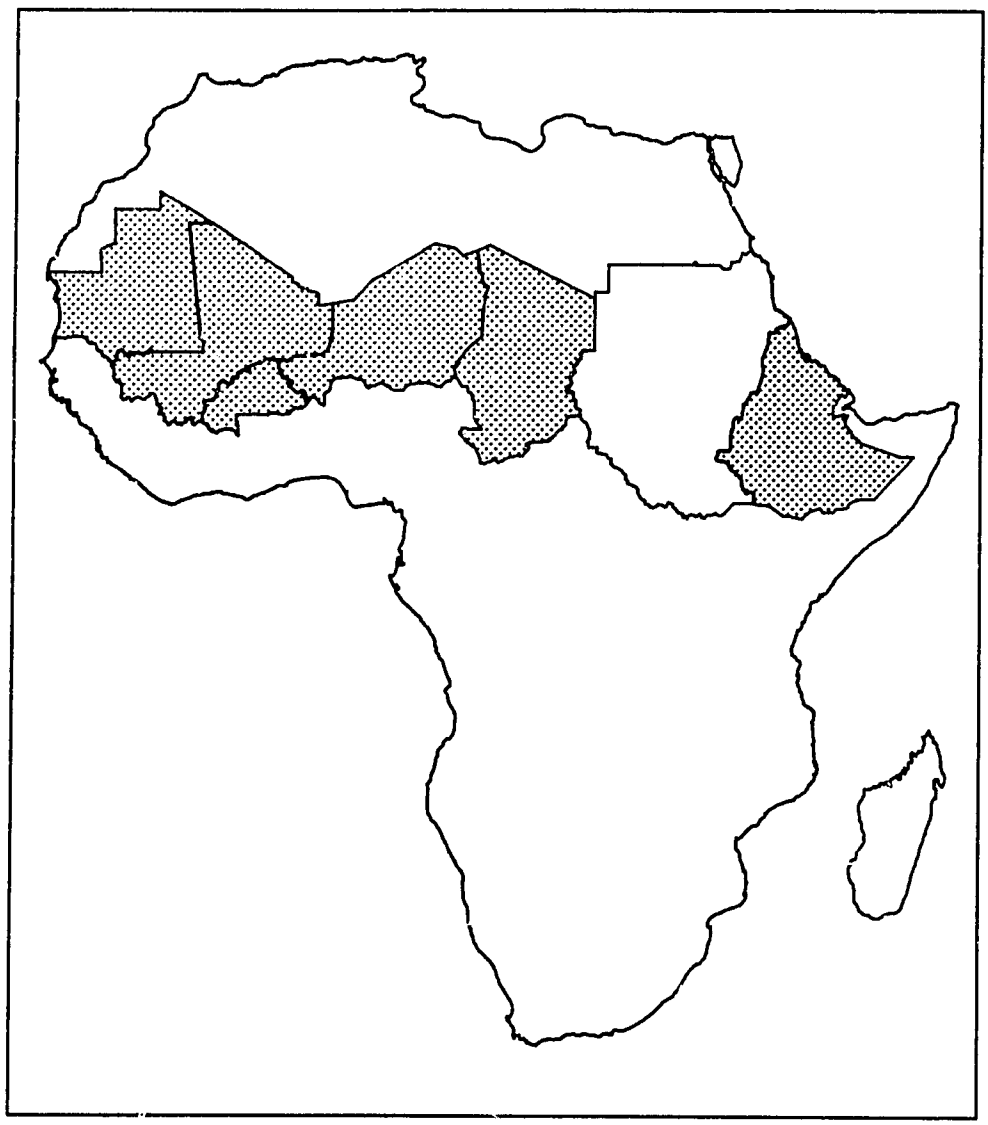
Pre-Harvest Assessment



Contains reports on:

Mauritania

Mali

Burkina

Niger

Chad

Ethiopia & Eritrea

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Pre-Harvest Assessment

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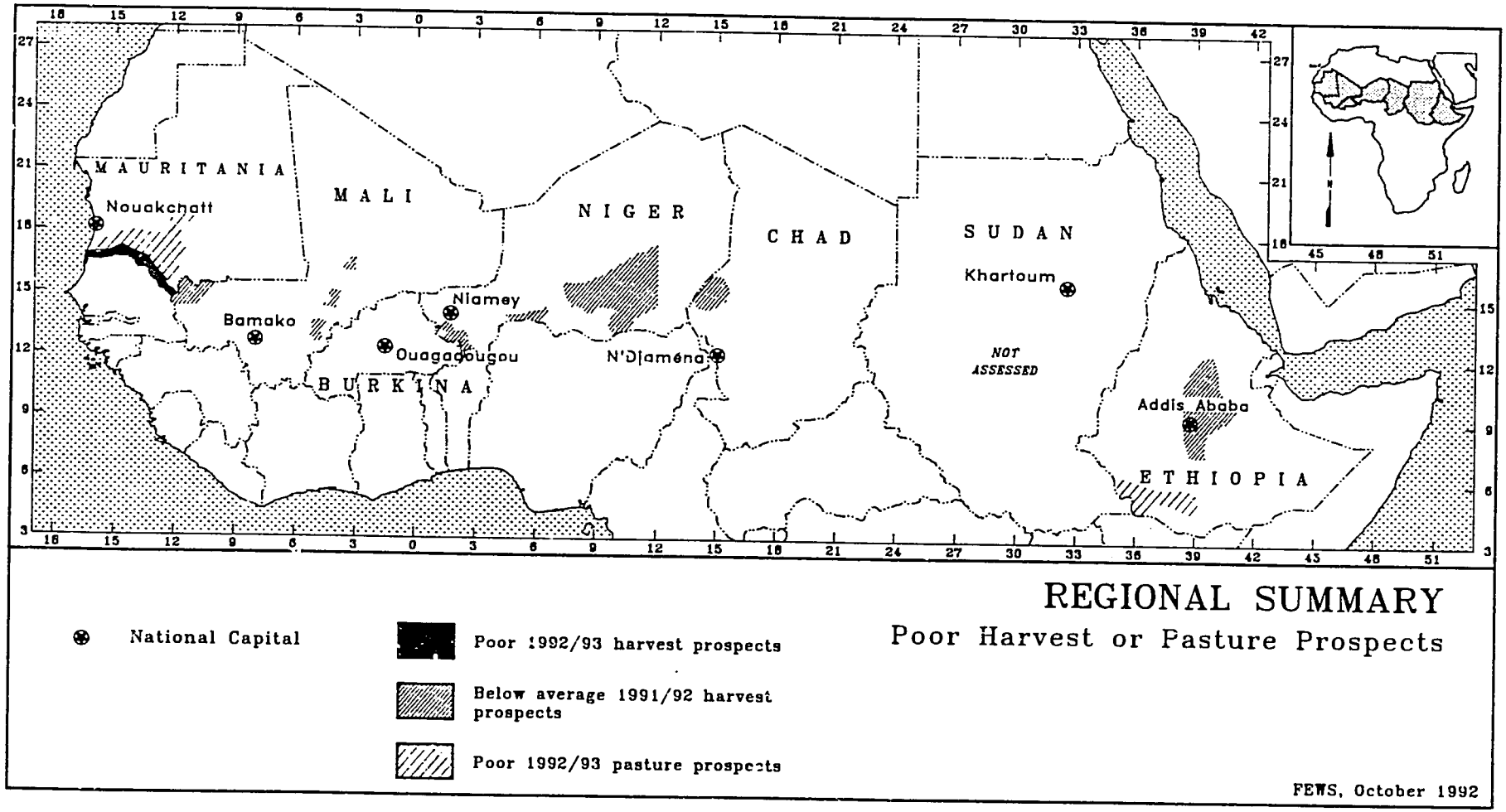


Executive Summary

The 1992/93 cereal harvest produced a surplus in most of the Sahel and, quite probably, in much of Ethiopia and Eritrea, allowing farmers to rebuild, or continued building, household food stocks. Poor rains in Mauritania have led to poor production and livestock loss (see Map 1). There are still many displaced people and returned refugees in Ethiopia and Eritrea who will require emergency assistance in 1993, even with the strong harvest prospects there. Satellite imagery suggests that there was ample rainfall in Sudan for crops this year. Because Sudan has not been actively covered by FEWS since May 1992, we cannot comment on whether farmers or agropastoralists had sufficient civil security or access to inputs to be able to take advantage of the good rains. Reports of civil distress from Sudan's South would lead one to believe that inputs in that area, at least, were hard to come by during 1992.

Mauritania

Steady rainfall since early July in the southern and far eastern *wilayas* (regions) has vastly improved pasture conditions in Mauritania and the 1992/93 harvest outlook for those areas. However, in western *wilayas* and throughout the Senegal River Valley, farmers will have to rely on irrigated and river recessional production to make up for very poor rainfed crop conditions. Targeted food aid distributions helped reduce food stress among the most vulnerable agropastoralist populations, but no intervention prevented the heavy livestock losses reported over the last few months that resulted from limited biomass availability and severe water stress.

Mali

A modest surplus of coarse grains is expected for Mali in 1992. Agroclimatological data, price data and field reports indicate that current conditions are generally normal. Significant crop losses in Kayes, Ségou, Mopti and Tombouctou regions will require some assistance, but this can be met from existing Mali Government stocks.

Burkina

Burkina's 1992/93 cereal harvest will be above average. FEWS/Burkina estimates a cereal production surplus of 159,000 metric tons for 1992/93. This will be the second consecutive year of cereal production surplus for Burkina. Small areas of crop failure require targeted assistance by the Government of Burkina.

Niger

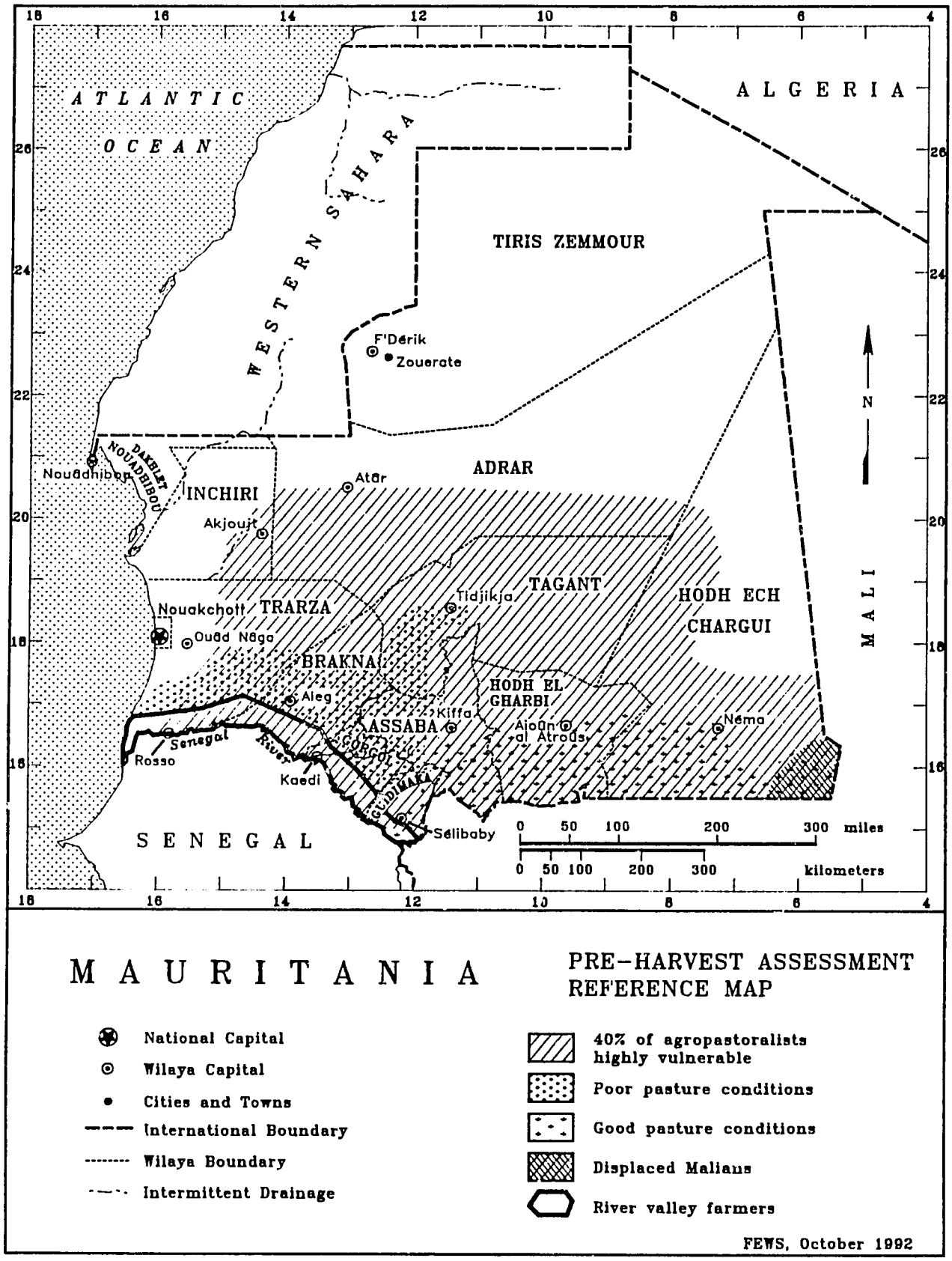
Initial projections and field reports indicate that Niger as a whole will have a production surplus again this year, but production will not reach the high levels of 1991/92. In spite of a potentially adequate national cereals supply, localized deficit production, low buying power and civil insecurity will lead to poor food security in many agropastoral and pastoral areas of the country during the 1992/93 consumption year.

Chad

Chad is expecting a second year of good harvest, with abundant and regular rainfall continuing into September. Any local cereal shortages will be met through trade and existing stocks. No emergency food aid imports are anticipated for 1993.

Ethiopia & Eritrea

The 1992 rains have been mixed in Ethiopia and Eritrea. Western regions appear to have had good growing conditions throughout the season. In *belg* areas, a dry June damaged early crops, but subsequent rains may allow good yields for short-cycle crops. Pastoral regions in the Southeast and South-center experienced a virtual failure of the early rains, but the area's second rainy season appears to be starting on time. Pastoral regions from northern Hararghe into Eritrea have shown remarkable vegetation 'green-up' from mid-August through September, a situation not seen since 1988.



MAURITANIA

PRE-HARVEST ASSESSMENT REFERENCE MAP

- National Capital
- Wilaya Capital
- Cities and Towns
- International Boundary
- Wilaya Boundary
- Intermittent Drainage

- 40% of agropastoralists highly vulnerable
- Poor pasture conditions
- Good pasture conditions
- Displaced Malians
- River valley farmers

FEWS, October 1992

Map 2: Mauritania Reference Map

MAURITANIA

Production Forecasts Bode Ill for Vulnerable Groups

Report released by USAID/Mauritania on September 21, 1992

SUMMARY

It is still too early to accurately evaluate Mauritania's crop production or regional food security for the 1992/93 year, but even if substantial rains continue through September and into October, total production will probably not surpass 100,000 metric tons (MT). The Ministry of Rural Development's (MDR) reported 1992/93 cereal production objective is 125,000 MT, net. FEWS/Mauritania estimates that total cereal production will be closer to 92,635 MT, net. Although this figure is approximately 18% higher than last year's MDR final production figure (78,071 MT net), it marks the third consecutive year that net production will have fallen below 100,000 MT. The agropastoralist populations identified in the June 1992 Vulnerability Analysis as being highly vulnerable are reported to have suffered heavy livestock losses since May (see Appendix C for a description of FEWS' use of the word 'vulnerability'). Pasture conditions have vastly improved in the southern and far eastern wilayas,[1] *but pasture green-up in western* wilayas *remains well below average (see Map 2). As a result, herds have moved farther south, into farming zones.*

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

Rainfed Agriculture

If significant rains continue until October, farmers in Hodh el Chargui, Hodh el Gharbi and Guidimaka *wilayas* and southern parts of Assaba Wilaya should harvest an above average crop.[2] Rainfed crop and pasture conditions in these areas are comparable to 1989/90. In contrast, rains were severely limited and sporadic until late August in the River Valley and western Trarza Wilaya. These conditions are close to those of 1991/92, making it probable that the rainfed crop will be negligible in Gorgol, Brakna and Trarza *wilayas*. No official crop evaluation figures or estimates will be released until at least the end of October. FEWS/Mauritania preliminary analysis indicates rainfed production should be about 30,380 MT net (see Table 1).

