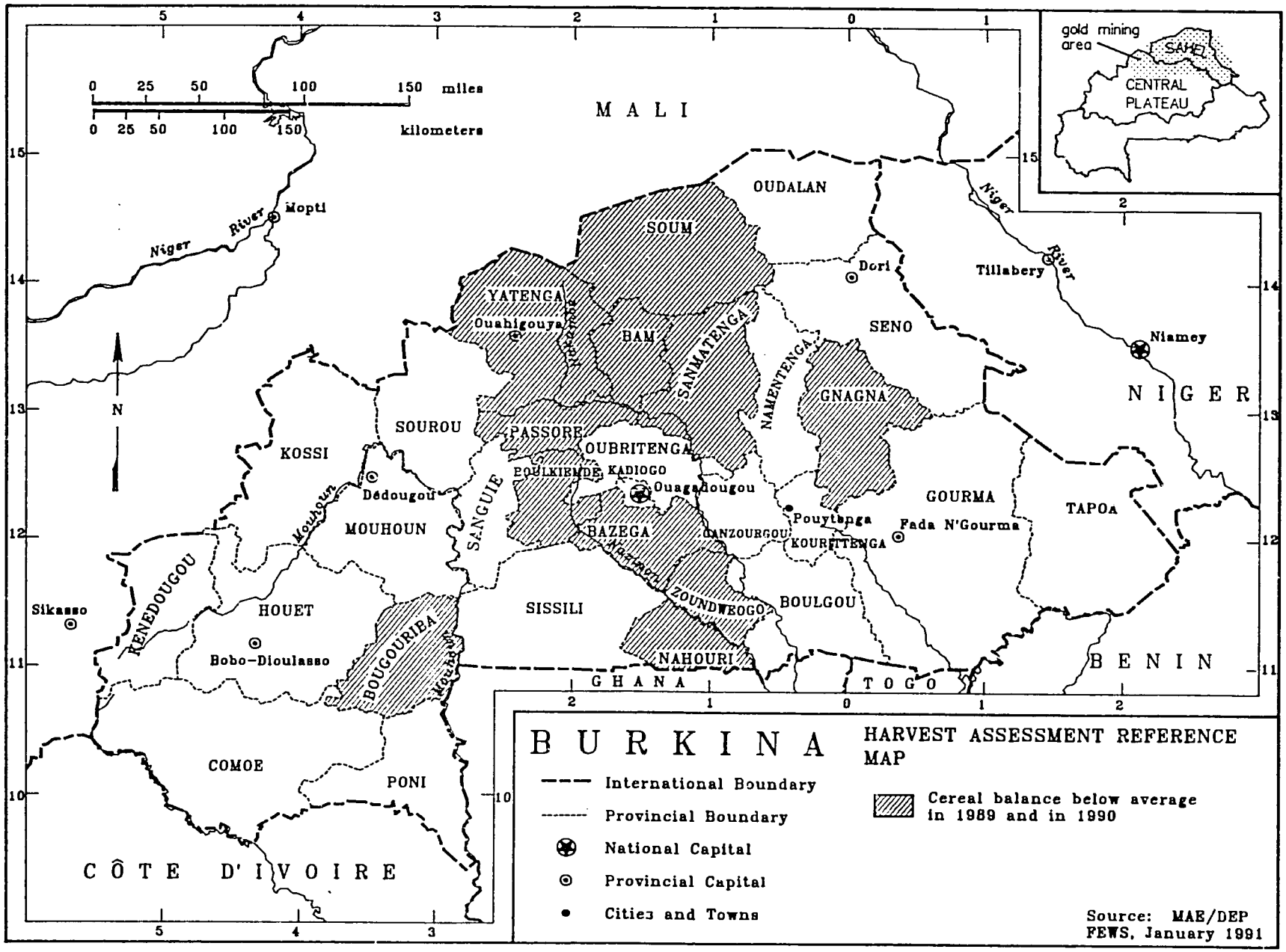
The civil war in Liberia displaced an additional 5,000 people. They are mainly located in Bamako. Civil strife has displaced 15,000 Mauritanians. The latter are found primarily in Kayes Region. GRM requested United Nations High Commission on Refugees (UNHCR) assistance for these refugees in September.

CONCLUSIONS

A generally good crop harvest and possible easing of import restrictions should ensure that the potential food supply will meet national needs. Cereal prices are higher in deficit regions than at the same time last year, however, signalling uncertainty over the cereal supply in 1991. Significant populations may not have suitable access to food supplies following crop failures and declining livestock prices. This is especially true for more than 71,000 residents of Niafunké Cercle in Tombouctou Region. SAP/Mali has recommended an initial distribution of 1,274 mt and possibly more in Niafunké Cercle.

Disruptions of herd movements and subsequent degraded pasture conditions make 218,000 pastoralists in Tombouctou and Gao regions vulnerable to food stress. Another 15,000 Mauritanians in Kayes Region are similarly affected.

Fortunately, a good harvest in the south of Mali may enable emergency food needs to be met locally, though donor assistance will be necessary to purchase and transport grain. Continued monitoring of population movements, livestock and cereal prices, local market supplies of cereals, and in-country food stocks will be necessary to determine developing food stress conditions in vulnerable areas.



Map 5: Burkina Reference Map

BURKINA

Emergency Food Aid Required

USAID/Burkina and FEWS/Burkina report received in Washington December 20, 1990

SUMMARY

The Government of Burkina (GOB) estimates the 1990/91 national cereal production balance (cereal production minus consumption requirement) to be deficit by 245,000 metric tons (mt). The national net cereal deficit (cereal production, stocks and imports minus consumption needs) is about 127,000 mt. The major part of this deficit is in eleven provinces of the Central Plateau that also had worse than average cereal deficits in 1989/90 (see Map 5). The result has been high prices for cereals and low prices for livestock, which has severely reduced purchasing power. Approximately 2.6 million smallholder farmers are at least moderately vulnerable to food crises following two consecutive years of low household incomes. Among those smallholders, approximately 1.2 million women and children are extremely vulnerable (at-risk). Burkina has received commitments of 46,000 mt of emergency food aid to augment the small amount of available in-country stocks. The GOB will distribute 30% of the food aid to Food-for-Work programs, 30% will be given away, and 40% will be sold at a social price that is less than the market price.

FACTORS AFFECTING FOOD AVAILABILITY

Harvest Outcome

Late planting and below-average rainfall made the 1990 cereal production year the worst since 1987. Provisional cereal production estimates are available from the Ministry of Agriculture and Livestock/Department of Evaluation and Planning (MAE/DEP). The methodology used for these estimates was to ask the 2,500 farmers participating in the GOB National Agricultural Sample Survey to rate this year's cereal production as compared to that of last year. The resulting estimate of gross cereal production for 1990/91 is 1,785,300 mt. This is about the same as the 1985-89 average, but considerably below last year's 1.95 million mt. The provinces that were the most seriously affected by the drought conditions are in the densely-populated Central Plateau.

Pastoral Conditions

Pastures in Yatenga, Soum, Bam and Sanmatenga provinces are in very poor condition because of below average rainfall over the rainy season. Surface water for livestock is also scarce in these provinces. The poor conditions for livestock will cause a movement of herds to eastern Burkina, where Normalized Difference Vegetation Index imagery (NDVI – see inside back cover) indicates pastures are in average condition (Séno, Gourma and Tapoa), and also to the south, where pastures are in good condition.

Food Stocks

As of December 1, 1990, the *Office Nationale des Céréales* (OFNACER) was holding Stabilization Stocks of 16,000 mt and Security Stocks of 28,000 mt. On-farm stocks were estimated by the MAE/DEP to be 28,000 mt and rice stocks to be 45,000 mt as of October 31. These stocks total 117,000 mt. They are not expected to cover the estimated national cereal production deficit of 245,000 mt, however, and the GOB has requested 100,000 mt of emergency food aid.

Food Aid

In a meeting of donors on December 18, 1990, there were commitments of emergency aid, totalling about 46,000 mt (shown in Table 11). In addition, Italy will make 300 million West African Francs (FCFA) available from counterpart funds and provide 1 billion FCFA of food commodities. Revenues from the sale of these commodities will be used to purchase local cereals. The Netherlands and the U.S. will also contribute, but they have not yet committed to a specific amount.

Cereal Balance

The cereal production balance for Burkina compares net cereal production (85% of gross) to the consumption requirement for the population (assumed to be 190 kilograms per person per year). It gives a general indication of the amount of cereal available for the market and is therefore a good indicator of the economic situation of the smallholder farmers, who depend on cereal production for their livelihood.

The national cereal production deficit for Burkina in 1990/91 is estimated to be 245,000 mt. This is considerably worse than the 1985-89 average deficit of 100,000 mt and last year's deficit of 56,000 mt. Even when expected stock drawdown and programmed imports are applied against this year's production deficit, there still remains an uncovered cereal balance of -127,000 mt (see Table 12).

Table 11: Commitments of Emergency Aid

Agency	Commodity or Contribution	mt
World Food Program		
Program in progress	Cereals	10,272
Emergency Program	Cereals	6,000
Japan	Rice	1,636
Catholic Relief Services School Feeding Food for Work	Cereals	9,000
Germany	2 million DM Cereals (approx.)	10,000
France	Wheat White Sorghum	5,000 3,000
European Economic Community	125 Million FCFA Rice Other Commodities	200 985
Switzerland	1 million SF for local purchase or transport	
Canada	5 million Canadian $	

Source: USAID/Burkina

Table 13 summarizes the cereal production balance by province and compares the 1990/91 balance to the 1985-89 average. Seventeen of Burkina's thirty provinces are deficit this year. The deficit in Yatenga is worse than the 1984 drought. Eleven provinces have had cereal production balances less than the 1985-89 average for two consecutive years. Households of smallholder farmers in these 11 provinces face food access-related stress from severely eroded purchasing power and the inability of the local market to supply cereal.

Table 12: GOB National Cereal Balance Estimate for 1990/91 (mt)

Cereal Production Balance	-245,000
Stock Drawdown	14,000
Gross Balance	-231,000
Programmed Imports	93,000
Uncovered Cereal Balance	-127,000

Source: GOB

Table 13: Comparisons of Provincial Cereal Balances (mt)

Province	Population 5/1991	1990 Production (net)	Avg. Cereal Balance 1985-89	Cereal Balance 1990-91	Deficit Years
Yatenga	562,063	50,235	-36,741	-56,707	89,90*
Boulkiemdé	394,879	41,140	-8,006	-33,977	89,90*
Bazéga	351,743	34,595	-3,446	-32,296	89,90*
Passoré	234,461	22,695	2,863	-21,853	89,90*
Soum	217,319	20,825	-15,311	-20,466	89,90*
Sanmatenga	406,024	58,735	-1,503	-18,950	89,90*
Nahouri	121,469	4,930	-7,051	-18,359	89,90
Bam	173,933	15,810	-5,931	-1,7237	89,90*
Zoundwéogo	175,640	19,465	-1,829	-1,4087	89,90
Gnagna	272,159	37,995	7,745	-1,3715	89,90*
Bougouriba	243,902	50,490	8,266	3,879	89,90
Kadiogo	655,960	23,035	-92,237	-10,1597	'90
Sourou	313,515	42,330	-2,078	-17,238	'90
Oubritenga	328,971	57,375	-2,605	-5,249	'90
Namentenga	215,040	31,025	-7,062	-9,833	'90
Kouritenga	227,325	17,765	-15,416	-25,457	'90
Boulgou	465,498	34,765	4,939	-54,640	'90
Comoé	296,881	86,870	17,077	28,363	
Ganzourgou	224,079	64,005	3,777	21,190	
Gourma	349,458	81,770	12,224	15,043	
Houet	719,993	164,560	8,876	23,231	
Kénédougou	161,987	52,275	13,286	20,177	
Kossi	389,350	125,545	28,352	51,539	
Mouhoun	337,636	91,715	11,949	26,814	
Oudalan	123,536	12,920	-10,845	-10,552	
Poni	260,007	58,990	-3,991	9,439	
Sanguié	234,919	48,025	2,911	3,300	
Séno	266,286	65,705	-12,090	15,111	
Sissili	296,958	62,645	2,480	5,893	
Tapoa	188,674	39,270	1,123	3,302	
Total	9,209,665	1,517,505	-100,279	-244,932	

Source: MAE/DEP, USAID/FEWS. Notes: * indicates that the moderate vulnerability of the province was foreshadowed in the FEWS Vulnerability Assessment of June 1990. Provincial population projections for April 1991 are based on exponential extrapolations of the 1985 census. In this table, cereal balance equals net production minus cereal requirement.

FACTORS AFFECTING FOOD ACCESS

Market Conditions

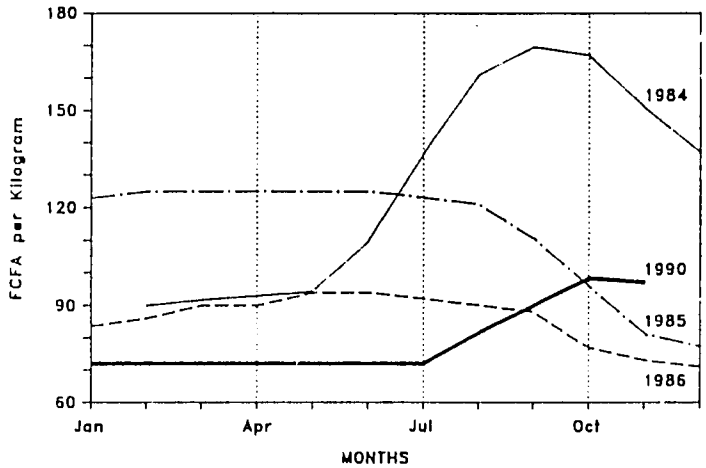
Cereal prices monitored during the harvest season (August through December) by OFNACER's Market Information System (SIM) have dropped only slightly in surplus production areas and not at all in deficit areas. In Dédougou, the capital of normally-surplus Mouhoun Province, the millet price fell during the harvest season from 81 West African Francs per kilogram (FCFA/kg) to 68 FCFA/kg. The same period in 1989 saw this price fall from 82 to 47 FCFA/kg in Dédougou. The smaller decline of 1990/91 suggests that market confidence in the 1990/91 harvest is less than that for the 1989/90 harvest. In Bobo-Dioulasso, the capital of surplus-producing Houet Province, the price fell from 100 to 89 FCFA/kg during this same period, reinforcing the impression of a lack of market confidence in this year's harvest.

Deficit areas exhibited little or none of the normal harvest-related decline in millet prices. Millet prices at Pouytenga Market in Kouritenga Province have remained near 78 FCFA/kg throughout the harvest period, again indicating reduced expectations for the 1990/91 harvest. The capital city market (Ouagadougou) exhibits similar behavior (see Figure 4), with prices increasing throughout the harvest period rather than declining in expectation of a new supply, as is normal. Ouagadougou price levels for November (97 FCFA/kg) were also higher than in previous years (1987, 1988 and 1989 November millet prices were 60, 88, and 72 FCFA/kg, respectively). Assuming stagnant or declining incomes, higher prices will require households to devote a greater share of their budgets to cereals, harming household food security over the months leading to the next harvest.

Other Economic Resources

Besides agricultural production, important sources of household income in Burkina include remittances from family members working in urban areas and in Côte d'Ivoire, livestock production, and artisanal gold mining. These activities are extremely important in the fifteen provinces that are chronically cereal deficit (see Table 13, negative average 1985-89 balances). Gold mining can provide a subsistence living for approximately 75,000 people in the northern half of Burkina (about six to seven percent of the region's population, see insert on Map 5).There have been no significant changes in the amount of remittances. The *Système d'Alerte Précoce du Sahel* (SAP/Sahel -- funded by OXFAM and Save the Children Fund/United Kingdom) reports that livestock prices are dropping as people realize that it will be difficult to support livestock in the coming months. This price drop will significantly reduce the purchasing power of agropastoralists in Yatenga, Passoré, Soum, Bam and Sanmatenga provinces. Income from the sale of livestock will be reduced as prices drop in response to low demand, increased supply on the market and poor animal health.

Figure 4: Nominal Monthly Millet Prices, Ouagadougou, 1984-86 and 1990



Source: GOB/INSD; FEWS/W. Note: Three-month moving average used.

UPDATE ON VULNERABILITY

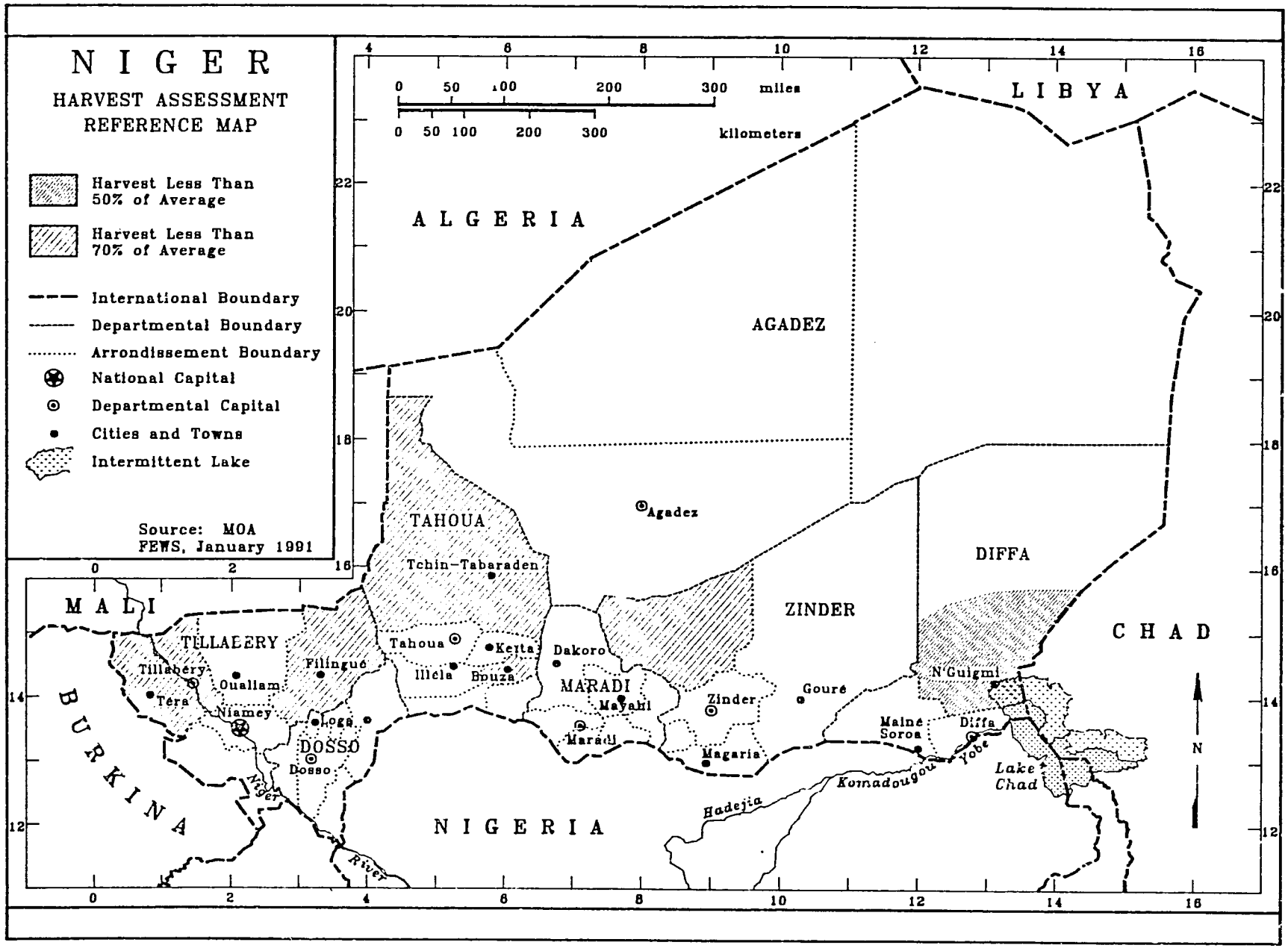
Smallholder farmers make up some 85% of the population in the eleven provinces that have had a below average cereal deficit for two consecutive years. This is about 2.6 million people, who are at least moderately vulnerable to food shortages. Of those smallholders, 1.2 million women and children are extremely vulnerable (at-risk). Of the eleven provinces currently in need of emergency food assistance, eight were foreshadowed in the FEWS Vulnerability Assessment of June 1990 as being moderately vulnerable to food crises due to a below-average cereal production deficit in 1989 (see Table 13).

Although the GOB has not yet made its distribution plans final, it does propose that 30% of the food aid be allocated to Food-for-Work programs, 40% be sold at a social price and 30% be distributed for free. The GOB will make 3,000 mt from OFNACER available in the first quarter of 1991 to help cover food needs until overseas shipments arrive.

CONCLUSIONS

Burkina has eleven provinces that have had below-average cereal production balances for two years in a row. The primary source of income for food has thus been severely reduced for the 85% of the population who depend on cereal production for their livelihood. A total of 1.4 million people are moderately vulnerable and 1.2 million women of child bearing age and infant children are extremely vulnerable to food crisis. The GOB and donor organizations are cooperating in the process of requesting and delivering at least 75,000 mt of emergency food aid.

Map 6: Niger Reference Map



NIGER

A Second Poor Harvest: Food Assistance Required in Several Regions

USAID/Niger and FEWS/Niger report received in Washington on December 22, 1990

SUMMARY

The 1990 rainy season was not good in many parts of Niger, leading to poor pasture development, reduced cereal production and decreased supplies of surface and ground water. Regions where the harvest was poor in both 1989 and 1990 have become increasingly vulnerable to severe food shortages because of decreasing purchasing power. These areas will require external assistance in 1991. Other areas, newly vulnerable following a poor 1990 harvest, may require assistance if non-farm income and stocks prove to be insufficient. Livestock owners' vulnerability also increased, owing to poor terms of trade for cereal purchase and generally below average pasture conditions.

FACTORS AFFECTING FOOD AVAILABILITY

Harvest Outcome

According to Niger's Ministry of Agriculture (MOA), the 1990 cereals harvest was mediocre for the country as a whole and poor in some areas (see Map 6). The growing season was characterized by insufficient, poorly distributed rain. A particularly severe drought period occurred in August during the most important period of grain development. Together with grasshopper and other pest activity in areas receiving adequate rain, the drought greatly reduced overall production potential. Gross production of millet and sorghum totals 1.69 million metric tons (mt), as compared to 1.75 million mt in 1989. The addition of rice, corn, wheat, and *fonio* production brings the gross 1990 total to 1.72 million mt.

Dosso, Tahoua, Maradi, Agadez, and Diffa departments all registered millet and sorghum production above the 1980-89 average, while Tillabéry and Zinder fell below (see Table 14). In addition, several arrondissements experienced production at levels significantly lower than their respective departmental averages (detail for all arrondissements can be found in Appendix 3).

Table 14: 1990/91 Rainy Season Production Estimates for Millet and Sorghum (mt)

Department	Avg Net Rainfed Production 1980-89	Net 1989 Rainfed Production	Net 1990 Rainfed Production	1990 as % of Avg	1990 as % of 1989
Niamey City	2,501	10,395	10,054	402	97
Tillabéry	287,135	237,301	208,160	72	88
Dosso	239,203	253,841	261,418	109	103
Tahoua	246,374	267,642	255,157	104	95
Maradi	315,913	379,075	397,235	126	105
Zinder	306,744	332,582	283,686	92	85
Diffa	17,432	8,890	22,817	131	257
Agadez	806	1,693	1,049	130	62
Total	1,416,107	1,491,419	1,439,576	102	97

Source: Ministry of Agriculture. Note: Net production equals 85% of gross.

At the department level, Tillabéry experienced the greatest reduction in millet and sorghum production (72% of the 10-year average and 88% of 1989 levels). Of the Tillabéry arrondissements, Téra, Tillabéry, and Filingué arrondissements were quite poor, at 65, 55, and 50% of average, respectively. Production in these three arrondissements was below average in 1989, as well.

Of the arrondissements in Dosso Department, Loga showed mediocre production (84% of average), while the rest of the arrondissements had better than average harvests. In Tahoua Department, Illéla and Madaoua produced mediocre harvests (81 and 77% of average, respectively), while Bouza and Tchin-Tabaraden arrondissements produced poor harvests (54 and 66% of average, respectively). Of these arrondissements, Tchin-Tabaraden also experienced below average production in 1989 (down by 64%).

In Maradi Department, arrondissement-level production was considerably above average except in Dakoro and Mayahi arrondissements, where production was just below average (90 and 96% of average, respectively). Production in Dakoro has been below average for two years in a row. In Zinder Department, two of the five arrondissements registered production significantly below average -- Magaria and Tanout showed a reduction to 82 and 55%, respectively. Magaria's production was also down in 1989 (89% of average).

In Diffa Department, Mainé-Soroa Arrondissement reported more than double its average production, while Diffa registered a mediocre harvest (78% of average) and N'Guigmi a dismal harvest (35% of average). Diffa Arrondissement production was also below average in 1989 (down by 21%).

Production Balance

The cereal production balance calculation (based on rainy-season millet and sorghum production, which comprises 95% of total cereal production) reveals arrondissement-level shortages, some of which are not likely to be overcome by stocks and imports. Table 15 shows the department-level balance between estimated consumption requirements and millet and sorghum production. Only Dosso and Maradi departments will meet their overall 1990/91 consumption needs through local production. Tillabéry and Diffa register the largest deficits. However, while Tillabéry showed a similarly substantial deficit in 1989, Diffa has actually met more of its food needs through local production this year than it has on average over the last ten years. Within departments, arrondissement-level balances vary greatly (see Appendix 4 for detail on all arrondissements).

Table 15: Department-level Percentages of Cereal Requirements Met by Production (mt)

DEPT	1991 Population	Net 1990/91 Production	Production Balance	% Req. Met 90/91	% Req. Met 89/90	% Req. Met Avg
Niamey City	455,725	10,054	-76,534	12	14	3
Tillabéry	1,474,870	208,160	-111,838	65	67	87
Dosso	1,139,749	261,418	13,443	105	112	118
Tahoua	1,413,946	255,157	-43,881	85	95	95
Maradi	1,551,326	397,235	65,154	120	123	115
Zinder	1,552,637	283,686	-44,225	87	104	111
Diffa	179,345	22,817	-18,277	56	25	46
Agadez	240,925	1,049	-44,727	2	19	2
NIGER	8,008,523	1,439,576	-260,885	85	94	100

Source: USAID/Niger population projections based on GON censuses of 1977 and 1988; MOA statistics used to calculate average figures. USAID/Niger consumption requirement: 190 kg/yr for nomads and 220 kg/yr for farmers. MOA estimates for millet/sorghum as of November 23, 1990. The production balance equals net production minus the cereals requirement. Percent of requirements met equals net production divided by cereals requirement. Percent of requirements met on average equals the mean of the percent of requirements met by each harvest from 1980 to 1989.

In Tillabéry Department, Téra, Tillabéry, Ouallam, and Filingué arrondissements have less than 70% of their 1990/91 cereal consumption needs met by local production. Ouallam and Filingué met more of their needs in 1989, but even then, their deficits were significantly greater than average. Dosso Department, on the other hand, shows notable surpluses in Boboye and Gaya arrondissements, at 128 and 117% of needs met, respectively. Of Dosso arrondissements, only Loga shows a significant shortfall, with 83% of its needs met by local production. This is a substantial drop from the 122% of needs met on average.

In Tahoua Department, Keita and Konni arrondissements show surpluses, while remaining arrondissements have less than 70% of their consumption needs met. Bouza and Tchin-Tabaraden are especially affected with only 48 and 41% of their needs met respectively. While it is usual for Tchin-Tabaraden to be food deficit, Bouza Arrondissement usually produces enough cereals to meet local needs. Maradi Department registered sizeable surpluses in all arrondissements except Dakoro and Mayahi. Dakoro's production met only 75% of its needs and was the only arrondissement to register a deficit in both 1989 and 1990 -- Dakoro usually produces enough cereals to meet local consumption needs.

In Zinder Department, only Matameye Arrondissement registered a surplus. Magaria, Tanout, and Gouré show unequivocal deficits with only 88, 79, and 78% of their needs met, respectively. Of these areas, Magaria and Gouré experienced sizeable deficits in 1989 as well. All arrondissements in Diffa Department have registered a deficit balance for two consecutive years. Conditions are best in Mainé-Soroa, where production meets 87% of the 1990/91 consumption needs. Production in Diffa and N'Guigmi arrondissements meets only 44 and 19% of their respective consumption needs.

Pastoral Conditions

Pasture development during the 1990 rainy season was significantly less than in 1989, because of poor rainfall. Some areas of northern Tillabéry, Zinder and Diffa departments did not experience any significant pasture development. In other areas development stopped in August due to the extended dry period. The only exceptions to this situation were along a zone running NW-SE from central Tchin-Tabaraden Arrondissement into Dakoro Arrondissement north of Dakoro and the south-central Zinder and Diffa departments (Magaria, Gouré, Mainé-Soroa and SW Diffa arrondissements), where vegetative biomass appears to have reached or exceeded 1989 levels.

As a result of the poor rainfall, surface and ground water resources in much of the pasture land are below normal as well. This situation has apparently contributed to an early out-migra-

tion of many herds, thereby reducing the immediate impact of the lack of forage and water to some extent.

Food Stocks

As of mid-December, there were 48,000 mt of millet reported in the Government of Niger (GON) Security Stock. An additional 2,100 mt of rice were in stock with the rice parastatal. USAID 1990 emergency program stocks and United Nations World Food Program (WFP) regular program cereal stocks totalled approximately 6,300 mt. Overall, private stocks of cereal are less than in 1989. As indicated below, commercial stocks are estimated to be less than last year, and concentrated in urban areas and the surplus production areas of Maradi, Dosso and Zinder departments. The household stock estimate of 72,000 mt is based on a Permanent Inter-State Committee to Combat Drought in the Sahel (CILSS)-funded MOA survey. Household stocks for 1989 were estimated at 102,000 mt. It is assumed that the location of these stocks follows a pattern similar to that of commercial stocks, with near zero supplies in the areas which have had two consecutive poor harvests and progressively increasing supplies towards surplus production areas.

Projected Food Aid and Commercial Imports/Exports

No firm pledges of assistance have been made in response to the GON request for 160,000 mt of emergency assistance for 1991. Based on informal discussions and previous experience, it is estimated that external sources will be used to provide 60,000 mt of food aid in 1991. This figure includes 10,000 mt for the regular WFP program. The GON security stock is expected to be used to provide another 12,000 mt of cereal for emergency distribution operations.

Commercial imports are estimated to total 130,034 mt during 1991, with 59% to come from within West Africa, principally as imports of millet, sorghum and corn from Nigeria and Bénin. The remaining cereal imports will be in the form of extra-regional rice or wheat/wheat flour for the flour mill in Niamey. The combination of lower effective demand for cereals in 1991 and below-1990-level harvests in Nigeria and Bénin are expected to cause regional imports to Niger to be less than seen in 1990.

Projected Food Consumption Requirement

The 1990/91 national cereals balance for Niger shown in Table 16 reveals a production shortfall of just over 197,000 mt with regards to cereal consumption needs. The production estimate of 1.5 million mt is based on GON estimates of millet, sorghum, rice, corn, wheat, and *fonio*, netted at 15% of gross production to account for feed, seed, and post-harvest loss. The consumption requirement of 1.7 million mt is calculated by applying USAID/Niger determined consumption rates (190 and 220 kg per person per year for nomadic and sedentary populations, respectively) to 1990 population projections based on the GON census of 1988 and a national growth rate of 3.1%.