Irrigated Agriculture

Tardy planting of irrigated perimeters are reported to be due to farmers' difficulties in obtaining agricultural credit loans again this year. FEWS/Mauritania has taken the provisional 1992/93 estimates of planted surface area supplied by SONADER, the national rice parastatal (including private and M'Pourie perimeters), and applied a yield of 3 MT per hectare for rice (instead of 4 MT, due to late planting) and 2 MT per hectare for coarse cereals. The result is production estimates of 24,790 MT net in rice and 3,790 MT net in sorghum and maize.

Flood Recessional Agriculture (Walo)

River levels are reported to have begun rising, but traditional river recessional lands have still not flooded. The Manantali Dam must be opened for flooding to cover an optimal surface area. Due to the late date, FEWS/Mauritania believes that *walo* production will not surpass MDR's 1991/92 net total of 8,590 MT. This estimate could possibly increase if flooding occurs by the first week in October.

Depression Agriculture (Bas-Fonds)

Due to the poor spacing of rains in the River Valley and western *wilayas*, many farmers chose to plant in *bas-fonds*. If rains continue through September and grasshopper densities do not increase significantly in crop areas, this year's *bas-fonds* crop will most likely compare to the FEWS-reported 1989/90 season total for the eastern *wilayas*. Brakna Wilaya is the only *bas-fonds* area where rainfall levels have been closer to those of 1991/92. Given these conditions, *bas-fonds* production will likely be about 20,510 MT net.

[1] *In order of precedence, Mauritania's administrative units are* wilayas *and* moukhataas. *These were formerly called regions and departments.*

[2] *Domestic production in Mauritania depends upon planting schemes that include rainfed* (dieri), *irrigated, river recessional* (walo), *and passive and diked lowland agriculture* (bas-fonds *and* decrue, *respectively), with each scheme usually contributing one-quarter of Mauritania's annual cereal production. Decrue agriculture is usually treated as a subset of* bas-fonds *in reports on the progress of Mauritania's cereal production, although* decrue *production statistics are sometimes reported seperately.*

Table 1: Mauritania, Preliminary Agricultural Estimates for 1992/93 (MT)

Wilaya	Rainfed	River Recessional	Bas Fonds	Irrigated Coarse Cereals	Irrigated Rice	Decrue Private Rice	Decrue SONADER Coarse Cereals	Decrue M'Pourie Rice	Gross Total	Net Total
Hodh ech Chargui	9,374	0	8,444	0	0	0	0	0	17,818	15,145
Hodh el Gharbi	6,614	0	10,904	0	0	0	0	0	17,518	14,890
Assaba	2,595	0	334	0	0	0	0	0	2,929	2,490
Gorgol	2,903	4,886	0	2,552	4,020	0	0	0	14,361	11,202
Brakna	1,575	823	4,167	1,794	2,169	0	0	0	10,528	8,406
Trarza	0	4,395	0	0	3,360	28,347	1,120	3,180	40,402	25,620
Guidimaka	12,675	0	284	110	240	0	0	0	13,309	11,253
Tagant	0	0	0	0	0	0	4,270		4,270	3,629
Gross Total	**35,736**	**10,104**	**24,133**	**4,456**	**9,789**	**28,347**	**5,390**	**3,180**	**121,135**	**—**
Net Total	**30,376**	**8,588**	**20,513**	**3,783**	**5,873**	**17,008**	**4,581**	**1,908**	**—**	**92,635**

Sources: FEWS/Mauritania, SONADER, Service de Statistiques Agricole (SSA)

Notes: FEWS/Mauritania production estimates are calculated according to the different types of agriculture as follows:

Rainfed: Due to well spaced and significant rains in the eastern and southern *wilayas*, production should rival the 1989/90 FEWS/Mauritania estimates. On the contrary, River Valley and western *wilayas* are suffering from very late and poor cumulative rainfall, so rainfed production should be closer to 1991/92.

River Recessional (*walo*): Because conditions and Senegal River levels are equivalent to last year at this time, FEWS/Mauritania has adopted figures from the official *walo* harvest of 1991/92 (as seen after last year's Pre-Harvest report, these figures may change significantly as the season progresses).

Depression (*bas-fonds*): Late rains caused many farmers to plant more hectares (ha) to this farming method this season (1992/93). At present, climatic conditions are similar to 1989/90 in all but Brakna Wilaya, where the situation is more similar to the poor climatic conditions of 1991/92.

Irrigated: Irrigated crops include rice, sorghum and maize. FEWS/Mauritania used the 1992/93 SONADER provisional planting expectation estimates as the base for its estimates. FEWS/Mauritania multiplied the surface area for rice by last year's average yield of three tons per hectare and two tons per hectare for traditional cereals.

Decrue SONADER: The 1991/92 *decrue* SONADER figures were used for this year's preliminary analysis since current conditions in these zones are comparable.

Net Production: Total net figures are based on conventional loss percentages. Traditional cerals are calculated with a 15% milling loss and paddy rice is calculated at a 40% loss.

Decrue Agriculture

Conditions in the *wilayas* where SONADER practices *decrue* agriculture seem relatively similar to those of 1991/92. Since it is too early for an assessment, FEWS/Mauritania has adopted last season's preliminary production estimate of 4,580 MT net.

Pastoral Conditions

Biomass development in the far eastern *wilayas* and in Assaba Wilaya is almost uniformly higher than the average Normalized Difference Vegetation Index (NDVI—see inside back cover). Pasturelands in the central and western parts of the country, however, are suffering from very dry conditions similar to those of 1991, registering well below average in biomass.

Heavy losses of both cattle and sheep were reported during May, June and July this year as a result of insufficient pasture in the West, overgrazing in the South and Southeast and scarcity of water in all three regions. The National Livestock Service reports that the overall health and strength of animal herds have now improved significantly in the East, where concentrations are currently highest, but conditions in the central and western *wilayas* have driven herds much farther south than normal, creating concern about potential conflict between farmers and herders. Although livestock conditions should remain acceptable to above-average throughout the two Hodh and Assaba *wilayas* for at least the next several months, significant restrictions remain concerning traditional transhumance movement across the Malian border. The restrictions could result in a recurrence of overgrazing and scarcity of water as early as the beginning of 1993.

Pests

At mid-September, the Desert Locust situation remained calm in Mauritania. A three-part Maghrebian team of experts, supported by the United Nations Food and Agriculture Organization (FAO), is currently on mission within Mauritania. The team has reported no sightings of gregarious-phase (swarming) Desert Locusts thus far.

Grasshopper infestation is reported in all eastern pastoral zones. The most heavily infested *wilaya* is Hodh ech Chargui. Treatment was underway in Hodh ech Chargui, Hodh el Gharbi, Assaba and Guidimaka *wilayas* during mid-September. While the majority of grasshoppers are currently in pasturelands, movement to the greener croplands as the grasses dry may cause moderate to heavy crop damage. The extent of damage and yield loss will depend on the crop stage when pastures dry. If rainfall continues until late in the season, it should be possible to harvest existing rainfed crops with minimal loss, but the *bas-fonds* crops may still be in danger.

Food Stocks and Flows

Although food stress remains high in various agropastoral zones and parts of the River Valley, it has been reduced significantly by ongoing food aid distributions carried out by the Food Security Commission (CSA). After three to four very poor agricultural years, a large percentage of the population finally displayed visible effects of extreme food stress (rapid rural assessments in various *moukhataas* throughout the country revealed abnormally high levels of infant and adult malnutrition). As a result of increased food distributions over the past few months, the CSA recently estimated that initial stock levels for 1992/93 may not surpass 20,000 MT, a large drop from the 76,383 MT available at the start of 1991/92.

FACTORS AFFECTING FOOD ACCESS

Projected Food Consumption Needs

Even though it is still very early to undertake a precise food accounting exercise, current indicators such as rainfall patterns, river levels and pest densities have allowed FEWS/Mauritania to launch very preliminary estimates of potential crop production. These estimates put global production at 92,635 MT net, a very mediocre scenario, but approximately 18% higher than 1991/92 (78,071 MT net). Table 2, a preliminary cereal production balance for the 1992/93 season, shows that Mauritania possibly has a 257,000 MT production deficit.

Economic Data

According to recent field trips and informal information, cereal prices remain high in the interior of the country, while meat prices are on the rise again after taking a dramatic dip between April and July of this year. Severe pressures caused by insuf-

Table 2: Provisional 1992/93 Cereal Production Balance for Mauritania, by Wilaya (MT)

Wilaya/Group	1993 Population	Cereal Needs	Net Production	Balance	Percent of Needs Met
Hodh ech Chargui	214,326	35,364	15,145	-20,219	43
Hodh el Gharbi	167,398	27,621	14,890	-12,731	54
Assaba	181,399	29,931	2,490	-27,441	8
Gorgol	195,841	32,314	11,202	-21,112	35
Brakna	214,507	35,395	8,406	-26,988	24
Trarza	267,540	44,144	25,620	-18,524	58
Guidimakha	127,918	21,106	11,253	-9,853	53
Tagant	75,830	12,512	3,629	-8,883	29
Adrar	70,459	11,626	0	-11,626	0
Inchiri	15,845	2,614	0	-2,614	0
Dakhlet Nouadhibou	69,727	11,505	0	-11,505	0
Tiris Zemmour	39,209	6,469	0	-6,469	0
Nouakchott	450,710	74,367	0	-74,367	0
Refugees	30,000	4,950	0	-4,950	0
Total	**2,120,708**	**349,917**	**92,635**	**-257,282**	**26**

Sources: Population figures were calculated using the official 1987 census figures and an annual growth rate of 2.7%. Cereal needs were calculated using the officially accepted consumption figures of 165 kilograms/person/year.

Notes: A cereal production balance is the amount of cereal needs met by local production, with possible commercial imports and food aid not taken into account. 1992/93 statistics concerning import quantities and programmed food aid are not yet available—1991/92 commercial cereal imports totalled 181,250 MT at last count, 1991/92 food aid imports totalled 45,135 MT.

ficient pasture, abnormally high animal concentrations, disrupted transhumance patterns and water scarcity resulted in significant livestock loss.

While still very early for speculation, if climatic conditions remain favorable until harvest in the South and far East, cereal prices should begin to fall significantly in those areas. At mid-September, only imported cereals and some locally grown rice were available in interior markets. This has been the case since 1991. In Nouakchott, cereal prices remain high while both meat and imported products continue to climb steadily in price. This phenomenon is most likely a response to the liberalization of prices and the rumored devaluation of the *ouguiya* (local currency).

UPDATE ON VULNERABILITY

It is important to note that, after three to four catastrophic production years, it appears that a significant portion of Mauritania's population has dropped below a certain threshold and for the first time is showing visible signs of food stress over fairly widespread areas. Between May and July this year, livestock loss was notably higher than normal due to the myriad of conditions cited over the past six months. In addition, food stress has become so great among a portion of the agropastoralist populations that various local officials speak of the crisis in terms of famine.

As reported in the FEWS June 1992 Vulnerability Assessment, the overall number of people facing elevated vulnerability in 1992 is higher than in 1991. FEWS/Mauritania believes that up to 40% of the agropastoral and pastoral populations are still highly vulnerable. In addition, approximately one-third of the River Valley population has become highly vulnerable because of the current agricultural situation. Malian refugees remain highly vulnerable because of the nature of their situation, but their immediate needs appear to be covered until at least the end of 1992.

Senegal River Valley farmers benefitted from sporadic food aid distributions over the past few months, helping to bridge the food gap until the upcoming harvest. Unfortunately, unless river recessional and irrigated production make up for poor rainfed crop conditions, harvest prospects are dismal for a fourth consecutive year. FEWS/Mauritania believes that up to one-third of the population does not possess sufficient "alternative coping mechanisms" to enable them to make it through another long year without assistance, unless they abandon some of their preferred production strategies.

Up to 40% of the agropastoral and pastoral populations remain highly vulnerable. Neither pasture nor agricultural conditions are favorable in northern Brakna, central Gorgol, southern Trarza or Tagant *wilayas*. Although a large majority of the agropastoral populations received food distributions between April and August, conditions in these areas are currently at risk of becoming even more stressed than in 1991/92. Conversely, agropastoralists residing in the Hodh and Assaba *wilayas* are profiting from lush pastures and sufficient water and are recuperating from the devastating effects of the 1991/92 dry season.

The Malian refugee situation was stable as of mid-September. According to United Nations High Commission on Refugees (UNHCR) officials, all immediate food, shelter and pharmaceutical needs appear to be covered for up to 30,000 refugees until at least the end of 1992.

CONCLUSION

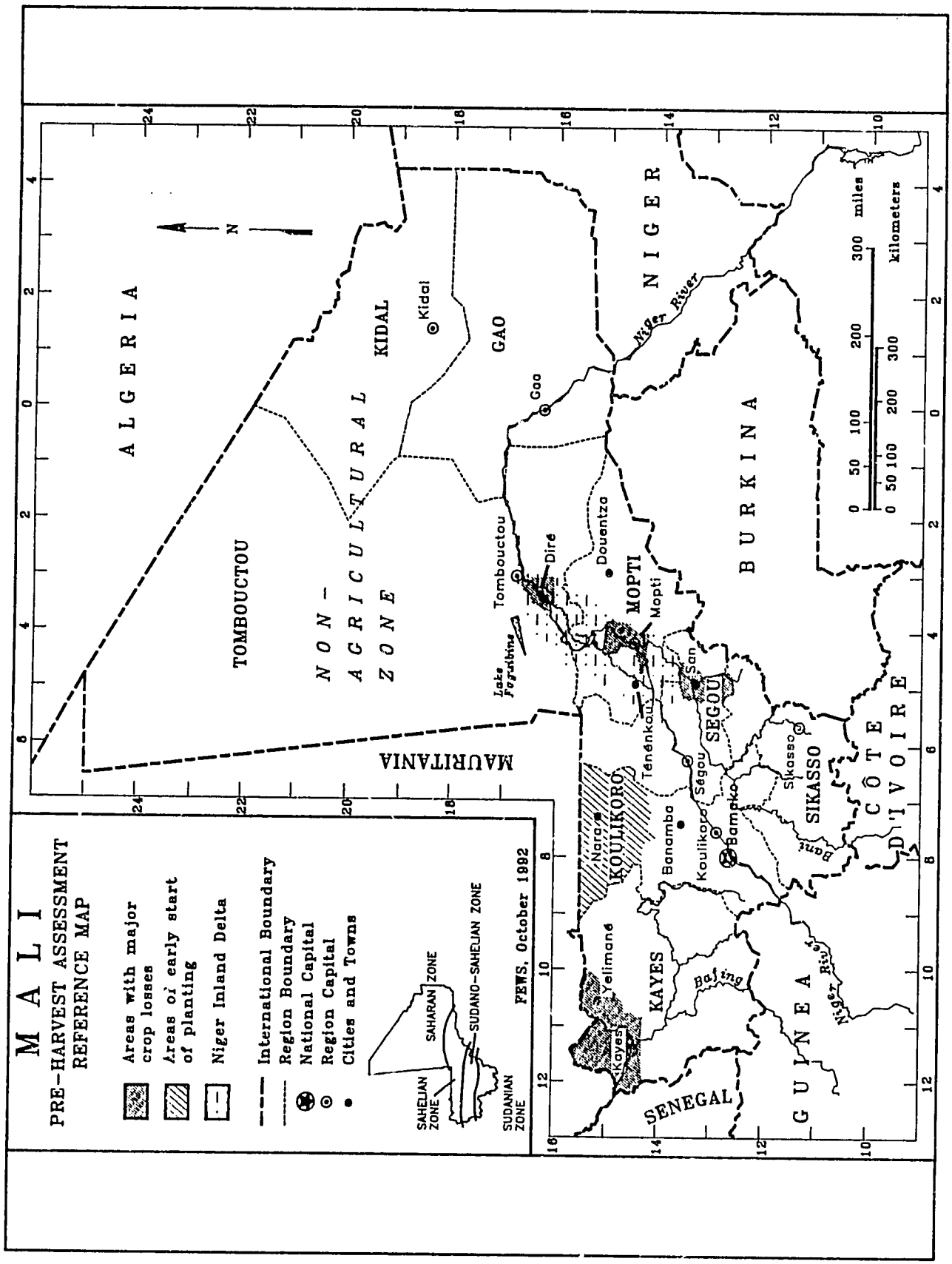
Because September is still early in the growing season with regard to three of the four main farming techniques practiced in Mauritania, it is very difficult to estimate production and food security by region. Even so, FEWS/Mauritania predicts that net global production will not be much higher than 92,000 MT, considering that the River Valley rainfed crop appears to be minimal at best, conditions for river recessional production are tenuous and *bas-fonds* production may be subject to pest infestations. This would make 1992/93 the third consecutive growing season with production falling below 100,000 MT.