Table 16: National Cereal Balance for Millet and Sorghum (mt)

Cereal Balance	12-15-90
Total 1990 Population	8,027,629
Consumption Requirement	1,700,462
Net Rainfed Millet and Sorghum Production	1,439,576
Net Rice Production	38,876
Net Corn, Wheat, Fonio	14,929
Net Off-season Cereals	10,000
Total Net 1990/91 Cereal Production	1,503,381
Production Balance	-197,081
Public Reserve/Working Stocks	54,000
Commercial Stocks	50,000
On-farm Stocks	72,000
Donor Stocks	6,300
Total Available Stocks	182,300
Cereal Exports	0
Total Domestic Cereals Supply	1,685,681
Import Requirement	-14,781
Commercial Cereal Imports	130,034
Program Food Aid Imports	10,000
Cereal Balance	125,253

Sources: USAID/Niger consumption requirement (190 unmilled kg/cap/yr for nomads; 220 unmilled kg/cap/an for farmers); FEWS/Niger population projection from GON 1988 census, MOA cereal production estimates; GON for non-commercial stocks; USAID/Niger's commercial stock estimate; MOA on-farm stock estimate from CILSS/DP department-level field survey; GON commercial import estimates for millet, sorghum, rice, corn, and wheat in coarse grain terms.

Despite the production deficit, the overall cereal balance reveals a net surplus of over 125,000 mt of unmilled cereal when in-country stocks and expected imports are considered. Total in-country stocks of over 182,000 mt include GON/CILSS estimates for non-commercial stocks and USAID/Niger estimates for commercial stocks.

Lacking GON estimates for commercial stocks, USAID/Niger estimated this year's commercial stocks to be less than last year's, based on field observations, and thus reduced the 1989/90 estimate of 67,000 mt to 50,000 mt for 1990/91. Total estimated commercial imports of over 130,000 mt include GON estimates for rice, corn, wheat, millet, and sorghum. The

food aid import figure reflects pledged WFP program sorghum. Possible food assistance which has not been approved is not included in the cereals balance sheet.

FACTORS AFFECTING FOOD ACCESS

Market Conditions

Sketchy and unofficial price data from November and December 1990 reveals that cereal prices varied greatly with respect to the average, and animal prices were lower than average for that period. Animal prices were at their lowest since the 1984/85 drought and showed a much greater departure from the average than did cereal prices.

Millet prices in most areas did not decline at harvest contrary to cereal price behavior during years of good harvests. City markets in Dosso, Tillabéry and Zinder only registered a slight decline. The highest millet prices in the agricultural zone were in Tillabéry Department, where production was more than 25% below average and 35% below consumption requirements. Téra and Ouallam arrondissements registered the highest prices in the country, at 8,500 and 7,500 West African Francs per 100 kg sack (FCFA/100 kg), respectively. Isolated markets in the northern part of these same arrondissements reported that 100 kg sacks sold for 10,000 and 9,000 FCFA, respectively. The situation is most acute in Téra, where cereal supply is also extremely low. Téra's isolation from major cereal trading routes makes provision from other producing areas less likely.

Millet prices were high when compared to the average in those areas where production was considerably below consumption requirements. These areas include: northern Dogondoutchi and all of Loga arrondissements in Dosso Department; Dakoro Arrondissement in Maradi Department; Bouza and Illéla arrondissements in Tahoua Department; and Gouré, Magaria, and Tanout arrondissements in Zinder Department. The unexpectedly high prices in Keïta Arrondissement are in contrast to the area's low relative vulnerability. Unusually high demand from surrounding areas or greater relative purchasing power in the region could explain this phenomenon.

Prices have stabilized in the significantly cereal deficit arrondissements of Diffa (all arrondissements) and Tahoua (Tchin-Tabaraden) departments. The influx of Nigerian grain appears to have had a stabilizing effect on market prices throughout Diffa. Limited purchasing power in Tchin-Tabaraden may have depressed demand and, therefore, prices. Elsewhere, prices are lowest in the production sufficient areas of Dosso and Maradi departments.

Other Economic Resources

Household purchasing power in Niger is largely determined by seasonal agricultural production, off-farm income activities and asset holdings. Income from agricultural activities was below average in 1990/91 because agroclimatic conditions were poor. Migratory wage labor, the major alternative income source, was less remunerative this year because of poor economic conditions in coastal countries. Within Niger, a severe recession has reduced the number of jobs in local businesses and seasonal employment opportunities. These factors point to weak purchasing power throughout Niger. In areas that experienced both a poor 1989/90 harvest and a poor 1990 rainy season, one should expect purchasing power to fall far below the level necessary for covering normal food needs.

UPDATE ON VULNERABILITY

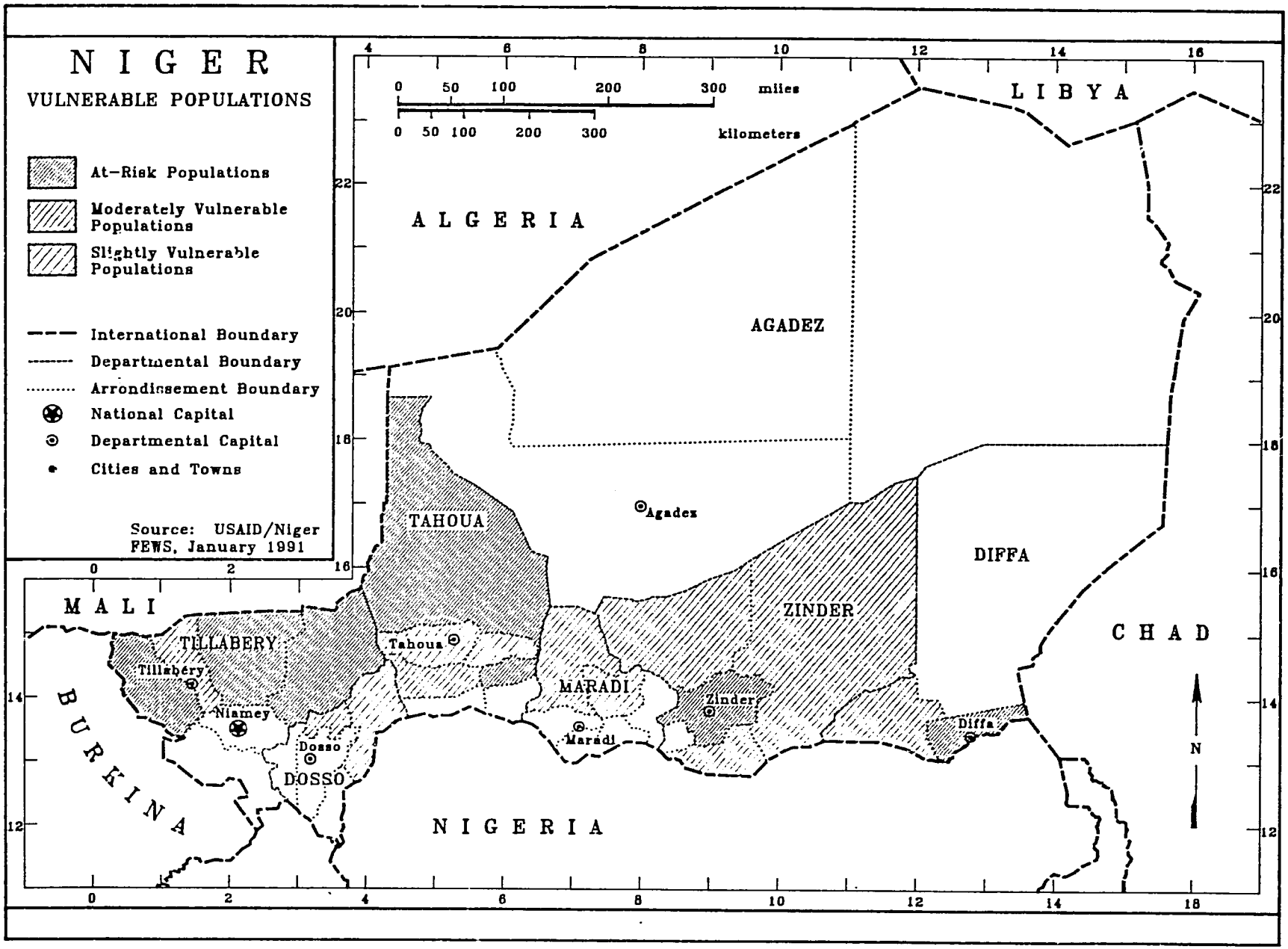
Current food insecurity is greater in Niger than projected in the June 1990 Vulnerability Assessment. Map 6 shows the locations of arrondissements named in this section. Conclusions regarding the arrondissements' current level of vulnerability are shown on Map 7. The generally inadequate 1990 growing season has increased levels of vulnerability among herding and farming populations in Téra, northern Tillabéry, Ouallam, and Filingué arrondissements in Tillabéry Department; Tchin-Tabaraden Arrondissement in Tahoua Department; Dakoro Arrondissement in Maradi Department; Magaria and Gouré arrondissements in Zinder Department; and Diffa and N'Guigmi arrondissements in Diffa Department. All these areas also experienced unsatisfactory agricultural conditions in 1989.

New areas of concern are Bouza and Illéla arrondissements (in Tahoua Department). Cereal production was significantly below consumption requirements in these arrondissements, household food stocks are reportedly low and cereal prices high. Although not as deficit as Bouza and Illéla, low food stocks and high grain prices also pose a potential threat to food security in northern Dogondoutchi and Loga arrondissements in Dosso Department, Mayahi Arrondissement in Maradi Department, and Keïta and Tahoua arrondissements in Tahoua Department.

Within all the areas mentioned, animal prices and herd conditions need to be monitored closely. Despite the assumption that the poor pasturage has led to coping through migration, the general terms of trade for livestock owners in Niger may continue to decrease, thereby significantly increasing the short-term vulnerability of this segment of the population. This group will be monitored closely over the coming six months.

CONCLUSIONS

USAID/Niger believes emergency food assistance will be required within Niger in 1991. Many areas of the country have suffered a second consecutive poor harvest. This will increase demand on stocks and commercial supplies. Pasture and water conditions for livestock are also inadequate following the poor rainy season. Although compensating through migration and sales of animals has begun, the terms of trade for animal owners appear to be decreasing.



Map 7: Vulnerable Populations in Niger

Negative economic factors, including weak purchasing power, limited non-farm income and decreasing terms of trade for animal owners, raise the question as to whether there will be adequate resources to attract cereal supplies from surplus to deficit areas. Previous experience indicates that, in a broad manner, there will be insufficient economic means to enable individuals to meet their immediate food needs as the 1991 harvest approaches, particularly in the areas noted as vulnerable earlier in this report.

The GON has requested 160,000 mt of emergency food assistance for Niger, including 141,000 mt for sedentary populations and 18,000 mt for nomads. USAID/Niger is evaluating this request and the needs of vulnerable populations in Niger. This analysis, through a rating system using data developed for this report, will result in the identification of the number of vulnerable persons and their food needs by month through the harvest.

In general, the donor community agrees with the GON assessment of the need for emergency food assistance. Donor pledges and commitments of assistance will depend on a United Nations Food and Agriculture Organization/WFP food needs assessment scheduled for January, 1991.

Appendix 3: Arrondissement-level Cereal Production (mt)

DEPARTMENT and Arrondissement	Avg Net Rainfed 1980-89	Net 1989 Rainfed Production	Net 1990 Rainfed Production	1990 as % of Avg	1990 as % of 1989
Niamey City	2,501	10,395	10,054	402	97
TILLABERY	287,135	237,301	208,160	72	88
Kollo	62,625	48,874	46,920	75	96
Say	44,265	45,117	46,880	106	104
Téra	59,604	54,490	38,458	65	71
Tillabéry	29,868	24,035	16,522	55	69
Ouallam	30,974	26,070	29,249	94	112
Filingué	59,798	38,714	30,131	50	78
DOSSO	239,203	253,841	261,418	109	103
Dosso City	0	0	358		
Dosso	58,607	60,597	55,288	94	91
Boboye	46,083	47,768	64,273	139	135
Loga	21,196	20,988	17,758	84	85
Dogondoutchi	70,744	75,703	77,216	109	102
Gaya	42,574	48,786	46,525	109	95
TAHOUA	246,374	267,642	255,157	104	95
Tahoua City	0	0	3,261		
Tahoua	33,758	35,664	42,411	126	119
Illéla	35,513	38,989	28,602	81	73
Keita	27,926	28,254	46,156	165	163
Bouza	37,774	49,246	20,209	54	41
Madaoua	43,328	50,273	33,228	77	66
Konni	58,815	61,917	75,194	128	121
Tchin-Tabaraden	9,261	3,300	6,096	66	185

DEPARTMENT and Arrondissement	Avg Net Rainfed 1980-89	Net 1989 Rainfed Production	Net 1990 Rainfed Production	1990 as % of Avg	1990 as % of 1989
MARADI	315,913	379,075	397,235	126	105
Maradi City	0	0	0		
Madarounfa	52,522	57,236	62,537	119	109
Guidan Roumji	59,039	86,659	93,248	158	108
Dakoro	51,114	45,036	46,232	90	103
Mayahi	52,360	67,675	50,402	96	74
Aguié	41,093	42,348	49,181	120	116
Tessaoua	59,785	80,119	95,635	160	119
ZINDER	306,744	332,582	283,686	92	85
Zinder City	1,673	3,314	2,977	178	90
Myrriah	96,126	90,796	93,060	97	102
Magaria	84,766	75,650	69,822	82	92
Matameye	38,378	50,924	55,104	144	108
Tanout	61,833	97,156	33,799	55	35
Gouré	23,968	14,742	28,924	121	196
DIFFA	17,432	8,890	22,817	131	257
Diffa City	108	130	407	377	313
Diffa	7,928	1,685	6,150	78	365
N'Guigmi	3,271	4,884	1,151	35	24
Mainé-Soroa	6,125	2,191	15,109	247	689
AGADEZ	806	1,693	1,049	130	62
Agadez City	1	8	0	0	0
Tchirozérine	720	1,522	990	137	65
Arlit	85	163	59	70	36
Bilma	0	0	0		
NIGER	1,416,107	1,491,419	1,439,576	102	97

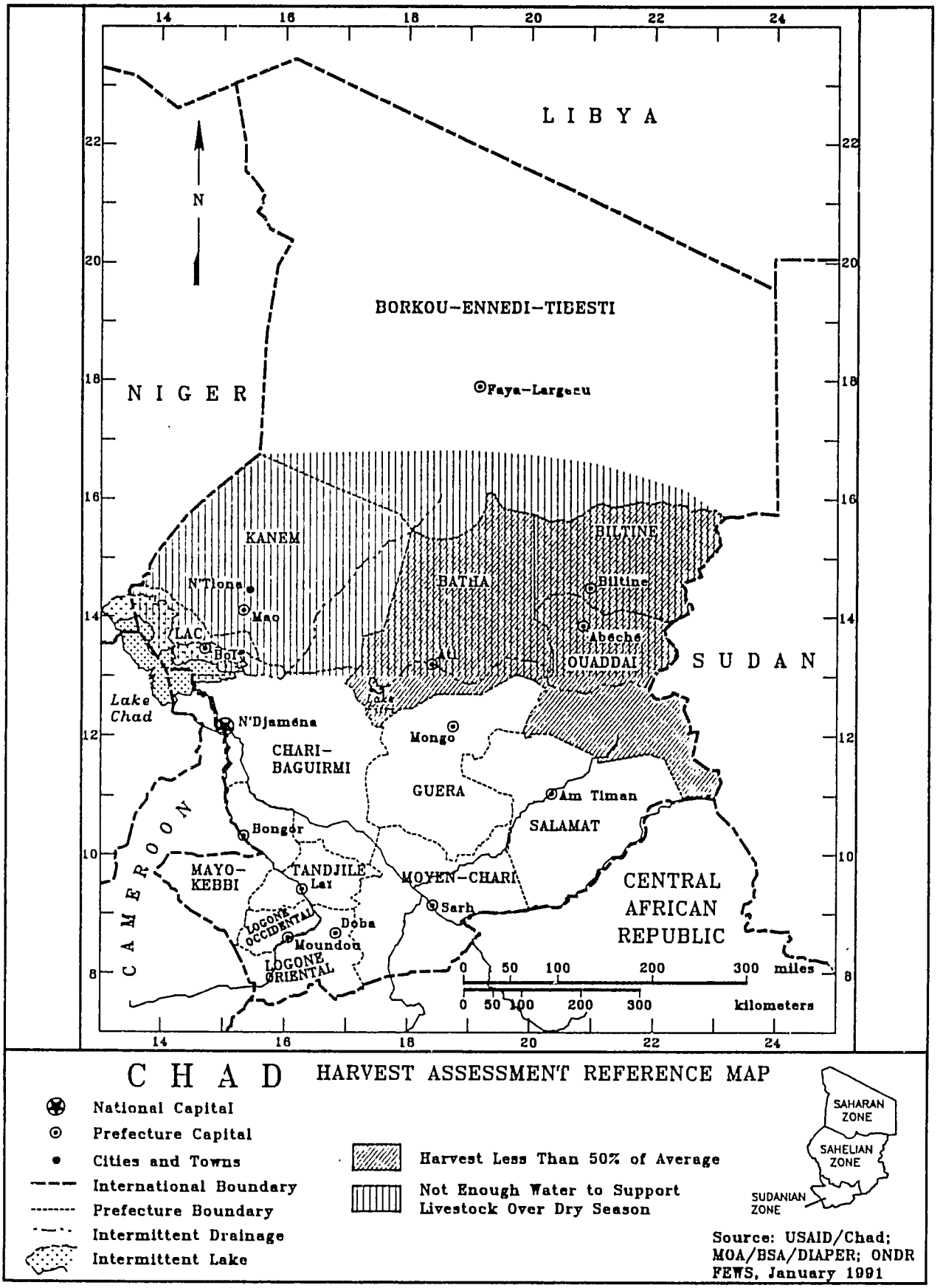
Source: Ministry of Agriculture

Appendix 4: 1990/91 Cereal Requirements Met by Production (mt)