The CSA has recently released a provisional report describing the high levels of food stress visible throughout the country. The CSA also predicts that the commercial sector is unlikely to import more than 40% of the wheat that it did in 1991/92, because significant taxes have been levied on commercial arrivals since June 1992, reducing this sector's profit incentive.[1] Based on this situation, the 1991/92 drawdown on initial stocks and marginal scenarios for 1992/93 production, the CSA believes that the cereal deficit to be made up by food aid imports will be between 126,000 and 153,000 MT. FEWS/Mauritania calculates a 128,250 MT 1992/93 pre-food aid-import cereal deficit, using FEWS/Mauritania production estimates and the CSA's predictions on commercial sector imports.

There are no disproportionate differences between the CSA and FEWS/Mauritania global preliminary deficit figures. What does appear as a glaring dissonance however, is the CSA request for 80,000 MT destined for free distribution, targeting some beneficiaries for up to 12 months a year. This request for long-term assistance addresses a much more serious structural food aid problem which most of the donors don't agree can or should be solved with free food aid. In 1990/91, donor contributions totailed 84,566 MT (approximately 34,000 MT were used for free distribution). In 1991/92, donor contributions totalled 45,135 MT (approximately 30,000 MT were used for

[1] *In 1991, the commercial sector imported an impressive quantity of cereals (181,250 MT total; 66,250 MT of wheat), equal to over 50% of that year's cereal consumption needs for the country. Commercial imports usually cover one-third of annual cereal needs.*

free distribution). This year, 1992/93, in all likelihood the cereal deficit will be significantly higher than in the past decade, but the food security committee (which includes both donor representatives and CSA officials) will be seriously looking for alternative methods to cover the food gap.



Map 3: Mali Reference Map

MALI

Adequate Harvest Expected Except Near Delta and in Northwest

Report released by USAID/Mali on September 22, 1992

SUMMARY

The 1992 agricultural season developed satisfactorily over most of Mali. Rainfall was adequate and timely in most parts of the country. No significant outbreaks of crop pests had been reported as of mid-September. Nevertheless, areas in northern Kayes, Yelimané, San, Diré and central Mopti cercles[1] *have had major crop losses (see Map 3). These areas suffered a relatively late seasonal start and some mid-season dry periods.*

The late onset of rains resulted in a shift from maize to millet production. Even though total surface area planted is reported to be higher than in 1991, this shift to lower yield crops will contribute to a smaller harvest in 1992. Overall coarse grain production should be approximately two million metric tons (MT), resulting in a gross production surplus[2] (before milling and storage) of 300,000 MT as compared to 530,000 MT in 1991.

Approximately 550,000 rural inhabitants will be negatively affected by crop losses. While a small portion of these will need emergency assistance, their needs can be met by existing Government of the Republic of Mali (GRM) security stocks. The larger need will be among northern populations affected by civil unrest and only indirectly affected by production shortfalls.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

If current conditions prevail through the end of October, Mali should enjoy a surplus harvest. The onset of initial rains was timely and well distributed throughout most of the country. No widespread mid-season droughts were experienced. Rainy conditions have continued in much of the country through the end of September.

As is usual for a Sahelian country, there is considerable variation in the quality of the crop season. Rains were late in starting and post-start rainfall levels were low in northern Kayes, central Mopti, San and Diré *cercles*. Estimated planting dates based on NDVI images indicate late starts in northern Kayes, Yelimané, western Ténénkou, Mopti and San *cercles*. The same methodology indicates early starts for Nara Cercle. This evaluation is supported by meteorological data for nearby stations and GRM field reports.

The onset of the annual flood of the Niger River and its tributaries has been slower than normal due to low rainfall in upper basin areas. Nevertheless, river levels have been satisfactory for recessional and irrigated rice in the Niger watershed.

Pest infestations have been generally low. Unusual January rains resulted in early, unsuccessful hatchings of grasshoppers, serving to keep grasshopper populations low throughout Mali. Early grasshopper hatches in Douentza attacked sprouting crops and necessitated replanting. Significant infestations of blister beetles have been reported in southern Nara and Banamba *cercles*, but no estimate of crop damage has been made.

Reports at the end of August from GRM Regional Development Offices (ODR) and Regional Agriculture Directorates (DRA) estimated that the surface area planted in 1992 was 97,301 hectares (ha) greater than at the same time in 1991, an increase of 6% (see Table 3). The number of hectares put into maize production in 1992 was 72,271 ha, as compared to the 156,081 ha planted in 1991. A corresponding increase in area planted in millet and sorghum has been noted. This is a reflection of the late start in the rainy season in 1992 compared to 1991. A corresponding decrease in overall cereal production may occur because of the difference between millet and maize yields.

FEWS/Mali estimated cereal production based on historical yield data from ODRs and DRAs with a surface area adjustment of 25%. This increase corresponds to historical differences from these data sources and final production estimates. Using

[1] *In order of precedence, Mali's administrative units are regions, cercles, and arrondissements.*

[2] *A cereal production balance is the amount of cereal needs met by local production before stocks on-hand, commercial imports and food aid are taken into account. 'Gross' production statistics do not account for milling, waste or seed and feed losses.*

Table 3: Mali, Estimated 1992 Cereal Production

Location (ODR/DRA)	1991 Area Planted	1992 Area Planted	High Production Estimate	Low Production Estimate
Kayes DRA	52,017	37,185	35,693	30,526
ODIMO-ODIPAC	125,624	124,434	22,152	122,152
ODI Kaarta	88,720	134,145	108,677	106,730
Koulikoro DRA	58,340	60,965	59,815	59,815
OHV Niger	135,675	139,620	136,093	136,093
Ségou DRA	276,236	292,316	193,009	193,009
CMDT	424,637	482,556	536,423	536,423
Office Riz Ségou	14,109	14,109	11,318	11,318
Office Niger	40,345	34,101	74,214	74,214
Mopti DRA	380,290	374,976	280,455	280,292
Office Riz Mopti	20,622	19,509	3,415	2,561
DRA Gao	—	—	8,224	8,224
DRA Tombouctou	—	—	40,942	30,707
Reported Total	**1,616,615**	**1,713,916**	**1,610,431**	**1,592,064**
Adjusted Total	—	—	**2,013,039**	**1,990,080**

Sources and Notes: Figures are based on reports from ODR and DRA offices as of 31 August. Historically, these ODR/DRA reports account for 75% of actual production. Yields used for the high production estimate are based on averages over 1985-91. The same yields were adjusted for late seasonal starts to obtain low-end estimates. Estimates for Tombouctou and Gao are based on historical averages of total production.

average yield for each crop, an estimate of 2,013,039 MT of coarse grains was obtained (high estimate). Production was then decreased by 25% for millet, sorghum and maize production in areas where the season started at least one month later than normal. This reduces the estimate by approximately 23,000 MT (low estimate). The estimated two million metric tons is slightly above the post-1985 average, but 300,000 MT less than 1991.

The estimates assume a normal completion of the rainy season. Production may be lower if rains end in September or if significant losses are experienced from crop pests. The GRM will release initial regional estimates based on survey data at the end of November. Final production figures may be available in mid-1993.

Pastoral Conditions

Current pasture conditions are generally good throughout the country. Pastures in the vicinity of the Inland Delta of the Niger River are recovering from overgrazing from unusually long-time concentrations of herds. The unusual duration of herd concentration is a result of insecurity in the North. Continuing insecurity in wet-season pastures in the more arid areas of Tombouctou, Gao and Kidal regions will continue to threaten these fragile areas, because seasonal transhumance is disrupted and herd concentration may continue.

GRM reports concentrations of herds in the West, along the southern border of Mauritania. Combined problems of insecurity and drought in wet season pastures have disrupted normal transhumance routes. These pastures may risk degradation if access to traditional seasonal pastures continues to be impeded or if alternative grazing areas are not found.

Food Stocks And Flows

The GRM early warning system (SAP/Mali) reports that most household food reserves in their area of surveillance have been largely exhausted as a result of normal consumption during the 1992 hungry season (*soudure*—the period from the start of rains to the start of harvest). Southern household reserves may be larger. Given adequate harvests, most families may be expected to reconstitute their reserves for the forthcoming year. Those areas suffering poor harvests may find this impossible and may resort to other economic activities to supplement production shortfalls.

GRM stocks and National Security Stocks (SNS) remain at near-record levels. Government purchases for SNS stocks may

be expected to be slightly over 5,000 MT in the upcoming year. USAID/Mali is importing 4,000 MT of sorghum for use in addressing expected emergency food needs for those northern populations who have been rendered destitute by civil unrest.

FACTORS AFFECTING FOOD ACCESS

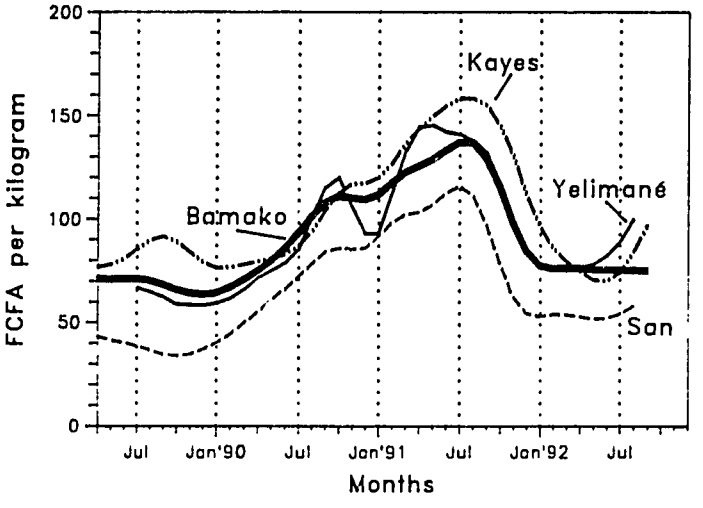
Projected Food Consumption Needs

Nationally, there should be a gross cereal production surplus of 300,00 MT, as compared to a surplus of 530,000 MT in 1991 (based on FEWS estimates of production). This is based on a consumption rate of 185 kilograms of unmilled cereal per person per year for a population of 8.83 million. The southern and central parts of the country should register the highest surplus, as is normal. Kayes, Mopti and Diré *cercles* will experience a larger than normal deficit in cereal production.

Economic Data

Cereal prices have remained very stable since the beginning of 1992. Prices feli considerably from their mid-1991 levels to levels similar to those following the excellent harvest of 1988/89. The cereal market usually responds to expectations of the forthcoming harvest in August, as reflected in consumer millet price trends (see Figure 1). As of mid-September, millet prices had remained stable or fallen in those areas which are reporting favorable crop conditions. Millet prices have increased rapidly as compared to pre-June levels in those areas experiencing poor crop conditions (most notably, Kayes, Yelimané and San).

Figure 1: Mali, Nominal Millet Prices, 1989-92



Sources: OPAM/SIM; SAP/Mali; FEWS/Mali
Note: The prices have been smoothed using a three-month moving average.

Goat-to-millet terms of trade have been good throughout the country, indicating a recovery of purchasing power from mid-1991 levels for producers holding livestock. SAP reports that current values of goats in exchange for sacks of millet averages about one head per sack, which is close to the average since 1986. Terms of trade are poorer in those areas of the north that are suffering from insecurity and in areas where current crop conditions are poor.

UPDATE ON VULNERABILITY

The areas of high to extreme vulnerability of food crisis identified in the 1992 FEWS Vulnerability Assessment for Mali were not so much due to production shortfalls as to civil unrest (see Appendix C for a description of FEWS' use of the word 'vulnerability'). The current crop conditions will serve to maintain adequate levels of stocks nationally, but severe shortages can be expected in northern zones until markets and trade routes begin to function normally. Should peace efforts prove successful, large numbers of indigent former residents of the North should return to their places of origin. They will need assistance in re-establishing themselves.

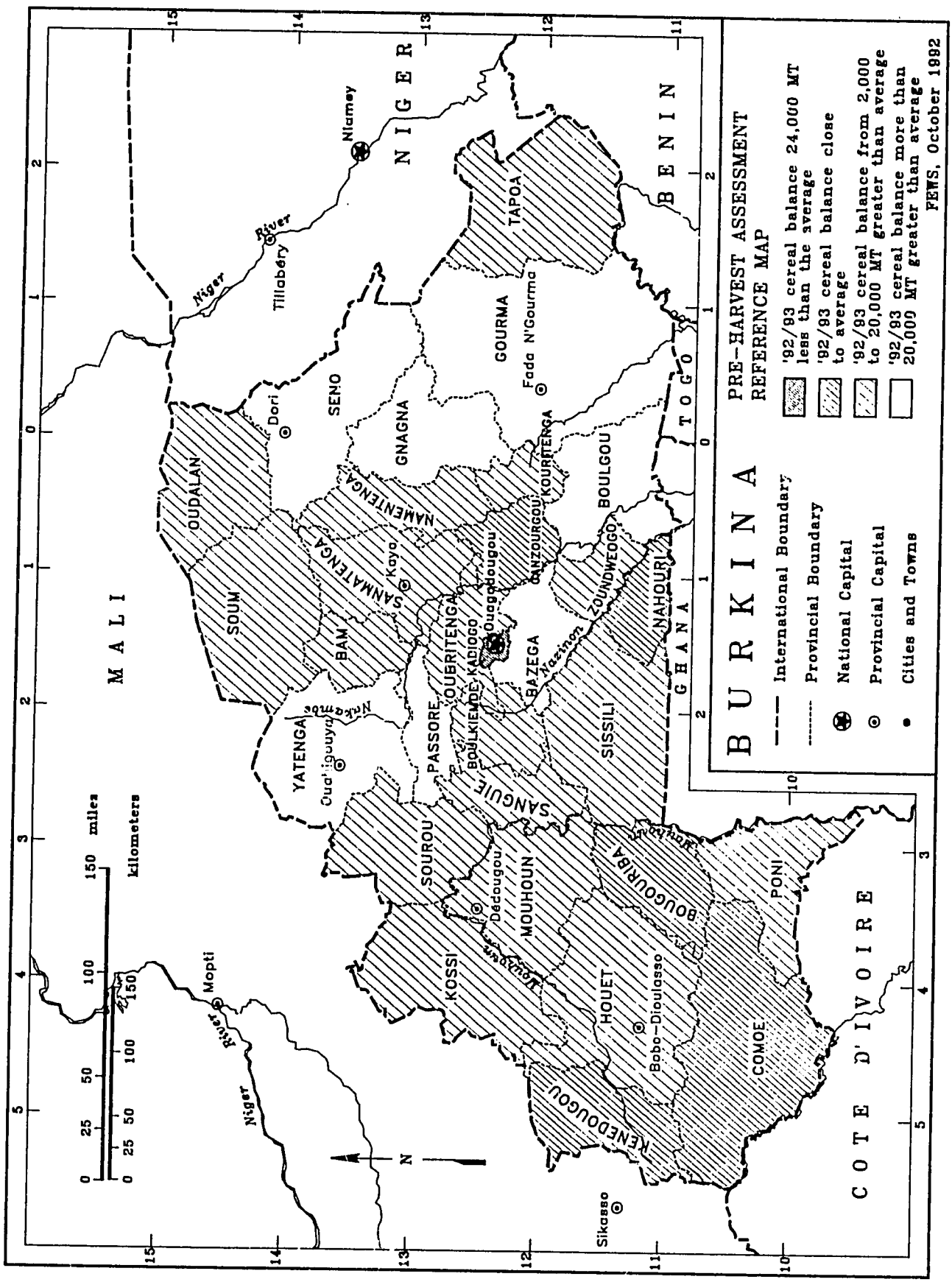
Should the crop harvest be extremely poor in those areas identified as having poor growing conditions, local food stocks may reach such levels that emergency assistance would be necessary by the beginning of the hungry period in April or May 1993. The total number of persons thus affected should not exceed 550,000. A small portion of this group may require emergency food assistance. The present expectation is that current SNS reserves are large enough to meet their needs.

CONCLUSIONS

There will be an estimated gross production surplus of 300,000 MT. Below-normal harvests may occur in central Mopti and northern Kayes *cercles*. Satellite imagery, rainfall data, field reports and price data all indicate that production in these areas will be below normal. The actual harvest is highly dependent upon the rains continuing into October and the absence of significant insect infestations.

Approximately 550,000 rural people live in areas suffering from reduced crop yields. A small portion of these will need emergency food assistance during the first half of 1993. Current commercial and security stocks are sufficient to meet production shortfalls in those areas suffering from reduced harvests.

Populations in the North remain highly vulnerable and will require exceptional assistance regardless of the harvest. The GRM and donors have plans in place. USAID/Mali has financed the stocking of 700 MT in Tombouctou Region and plans are being made for the distribution of another 4,000 MT in Tombouctou, Gao and Kidal regions.



Map 4: Burkina Reference Map

BURKINA

Good Growing Season Reduces Food Stress

Report released by USAID/Burkina on September 21, 1992

SUMMARY

The 1992/93 growing season began late compared to that of 1991/92. Due to the late start of the rains, farmers in the Central Plateau completed their planting as late as the end of July (especially around Ouagadougou). Fortunately, adequate rainfall from late July through August greatly improved the growing season in the late-planting provinces. Several provinces suffered from reduced rain during two consecutive dekads in late July and early August, seriously affecting maize crops (Comoé, Mouhoun, Sissili, Houét, Poni and Bougouriba). Overall, however, cereals are in very good condition and the harvest outlook is excellent (see Map 4). FEWS/Burkina estimates a national cereal surplus for 1992/93 of approximately 159,000 metric tons (MT)—314,000 MT better than the average balance for Burkina (a 155,000 MT deficit). The northwestern provinces of Soum, Yatenga and Sourou will have above average production. This will help groups that had been identified as extremely vulnerable in the 1992 FEWS Vulnerability Assessment (see Appendix C for a description of FEWS' use of the word 'vulnerability'). These people will be able to start the rebuilding of household economic resources lost over two to three consecutive years of below-average production. Even with this year's good harvest, however, they will remain moderately vulnerable.

FACTORS AFFECTING FOOD AVAILABILITY

Cereal Crop Production

The 1992/93 growing season started later than last year, delaying cereal planting, especially in the central and northern provinces. Planting in these provinces was completed in late July, once rainfall became adequate. METEOSAT-based rainfall estimates show insufficient rainfall in June to allow for timely planting in Kadiogo and Oubritenga (see inside back cover for an explanation of METEOSAT). Despite the below-average rainfall throughout the country, however, its distribution over time and space has been generally good.

Moisture stress was inferred from NDVI images (see inside back cover for an explanation of NDVI). As of the last ten days of August, the most stressed areas were in Poni, Sissili, Comoé and Bougouriba provinces and in areas east of Ouagadougou—moisture stress will reduce cereal production potential. During this period, NDVI was below the 1982-90 average only in the South (Comoé, Poni, Sissili, and Bougouriba provinces).[1] Grasshopper infestations have not been economically significant. Estimated net cereal production for 1992/93 is approximately two million MT (see Table 4). This figure results in a national cereal production surplus of 159,000 MT, 314,000 MT more than the 1985-90 average production deficit of 155,000 MT.[2]

Pastoral Conditions

Pasture development started late in the central and northernmost provinces due to the lack of rain. However, adequate rain in late July and through August filled the gap. As of late September, pastures are in excellent conditions for adequate livestock production. This will greatly reduce the vulnerability of agropastoralists in economically stressed areas of Gnagna, Tapoa and Gourma. Water availability will no longer be a constraint following heavy rains in August that created some significant floods in several provinces (Bam, Oubritenga and Boulgou).

Food Stocks and Flows

An initial assessment of existing stocks, food aid and planned imports for 1992/93 is summarized in Table 5. On-farm stocks are estimates that take into account the very good growing season of 1991.

FACTORS AFFECTING FOOD ACCESS

Projected Food Consumption Needs

FEWS assesses food access in Burkina by using the estimated 1992/93 cereal production balance compared with the 1985-90

[1] *There is a high correlation between maximum NDVI for the season and gross cereal production in Burkina, where the maximum NDVI usually occurs in the final ten days of August. Estimates of cereal production potential by region generally follow the NDVI difference from average.*

[2] *A 'cereal production balance' equals domestic cereal production minus domestic cereal consumption needs. In Burkina, consumption is assumed to be 190 kilograms per person per year.*

Table 4: Burkina, FEWS-estimated 1992/93 Cereal Production Balance (000 MT)

Province	FEWS June 1993 Population	1992/93 Cereal Needs	FEWS-estimated 1992/93 Production			Average Cereal Balance (1985-90)	1992/93 Difference from Average Balance
			Gross	Net	Balance		
Bam	177,867	34	39	34	0	-8	8
Bazèga	371,796	71	100	87	17	-5	22
Bougouriba	252,281	48	68	59	11	9	2
Boulgou	478,420	91	126	109	19	-7	26
Boulkiémdé	405,657	77	93	81	4	-11	15
Comoé	315,619	60	86	75	15	16	-1
Ganzourgou	229,559	44	57	49	6	3	2
Gnagna	291,309	55	96	84	28	2	26
Gourma	372,397	71	116	101	30	10	21
Houét	784,609	149	190	165	16	7	9
Kadiogo	765,744	145	28	25	-121	-97	-24
Kénédougou	171,391	33	53	46	13	14	-0
Kossi	410,698	78	138	120	42	31	12
Kouritenga	234,580	45	34	30	-15	-19	4
Mouhoun	358,888	68	105	91	23	10	12
Nahouri	126,518	24	15	13	-11	-9	-2
Namentenga	220,909	42	52	45	3	-6	9
Oubritenga	335,809	64	77	67	4	-4	7
Oudalan	122,028	23	18	16	-7	-10	3
Passoré	237,671	45	79	69	24	-3	27
Poni	269,477	51	67	59	7	3	5
Sanguié	238,560	45	60	52	7	-0	7
Sanmatenga	417,878	79	105	92	12	-7	19
Séno	280,609	53	74	64	11	-11	21
Sissili	319,673	61	89	78	17	3	14
Soum	233,269	44	41	36	-9	-15	7
Sourou	329,902	63	85	74	11	-6	17
Tapoa	199,802	38	62	54	16	2	14
Yatenga	569,501	108	107	93	-15	-42	27
Zoundwéogo	181,698	35	41	36	1	-3	4
Total	**9,704,121**	**1,844**	**2,304**	**2,003**	**159**	**-155**	**314**

Sources: Provincial population projections for June of 1992 are exponential extrapolations of 1985 census figures (Institute Nationale de Statistique et Demographie—INSD) at province-specific growth rates. Consumption is assumed to be 190 kilograms per person per year. Net production equals 85 percent of gross. Cereal production figures for 1984-90 come from the Ministry of Agriculture.

Notes: The quality of the growing season was estimated as a function of the presence of two consecutive dekads of drought. Drought was defined as two consecutive dekads of decreasing NDVI. A drought later in the season was considered worse than drought early in the season. For each department (Burkina has 300), the time of the drought period was converted to an index value. This index value was used to adjust the standard deviation of 1985-90 average per capita production for each department to produce the 1992/93 estimate of production per capita. Using the standard deviation in this way gives an estimate of cereal production that takes into consideration the variability of annual cereal production.

average production balance. Table 4 presents the FEWS estimate for the 1992/93 cereal production balance. Areas showing a better-than-average balance include most of Yatenga, Soum, Séno and Oudalan provinces. Production balances for Ganzourgou Province and areas east of Ouagadougou are slightly worse than average. This conclusion about the quality of the growing season is similar to assessments by the Ministry of Agriculture.

Projected Food Aid Needs

If the cereal production estimates in Table 4 are accurate, Burkina will not need emergency food aid in 1992/93. Given current estimates of 1992/93 commercial and food aid imports, Burkina's overall cereal balance should be 318,000 MT (see Table 5). The Government of Burkina (GOB) should be able to deal with any pockets of poor production that might exist due to drought or floods. Recent floods in Oubritenga and Bam provinces affected some 4,300 hectares of millet, sorghum and rainfed rice. These provinces may need targeted food aid from the government.

Food aid or other income support will need to be targeted to areas where cereal production has been below average for several consecutive years. The aid would reduce the likelihood that vulnerable groups would have to sell off household assets to purchase cereal. Smallholder agriculturalists in Gnagna will be better off this year because of the above average cereal production, but will still remain highly vulnerable because of several consecutive years of below average cereal production.

Yatenga, Passoré and Soum provinces will have above average production this year. Smallholder agriculturists in these provinces can begin the long process of resource reconstitution. These groups will still be moderately vulnerable to food shortages, however, because of last year's deficits.

Price Information

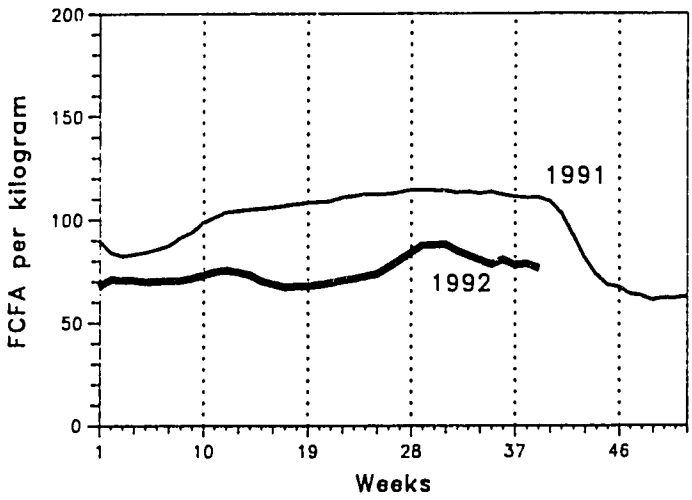
Price data from the OFNACER Market Information System show millet prices during the 1992 "hungry period" of June through August have been considerably less than in the same period in 1991. Figure 2 shows the evolution of average millet prices in selected markets. The low prices have made it easier for smallholder agriculturists in cereal deficit areas to purchase

Table 5: FEWS-estimated National Cereal Balance for Burkina (MT)

1993 Population		**9,700,000**
Annual per capita consumption rate (kg)		**190**
1992/93 CEREAL CONSUMPTION REQUIREMENT		
Expected 1992/93 Cereal Consumption		1,843,000
Replenishment of Stocks (not available for consumption)		20,000
OFNACER	10,000	
On-Farm	10,000	
Total 1992/93 Cereal Requirement		**1,863,000**
1992/93 CEREAL SUPPLY		
Estimated Net 1992/93 Production		2,003,000
Available In-Country Stocks (OFNACER)		25,000
Programmed Food Aid for 1992/93		18,000
CATHWEL	12,000	
WFP	5,000	
EEC	1,000	
Expected 1992/93 Commercial Imports		135,000
Wheat	35,000	
Rice	100,000	
Total Available Cereal Supply for 1992/93		**2,181,000**
PROVISIONAL NATIONAL CEREAL BALANCE		**318,000**

Sources: FEWS/Burkina; USAID/Burkina; GOB/OFNACER; GOB/INSD; GOB/MOA

Figure 2: Burkina, Average of Millet Prices in Dédougou, Fada N'Gourma, Kaya and Ouahigouya, 1991-92



Source: GOB/OFNACER; FEWS/Burkina
Note: Prices are nominal and have been smoothed with a three-week moving average.

cereals. However, the low prices contribute to the decline of farmers' cash income, especially in surplus areas.