DEPARTMENT and Arrondissement	Population 1991	Net Production	Production Balance	% Req. Met 90/91	% Req. Met 89/90	% Req. Met Avg
Niamey City	455,725	10,054	-76,534	12	14	3
T'BERY	1,474,870	208,160	-111,838	65	67	87
Kollo	275,259	46,920	-12,482	79	92	142
Say	189,406	46,880	5,211	113	121	139
Téra	322,892	38,458	-30,196	56	86	103
Tillabéry	166,292	16,522	-19,747	46	81	88
Ouallam	206,341	29,249	-15,949	65	62	80
Filingué	314,680	30,131	-38,675	44	61	104
DOSSO	1,139,749	261,418	13,443	105	112	118
Dosso City	35,635	358	-6,413	5		0
Dosso	241,992	55,288	2,330	104	127	134
Boboye	228,312	64,273	14,044	128	104	112
Loga	98,235	17,758	-3,750	83	106	122
Dogondoutchi	353,196	77,216	311	100	107	112
Gaya	182,379	46,525	6,920	117	136	130
TAHOUA	1,413,946	255,157	-43,881	85	95	95
Tahoua City	59,172	3,261	-7,982	29		0
Tahoua	207,162	42,411	-2,494	94	85	89
Illéla	188,882	28,602	-12,319	70	102	100
Keita	167,976	46,156	9,317	125	82	84
Bouza	191,125	20,209	-21,839	48	125	101
Madaoua	240,947	33,228	-16,983	66	106	104
Konni	280,596	75,194	17,159	130	115	122
Tchin-Tabaraden	78,086	6,096	-8,740	41	22	56

DEPARTMENT and Arrondissement	Population 1991	Net Production	Production Balance	% Req. Met 90/91	% Req. Met 89/90	% Req. Met Avg
MARADI	1,551,326	397,235	65,154	120	123	115
Maradi City	145,678	0	-27,679	0		0
Madarounfa	211,040	62,537	16,792	137	134	134
Guidan Roumji	237,079	93,248	41,176	179	181	137
Dakoro	285,566	46,232	-15,050	75	79	101
Mayahi	246,270	50,402	-3,485	94	135	113
Aguié	189,204	49,181	8,689	121	112	119
Tessaoua	236,488	95,635	44,711	188		141
ZINDER	1,552,637	283,686	-44,225	87	104	111
Zinder City	147,405	2,977	-25,757	10		7
Myrriah	463,897	93,060	-7,381	93	84	115
Magaria	380,320	69,822	-9,800	88	73	122
Matameye	182,116	55,104	15,865	140	143	117
Tanout	205,422	33,799	-8,994	79	287	161
Gouré	173,478	28,924	-8,158	78	40	77
DIFFA	179,345	22,817	-18,277	56	25	46
Diffa City	19,106	407	-3,223	11		4
Diffa	65,216	6,150	-7,885	44	13	61
N'Guigmi	29,303	1,151	-4,838	19	91	52
Mainé Soroa	84,826	15,109	-2,331	87	15	37
AGADEZ	240,925	1,049	-44,727	2	19	2
Agadez City	64,030	0	-12,166	0	2	0
Tchirozérine	77,660	990	-13,765	7	42	5
Arlit	89,957	59	-17,033	0	10	1
Bilma	9,278	0	-1,763	0	10	0
NIGER	8,008,523	1,439,576	-260,885	85	94	100

Source: USAID/Niger population projections based on GON censuses of 1977 and 1988; MOA statistics used to calculate average figures. USAID/Niger consumption requirement: 190 kg/yr for nomads and 220 kg/yr for farmers. MOA estimates for millet/sorghum as of November 23, 1990. The production balance equals net production minus the cereals requirement. Percent of requirements met equals net production divided by cereals requirement. Percent of requirements met on average equals the mean of the percent of requirements met by each harvest from 1980 to 1989.



Map 8: Chad Reference Map

CHAD

Production Shortfalls and Armed Conflict Increase Food Insecurity

USAID/Chad and FEWS/Chad report received in Washington December 21, 1990

SUMMARY

Armed conflict, civil disturbances and a change in government have compounded Chad's already precarious food supply situation. The impact of the November fighting (mostly along the Chadian side of the Sudanese border) on extremely vulnerable (at-risk) groups is difficult to ascertain at this point. Some reports of pillaged public sector stocks have reached N'Djaména, but losses appear to be minimal. Efforts are underway to quantify losses and remaining stocks, but communication with outlying areas has proven problematic. Up-country travel is currently restricted due to insecurity, but will likely improve as administrative and military control are consolidated.

In addition to the 504,000 people in Chad's Sahel identified in October as requiring food relief following a failed harvest, it will now be necessary to take into account returning refugees. After the installation of the new government, an influx of 2,000 returnees was reported in Kanem, for whom the government has already authorized a two-month ration. Relief assistance of this nature is likely to continue as new groups of former refugees return. To meet all of these feeding requirements, it will be necessary to mobilize 20,000 to 30,000 metric tons (mt) of food aid from the donor community.

FACTORS AFFECTING FOOD AVAILABILITY

Harvest Outcome

Cereals production was estimated in October by a United Natins Food and Agriculture Organization/Permanent Inter-State Committee to Combat Drought in the Sahel (FAO/CILSS) crop assessment team at 605,000 mt gross. This figure has not been revised by the Ministry of Agriculture, as crop production data provided from the field remains incomplete. Table 17 provides the estimate of cereal production broken down by administrative district.

Most observers agree that crop production data for Chad is weak, due in part to the lack of a thorough and reliable agricultural census. However, even without firm data, it is possible to compare this year's production figures with those of previous years (see Table 18).

The current harvest falls in the range seen in years when significant production shortfalls were registered, but did not attain the level of severity characterized by the 1984/85 period. The current situation appears to be similar to that following the 1987 harvest, when production declined dramatically in the Sahelian Zone, resulting in food aid distributions of approximately 26,000 mt (see Map 8).

Table 17: Gross 1990/91 Cereal Production (mt)

Zone/Prefecture	Production
Sahelian Zone	
Chari-Baguirmi	59,900
Salamat	39,800
Guéra	37,500
Lac	28,000
Ouaddaï	10,800
Batha	9,300
Kanem	9,200
Biltine	6,900
Sahelian Subtotal	201,400
Sudanian Zone	
Moyen-Chari	112,400
Mayo-Kebbi	94,900
Logone Oriental	81,400
Tandjilé	77,800
Logone Occidental	36,800
Sudanian Subtotal	403,300
Total	604,700

Source: FAO/CILSS Crop Assessment Mission

Food Stocks

Neither imports nor in-country stocks will fully offset the 1990/91 production shortfall, as neither represent significant amounts. Official cereal imports through the private sector have averaged only 27,000 mt over the past three years, most of which is flour for N'Djaména's twelve bakeries. It is significant to note, however, that millet is currently being imported unofficially from northern Nigeria to N'Djaména by private traders. This is indicative of the poor millet harvest in Chad's Sahelian Zone and the high transport costs for millet grown in the

Table 18: Annual Cereal Production Since 1983 (mt)

Crop Year	Gross Cereal Production	Observation
1990/91	605,000	Current Estimate
1989/90	696,000	Poor Production in Sahel
1988/89	769,000	Bumper Crop
1987/88	569,000	Drought in Sahel
1986/87	646,000	
1985/86	716,000	Good Harvest
1984/85	346,000	Severe Drought and Famine
1983/84	446,000	

Source: *Office National de Developpement Rural*, ONDR (Government of Chad Agricultural Extension Service)

South. The last time this phenomenon occurred was in 1987. Although it is difficult to estimate current commercial stocks, experienced observers of the N'Djaména grain market report that, in November and December, the cereal stocks regained their normal height after having reached low levels in September/October. The European Community-funded early warning project, Système d'Alerte Précoce (SAP/Chad), similarly reports that cereals are still present in markets in rural areas throughout the Sahelian Zone.

Prior to November hostilities, the public sector Security Stock was 15,000 mt. With the breakdown of authority as opposition forces advanced towards N'Djaména, and during the period following the installation of the new government, several up-country warehouses were opened and stocks looted. The National Cereals Office (ONC), which manages these stocks, has been unsuccessful in quantifying its losses due to poor communication and inability of its agents to conduct the requisite inventories. Some warehouses were completely emptied of their contents (Faya Largeau), while others were untouched (N'Djaména). It is clear, however, that there will be less of a buffer for responding to critical feeding requirements than had been previously planned. Based on the partial information received so far, it would appear that some 10,000 to 12,000 mt of security stocks remain. This should be sufficient to cover distribution needs through the month of May. Feeding requirements for the remaining four months of the lean period (June-September) will have to be met with donor assistance.

Pastoral Conditions

Although pastoral conditions are in general adequate, the dry season hay stock will not be used in many of the pastoral areas north of the 13th parallel because watering points have dried up. Herds have therefore been moved elsewhere, south into Guéra and Salamat prefectures and west towards the Lake Chad and Lake Fitri basins, where pastoral vegetation and watering points are adequate. The movement began in September, about two months earlier than is the normal practice.

Food Self-Sufficiency

It is generally accepted that cereal production levels of 650,000 to 700,000 mt equal food self-sufficiency for Chad, as evidenced by the build-up of surpluses and falling market prices for local cereals when that level is reached. The World Bank, for example, states that production levels exceeding 650,000 mt make Chad self-sufficient in cereal. The estimate of aggregate cereal production for 1990/91 is 605,000 mt. Given inevitable post-harvest losses and relatively small amounts of commercial imports, there will be a gap between cereal needs and cereal availability in 1991.

The degree to which these figures require further refinement in Chad is debatable. A cereals balance table, which is supposed to finely tune needs and availabilities, does not yield satisfactory results for Chad. For 1989, the cereal balance for Chad showed a net deficit of 100,000 mt, yet only 26,000 mt food aid were imported and no crisis developed. The pattern is consistent throughout the past decade. For these reasons, USAID/Chad's Food Security Operations Group does not intend to provide a cereals balance for 1990/91.

The Government of Chad (GOC) will soon make an appeal for emergency assistance. Before the December change of government, the GOC was expected to request 250,000 mt food aid. With the new government, it is likely to request 150,000 mt. In the end, donors will probably provide less than 50,000 mt. The discrepancy is largely due to the unreliability of data.

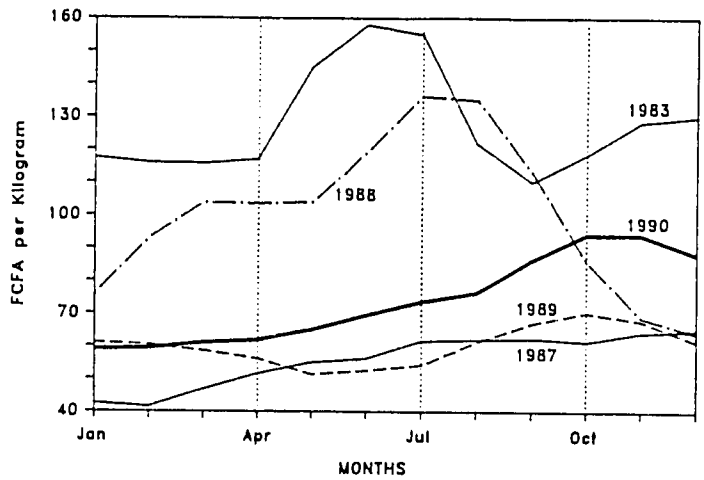
FACTORS AFFECTING FOOD ACCESS

Market Conditions

Despite the poor harvest in Chad's Sahelian Zone, cereal availability is not yet a problem -- *access* is. The recent behavior of millet prices reflects reduced access to cereals at the household level. Throughout 1990, the average price for millet in the N'Djaména market has remained at a higher level than in 1987 and 1989 (see Figure 5). Comparison of December price levels over the last several years indicates that millet prices are at their highest since the 1984/85 period (the December 1984 price was 195 West African Francs (FCFA) per kilogram). Assuming static or declining per capita incomes, the increased absolute level in prices will reduce people's access to cereals.

The continued increase of 1990 millet prices through the harvest months of September to November is more alarming than the actual level of the price. Historically, N'Djaména millet prices have declined or stabilized during the harvest period (see Figure 5). The observed lack of significant decline implies low market expectations for the 1990/91 harvest. Similar behavior was reported by SAP/Chad for outlying Sahelian markets. SAP/Chad also reports that these high prices

Figure 5: Nominal Monthly Millet Prices, N'Djaména, 1983 and 1987-90

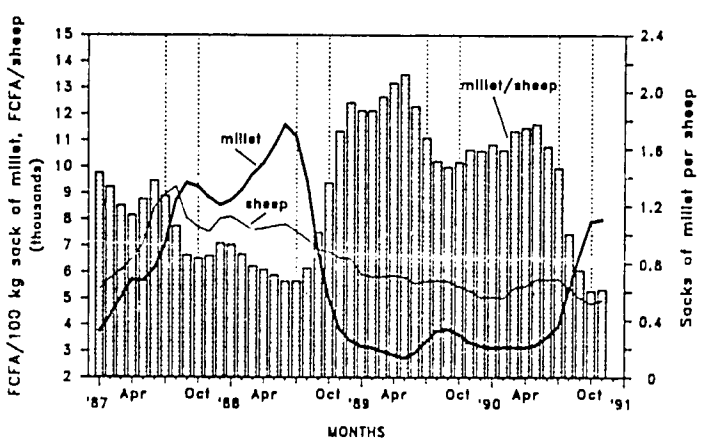


Source: USAID/Chad; FEWS/Chad. Note: Three-month moving average used.

do not necessarily reflect a shortage of cereals on the markets. Rather, they are a reflection of the pessimism caused by generalized crop failure in northern producing areas, speculation, and the tendency of rural households to keep stocks from the 1988 bumper harvest on the farm.

Socioeconomic groups that will be particularly disadvantaged by the increasing price trend are those who regularly sell livestock to purchase their cereal needs (i.e., pastoralists and agropastoralists). An analysis of seven SAP/Chad-monitored markets in Biltine and Ouaddaï prefectures indicates that the purchasing power of these groups of households has declined significantly since May 1990 (see Figure 6). Revenues generated from the sale of one sheep in late 1989 in these two prefectures would, on average, purchase approximately 160 kilograms of millet. By late 1990, the same sheep would

Figure 6: Terms of Trade between Millet and Sheep, Average over SAP markets in Biltine and Ouaddaï



Source: SAP/Chad; FEWS/Chad. Note: Lines indicate prices of millet and sheep. Bars indicate the number of sacks of millet that can be purchased with the proceeds from selling one sheep.

purchase about 60 kilograms. This is a drastic reduction in the terms of trade of pastoralists and agro-pastoralists. The reduction will severely limit their access to cereals.

It is also likely that the armed conflict along Chad's eastern border, which has raged off and on since April 1989, has disrupted the livelihoods of rural populations in that zone and limited their access to cereals. The GOC has been unable to quantify the needs of these vulnerable groups or to provide any specific information on the disruption caused by the hostilities.

UPDATE ON VULNERABILITY

Drought-related Vulnerability

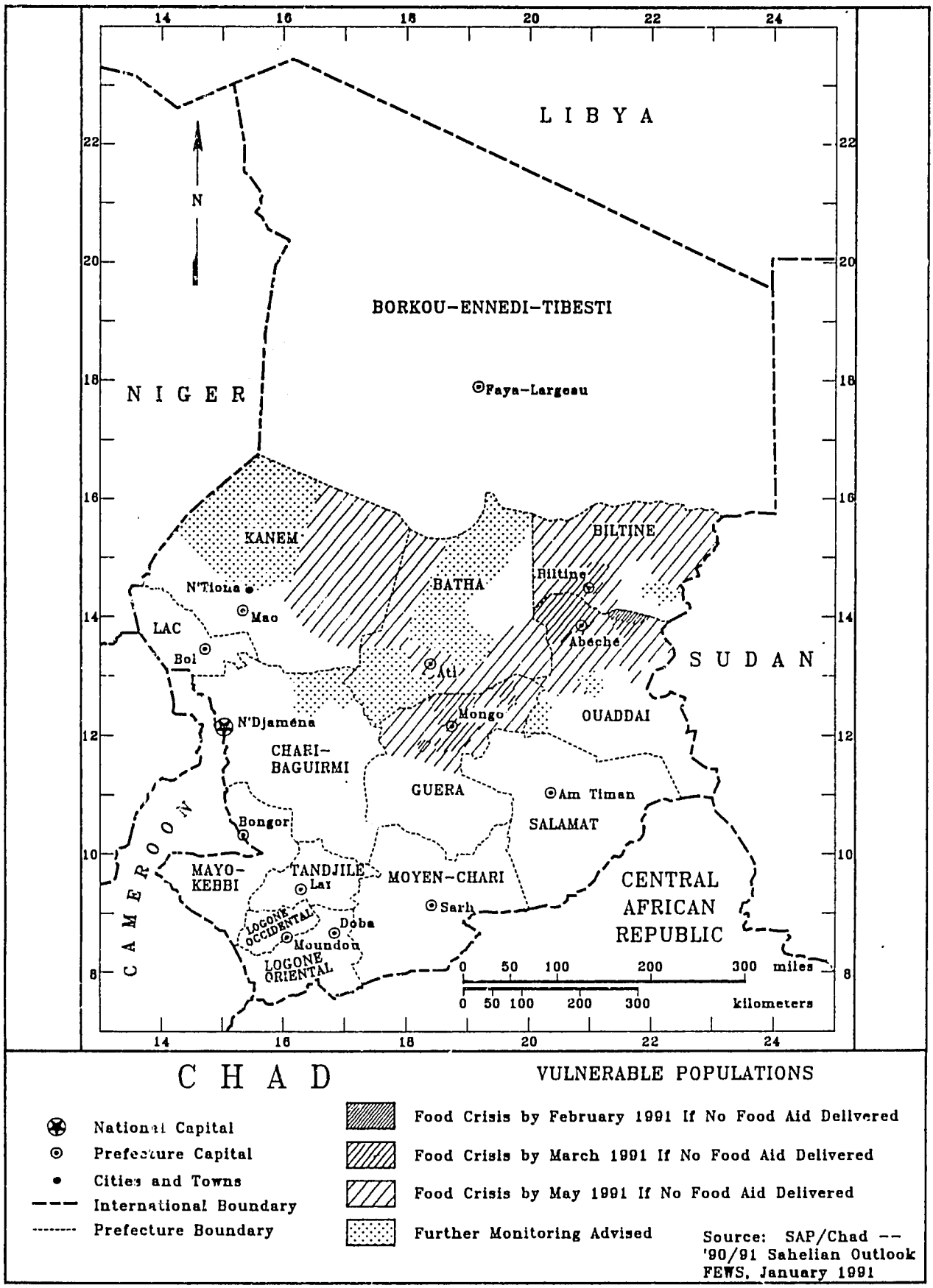
SAP/Chad estimates the extremely vulnerable (at-risk) population in Chad's Sahelian Zone to be 504,000 persons. Although there may be some localized shortages in southern Chad, there is insufficient information at this time to project possible feeding requirements in that zone. Also, the FAO crop assessment team advised that cereals production was adequate-to-good in the south, and the ONC began a program of purchasing surplus production in that zone. It is unlikely that significant feeding requirements will arise in the South. USAID/Chad does not believe that emergency food aid is required in the Saharan Zone (Borkou-Ennedi-Tibesti Prefecture, BET), as the BET population relies upon resources, oasis agriculture, and livestock that are drought-resistant. USAID/Chad analysis of emergency feeding requirements is therefore limited to the Sahelian Zone, where rainfed agriculture was severely compromised this year by below-average and poorly-spaced rainfall and where at-risk populations have been identified.

A distribution plan was proposed during October by SAP/Chad targeting 504,000 persons in 62 cantons among five Sahelian prefectures. Although this plan is likely to be modified in coming months as additional information is obtained, it is indicative of the regions to be targeted and the magnitude of assistance required (see Table 19).

Map 9 shows the month in which food aid distribution should begin in each of the affected cantons in order to avert food crises. The recommended level of emergency food aid distributions indicated above roughly approximates the amount of food aid distributed in 1987, which was a similar year in terms of aggregate production and areas of the country hardest hit by crop failure.

Other Causes of Vulnerability

Recent fighting in the East, which resulted in the December change in government, has created two new groups of potentially at-risk populations within Chad: war victims and returning refugees. The magnitude of the problem is difficult to discern at this point. The GOC suggests that both groups should be considered in evaluating food aid requirements, but has yet to provide figures or even rationale for assistance. For example,



Map 9: Vulnerable Populations in Chad

Table 19: SAP/Chad Food Aid Distribution Plan

Prefecture	At-risk Population	Number of Cantons Affected	Months Food Aid Required	Food Aid Required (mt)
Kanem	47,133	11	5	2,830
Batha	115,155	9	5	6,910
Biltine	66,396	14	5-7	4,273
Ouaddaï	174,479	15	5-10	12,556
Guéra	100,414	13	5-8	7,314
Total	503,577	62		33,883

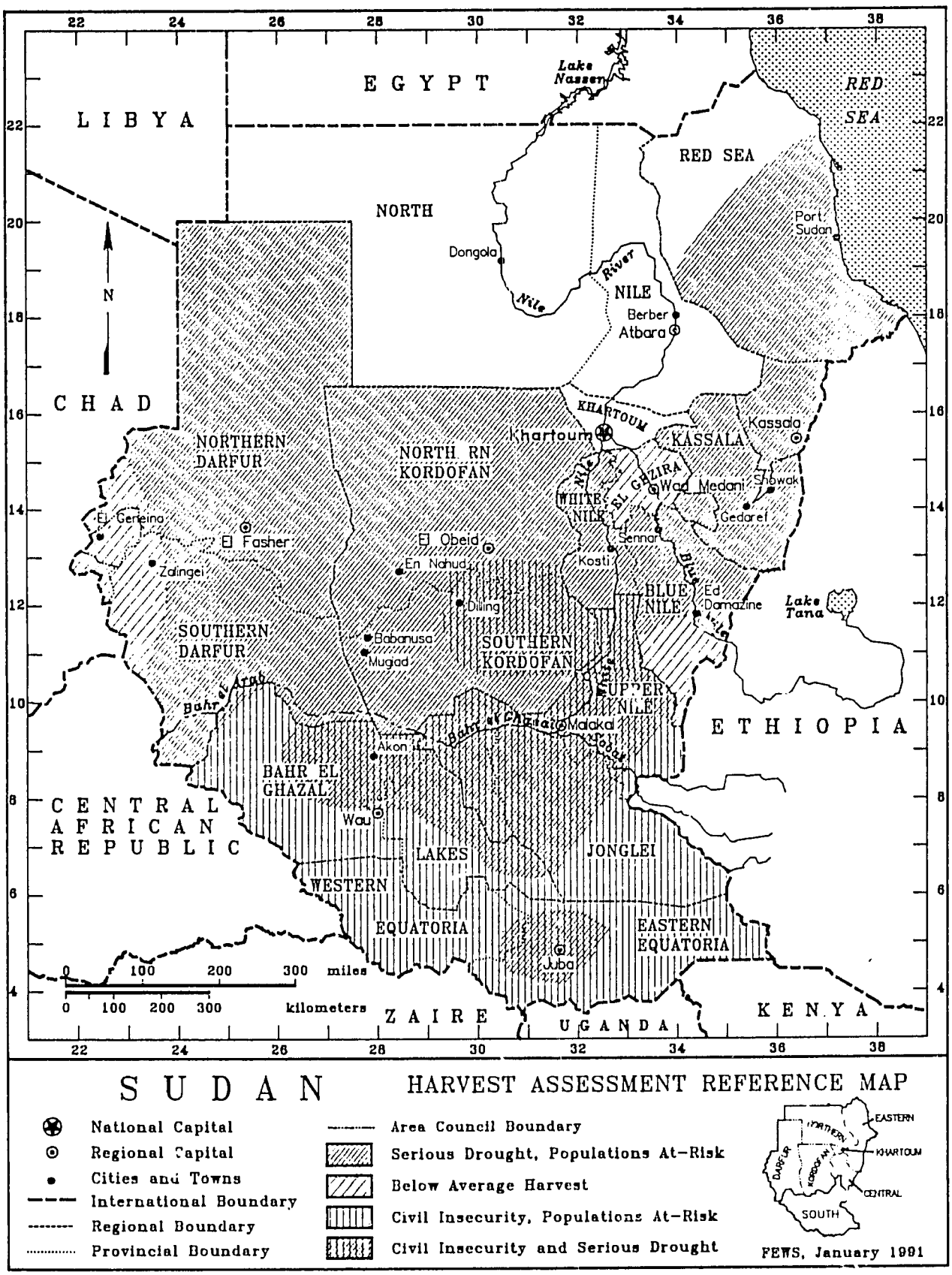
Source: SAP/Chad

the fighting was intense but highly localized at several remote border stations. The effect on the general population in the region is not altogether clear. At least initially, the returning refugees have been those opposed to the former government, and have been in exile for many years. It is not altogether certain that they will be returning destitute and in need of assistance. Experience has shown that such returnees have generally been well established in their country of asylum and do not return empty-handed. Nonetheless, food aid for returning refugees will remain high on the agenda.

It was reported in mid-December that 2,800 people had returned from Niger and Nigeria to the Mao region of Kanem Prefecture. The GOC/donor Food Aid Coordination Committee immediately allocated 57 mt cereals from the Mao security stock for the returned refugees. A team comprised of United Nations World Food Program (WFP), CARE, SAP/Chad, UN Children's Emergency Fund (UNICEF), Chadian Red Cross, and Commission for Food Security and Disaster Victims representatives departed for Mao on December 20, accompanied by an armed escort, to supervise the distribution and report on the condition of the returnees.

CONCLUSIONS

Chad is facing serious food access problems and will meet significant food supply problems in the near future. Drought has severely compromised the cereals harvest in northern producing zones and armed hostilities have created new groups of at-risk populations. The paucity of data, due in large part to Chad's turbulent post-independence history, precludes a quantified food needs analysis based on cereal availability versus consumption requirements. Rather, based on historical precedent, it would appear that 30,000 to 40,000 mt of carefully targeted food aid would be sufficient to forestall disaster and meet the most critical feeding needs. Of this amount, there are already 10,000 mt in Chad's security stock, leaving a net requirement of 20,000 to 30,000 mt for the donor community to meet.



Map 10: Sudan Reference Map

SUDAN

Food Deficit of 1.2 Million Tons Threatens 9-10 Million

USAID/Sudan and FEWS/Sudan report received in Washington on December 27, 1990

SUMMARY

A disastrous agricultural performance in the traditional and mechanized sectors will allow northern Sudan to satisfy only 63% of its food needs in 1991. There will be an estimated 1.2 million metric ton (mt) cereal deficit, resulting from production shortfalls and lack of carryover stocks. Severe food deficits exist in all areas. All regions except Northern require immediate emergency assistance. As of January 2, 1991, donor pledges for 1991 totaled 313,650 mt, including at least 100,000 mt from the U.S. Government (USG). Although the current production estimate is similar to last year's, the virtually nonexistent public and private stocks aggravates the severity of the situation, which approaches the disastrous season following the harvest of 1984. Poor production in the oil seed sector also means a severe scarcity of domestic cooking oil.

FACTORS AFFECTING FOOD AVAILABILITY

Harvest Outcome

Northern Sudan's cereal production for 1990/91 is estimated by both USAID/Sudan and the United Nations Food and Agriculture Organization (FAO) to be 2.1 million mt (sorghum, millet, and wheat), compared to a five year average of 3.37 million mt (see Table 20). The traditional sector will only produce about half the amount recovered from last year's (1989/90) poor harvest. Irrigated sorghum and wheat are projected to exceed 1989/90 production levels (irrigated sorghum is harvested in January, wheat in March). The projected increase in irrigated production will not be enough to offset the harvest problems in the traditional, rainfed areas. It is also unlikely that 1990/91 production from the irrigated sector will find its way to the markets of the most vulnerable areas. The poor rainfed production is the result of insufficient and poorly distributed rains. In most areas, the rains never reached much more than 50% of average, started 30 to 40 days late, and included dry spells of up to 50 days. Map 10 shows the extent of drought-affected areas.

Table 20: Inter-annual Comparisons of Northern Sudan Gross Cereal Production (000 mt)

Cereal/Sector	Average 85-89/90	1984/85	1989/90	1990/91
Sorghum (total)	2,826	1,096	1,536	1,503[1]
Irrigated	466	435	392	585[2]
Mechanized	1,949	389	853	746
Traditional	411	272	291	172
Millet (total)	303	161	161	112
Irrigated	4	14	1	1
Mechanized	17	1	18	3
Traditional	282	146	142	108
Wheat (irrig.)	239	79	409	500
Total	3,368	1,336	2,106	2,115

Source: FAO, FEWS/Sudan. Notes: [1]The Government of Sudan (GOS) estimates total sorghum at 1.6 million mt. [2]USAID projections put this as low as 500,000 mt.

Traditional Sector: The traditional rainfed sector has almost entirely failed this year throughout most of Darfur, Kordofan, and Central regions (see Map 10 legend). In spite of a 20% increase in area planted over 1989/90, production will be only two thirds of last year's, which itself was considered a poor year. In Darfur, only the western-most areas have produced enough cereal for local consumption (around El Geneina and south of Zalingei). These areas cannot, however, supply surplus to other areas.

Overall, Northern Darfur Province has had about 80% crop failure. In Southern Darfur Province, deficits are estimated at 100,000 to 140,000 mt and in Northern Darfur at 200,000 mt. Kordofan regional authorities estimate a deficit of 336,000 mt, with Northern Kordofan Province a virtual total failure, and Southern Kordofan Province well below normal, with complete

crop failure in the northern areas of Southern Kordofan. In Central Region, White Nile Province traditional crops have also nearly failed.

The harvest of traditional sector cash crops is also virtually nil, and in most areas of the West even watermelon, the traditional drought crop, has failed. This will deny farmers a very important source of cash income normally used to purchase food.