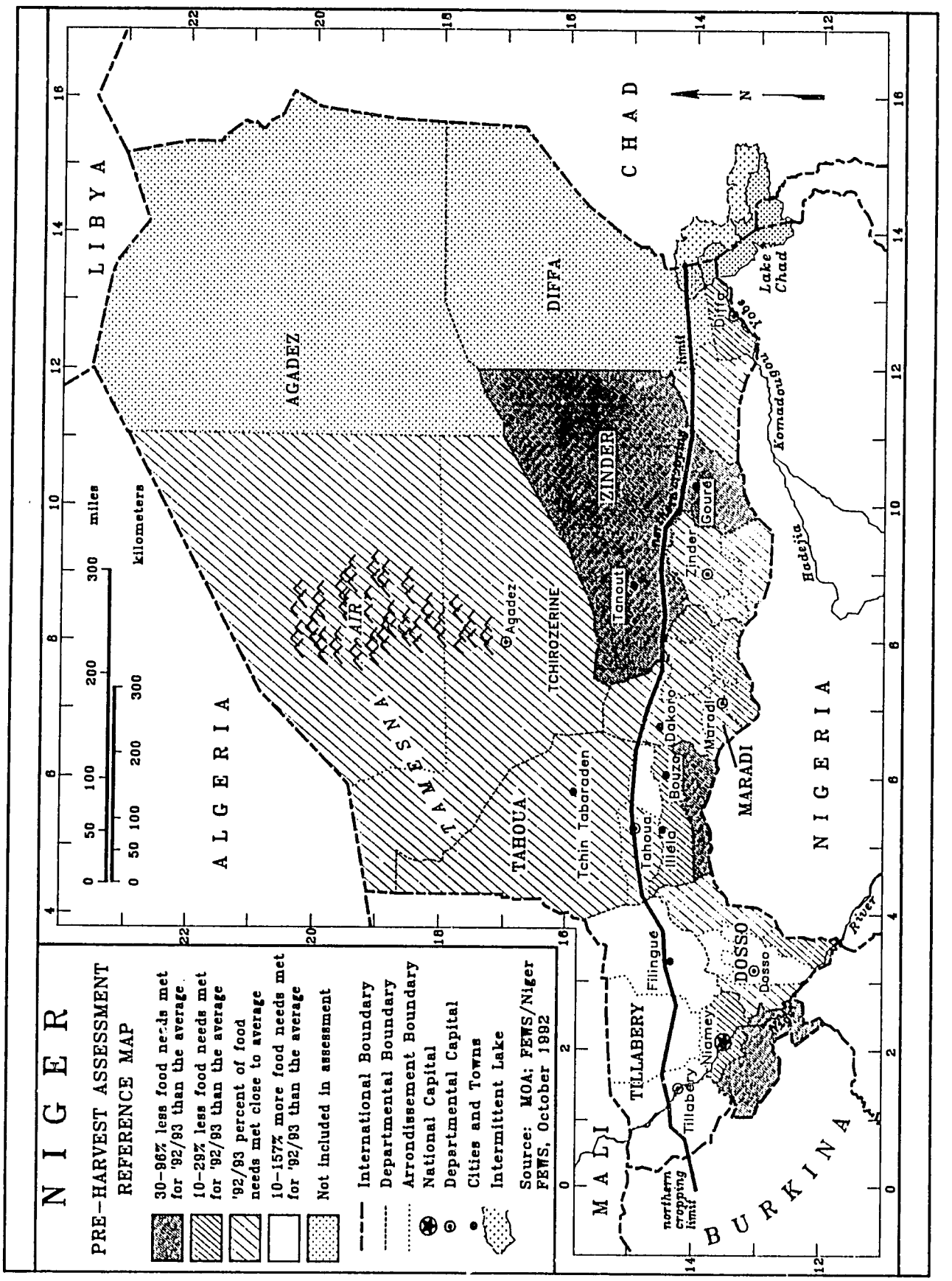
Two factors caused prices to stabilize: a perception that the current cereal production season will have above average production and the distribution of food aid in zones where prices were high. It is very likely prices will drop significantly in November in response to the quality of this year's harvest.

UPDATE ON VULNERABILITY

The FEWS Vulnerability Assessment of June 1992 identified 241,000 smallholder agriculturalists and 79,000 agropastoralists as highly vulnerable. An estimated 80,000 smallholder agriculturalists were found to be extremely vulnerable. Most of these people were in Sanmatenga, Boulgou, Tapoa, Bazèga, Nahouri, Boulkiémdé and Gnagna provinces. These groups had suffered from at least two consecutive years of below-average cereal production. It appears that in 1992/93 all of these provinces will have above-average cereal production. Above-average cereal production will significantly reduce the vulnerability of these groups, bringing it to a moderate level.

CONCLUSIONS

The FEWS-estimated national cereal production balance for 1992/93 is a surplus of 159,000 MT. This is the second consecutive year of above average cereal production, which will increase food security for the country—a welcome relief for severely stressed socioeconomic groups. Emergency food aid will likely not be needed. The Government of Burkina will be able to deal with pockets of below-average cereal production through targeted food aid distributions.



Map 5: Niger Reference Map

NIGER

An Equilibrium Between Production and Consumption?

Report released by USAID/Niger on September 22, 1992

SUMMARY

Above average rainfall in July, August and September appears to have led to a good 1992 rainy season harvest, despite a dry period over much of the country between late May and mid-to-late June that caused the failure of most early plantings. FEWS/Niger projects that 1992 cereals production will be deficit only in chronically deficit or pastoral areas. These projections do not take into account possibility of an early end to rains or late-season insect damage. Fodder production in most of the country has been relatively good this year, but in many areas pasture conditions did not start to improve until the month of August. Pasture production in the pastoral zone now appears to be at, or approaching, normal levels. Cereal prices remain at high levels, leading to livestock-to-cereal terms of trade that are disadvantageous to herders and agropastoralists. Civil unrest is continuing in northern areas of Niger, contributing to heightened vulnerability for herding and agropastoral populations in these areas (see Appendix C for a description of FEWS' use of the word 'vulnerability'). To the extent possible, USAID/Niger will investigate and report on recent impacts of civil unrest in future Mission cables.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

Significant rainfall and plantings began as early as mid-April in southern areas of Tahoua and Maradi departments.[1] First plantings in most of southwestern Niger had taken place by the end of May. However, a dry spell in most of the country from the end of May through mid-to-late June caused the failure of most early plantings, except a few locations in southern Tillabéry, Tahoua and Maradi departments.

Abundant rains returned to most areas in early to mid-July, leading to large-scale replanting, especially in Tillabéry, Dosso, Tahoua and Zinder departments. The first substantial rains also fell in Diffa Department in mid-July, permitting first plantings there. Above-average rainfall during August and early September has improved production prospects, but an end to rains before September 30, as well as insect damage, may significantly reduce yields in areas with late-planted crops.

As usual, cereal production appears to be the best in southern areas of Tillabéry, Dosso, Maradi and Zinder departments. Many farmers in these areas have already harvested, particularly in Maradi Department. Prospects for a good harvest in most other areas depend on the continuation of rains. Due to below-average rainfall and late planting or replanting, and based on model projections and Government of Niger (GON) Ministry of Agriculture and Livestock (MOAL) reports, harvest prospects in Diffa Department and Tanout and Gouré arrondissements (Zinder Department) are not favorable, unless rains continue through the end of September (see Map 5). In addition, the GON Directorate of Crop Protection reports that over 500,000 hectares of production area in Zinder Department and another 500,000 hectares in Maradi Department are currently pest infested. Pesticide treatments are underway, but these infestations could seriously decrease yields for crops harvested later than in most of the country, such as those in Gouré and Tanout (Zinder Department), as well as Dakoro (Maradi Department), arrondissements.

Pastoral Conditions

Fodder production in most of the country has been relatively good this year. Because of late starting and erratic rainfall, NDVI images and field reports show poor pasture conditions in many areas did not start to improve until the month of August (see inside back cover for a description of NDVI). Animal health is reported as generally good, but a substantial number of animal deaths from starvation were reported in Diffa Department earlier in the season and livestock appear to be generally thinner than the norm. In the pastoral zone, pasture production now appears to be at or approaching normal levels. Dry-season pasture in the Aïr Mountains and the Tamesna should be good this coming year following above-average August rains and significant runoff in the area.

[1] *In order of precedence, Niger's administrative units are departments and arrondissements.*

Table 6: Niger, Preliminary 1992/93 Production Estimates For Rainfed Millet and Sorghum (MT)

Department	Estimated 1992/93 Production	Consumption Requirements	Estimated Balance	Percent Needs Met	Percent Needs Met On Average
Niamey City	3,515	92,786	-89,271	4	6
Tillabéry	450,639	314,320	136,319	143	111
Dosso	346,132	265,601	80,531	130	123
Tahoua	276,399	322,825	-46,426	86	103
Maradi	425,817	359,621	66,196	118	127
Zinder	374,380	355,600	18,780	105	115
Diffa	14,414	41,887	-27,473	34	48
Agadez	305	54,417	-54,112	1	3
Total	**1,891,601**	**1,807,057**	**84,544**	**105**	**110**

Sources: FEWS/Niger population projection from GON 1988 census based on population growth rates from GON census bureau; USAID/Niger rainfed production estimate based on AGRHYMET yield projection model and GON/MOAL 1991/92 area cultivated estimates; FAO 1990 sorghum production figures; GON/MOAL statistics for 1991/92 production; USAID/Niger consumption requirement (190 kilograms per year for nomad and urban populations; 220 kilograms per year for farming populations).

Notes: All production figures are net of gross by 85%. Estimated balance equals estimated production minus the consumption requirement. Kilograms per capita equals production divided by population. Percent requirements met equals estimated production divided by cereals requirement. Percent requirements met on average equals the mean of the percent requirements met by each harvest from 1985 to 1991 (GON/MOAL statistics used for 1985 to 1991 production).

Projected Cereals Production and Requirements

In the absence of current figures on area cultivated and yield, the rainfed millet and sorghum production estimate of almost 1.9 million metric tons (MT) is based on last year's GON MOAL area-cultivated estimates and yield estimates resulting from a projection model developed by the French Project Espace, and applied by the GON meteorological service. The yield model, as applied, assumes that rains will continue through the end of September and does not take into account yield reductions from pests. In addition, because of late or erratic rainfall in many areas, the area under cultivation this year is probably less than in 1991.

The national rainfed cereal production balance[1] shown in Table 6 reveals a slight national rainfed production surplus (just over 84,000 MT). Rainfed millet and sorghum production comprises 95% of total cereal production in Niger and 70 to 80% of total food intake. It should be noted that, although there is a projected 5% national surplus, important regional and local shortages still may exist. Only Dosso and Maradi departments are projected to produce significant surpluses in all arrondissements. In addition, as mentioned above, the production figures in Table 6 are conditional model projections, and should not be taken as definitive.

[1] *A 'rainfed cereal production balance' equals domestic rainfed cereal production minus domestic cereal consumption needs. The cereal production balance includes irrigated and off-season production in addition. Further explanation is provided in the notes to Table 6 and Table 7.*

Projected National Food Supply

The provisional 1992/93 national cereal production balance for Niger shown in Table 7 reveals an overall cereal production surplus of over 138,000 MT. The overall cereal balance, which adds in on-hand cereal stocks and expected commercial and food aid imports, may be a surplus of over 393,000 MT. As indicated above, this cereal balance includes rainfed cereal production projections as of September 10, 1992, which depend on the continuation of rains through the end of September. Late season insect damage as well as an early end to substantial rains could lead to major revisions of these provisional figures.

FACTORS AFFECTING FOOD ACCESS

Cereal Market

Prices in many areas did not begin falling until mid- to late August this year. The normal trend for Niger millet prices is for prices to rise until the beginning of July, begin falling during July and continue falling at least through October. GON Market Information System (SIM) data show that millet prices continued to increase sharply in Dosso, Tahoua, Tillabéry, Diffa and Agadez departments through the end of July. Price increases in 1992 from March through July in Agadez, Tahoua and Dosso departments (57, 45 and 32%, respectively) were the sharpest since the same period of 1988, following the poor 1987 harvest. Only in Maradi Department, Zinder Department and Niamey City did prices fall slightly before the end of July.

Table 7: Niger, Projected 1992-93 Cereal Balance

Agricultural Year	November - October
National Cereal Consumption	
Rate (kg/cap/yr)	190/220
Population (1992/93)	8,448,227
Total Requirement	**1,807,057**
National Cereal Production	
Net Rainfed Millet/Sorghum	1,891,601
Net Irrigated Production	40,957
Net Off-season Production	13,145
Total Net Production	**1,945,703**
PRODUCTION BALANCE	**138,646**
Available Stocks	
Public Reserve Stock	40,216
Public Working Stock	6,160
Commercial Stocks	1,917
On Farm Stocks	83,000
Donor Stocks	10,555
Total Stocks	**141,848**
Cereal Exports	0
Domestic Cereal Supply	2,087,551
Cereal Imports	
Commercial Cereal Imports	103,000
Program Food Aid Imports	10,000
CEREAL BALANCE	**393,494**

Sources and Notes: USAID/Niger consumption requirement (190 kilograms per person per year for nomad and urban populations; 220 kilograms per person per year for farming populations); FEWS/Niger population projection from GON 1988 Census, based on GON Census Bureau population growth rates; USAID/Niger rainfed production estimate based on AGRHYMET model for yield projections and MOAL 1991/92 area-cultivated statistics; irrigated production as last year's level (MOAL production statistics); off-season production as last year's GON estimate; 1991/92 GON on-farm stock estimate; situation as of August 31, 1992 for commercial stocks (Ministry of Economic Promotion statistics); situation as of September 15, 1992 for all other stocks; commercial and food aid imports at last year's levels (CNUT statistics).

August data show that prices dropped slightly in a majority of areas, but are still considerably higher than for the five-year average (1987-91). Late August prices were slightly lower than July prices on average, but no clear trend in any one region is immediately apparent, and prices in up to one-third of reporting markets rose slightly or remained stable (35 markets for latest data). It appears that continued uncertainty concerning the harvest results (potential cereal supply) may be causing prices to remain at unusually high levels for the present.

Livestock Market

From April through July 1992, livestock prices across the country generally decreased by an average of 15%. Although country-wide data were not yet available at mid-September, field reports indicated that August livestock prices had begun to stabilize in many areas.

In July 1992, falling livestock prices and rising cereal prices in Diffa, Agadez, Tahoua and Dosso departments caused herder terms of trade to reach their lowest point in the last five years. Terms of trade for Zinder and Tillabéry departments were slightly lower in July of 1991 than in 1992, and for Maradi Department were lower in 1988. With the apparent mild decrease in cereal prices and apparent stabilization of livestock prices in August, current livestock terms of trade in a majority of areas may be slightly improved from July's low levels.

Economic Situation

The GON paid August civil servant salaries at mid-September. GON employees are not expected to receive unpaid March salaries, but all subsequent salary payments have been made, and indications are that government salaries will be paid in the immediate future. This should result in reduced current vulnerability for populations wholly or partially supported (i.e., employees themselves, immediate families and relatives across the country) by income from government salaries.

On average, approximately 100,000 MT of cereal is unofficially traded from Nigeria to Niger annually. In late July, this trade was down to about 70% of previous levels because of high prices in Nigeria and competing demands for maize and sorghum from Nigerian breweries. Cereal prices in northern Nigeria appeared to have remained high because of uncertainty about the harvest in the area. It now appears the Nigerian harvest will be adequate, and August prices in northern Nigeria were lower in response.

Lower prices in Nigeria may lead to an increase in the cross-border grain trade, increasing overall cereal supply in Niger, and probably lowering prices further in Nigerien border markets. It should be noted that cereal imports from Nigeria are not included in Table 7, because they are unofficial and unacknowledged by the GON or the Nigerian government.

Civil unrest is continuing in northern areas of the country. This unrest is probably having substantial impacts on normal migrations of people and herds. It is also probably having significant effects on the normal flow of cereal stocks from southern, more agricultural areas of the country to northern population centers. USAID/Niger will investigate and report in future cables, to the extent possible, these and other recent impacts of civil unrest.

UPDATE ON VULNERABILITY

Farmers and Agropastoralists

In general, conditions have worsened for farmers and agropastoralists across Niger from those reported in the FEWS June 1992 Vulnerability Assessment. In that assessment, no farming or agropastoral group was reported as being more than moderately vulnerable. Subsequent USAID/FEWS/Niger Food Security Operations Cables revised that assessment for these two groups in Diffa Department and Filingué Arrondissement (Tillabéry Department), finding them highly vulnerable. Because of projected deficit production, continued high grain prices and difficult access to cereal stocks due to civil insecurity, farmers and agropastoralists in Tahoua, northern areas of Maradi, Zinder, Tillabéry and Agadez departments face heightened levels of vulnerability at the start of the harvest.

Areas Most or Newly Vulnerable

Diffa and Tillabéry departments: Chronically deficit cereals production, late rains and planting, high cereal prices and low animal terms of trade in Diffa Department and Filingué Arrondissement (Tillabéry Department) continue to render up to 435,000 agropastoralists highly vulnerable to food insecurity. However, a good harvest in these areas would substantially decrease these populations' levels of vulnerability.

Agadez Department: Agropastoralists in western Agadez Department are generally sedentarized herders who in an exceptionally good year meet no more than 10% of their own consumption requirements from cereal production. The remaining requirement must be filled through cereal bought with income from other types of production, particularly livestock sales. High cereal prices, low livestock terms of trade and civil insecurity (which is limiting access to food stocks and has crippled alternative income generation associated with tourism in the region) cause approximately 80,000 people to be highly vulnerable.

Potentially Vulnerable Areas

If rains do not continue until the end of September, the MOAL predicts that farmers in the following areas will face increased vulnerability.

Zinder Department: Farmers and agropastoralists in Gouré and Tanout arrondissements were not able to plant successfully until mid-July. Some farmers are reported to have been forced to replant as many as five times during the season. If rains do not continue, the MOAL states that up to 20% of the harvest may be lost in these areas. As of mid-September, high cereal prices are continuing and buying power is said to be low. If the harvest is poor, prices remain high and stocks low, up to 340,000 people will become highly vulnerable.

Tahoua Department: Farmers and agropastoralists in Bouza, Illéla and Tchin Tabaraden arrondissements will not reap good harvests if rains end early. The MOAL estimates that 60% and 42% of production in Bouza and Illéla arrondissements, respectively, will be adversely affected. An early end to rains in combination with very high cereal prices and low buying power could cause up to 416,000 people to be highly vulnerable.

Nomadic Herders

Herder vulnerability levels remain the same (moderately vulnerable—Maradi, Zinder, Tahoua, Tillabéry and Dosso departments, highly vulnerable—Diffa and Agadez departments) as reported by USAID/FEWS/Niger in August, except in Diffa Department. Although there has been only minimal improvement in livestock terms of trade, field reports indicate vastly improved pasture, which should alleviate the acute shortage of livestock fodder that existed in the department earlier in the season. As a result, up to 44,000 herders in Diffa Department are now rated as only moderately vulnerable.

Very low herder terms of trade continue to cause all herders in Niger to be rated as at least moderately vulnerable. In addition, poor access to cereal supplies and continuing civil insecurity in the region cause approximately 111,000 herders in Agadez Department to remain highly vulnerable.

Urban Populations

Niamey City: Because the GON has been paying government salaries in recent months, 60,000 GON employees and their dependents previously considered moderately vulnerable are now considered to be no more than slightly vulnerable.

CONCLUSIONS

Although production may not reach the high levels of 1991/92, initial projections and field reports indicate that Niger as a whole will most likely have a reasonably good cereal harvest this year, with rainfed cereal production meeting over 100% of consumption requirements. As a result, adequate food supplies should be available for the 1992/93 consumption year.

Despite this favorable overall supply situation, deficit production, low buying power and civil insecurity will lead to poor food security in many agropastoral (marginal) and pastoral areas of the country. Civil insecurity may also hamper or prevent GON or donor interventions aimed at reallocating food supplies to these areas.

USAID/Niger and FEWS/Niger will continue to monitor food security conditions, especially in the agropastoral region, using indicators such as commodity prices, commodity terms of trade and stock movements, which help in evaluating populations' potential buying power and access to food.

APPENDIX A: Niger, Notes on Estimations

Background On Millet and Sorghum Production Projections

- Yield estimates for millet are projected from a model developed by Project Espace at AGRHYMET, based on soil moisture, planting dates and rainfall probabilities. The application of this model was performed by the GON meteorological service using actual (as reported by MOAL), instead of historical planting dates. Field data for the model are collected regularly from 35 sites in Niger, with at least one for each arrondissement in the agricultural zone. The latest data used from this model are from the end of the first dekad (ten-day period) of September, 1992.

- The area projections for rainfed millet are drawn from last year's MOAL post-harvest, area-cultivated estimates.

- FAO estimates for 1990 sorghum production are used for lack of better figures. According to the MOAL, sorghum production in 1990 was close to average. Sufficient historical sorghum production figures, as separate from millet, are not available to calculate a definitive average.

Departmental Production and Demand Summary

Diffa Department could register the most severe deficit for the fourth year in a row, with N'Guigmi arrondissement the hardest hit. It is likely that rainfed cereal production will meet less than 35% of the consumption requirement. This is in comparison with 48% of needs met on average (1985-91). This projection is in agreement with rainfall and planting data, but recent field reports indicate that actual production may be considerably higher. Regardless, Diffa Department normally meets less than half its consumption requirement, with all arrondissements having substantial deficits, and is not considered a cereal producing region.

Production in *Zinder Department* as a whole should meet more than 100% of consumption requirements this year. All arrondissements, except Gouré and Tanout, should have surpluses of 15 to 30%. Production in Gouré Arrondissement could meet only about half of the arrondissement's requirements, while production in Tanout could fall just short of meeting consumption needs. Mirriah Arrondissement continues to show a substantial surplus even when the population of the city of Zinder is included in its cereal requirements. Field reports and information from MOAL dekadal updates do not contradict these projections. However, these reports state that an early end of rains could be disastrous for already less than favorable production prospects in Gouré and Tanout arrondissements. In addition, the Directorate of Crop Protection reports that over 500,000 hectares of production area in the department are pest infested. Pesticide treatments are ensuing, but this infestation could seriously decrease yields for crops not yet harvested, such as those in Gouré and Tanout arrondissements.

Maradi Department will have surplus cereal production this year, with all arrondissements also having surpluses. All arrondissements in Maradi Department are normally surplus in production with the department as a whole usually meeting 127% of consumption needs. Field reports indicate that harvesting has already taken place in most southern areas of the department. MOAL reports indicate that, because of late planting, a large proportion of production in Dakoro Arrondissement (the northernmost arrondissement in the department) will be lost if rains do not continue through the end of September. In addition, over 500,000 hectares of production area have recently suffered major pest infestations. Pesticide treatments have begun, but this development could have disastrous affects on yields for crops in areas of the department which have not yet harvested.

Tahoua Department could experience an overall cereals deficit with production falling short of needs in all arrondissements, except Keita and Tahoua. Konni, Illéla, Madoua and Tchin Tabaraden arrondissements could all meet about 70% of consumption needs, while Bouza Arrondissement may meet almost 90% of requirements. Field reports indicate that these projections may be underestimating production, particularly in Konni and Madoua arrondissements. The department as a whole normally meets over 100% of consumption requirements, with only the mostly pastoral arrondissement of Tchin Tabaraden being chronically deficit (meeting 58% of needs on average).

According to current projections, *Tillabéry Department* could have record production, with a surplus of over 40% and all arrondissements at least meeting consumption requirements. However, although these projections indicate that Filingué Arrondissement may have as much as a 19% production surplus, MOAL reports indicate that crops are in extremely heterogeneous stages of development—up to 34% of potential production could be lost if rains do not continue until the end of September. The model also projects a tremendous surplus in Ouallam Arrondissement. Although most of Ouallam had above-average rainfall this year and some planting began earlier than in most other areas of the department (two major criteria for the yield model), it is unlikely that production there will reach the model's expectations. Tillabéry Department is surplus as a whole, but Tillabéry, Ouallam and Filingué arrondissements are normally mildly deficit.

Agadez Department will meet no more of its consumption requirement from local rainfed production than is expected. It lies outside of the agricultural zone and has always been dependent on imports from agricultural regions of the country to satisfy its cereal needs. The department normally meets only 3% of its consumption needs from local production.

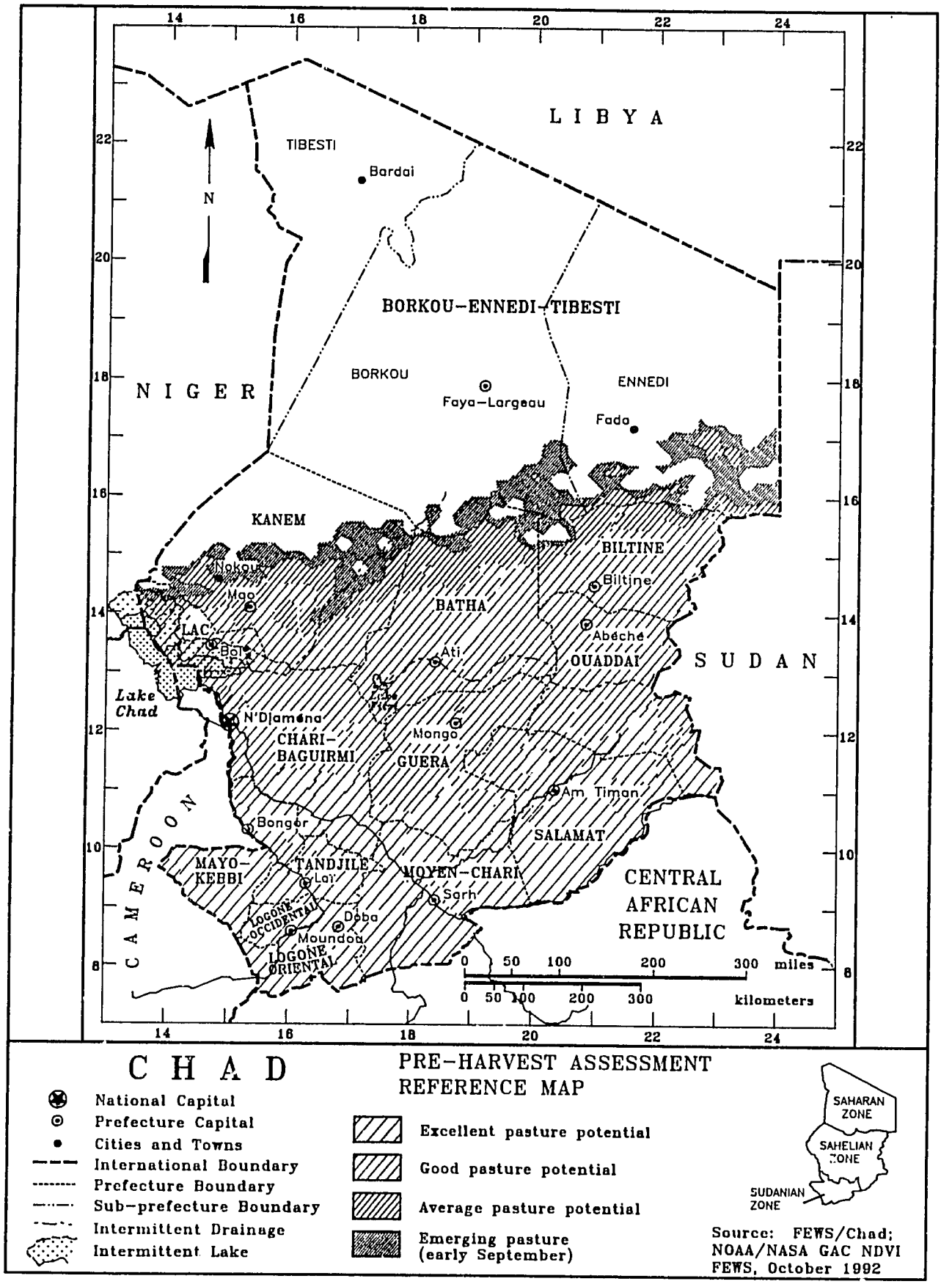
Projected Food Supply

- All production estimates (rainfed and off-season/irrigated) are netted at 85% of gross production to account for feed, seed and post-harvest loss.

- Irrigated and off-season cereal production, which includes rice, wheat, sorghum and corn, is estimated at last year's levels, as reported by the MOAL.

- The consumption requirement of over 1.8 Million MT is calculated by applying the USAID consumption rates (190 and 220 kg per person per year for nomadic/urban and farming populations, respectively) to 1992/93 population projections based on the GON census of 1988 and arrondissement-level growth rates developed in conjunction with the GON census bureau.

- Total stocks of approximately 141,000 MT include: two-thirds of public reserve stocks (GON security stock); public working stocks from the national rice parastatal and the flour mill; commercial stocks as reported by the Ministry of Economic Promotion; on-farm stocks estimated at last year's level; and donor stocks (approximately 10,555 MT of various cereals held by the WFP, German stock reserve project and similar donor activities). Anticipated cereal imports of approximately 113,000 MT reflect commercial cereal imports at last year's GON-estimated level and WFP pledges.



Map 6: Chad Reference Map

CHAD

Good Harvest Expected Again in All Zones

Report released by USAID/Chad on September 18, 1992

Summary

Although the 1992 rainy season in Chad started late, with irregular rains in the south, rainfall has become regular and abundant in most of Chad's agropastoral zones since mid-July. The good rains are continuing through September, even in the Sahelian zone. The prolonged rainy season has relieved the negative impacts of a late and uncertain start. By the end of September, cumulative rainfall amounts equaled or exceeded the 20-year normal (1971-90) in all agropastoral zones except western Kanem Prefecture, where cumulative rainfall is at 80% of the 20-year normal.

Although scattered grasshopper attacks have been reported from some areas, there is no extensive crop damage. Grasshopper activities are calm when compared to recent years. Throughout the growing season, soil moisture reserves have been good, resulting in excellent crop conditions.

Harvesting of rainfed crops had begun by mid-September in many areas. With expectations of a good harvest, merchants have started releasing stored grains onto local markets. This release, combined with the arrival of newly harvested maize and peanut crops, has resulted in a decline in cereal prices starting in mid-August. With these indicators all being favorable, Chad is expecting a second consecutive year of good harvest.

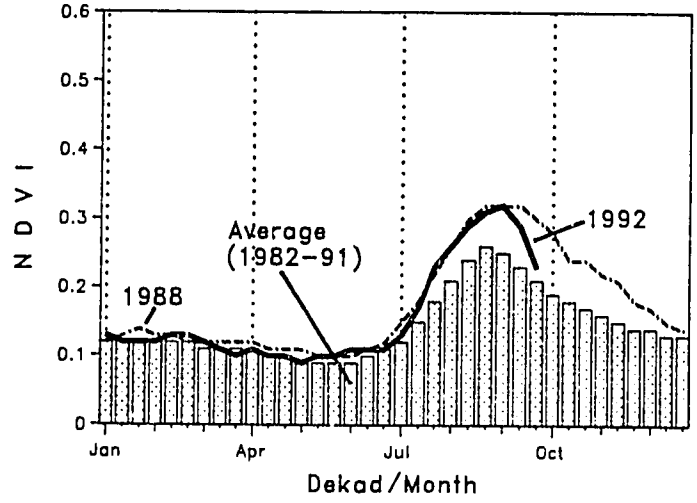
FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

The 1992/93 rainy season started in May, with irregular rainfall, in the Sudanian zone. In June, a dry spell affected Moyen-Chari and Salamat prefectures in the southeast. However, since mid-July, rainfall has become abundant and regular in all agropastoral zones. There have been no appreciable dry periods since mid-July. In addition, abundant rains are continuing through September in the Sahelian zone. Cumulative rainfall on September 30, 1992, equaled the 20-year normal (1971-90) in all areas except western Kanem around Nokou. There, cumulative rainfall is around 80% of normal.

Crops were planted late in the Sudanian zone, with some replanting necessary due to the June dry spell. In the Sahelian zone, crops were planted on schedule. Satellite NDVI images show rapidly increasing biomass since late July (see inside back cover for an explanation of NDVI). The biomass increase has continued for more than forty days, climaxing 10 to 20 days later than average (see Figure 3). The current year biomass development resembles closely that of 1988, which is the best year on record.

Figure 3: Chad, Sahelian Zone NDVI for 1988, 1992 and the 1982-91 Average



Source: NOAA/NASA GAC NDVI
Note: NDVI values were smoothing using a three-dekad moving average. A 'dekad' is a period of ten days.

In the Sudanian zone, farmers planted a mixture of short- and long-cycle crops. This has become standard practice since the 1983-84 drought. Sowing of short-cycle crops occurred in May and early June, before the planting of long-cycle crops. With the June dry spell, some of these crops were lost, especially in Moyen-Chari Prefecture. The remaining short-cycle crops have reached maturity and are being harvested. Long-cycle crops were planted later in July. At the end of September, they are in the flowering stage and should reach maturity by the end of October. With the slow retreat of the Intertropical Convergence Zone (ITCZ—see inside back cover for an explanation of this term), the probability of rainfall continuing in the south into October is very high. A good harvest is still expected from these long-cycle crops.