Mechanized Sector: In the rainfed mechanized sector, the area planted increased 15% from last year (from 5.8 to 7.8 million *feddans* for all mechanized areas -- 1 *feddan* = 1.03 acres). As a result of poor rainfall, however, sorghum and millet production is estimated at 749,000 mt, compared to the five-year average of 1,965,400 mt. In the major mechanized areas, 1.4 million *feddans* are virtually a total failure, particularly in northern Gedaref. Another one million *feddans* may produce 83% of their average yield. Overall, Gedaref will produce about half of its normal output. Harvesting problems caused by shortages of fuel, combine harvesters, and drinking water for laborers could reduce final production.

Irrigated Sector: Poor performance in the rainfed mechanized and traditional sectors puts more emphasis on the irrigated sector. The Government of Sudan (GOS) has increased the area under irrigation this year to offset some of the expected losses in the traditional and mechanized sectors. If projections are correct, about 47% of the 1990/91 cereal harvest will come from the irrigated sector, as opposed to the usual 19%.

The United Nations Food and Agriculture Organization (FAO) estimates that irrigated sorghum will produce 50% better yields than average. The area planted in sorghum has been increased this year from 755,000 *feddans* to one million (at the expense of cotton and peanuts). Thus, according to the FAO, production could reach 585,000 mt (although USAID/Sudan estimates a less optimistic 500,000 mt sorghum harvest).

Wheat, which will be harvested in March, could set a production record at 500,000 mt (25% of all 1990/91 grain production). This is compared to a five-year average of 239,000 mt. The area planted was to be increased from 600,000 *feddans* in 1989/90 to a target of one million *feddans* in 1990/91. However, a late start and a shortage of planting machines may force hand-planting, probably compelling more than 50% of the area to be planted after the prime sowing date and thus reducing the yield potential. Finally, a threatened insufficiency of irrigation water and fertilizer and a shortage of combine harvesters may reduce production still further.

On the Gezira Scheme, the area planted to cereal crops was doubled this year. This was done at the expense of areas planted to cotton and peanuts, which was significantly reduced because of pricing policies and a deliberate emphasis on cereal crops. The area planted to peanuts was at its lowest ever, down from an average of 150,000 *feddans* to 40,000 this year. This will severely reduce domestic cooking oil supplies, which are fundamental to the Sudanese diet. The area planted to sesame (in the mechanized sector) has also been reduced by 25% from last year.

Pastoral Conditions

Pastoral and livestock conditions throughout Sudan are poor, particularly in the northern parts of the country (including Northern Darfur, Northern Kordofan, White Nile Province, and Red Sea Province, where herding is a primary activity). Poor rains prevented adequate pasture development and caused severe water shortages. Widespread livestock losses have been reported, and the failure of animals to produce milk has removed one more staple from people's diets, especially children's. Increasing animal sales are reducing smallholder herds drastically. It may take many years for herds to recover to adequate sizes.

Food Stocks

Following last year's poor harvest and severe stock drawdown, household, commercial, and government stocks are nearly exhausted. Estimates for all domestic stocks, including commercial, range from 50,000 mt (USAID) to 170,000 mt (FAO). In comparison, government stocks alone were judged to be 302,141 mt in November 1989. USAID/Sudan recently designated most of its remaining 32,500 mt of in-country relief stocks for immediate distribution. The United Nations World Food Program (WFP) recently imported 19,000 mt of wheat for its relief program, of which 2,063 mt has been distributed.

Commercial Imports/Exports

The production deficit will prevent any cereal exports in the coming year, compared to 594,087 mt of exports in calendar year 1989 and 130,700 mt in 1990. Cotton and oilseed exports will be significantly reduced because of decreased cotton planting and partial failures of oilseed crops and peanuts. Livestock exports will be greatly decreased because of poor herd conditions and heavy losses.

Commercial cereal imports are expected to be low because of a severe shortage of foreign exchange. The Ministry of Commerce, however, is now arranging to import 200,000 mt of wheat, as compared to imports of 305,571 mt in 1990.

Consumption and Food Needs

Cereal consumption requirements in 1991 will be 3.328 million mt. This gives a cereal production deficit of 1.21 million mt, equal to the cereal needs of between 9 and 10 million people. This deficit is virtually identical to the estimated deficit of 1.19 million mt reported in the FEWS Pre-Harvest Assessment, prepared in September 1990. Table 21 indicates the magnitude of the deficit in each region. See the Map 10 legend for location of regions.

Table 21: Regional Production Balances for 1990/91 (000 mt)

Region	1985/86-89/90 Avg Gross	Production 1990 Gross	1990 Net	Consumption	Deficit
Darfur	208	150	128	502	-374
Central	1,520	1,167	907	1,260	-353
Kordofan	373	148	126	451	-325
Northern	74	99	84	258	-174
South	123	117	100	516	-100*
Eastern	1,070	535	455	341	+114
Total	3,368	2,116	1,800	3,328	-1,212

Source: FAO, FEWS/Sudan
Note: Consumption is calculated as 141 kg/yr per capita in the North and 90 kg/yr in the South rather than 145 and 100 used previously by FEWS. Net production is calculated by subtracting 15% for seed, feed, and waste. The total population of Sudan is 25,686,000, based on projections from the 1983 census.
*The deficit of 100,000 mt for the South is based on logistical delivery potential rather than actual food needs. WFP has indicated this could be raised to 140-150,000 mt.

Food Aid

Donors initially set a target of 300,000 mt as emergency relief for the North to address the 1.2 million mt production deficit, with the expectation that remaining food needs would be met through commercial channels. However, the magnitude of the emergency and anticipated inability of the GOS to facilitate the balance has significantly increased the target. The target is now restricted only by the limited logistical and infrastructural capacities in Sudan. The United Nations (UN) agencies have stated that Sudan now has half the logistical capacity it needs for this emergency. Plans by the donors to increase that capacity are underway.

The USG has issued a policy statement offering to provide one third of relief needs against the original relief target (up to 100,000 mt). Of this, 47,700 mt has already been approved by the U.S. Development Coordinating Committee (DCC) and another 32,300 has been requested by USAID/Sudan. The remaining 20,000 would be delivered to the South from Nairobi. An additional USG contribution against the larger target is being discussed.

As of January 2, donor pledges totaled 313,650 mt (see Table 22). This figure has grown rapidly. Donors include Australia, Canada, Denmark, the European Community (EC), Germany, Italy, Japan, the Netherlands, the U.K., and the U.S. Relief food implementing agencies for Sudan include the Adventist Development and Relief Agency (ADRA), Care, CONCERN, Goal, the GOS, Save the Children/United Kingdom (SCF/UK) and SCF/US, the Sudan Council of Churches, and WFP.

Relief Needs by Area

For Northern Kordofan Province, Care and SCF/US together have requested 184,600 mt of food for 1991. These requests are expected to be met between the USG and other donors. For Darfur Region, relief needs are estimated at 230,860 mt, with 144,000 mt for Northern Darfur Province and 86,860 mt for Southern Darfur Province. SCF/UK has requested 60,000 mt from the EC. As of mid-December, WFP promised 3,000 mt for Darfur from 19,000 mt already in Sudan, but none had been delivered. For White Nile Province (Central Region), CONCERN estimated a total 1991 need of 114,000 mt to cover 40% of the population until March and 80% thereafter. They have requested 45,000 mt from the EC. In Kassala Province (Eastern Region), SCF/US will be distributing relief to 26,000 people. Needs in Red Sea Province have been calculated at 40,000 mt by OXFAM/UK. At mid-December, no needs assessment had yet been completed for Khartoum, but several non-governmental organizations (NGOs) had requested a total of 34,000 mt for the most vulnerable groups.

Table 22: Donor Pledges as of January 2, 1991 (mt)

Donor	Pledge
Australia (ADAB)	10,000
Canada (CIDA)	30,000
Denmark	10,000
EC	110,000
Germany	9,000
Italy	2,250
Japan	12,000
Netherlands	15,000
UK (ODA)	15,400
US (USAID)	100,000
Total	313,650

Source: FEWS/Sudan

FACTORS AFFECTING FOOD ACCESS

Market Conditions

Cereal prices in major urban markets began to decline slightly in December following the limited arrival of new production on the market, but prices still remained exceedingly high. In Khartoum, cereal prices (except for wheat) have actually gone down 30% in the last month to 1,175 Sudanese pounds per 90-kilogram sack (£S/90 kg), more than seven times the December 1989 price of 155 £S/90 kg. Sorghum usually arrives from Gedaref, Sennar, Kosti, Ed Damazine, and Gezira at this time of year, but in December 1990 the flow was quite low and coming almost solely from Gedaref. In Gezira, sorghum is being kept for local consumption. Elsewhere, harvest-

ing delays and high local market prices may be keeping new production from reaching Khartoum. Wheat in Khartoum is now 2,500 £S/100 kg, compared to 900 £S/100 kg six months ago. Some expensive grain is arriving in western towns, but in many rural markets cereal is totally unavailable at any price.

Much of this year's sorghum crop may be late in entering the market. For example, the sale of new sorghum in Gedaref is negligible. After covering expenses, farmers and traders will hold their stocks because of fears of government intervention in pricing and expectations of price increases.

Terms of trade continue to be very poor. In many places, the sale of one goat supplies enough grain for a family of five for only two or three days. In normal times, the sale of a goat would procure three to five 90 kg sacks of grain. Nonetheless, butchered meat prices remain high -- four to five kilograms of meat cost the same as the sale price of a whole animal.

Other Economic Resources

Virtually no non-farming income opportunities currently exist. Firewood and charcoal sales are limited by scarce resources. Gum arabic sales are limited by a poor crop. Remittances from overseas, which are important to many rural families, have been reduced because of the Gulf situation. Employment on mechanized and irrigated schemes is very limited this year and the labor pool is flooded. In many villages in central Sudan, as much as 70% of village populations have migrated seeking farm employment. Many unsuccessful job seekers have been forced to return to their villages. Some limited employment is available in urban centers, but the very large numbers of displaced persons have made competition intense.

UPDATE ON VULNERABILITY

As a result of poor 1989 production, household cereal reserves and animals were already virtually depleted at the start of this season. Practically all groups are now undergoing severe food deficits, either from scarcity, lack of access (because of price or delivery problems), or both. The most seriously at-risk are farmer and pastoralist groups in Northern and Southern Kordofan provinces, Northern and Southern Darfur provinces, Red Sea Province, and White Nile Province in the North, and large parts of Upper Nile and Bahr el Ghazal provinces in the South. The same groups in Kassala Province (Eastern Region) will be at risk of food crises by April of 1991. Even in Gezira and Blue Nile provinces, there will be significant although much smaller numbers of traditional farmers who will experience food stress. Large numbers of displaced persons in many of the towns in the South are also now at risk of food crises following GOS imposed relief delivery restrictions. Children and pregnant and lactating women are the most vulnerable in all of these groups, requiring additional supplementary food and more immediate attention.

Refugees and Displaced People

Refugees in Sudan, who number between 768,000 (United Nations High Commission on Refugees) and 950,000 (GOS Commission on Refugees), are always a vulnerable group. As their overall food insecurity increases, so does their vulnerability. There will certainly be substantial relief requirements for this group in 1991, although exact quantities are not yet determined.

There is considerable human movement throughout Sudan. There are reports of influxes to the Khartoum area of many thousands of drought victims from the West. People in central Sudan have also been heading east in search of farm employment. Large numbers of displaced who had been in settlements in Southern Kordofan, particularly at Babanusa and Muglad, are moving south into Bahr El Ghazal, trying to return home. A large influx of perhaps 10,000 drought victims has arrived in En Nahud from surrounding areas in Northern Kordofan, with daily arrivals of about 200.

Vulnerability Status by Province

In Northern Darfur Province, large numbers of people are relying on wild foods. This diet, combined with reduced consumption and severe scarcity of milk for children, has increased malnutrition rates to an alarming level of 23.8%. A child is considered to be malnourished when its weight is less than 80% of the standard weight for children of the same height (less than 80% wt/ht). In one town, the rate in October was 20.1%, compared to 5.7% in November of 1989.

In Northern Kordofan Province, relief agencies have targeted 1.4 million of the 2.2 million estimated population as most at risk of famine and requiring immediate assistance from mid-December until the 1991 harvest (expected in October and November). People of northern and central areas of Southern Kordofan Province may soon be at-risk because the mechanized schemes and small farms have failed. The Habilla mechanized scheme, which usually supplies agricultural employment, is a virtual failure. There are no alternate income sources this year. People are eating wild foods and have already sold most of their animals to purchase grain. The danger of famine is increased because no relief agencies are currently active there (because of security problems) and far more attention is being paid to other areas. The GOS maintains that the province will be food self-sufficient.

In primarily pastoralist Red Sea Province (Eastern Region), there is no pasture or fodder. Very heavy livestock losses have been reported. Animal prices continue to plummet -- prices at mid-December were half those of November. Relief delivery will be a problem because the major NGOs working there are encountering severe resistance from local authorities, who prefer to work only with Islamic agencies. In Kassala Province (Eastern Region), SCF/US has identified 26,000 people in Showak Town and 32 villages in Showak District who require emergency food because of crop failure.

A nutrition survey conducted in September in Gezira Province (Central Region) found an overall child malnutrition rate of 15% (less than 80% wt/ht) and an alarming rate of 29% among infants 6-12 months old. CONCERN reports that 40% of the total population of White Nile Province (Central Region) are currently at-risk and that 80% will be at-risk by April 1991, following an almost universal crop failure and a shortage of labor demand on the mechanized schemes. White Nile livestock are being sold off at drastically low prices. In Kosti Town, sorghum cost 1,500 £S/sack in September, compared to 100-150 £S/sack at the same time last year. A 90 kg sack of sorghum now costs six to eight goats (in 1984 a sack cost three goats). CONCERN has calculated a cost of 1,710 £S per month (£S/mo) to feed a family of six. For those few who can find work, however, wages are about 600 £S/mo. Many families have gone to eating one meal per day and are consuming famine foods such as watermelon seeds, although most famine foods have died for lack of water. In September, malnutrition (less than 80% wt/ht) had reached 21% for children under five years old in some places.

In southern Sudan, populations in the northeastern part of Bahr El Ghazal Province, Upper Nile Province (particularly Malakal), and the Akon area of Jonglei Province are at-risk. Relief deliveries, especially airlifts, have been virtually prohibited by the GOS. In Eastern Equatoria Province, Juba is also currently of great concern. Relief stocks there are insufficient and may only represent a two week supply.