Crops in the Sahelian zone were planted in early July. The abundant August rains ensured good soil moisture reserves. These crops are now reaching maturity. With no major pest attacks and absence of water stress, confidence is high for a good-to-exceptional harvest in the Sahelian zone, except in Kanem Prefecture.

Pastoral Conditions

Good pastoral conditions prevail in the Sahelian zone, including Kanem Prefecture. NDVI images confirm the presence of good pastures in northern Kanem, northern Batha, and southern Ennedi (see Map 6). In the Sahelian zone, biomass development peaked in early September, rather than the usual mid-August (see Figure 3). Consequently, the outlook for dry season fodder is good. In addition, no major animal illness has been reported.

Food Stocks and Flows

As of August 31, 1992, there were 20,000 metric tons (MT) of food aid in Chad. Of this amount, approximately 15,000 MT is composed of national food security reserves or residual emergency food aid grants. These stocks could be drawn upon for any local production shortfalls that might occur in 1992/93. Finally, local currency generated from the sales of United States wheat flour can be used to buy cereals from surplus regions for security stocks and to pay distribution costs should the need arise. The French also intend to buy local cereals this year for the security stock.

FACTORS AFFECTING FOOD ACCESS

Economic data

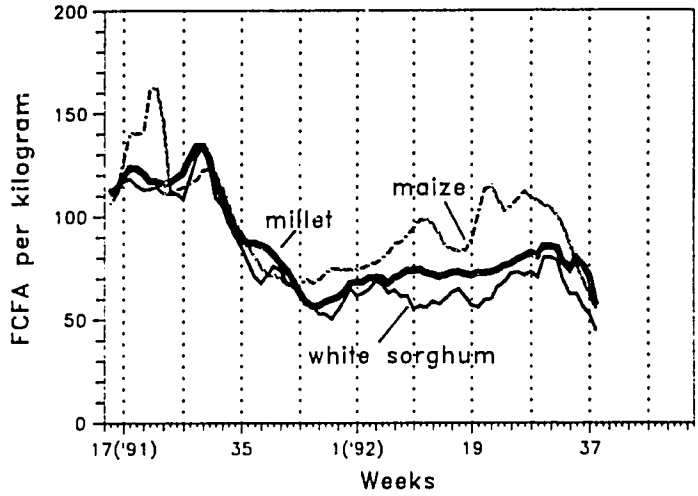
Cereal prices during the first half of 1992 remained relatively low when compared to the same period in 1991. Prices increased steadily but slowly through July 1992. In mid-August, cereal prices started declining in most markets. In four major urban centers, the 1992 price decline started with maize prices in June and was followed by declines in millet and sorghum prices in late July (see Figure 4).

Figure 5 shows millet prices in the Sahelian zone for the past five years. The falling 1992 cereal prices follow the same pattern as in 1988 and 1991, when the then good harvest prospect built confidence and merchants released their grain stock onto local markets. The falling cereal prices since mid-August reflect similar optimism in the 1992/93 harvest.

UPDATE ON VULNERABILITY

Approximately 15,000 persons were considered highly to extremely vulnerable to food stress following the 1991/92 agropastoral season (see Appendix C for a description of FEWS' use

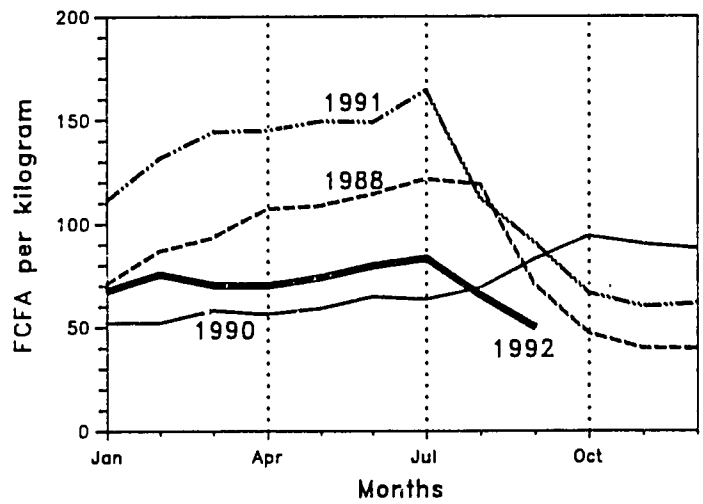
Figure 4: Chad, Average of Cereal Prices in N'Djaména, Moundou, Sarh and Abéché, 1991-92



Source: SIM; FEWS/Chad
Note: Prices are nominal and are smoothed using a three-week moving average.

of the word 'vulnerability'). These persons were located in western and northern Kanem. Although these areas received only 80% of normal rainfall (1971-90 reference), some harvests of maize crops are reported in the wadis of the region. Pasture conditions are also very good throughout Kanem, assuring adequate feed for animal herds. A structural survey done by the European Community-funded Système d'Alerte Précoce Project (SAP) shows that 90% of food consumed in Kanem is purchased on the market. With falling cereal prices and expectations for a good-to-exceptional harvest in northern Chari-Baguirmi, an area that supplies grains to Kanem, the vulnerability levels of these persons should decrease.

Figure 5: Chad, Average of Millet Prices in Sahelian Markets, 1988 and 1990-92

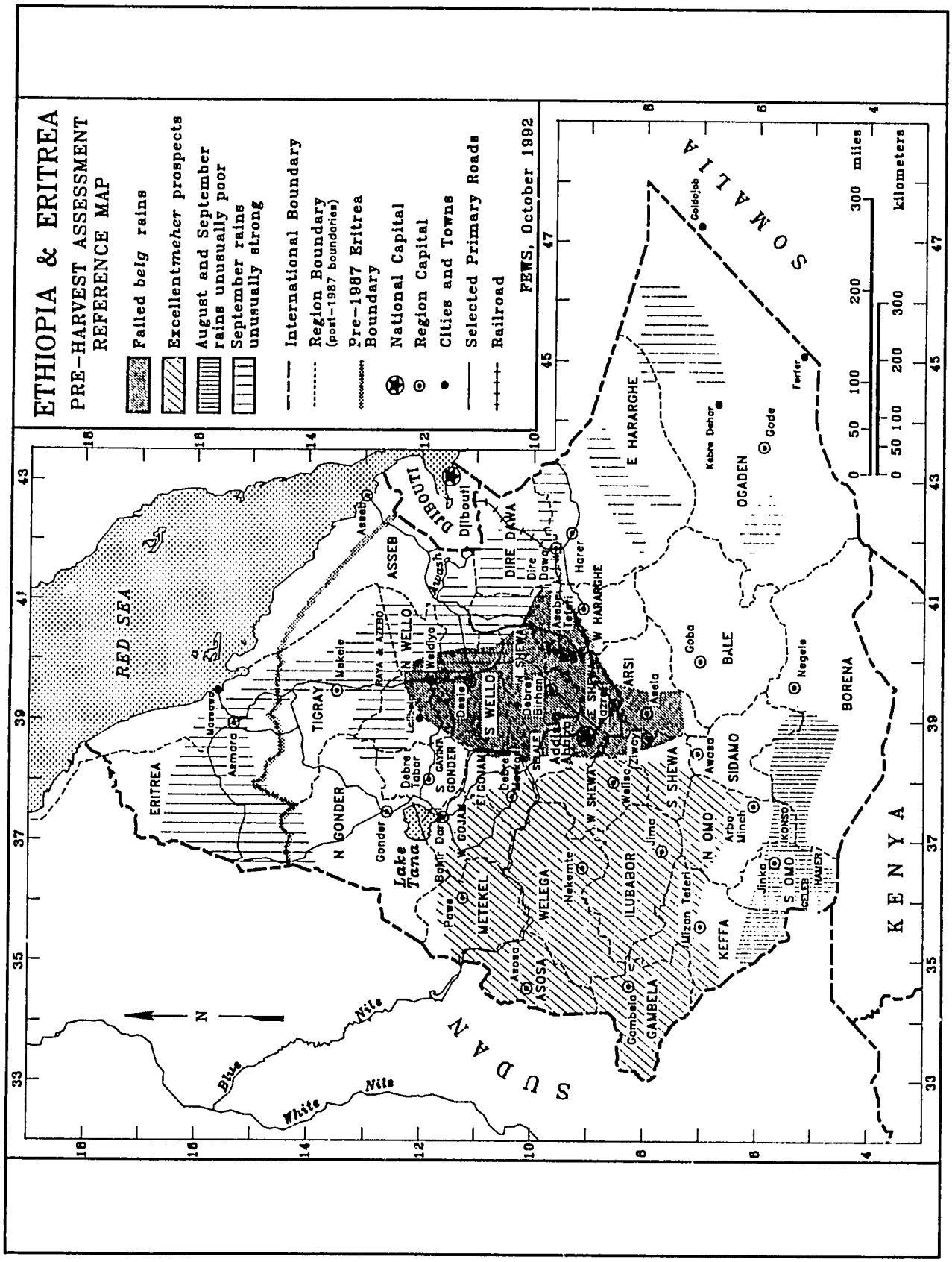


Source: SAP/Chad; FEWS/Chad
Note: Prices are nominal and are smoothed using a three-month moving average.

An additional 350,000 persons were considered moderately vulnerable to food stress following pockets of failed 1991/92 harvest in the southeast. The growing conditions this year are excellent in these areas. The reason for last year's failed harvest was damage due to late and heavy rains in late October 1991. There exists always a small probability of late rains in the Sudanian zone. Unless this should happen once more in 1992, the vulnerability levels of these persons will return to a normally low level after the current harvest.

CONCLUSIONS

Crop conditions are good to excellent in all agricultural zones. Pastoral conditions are similarly good. In expectation of a good harvest, cereal prices have started declining. With a good harvest prospect, food security in Chad should continue to improve in 1992/93. No major areas of deficits are expected. Any local shortages will be met through normal commercial exchanges and existing government stocks. No emergency food aid imports will be required.



Map 7: Ethiopia & Eritrea Reference Map

ETHIOPIA & ERITREA

Harvest Prospects Good

Report completed by FEWS/Washington on October 8, 1992

SUMMARY

In 1992, Ethiopia's the main rains started late, with impacts felt in the spine of the country running from northern Bale to North Wello. Some of these areas had also suffered from a poor 1992 belg *(early) agricultural season (see Map 7). Western regions appear to have had suitable growing conditions. Most pastoral regions in the Southeast and South-center suffered badly from a virtual failure of the early rains in 1992. The second potential growing season for 1992 normally starts at the end of September. As of September 23, recent rainfall activity has been reported from, for example, Gode and Kebre Dehar, but it remains to be seen how the season will continue.*

Pastoral regions north of Hararghe, through the Afar region, across to Asseb, and up into Eritrea showed remarkable vegetation 'green-up' from mid-to-late August through September. Such late-season greenness (with levels around or exceeding normal early rainy season values) has not been seen in these areas since 1988. FEWS will continue to monitor the situation and corroborate with available ground data.

Areas in Eritrea (not specifically covered in the assessment mission) and northern Tigray also showed good conditions, comments relating to Eritrea often mention the 'best rain in 20 years.' With the rainy season having appeared to start its southward withdrawal at a normal time of year, it will be necessary to monitor crop conditions in northern regions, checking for the impacts of any water stress in these late stages.

INTRODUCTION

The FEWS assessment mission concentrated on Ethiopia & Eritrea's two agricultural seasons, the earlier *belg* and the main *meher*. The analytical method and data focussed on by the mission was satellite imagery and its applicability to agriculture. Seasonal NDVI, or 'greenness' curves, show how the vegetation is responding to climatic input, principally rainfall (see inside back cover for an explanation of NDVI). A 'good' seasonal NDVI curve tells nothing about contemporaneous food security. A classic example would be the hungry season immediately before the harvest, even before a good one. Neither does NDVI yield information about the food security status of groups such as displaced people. Such factors must be addressed with additional, ground-based information. It is expected that such factors will be included in a FEWS assessment at a future date.

NOTE: This chapter is based on findings from a FEWS/Washington mid-season assessment mission to Ethiopia from September 5-23, 1992. The mission focussed on potential for agricultural production as represented by variations in Normalized Difference Vegetation Index satellite imagery. Interpretation of the imagery was combined with anecdotal information gleaned from contacts in Addis Ababa to gain a qualitative understanding of the progress of the growing season through the month of September. Owing to the unavailability of other data, this chapter will follow a format that is different from the other chapters.

It has indeed been a year of unusual, non-seasonal changes in NDVI patterns in Ethiopia and Eritrea. The unusual patterns have included an early peak in February and March, a decline in vegetation values during the *belg* season, a dry spell in June that depressed vegetation values, and then excessive rainfall in August, which boosted vegetation values.

ELEMENTS OF THE SEASON

A Green Eritrea

Although the mission was not initially tasked with reporting on Eritrea, the economies and activities of Ethiopia and Eritrea are so closely related that in order to understand northern Ethiopia, it is necessary to know what is happening in Eritrea.

The satellite-based interpretation of conditions in Eritrea indicates a slightly late start to the season followed by exceptional rains, 'the best in 20 years' according to some anecdotal reports, and the potential for high agricultural production. Limited ground reports are in concurrence with the satellite interpretation.

The crucial factor in Eritrea will be the timing of the retreat of the rainy season. It looks as if the retreat started to occur in the second half of September. Satellite imagery through September 20 shows pastoral areas to be well above normal (see below) and agricultural areas closer to the Tigray border to be generally above or near-normal.

Good in the West, but how much was planted?

Another area that is showing very good vegetation response this year is the West of Ethiopia. NDVI imagery shows early starts in many areas followed by average or, for large areas, above-average seasonal progression. This information ties in with rainfall data for the same regions.

The disadvantage that the assessment mission found itself in concerning the West, indeed concerning the whole country, is that there are limited available data for the area planted in 1992, and, therefore, area planted in comparison to the average or to recent years.

There are anecdotal reports that security problems in the West have resulted in less area being planted than usual. As of the end of September, there are no firm data to substantiate or question such statements. The Agricultural Marketing Commission (AMC) is conducting some surveys, but the Central Statistics Authority (CSA) is not (see Appendix B). All that can be said at this stage is that the satellite imagery would suggest that, if people had access to resources and did plant, climate conditions would be amenable to good or high levels of production.

Poor Early Rains in South and Southeast

The pastoral areas of Ogaden, Borena and Bale regions[1] normally experience a rainy season early in the year. Analysis of the vegetation imagery for February through May of 1992 reflect the very poor conditions already reported by non-governmental organizations (NGOs), the Ethiopian Relief and Rehabilitation Commission (RRC) and United Nations (UN) organizations. There is an area of five *woredas* along the Somalia border (from Ferfer to Goldojob in the eastern tip of Ogaden) that shows average or slightly above average conditions in this period. However, the rest of the area from western Borena (around the lowland periphery) to the southern Hararghe lowlands shows poor vegetative conditions in the time of the early rains.

These areas of southeastern Ethiopia experience, normally, a second season starting late September or October. From a food security perspective it is hoped that the 1992 second season will be a good one, thereby helping to make up ground lost by a high frequency of poor seasons over recent years. Some locations did report rainfall around September 23. FEWS will continue to monitor the situation.