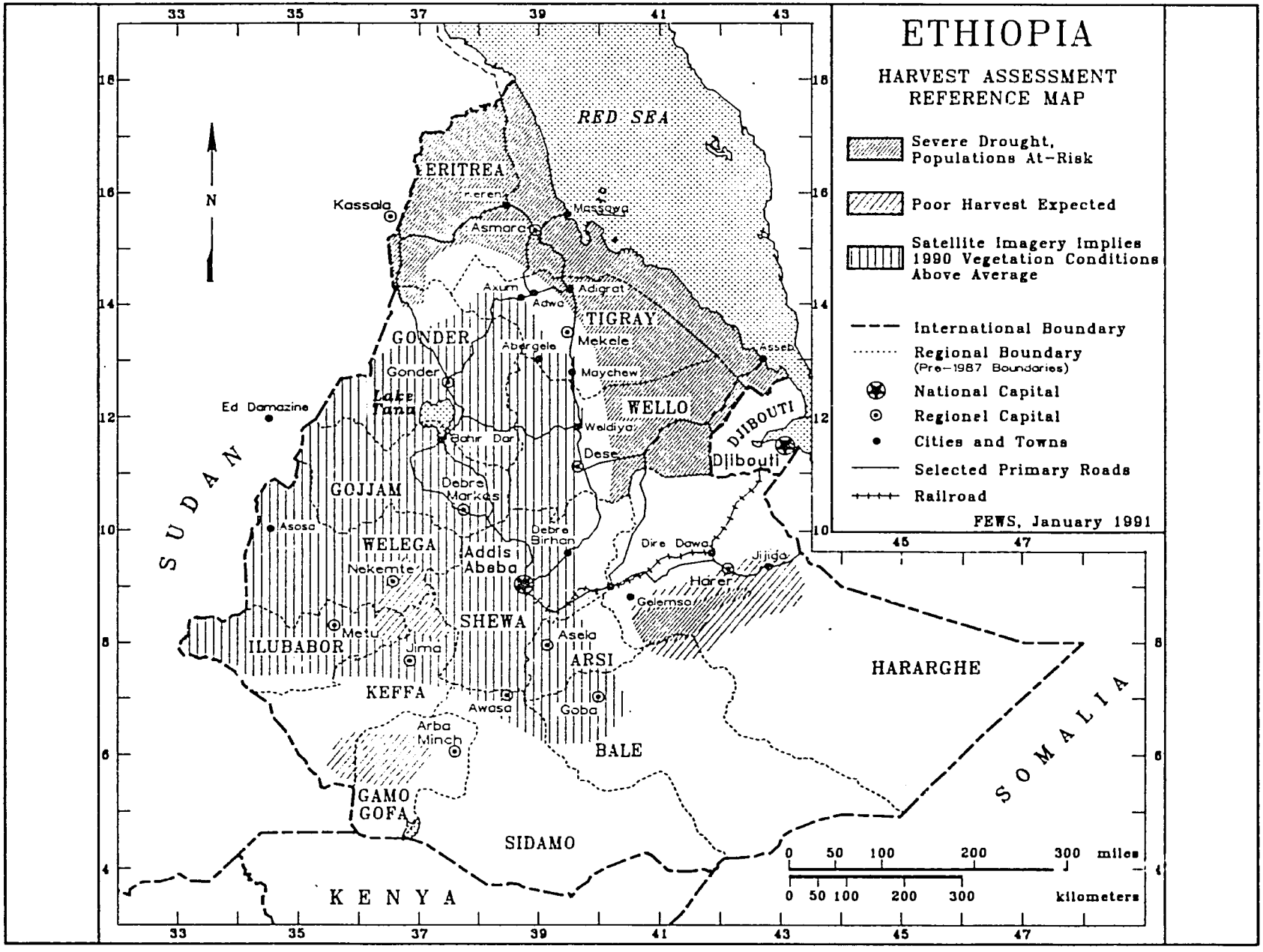
In Khartoum, there are now an estimated two million displaced who are highly vulnerable because of their dependence on casual labor, gifts from relatives, and relief. Only the families of children who are malnourished, and malnourished pregnant and lactating mothers, normally receive relief. With continued food scarcity, high prices, and lack of employment, far more displaced people could require aid in the coming year.

CONCLUSIONS

The need for donor assistance to Sudan is huge and immediate. Of the 1.2 million mt production deficit, a large portion must be provided as relief to prevent widespread and massive numbers of famine deaths in virtually every corner of the country. Between December 1990 and November 1991, farmers and pastoralists in the West, in Central and Eastern regions, and in Red Sea Province require relief. Displaced persons in urban centers and rural areas in the South also require relief. Logistical and infrastructural deficiencies limit the amount that can be cleared through the ports and subsequently distributed. Donor plans have been underway to increase the capacity of these systems.

Just food is not enough, and just grain is not enough -- supplementary food such as pulses and cooking oil are required; health, sanitation, and water intervention must also be included in an overall emergency response. To re-establish self-sufficiency in 1991, seed and in many cases tools will be needed, as well as improved drinking water resources, fishing equipment and cattle vaccinations (in the South).

The major constraint to relief in 1991 will be transport, including travel and transport clearances by road, water, and air, acquisition of vehicles and fuel, commodity processing at Port Sudan, and increased access to Sudan from other points. It will be important to monitor the developing irrigated wheat crop, track human movements, nutrition and mortality, and follow market prices to triage and best target areas for receipt of food aid. It is important also to monitor the level of donor pledges and both relief and commercial imports, as well as the success of food delivery throughout the country over the coming year.



Map 11: Ethiopia Reference Map

ETHIOPIA

Consecutive Year Crop Failure in North

FEWS/Ethiopia report prepared January 10, 1991

SUMMARY

For the second year in a row, severe drought has caused extensive crop failures in northern and eastern Ethiopia (see Map 11). Record agricultural production in other parts of the country will alleviate some regional shortages and produce a record national harvest. Nevertheless, the continuing widespread civil strife, an almost total breakdown of traditional coping mechanisms in Eritrea, and significant regional crop failures in the North, East, and scattered pockets elsewhere will raise the country's emergency relief requirements to nearly 1,000,000 metric tons (mt).

FACTORS AFFECTING FOOD AVAILABILITY

National Agricultural Production

The 1990 Food and Agriculture Organization (FAO) Crop Assessment Mission to Ethiopia forecast a record national grain and pulse crop of nearly 7.5 million mt, a 5% increase over last year's harvest and 7% above the average of the previous four-year period. The greatest gains this season came in areas that frequently produce a grain surplus, with the top four crop-producing regions all showing production increases over last year. In Shewa region alone, production increased 14%, accounting for nearly 30% of the nation's private main-season production.

The record level of agricultural production this year is due to the late but strong performance of the main rains in the central and western highlands, and significant increases in areas planted in some of the most productive areas of the country. The latter are attributed to farmer optimism over major pre-season reforms in agricultural policy, including the abolition of production quotas and the liberalization of agricultural marketing and trade.

While nationwide production was an aggregate record, the extent of crop failure in the North and East was also exceptional. Rainfall levels and distribution patterns in Eritrea and Harerghe appear worse than in any other year this decade. Production in Eritrea fell to 67% of 1989's already low level, while that of Harerghe dropped to 85% of its mediocre 1989 level. While the exact outcome of the agricultural season in Tigray is still the subject of some debate, it is clear that the region's production remains seriously below average for a second year in a row.

Agricultural Production Problems

Eritrea - The typically-fragile agricultural and pastoral lands of Eritrea are the worst hit this year, with most observers in agreement that the extent of crop failure exceeds even that of 1983/84. Preliminary Ministry of Agriculture (MOA) estimates indicate Eritreans plowed 350,000 hectares (ha), but were able to plant only 300,000 of these owing to poor soil moisture. Of this amount, 150,000 ha (50%) were lost completely, 50,000 ha experienced a 50% loss and only 100,000 ha were relatively unaffected. The MOA estimated final production on the order of 60,000 mt, or 25% of what would have been possible under the initial cultivation levels had the region experienced adequate rainfall. The 1990 FAO Crop Assessment Mission revised the production estimate downward, to 40,000 mt, which is 34% below 1989 production and similar to that of the drought year of 1984.

The worst hit areas of Eritrea are in the highland cropping areas. In former Hamasien Awraja[1] (surrounding Asmara), average total rainfall recorded from March to October was 70% of 1989's meager level, and 24% of the level recorded in 1985. The situation in the former Keren and Akele Guzai *awrajas* (southeast of Asmara) is no better, with all observers reporting a near total failure of agricultural efforts. From south of Asmara to the border with Tigray (eastern Seraye), the situation is somewhat better, but still significantly below average. The Ethiopian Relief and Rehabilitation Commission (RRC) reports that crops failed in over 54% of the cultivated area. Where production did succeed, it tended to be in areas with residual water or ground water that could be exploited for agricultural purposes, or in parts of western Seraye and eastern Gash and Setit *awrajas* (south central and southwestern Eritrea) where rains were better. These latter areas were able to grow a crop

1 Ethiopia's first-level administrative units are regions and second-level administrative units are *awrajas*. New region and *awraja* boundaries were drawn in 1987. Much of the information FEWS now receives refers to the new boundary definitions. FEWS' map base, however, contains pre-1987 boundaries. Wherever possible, references are made both to the new and the old names.

that will end up providing 97% of Eritrea's poor production this year, according to the RRC.

Tigray - The 1990 agricultural season in Tigray was mixed. The onset of the rains was late almost everywhere and distribution patterns were highly irregular. Field reports indicate a second year of wide-scale production failure throughout the northeast and north-center, especially east of the road from Adigrat to Mekele, in Agame and Kilte Awlallo *awrajas*. West and south of there, pockets of poor production are found in Adwa, Axum and Shire *awrajas* (northwestern Tigray). Satellite imagery indicates fair to average vegetative conditions throughout much of the season in some of the traditionally most productive areas of eastern Shire and extreme western Adwa *awrajas*, and between Maychew and Abergele.

Only the Independent Crop Assessment Mission was able to visit Tigray. It provided few estimates of crop production, although it concluded that there had been wide-scale harvest failure and a large production shortfall.[2] On the other hand, the FAO Mission estimated overall 1990 production in Tigray at 220,000 mt, or 16% higher than that of 1989. Satellite data and field reports suggest that the most pessimistic assessments of Tigray may overstate the size of the production shortfall this year. While production in the typically-surplus areas is perhaps not as great as that in 1989, considerable surpluses appear to exist in those areas that can be applied against local deficits. Informal estimates of 30,000 mt of purchasable surplus in 1990/91 appear somewhat low when compared to more than twice that level the previous year. While the FAO qualitative description, "better than 1989," may be difficult to substantiate, the quantitative estimate of 220,000 mt appears more in line with available data than more pessimistic estimates.

There is an issue of whether and by how much 1989 production in Tigray was understated. The continued market presence (in Tigray and in Eritrea) of 1989/90 surplus production from Tigray at least hints that the agricultural situation in 1989 may not have been as bad as assumed earlier.

Wello - Despite generally favorable agroclimatic conditions, especially for short-cycle crops, the RRC and FAO predict a second year of below-average production in most of North and South Wello. Satellite imagery, on the other hand, suggests the situation is better. Difficulties arise in calculating the true picture, since a great deal depends on the overall impact of civil strife early in the season and field visits to the region have not been possible.

The East - Major parts of the new East and West Hararghe and Dire Dawa regions appear to have experienced the worst agroclimatic conditions of the decade over the past two years.[3] This is clearly suggested in the satellite vegetation imagery and has been confirmed in field reports from several areas. While highland agricultural production has been less affected by these conditions, the mid-highlands and lower-lying agricultural and pastoral areas south of a line from Gelemso through Harer to Jijiga have been significantly harmed by insufficient and poorly distributed rainfall.

In Hararghe, seriously deficient rainfall in June and July led to the wide-scale failure of maize and considerable damage to sorghum. Adequate rainfall in late August and September did permit some recovery in sorghum, however, and allowed the substitution of late-planted pulses and sweet potato for the failed maize crop. The RRC estimates that the area planted to maize this year in East Hararghe was only 36% of normal. The FAO estimates the region's overall cereal and pulse output was 355,000 mt, or 17% below the poor level of 1989.

Other Areas - Rainfall deficiencies and reduced access to credit led to harvest reductions in Bale, Sidamo, and former Gamo Gofa (now North and South Omo) regions. In Bale and Sidamo regions, 1990/91 production is estimated at 135,000 mt and 179,000 mt, respectively, or 10% below last year's above-average levels. In North Omo, the 1990/91 harvest of cereals and pulses is forecast at 139,000 mt, compared with 162,000 mt last year. In South Omo, this year's main crop is estimated at 12,000 mt, compared with 14,000 mt last year.

Performance by Crop

In much of the country, long-cycle crops such as maize and sorghum suffered from late and insufficient rainfall early in the season. Due to a shorter growing season in the North and East, the late start to the main rains meant that long-cycle grains could not be planted at all in many areas. Although maize seemed to fare well in the central and western areas of the country, it failed miserably in the East. Sorghum saw near total failure in the North, and its yield was seriously reduced in both middle and low altitude areas in East and West Hararghe.

The nation's overall crop mix changed significantly in 1990. Many farmers switched to short-cycle crops such as *teff*, wheat, barley and pulses where long-cycle crops such as maize and sorghum either failed or could not be planted. Agroclimatic factors in most areas were quite positive for these short-cycle crops. This contributed greatly to the overall production performance this year. Further substitutions resulted from perceived changes in relative price and market opportunities following the April agricultural policy reforms. Marketable crops became more popular, especially in areas with good access to urban markets. This is evidenced by the record year in *teff* production nationwide, and the 50% increase in area planted to *teff* in Arsi Region alone.

2 Conclusions published in "Independent Crop Assessment Mission, Eritrea and Tigray, November/December 1990" by the CDR Resource Group.

3 The former Hararghe Region, depicted in Map 11, has been split into four regions: East Hararghe, West Hararghe, and Dire Dawa regions in the north, and Ogaden Region in the south. The new Ogaden Region also includes the southeastern half of the former Bale Region.

FACTORS AFFECTING FOOD ACCESS

Marginal harvests are not unknown in typically food-deficit areas such as Eritrea, Tigray and Harerghe. Indeed, they are quite common. What allows the inhabitants of these areas to survive is their ability to supplement agricultural activities with other sources of income. Such income typically comes from livestock, wage labor, debt, remittances and the sale of cash crops, crafts and firewood.

Eritrea - In Eritrea, alternative income-generating mechanisms and famine coping strategies were compromised more this year than ever before. The closing of Massawa early in 1990 paralyzed much of the region's economic activity. It has also eliminated many wage labor opportunities and driven grain prices higher than they have ever been before. The recent re-opening of Massawa, while improving avenues for food aid deliveries to the region, offers little for the commercial economy, continuing the economic paralysis, elevated food prices and heightened vulnerability faced by much of the region's population.

Shortages of pasture have led to a severe decrease in the number, condition, and value of livestock. The coincidence of record grain prices and low livestock prices has seriously worsened rural terms of trade, reducing or eliminating entirely one of the most important coping strategies farmers maintain against bad production: the sale or trade of livestock for food grains.

The unusually bad agricultural year in the Sudan has eliminated two additional resources important to the Eritrean food system: (1) cheap sorghum imports which usually flow in from eastern Sudan, and (2) temporary wage labor opportunities for many thousands of Eritreans who depend on seasonal wage labor migration to supplement household cash resources.

Compounding matters in Eritrea is an unprecedented shortage of water for both human and animal consumption. River beds and wells have already dried in many areas, and people are forced to walk long distances for water much earlier in the season than is usually the case. Herd conditions have been affected as a result. Many animals have died because they were too weak to make the traditional trek to better pastures in southern Eritrea and Tigray. Also, the health of oxen (usually kept on farms) has deteriorated and many have been lost.

Tigray - Again, conditions in Tigray vary greatly from area to area. In some areas where production has been affected for a second year in a row, as in Agame and Kilte Awlallo *awrajas*, coping resources have been exhausted and a large number of people are moderately to extremely vulnerable. Other areas experiencing a second poor year of production will be somewhat less vulnerable due to their proximity to areas registering surpluses either last year, this year, or both. This is likely to be the case in western Shire, Adwa and Axum *awrajas*.

For some *awrajas* in Tigray, however, the prospects are brighter. South and southwest of Axum (in parts of Shire and Tembien *awrajas* and near Abergele), good production is reported for a second year in a row, and many coping mechanisms remain in place. Pasture and water resources, while reduced, can still be found in southern parts of the region and opportunities for wage labor exist in surplus agricultural areas to the south and in Dire Dawa. Due to changes in the military/political situation early in the year, freedom of movement for goods and labor has improved for all Tigreans.

The East - Total food resources in Harerghe and Dire Dawa are probably stronger this year than in the past, thanks primarily to the agricultural reforms of April 1990. Liberalization of agricultural price and marketing policies led to a significant increase in the amount of cereal traded in the region this year. The influx of surplus grain from nearby regions has helped keep a cap on cereal prices, thereby dampening the impact of reduced livestock prices on the purchasing power of agropastoralists. Cash crops and a continued strong market for wage labor will augment most people's ability to weather the below-average production this year.

There are pockets in Harerghe and Dire Dawa this year, however, which do not possess the same strong level of coping mechanisms as others. This may be due to a second or third year of consecutive poor production, security problems, input limitations, deterioration of livestock, etc. People in these areas are inordinately more vulnerable than the majority of the population in the area and must not be overlooked. The areas of most immediate concern (see shaded areas southwest of Harer on Map 11) include the middle and lower altitudes of Gara Muleta, Bedeno and Meyu Burka and Gursom *awrajas* in East Harerghe, and Mesella, Roke Kuni and Habro *awrajas* in West Harerghe.

Other Areas - Although the food security picture for the remainder of the country is above average, pockets of heightened vulnerability can be found in certain spots around the country. In both North and South Omo regions (Gamo Gofa), and southern Keffa region, poor crop production and pasture conditions will increase the vulnerability of the population. The limited nature of commercial trade in these areas will make it difficult even for those people with resources to secure food grain. Vulnerability is increasing as well in the trypanosomiasis-affected areas of Wellega and Illubabor regions, where the advance of the tsetse fly is forcing more and more people out of the fertile lowlands and into the already over-populated highlands. Depending upon the outcome of the October to November rainy season in Ogaden Region, there may be an increase in the vulnerability of the pastoral populations in these areas as well.

Table 23: FEWS 1990/91 National Food Balance

1990/91 FOOD BALANCE All Major Food Items (000 mt, unmilled cereal equivalents)	Total	Cer/pulse	Other
Per Capita Consumption (unmilled kg/year)(1)	162	144	18
x Population (millions)(2)	51.3	51.3	51.3
= Total Consumption Requirement	8,311	7,388	923
Gross Domestic Production (3)	8,605	7,470	1,135
- Seed Requirement (4)	430	374	57
- Post-Harvest Losses (5)	861	747	114
= Net Domestic Production	7,314	6,350	965
- Food Exports (6)	0	0	0
= Domestic Food Supply	7,314	6,350	965
Total Consumption Requirement (from above)	8,311	7,388	923
- Domestic Food Supply (from above)	7,314	6,350	965
= Import Requirement	997	1,038	(41)
- Commercial Food Imports (7)	0	0	0
= Food Deficit (unmilled kg) (8)	997	1,038	(41)

Source: FEWS. Notes:
(1) 1980/81 - 1983/84 status quo calculations, excluding oilseeds (see 1989 FNA for Ethiopia).
(2) Based on 1984 census figures projected at 2.9% population growth rate.
(3) FAO 1990/91 Crop Assessment Mission.
(4) Estimated at 5% of gross production.
(5) Estimated at 10% of gross production.
(6), (7) USAID/estimates.
(8) Does not take into consideration likely changes in private or commercial food stock positions.

Food Aid

Table 23 presents FEWS' food balance sheet for Ethiopia for the 1990/91 season (accounting for cereals, pulses, and other food commodities). To maintain consistency with previous USAID/Addis assessments, FEWS has employed average aggregate consumption information from the base period 1980/81 - 1983/84 to estimate a 1990/91 status quo consumption requirement of 8,311,000 mt. When this is compared with a corrected estimate of food available from all sources, the 1990/91 food deficit is 997,000 mt.

This food deficit estimate differs only slightly from that of the FAO food balance (985,000 mt). This is due to small differences in the treatment of some variables which, if adjusted properly for each year in the chosen base period, have no significant effect on the end analyses. For purposes of consistency with previous years, these adjustments have not been made.

A comparison of food *need* estimates is not easy. The RRC, United Nations World Food Program (WFP), Independent Crop Assessment Mission and others approach food needs from a demand side, estimating the number of people needing assistance and applying that against a predefined ration, making direct comparison with either the FEWS or FAO food balance numbers impossible. The lack of a standard approach on the demand side has led to the adoption by different organizations of different food rations and foci (regular versus emergency, urban versus rural, natural versus man-made, agricultural versus pastoral) , so that the demand-oriented assessments can not be directly compared to each other. Caution should thus be used when comparing and evaluating these numbers. See Table 24 for more detail.

The RRC estimates that roughly 4.3 million people will require relief food assistance amounting to 839,000 mt. Approximately 3.4 million of these people are victims of natural disaster, while just under a million have been affected by civil strife. It should be noted that the RRC estimate does not include food for regular (non-emergency) programs or the needs of the nomadic population.

FAO estimates that 4.4 million people will need 820,000 mt of emergency food assistance, with a further 165,000 mt required to maintain regular programs. The WFP estimate is higher than either RRC or FAO. WFP estimates that 5.6 million people have been affected by natural disaster, and has asked for 942,000 mt of emergency relief alone.

Eritrea - The Eritrean Relief Association's estimate of 354,243 mt necessary for rural areas alone is consistent with that of the RRC (347,451 mt). If the RRC's estimates for urban (46,119 mt) and displaced (27,137) persons are added in, the total need comes to 420,707 mt. WFP's assessment, including rural, urban and displaced, is quite a bit lower at 366,580 mt. This is because the WFP maintains lower estimates for the displaced (65,000 people needing 11,466 mt of food aid versus the RRC's 133,025 people needing 27,137 mt.) The WFP also does not project additional needs in urban areas, while the RRC estimates these to be 46,119 mt.

Tigray - Food needs in Tigray this year probably fall somewhere between those estimated by the RRC (186,921 mt) and those suggested by the Relief Society of Tigray (REST) and others (454,657 mt). The WFP assessment of 282,002 mt appears a more likely figure given production and access factors discussed above.

After allowing for assumptions of higher population and expanded territorial boundaries, the relief estimates for Tigray provided by REST and the Independent Crop Assessment

Table 24: Comparison of Relief Estimates

Region	Agency	TOTAL		NATURAL CAUSES			DISPLACED			URBAN		
		Number Persons	Food Req'd	Number Persons	Ration	Food Req'd	Number Persons	Ration	Food Req'd	Number Persons	Ration	Food Req'd
Eritrea	RRC	2,288,365	420,707	1,703,190	204(1)	347,451	133,025	204	27,137	452,150	102 (2)	46,119
	WFP	2,265,000	366,580	2,200,000	161(3)	355,114	65,000	176	11,466			
	ERA (4)	1,976,926	354,243	1,976,926	179(5)	354,243						
Tigray	WFP	1,800,000	282,002	1,800,000	157	282,002						
	REST (6)	2,428,804	454,657	2,428,804	241(7)	585,099						
N. Wello	RRC	45,640	6,983	45,640	153(8)	6,983						
	WFP (9)	500,000	78,334	500,000	157	78,334						
S. Wello	RRC	322,280	52,940	251,080	153(8)	38,415	71,200	204	14,525			
	WFP	413,580	60,527	251,080	127	31,862	162,500	176	28,665			
Gonder	RRC	299,354	61,068				299,354	204	61,068			
	WFP	455,000	59,774	355,000	119	42,134	100,000	176	17,640			
Hararghe	RRC (East)	85,640	17,471	85,640	204	17,471						
	RRC (West)	80,000	0	80,000	0(10)	0						
	WFP	211,600	35,803	211,600	169	35,803						
Dire Dawa	RRC	51,600	10,526	51,600	204	10,526						
N. Shewa	RRC	52,211	10,651				52,211	204	10,651			
	WFP	78,000	13,759				78,000	176	13,759			
Wellega	RRC	76,977	8,413	71,470	102(11)	7,290	5,507	204	1,123			
	WFP	71,470	6,046	71,470	85	6,046						
Assosa	RRC	14,864	3,032				14,864	204	3,032			
N. Omo	RRC	64,560	9,878	64,560	153(8)	9,878						
	WFP	64,560	8,193	64,560	127	8,193						
Illubabor	RRC	33,690	3,436	33,690	102(11)	3,436						
	WFP	33,690	2,850	33,690	85	2,850						
Asseb	RRC	198,530	40,500	143,530	204	29,280	55,000	204	11,220			
	WFP	163,030	27,725	143,530	169	24,285	19,500	176	3,440			
Gambela	RRC	63,220	6,448	63,220	102(11)	6,448						

Sources: RRC, FAO, WFP, ERA, REST, Independent Crop Assessment Mission, FEWS. Notes: 1) RRC standard daily ration: 500 grams cereals and 60 grams pulses. (2) RRC applies half ration to urban population. (3) World Food Program ration varies, depending upon specific situation. (4) ERA estimates are aggregates; they do not include needs of urban population in GOE-held areas. (5) ERA standard daily ration for cereals (550 grams), lentils (50 grams), and other (100 grams). (6) REST estimates are aggregates; they include persons in parts of GOE-defined Gonder and Wello. (7) REST standard daily ration for cereals (500 grams), pulses (60 grams), and other (100 grams). (8) Estimate is based on need for nine months only. (9) WFP calculations include parts of eastern Gonder. (10) Needs will be met through existing programs. (11) Estimate is based on needs for six months only.

Mission are difficult to support. They appear to underestimate (1) agricultural production in certain areas of Tigray, and (2) the role played by other income and food access mechanisms (the sale of cattle, wage labor, barter and debt arrangements). It would be incorrect to dismiss these other mechanisms as being exhausted in Tigray this year and define food need simply as the difference between agricultural production and consumption. While the other income mechanisms may be severely compromised this year in Eritrea, they are by most reports still relatively healthy in all but northeastern Tigray.

The East - The RRC estimates 1990 relief requirements for Harerghe and Dire Dawa at 27,997 mt, to be distributed to 217,240 people. WFP estimates are somewhat higher, suggesting 35,803 mt for 211,600 people. It would appear from the satellite data and recent field reports that both WFP and RRC estimates should be taken as the lower threshold of needs for the area. It is possible that the extent of vulnerability in the pocket areas described earlier in this chapter may be greater than originally believed.

Update

On January 18, FEWS received a report of a revised RRC appeal for an additional 106,847 mt of relief food to address the needs of 523,760 pastoralists experiencing a serious reduction in water and pasture resources in the Ogaden region. This appeal is currently under discussion by the donors. Please note that these new numbers are not reflected in the text or tables of this report.

Other Areas - WFP and RRC both point to a need for relief food in North and South Wello. The WFP estimates needs in North Wello to be 500,000 beneficiaries requiring 78,334 mt of relief. It should be noted that this estimate includes needs in eastern Gonder. The RRC estimate for the same areas is less than one-third of that. Based on numerous field reports and the analysis of satellite imagery, FEWS believes the needs in North Wello will tend toward the lower RRC estimate.

Relief needs in South Wello are more significant. Even so, the impact of civil strife and displacement may not have had as serious an effect on agriculture as was originally thought. Recent field reports would suggest that food systems are relatively healthy. The estimates from the RRC (322,000 people requiring 53,000 mt of food) and WFP (414,000 people requiring 61,000 mt) might be taken as upper limits of need in the region.

Minor pockets of need exist in other regions of Ethiopia, including Asseb, North Shewa, North and South Omo, and the trypanosomiasis-affected areas of Illubabor and Wellega. Where displaced persons are involved, the RRC estimates appear to best define the upper level of needs. Otherwise, there appear to be no significant inconsistencies between the estimations of the various relief players.

UPDATE ON VULNERABILITY

Between 2 and 3 million highland agropastoralists in Eritrea and northern Tigray are at-risk. The fragile nature of agriculture in these regions makes these people depend upon their livestock more than agropastoralists in most other regions. With agricultural production seriously reduced a second year in a row and terms of trade falling dramatically, the level of resources these people can bring to bear against the current situation is quite low. Pastoral Eritreans have also been hard hit by the minimal rainfall of the main season and will continue to be very vulnerable until the next rainy season arrives in June or July. There are already reports of very high animal mortality in Eritrea.

Herders in parts of the Ogaden were already vulnerable because of severe shortages of pasture and record low water levels that occurred during the *meher* (main) season in 1990. In southern pastoral areas, rains since October have been poor, and suggest that conditions will continue to worsen until the *belg* (short) season. Other pastoralists around the country are faring better.

There is an increased number of displaced persons in Eritrea, Gonder and Wello as a result of civil strife earlier in the year. While some of these people already may have returned to their farms, they will remain slightly to moderately vulnerable at least until they are able to harvest the next crop. Most of the displaced, however, are government workers, traders and merchants from urban areas that have changed hands in the civil war. These people are likely to remain displaced for the foreseeable future and will have to be supported at a fairly high rate of relief.

CONCLUSIONS

The vulnerability of large numbers of people in Eritrea is perhaps worse than it has been in recent memory, including during 1984 and 1985. Besides the poor rainy season and meager agricultural production, coping mechanisms have been heavily battered by the recent string of bad years, and by the civil conflict in the area. Tigray has had a mixed year, although the worst-hit areas in the northeast are probably in a condition approaching that in Eritrea. The difference here is that the warfare that covered the area last year has moved away somewhat and other coping mechanisms are still available. The poor harvest in Harerghe has hurt those who are least able to absorb the losses, but other income-generating activities are available to many in this area despite the disruptions caused by warfare in Somalia.

The recent reforms in the agricultural sector appear to have already had a significant positive impact in Harerghe on areas planted. This appears to be true as well in areas where access to sizeable markets is relatively secure, as in agricultural areas that serve the Addis Abeba market. The same may not be true of other parts in the country. Observers noted major disruptions in agricultural activity in many rural areas caused by the changes occurring in existing input, cooperative, and marketing structures. Overall, the new reforms probably had a net negative impact on area planted, although the increases noted in some areas seem to indicate the possibility of major positive impacts in the middle- and long-term. Donor commitments of regular and emergency food are now being made and totalled 316,800 mt as of December 18, 1990. The US Government had committed at least 100,000 mt of emergency food aid by this date.

Key Terms

At Risk - FEWS Reports employ the term "at risk" to describe populations either currently, or in the near future, expected to have insufficient food, or resources to acquire food, to avert a nutritional crisis (i.e., progressive deterioration in health or nutritional condition below the status quo). "At risk" populations require specific intervention to avoid a life-threatening situation. Food needs estimates are sometimes included in FEWS reports. However, no direct relation exists between the numbers of persons deemed "at risk" and the quantity of food assistance needed. Famines are the culmination of a slow-onsetting process, which can be extremely complex. The food needs of specific "at risk" populations depends upon the point in this process when the problem is identified and the extent of its cumulative impact on the individuals concerned. The amount of food assistance required, from either internal or external sources, depends upon many considerations. Food need estimates periodically presented in FEWS reports *should not* be interpreted as food aid needs (e.g., as under PL-480 or other specific donor programs).

Vulnerability - FEWS Reports use the term "vulnerability" to indicate relative susceptibility to food insecurity of groups of people or areas. In FEWS usage, vulnerability is always characterized by its degree: slight, moderate, or extreme. Extreme vulnerability is synonymous with "at risk." Vulnerability is a dynamic concept that incorporates both chronic and current conditions. Chronic vulnerability involves long-term conditions that predispose a particular group or region to food insecurity. Current vulnerability highlights short-term changes in food security status and their implications. Vulnerability analysis involves three levels of concern: food availability, food access, and food utilization. These levels are linked by a common analytical framework that interprets all relevant information for its food security impact on the diversified income generating possibilities of different groups of households.

ITCZ - The Intertropical Convergence Zone (ITCZ) is equivalent to a meteorological equator; a region of general upward air motion and relatively low surface pressure bounded to the north and south by the northeast and southeast Trade Winds, respectively. The upward motion in the ITCZ forms the rising branch of the meridional Hadley Circulation. The ITCZ moves north and south following the apparent movement of the sun. It is at its most northerly position in the summer months. 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). The images are derived from Global Area Coverage (GAC) imagery (of approximately seven kilometers 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 five spectral bands. Bands 1 and 2 sense reflected red and infrared wavelengths respectively, and the remaining three bands sense emitted radiation in three different spectral bands. The NDVI images are created by calculating "(infrared - red)/(infrared + 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.

METEOSAT - METEOSAT-based Rainfall Estimates. FEWS uses rainfall estimates based on cold cloud duration as measured by thermal infra-red radiometers on the METEOSAT satellite. The estimates are calculated by the Department of Meteorology at the University of Reading in the U.K. Cold cloud duration correlates well with thunderstorm generated rainfall and, thus, is suitable for use in the semi-arid Sahel. The method works best on level terrain; hilly areas may produce local enhancements or rain-shadow areas that are not detected. In level areas the method has an accuracy of "rain/no rain" of at least 85% (based on a comparison with ground data). At a dekadal (ten-day) scale, 80% of rainfall amounts under 60 millimeters (mm) are accurate to plus or minus 10 mm, while rainfall over 60 mm is accurate to plus or minus 20 mm. This accuracy is acceptable for use in the FEWS-monitored region given that the method provides near-real-time coverage for a large area at a resolution of less than 10 kilometers.