Early Start then Poor Belg

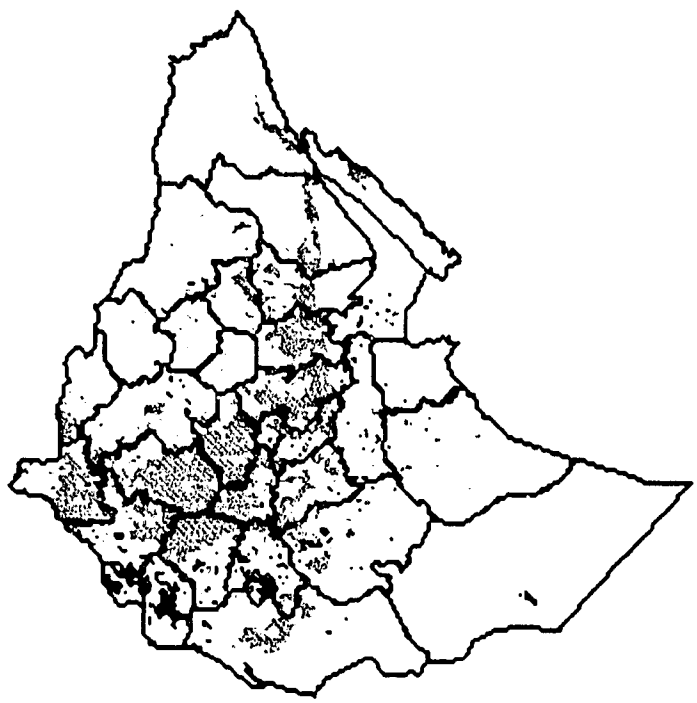
The *belg* rains usually run from February through May, coming earlier in the southern areas, and serve two purposes. First they are used for the cultivation of *belg* crops. Second, they provide soil moisture for land preparation of the *meher* agricultural season. Some long-cycle crops (for instance, sorghum) are planted in the *belg* season and harvested in the *meher*.

The *belg* season is particularly important in a north-south central spine of Ethiopia, running from northern Bale to the North Wello-Tigray border. Some *belg* agriculture is carried out in Hararghe. On average, over half of the *belg* production comes from Wello Region, Raya Azebo Awraja in Tigray Region and Shewa Region (35%, 3% and 20%, respectively). Belg agriculture is a very important contributor to annual consumption in northern Shewa, North and South Wello and the highlands of Bale. Harvests in June and July help to carry subsistence farmers until main season crops are harvested from October to December.

In 1992, there were some rains early in the year that raised NDVI levels to higher than average conditions. This can be seen in Figure 6, where the composite February through March difference image shows a large area of better than average conditions in the center of Ethiopia, including some *belg* areas.

Unfortunately, these better-than-normal conditions did not persist. In many areas, the NDVI levels decrease from that date, instead of staying high for the *belg* season. An area north of Addis, running though North Shewa and the Wellos, shows a preponderance of declines from one dekad to the next over the

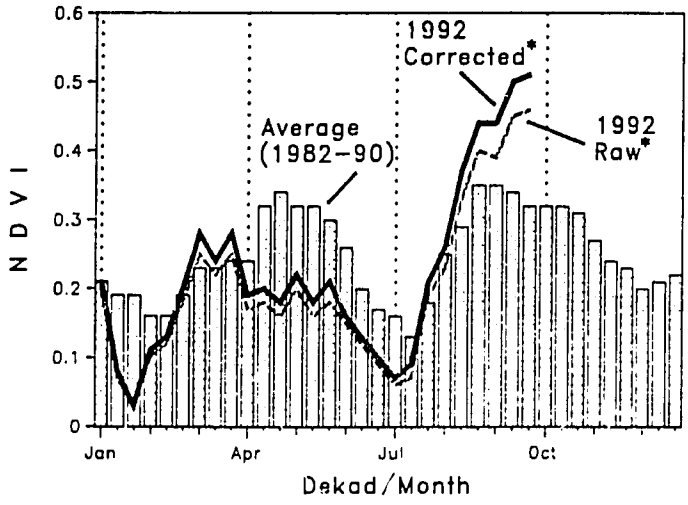
Figure 6: Ethiopia & Eritrea, February and March Difference from Average (NDVI)



Source: NOAA/NASA GAC NDVI
Note: Gray areas contain better-than-average vegetation levels, black areas contain worse-than-average vegetation levels.

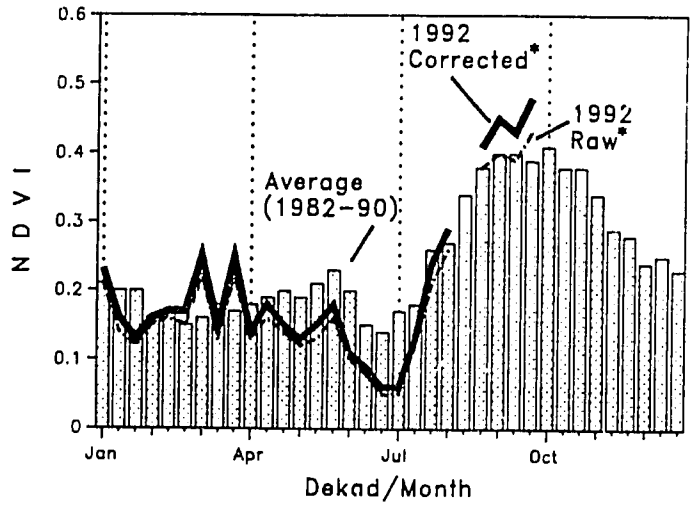
[1] *In order of precedence, Ethiopia and Eritrea's administrative units are regions, awrajas, and woredas.*

Figure 7: Ethiopia & Eritrea, NDVI Time Series Showing Belg Failure (Fursi W., Yifat & Tumuga A., North Shewa Region)



Source: NOAA/NASA GAC NDVI
Note: A 'dekad' is a ten-day period.
*See Appendix B for discussion of 'raw' and 'corrected' NDVI.

Figure 8: Ethiopia & Eritrea, NDVI Time Series Showing June Deficit (Beta Bilo W., Merhabete A., North Shewa Region)



Source: NOAA/NASA GAC NDVI
Note: A 'dekad' is a ten-day period.
*See Appendix B for discussion of 'raw' and 'corrected' NDVI.

March through May 1992 period (five or six drops in vegetative levels out of a possible 8 changes). This satellite interpretation is a reflection of the failure of the *belg* season. Figure 7 gives an example of the time series for areas afflicted in this way.

The geographic greatest impact of *belg* failure, from a satellite data perspective, seems to have been in northern Shewa and North and South Wello. Earlier reports of late starts and poor seasons in the southern *belg* areas (Bale) are from areas that, in the main, are showing signs of later improvement.

The impact agriculturally will be seen in reduced production of particular crops such as sorghum. Conversely, replanted *belg* areas will lead to increased areas under other, shorter-cycle, crops (for instance, *teff* and pulses).

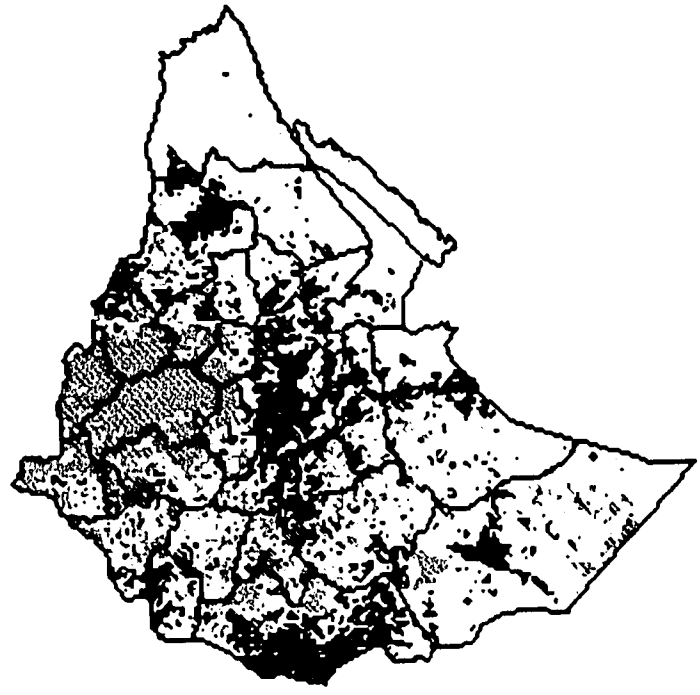
June Dry Spell

There have been many anecdotal reports of a late start to the *kiremt* rains, which drive the later parts of the *meher* agricultural season. The vegetative response to this dryness can be seen in the NDVI time series analysis as a reduction of June NDVI values. Figure 8 shows the dip for one *woreda* in Selale Awraja, North Shewa, while Figure 9 illustrates the spatial extent of this June negative anomaly. Such a dip in the vegetative response would suggest stress to any *belg* crops that had been planted before June. Note that areas in the western regions had positive anomaly in June, a point we return to below.

Rapid Recovery of Meher Season

Anecdotal comments again suggest that this has been a good *meher* season. The NDVI imagery shows a surge of vegetative activity through July and August, reaching or exceeding seasonal average values by the end of August in most agricultural locations.

Figure 9: Ethiopia & Eritrea, June Difference from Average (NDVI)



Source: NOAA/NASA GAC NDVI
Note: Gray areas contain better-than-average vegetation levels, black areas contain worse-than-average vegetation levels, striped areas represent cloud cover.

The critical factor will be for how long the *meher* agricultural season continues. In areas where the planting date was delayed, it would be better if the rainy season were to extend by two or three weeks. The first ten days of September show the start of the rainy season retreat with low rainfall amounts over coastal Eritrea and extending into parts of Tigray. From September 1-13, Asmara recorded only 21 millimeters of rain (with two days missing data). Over the same period, Mekele was reporting rain up to September 7. Anecdotal reports suggest no rain in Mekele since the Ethiopian New Year (September 11).

Although this is a very small sample of rainfall stations, such a timing is consistent with a normal retreat of the rains. FEWS will continue to monitor the vegetation satellite imagery, where the response can be watched with much more spatial detail. A non-extension in the season could lead to a lowering of potential yields, the magnitude of which would need to be determined from ground sources.

The strong NDVI signal in many areas also has to be weighed against some field reports of problem regions. For example the Food for the Hungry International (FHI) has carried out nutritional surveys in the Gayint area of Gonder and found levels of malnutrition that warranted a limited free food distribution, in addition to their normal food-for-work approach. The difficulties in the Gayint region are occurring in the more remote lowland areas, while crops in the highlands are receiving plentiful rains, even to the point of problems caused by excess water. This is one example where the NDVI cannot pick out the necessary level of detail—the total picture has to be assessed with a combination of satellite imagery and field reports.

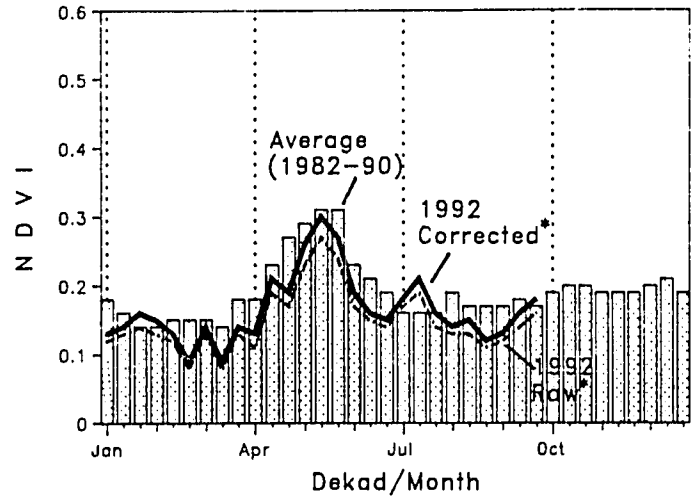
A few other areas, such as on the Gonder-Tigray border, or around Lalibela in North Wello, show seasonal NDVI curves that raise some questions in our minds. These areas will be monitored, with more focus on them in upcoming assessment missions.

Unusual August in North and South Omo and Keffa

During the analysis of the *woreda*-level NDVI data, we have noted an area in South Omo and Keffa regions that has an unusual vegetation signal compared to average. The worst affected areas are Geleb and Hamer *woredas* in South Omo where we see a poor early (*belg*) season and then a marked decline in August, when the normal conditions would call for a leveling off of NDVI levels (see Figure 10). This is essentially a pastoral area. However, a surrounding ring of *woredas* includes both pastoral and agricultural regions such as Konso Woreda, in North Omo.

Satellite imagery through September 30 suggest an upturn in the NDVI signal in this area, a hopeful sign. However, the August dip was marked and non-seasonal, so this is an area where more ground information is vital. Continued monitoring is necessary,

Figure 10: Ethiopia & Eritrea, NDVI Time Series for Geleb W., Geleb A., South Omo Region



Source: NOAA/NASA GAC NDVI
Note: A 'dekad' is a ten-day period.
*See Appendix B for discussion of 'raw' and 'corrected' NDVI.

in case of deterioration of the situation and a subsequent deterioration in the food security status in the region.

Pastoral Peak

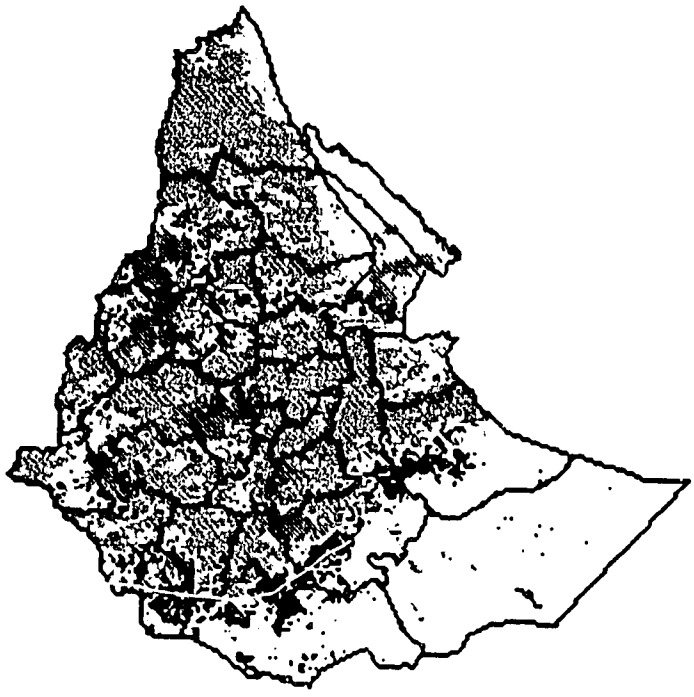
The August rainfall anomaly map (not presented here), expressed as a difference from average, shows a large positive anomaly that spreads from north of the Hararghe highlands up the eastern lowlands and over into Eritrea. The cumulative effect of such a large input of water can be seen in the NDVI imagery for the last dekad of August and through the end of September.

The image for mid-September is given in Figure 11. The 1992 time series for one example *woreda* is given in Figure 12. The values reached in September are the highest late-year values since 1988, on a par with some of the values reached in the main (*kiremt*) rainy seasons of 1990 and 1991.

What these two figures represent is a large 'green-up' in the pastoral areas. From this imagery, we would expect to see significant grass growth on the ground. Even when this grass dies off, which will happen as the rainy season recedes, there will still be a large 'crop' of standing hay.

Such an increase in vegetation should act as a valuable input to the pastoral systems in those areas. That is not to say however, that there have not been associated problems. For example, sources in Save the Children Fund (SCF)/US and the Red Cross Federation report that the Awash River is high and has burst its bank in some areas. This will affect riverbank agriculture, and stop the herders on the east side of the river from moving their cattle up the lower highland slopes on the west side, a normal practice at this time of the year. Thus, they will be forced to

Figure 11: Ethiopia & Eritrea, Mid-September Difference from Average (NDVI)



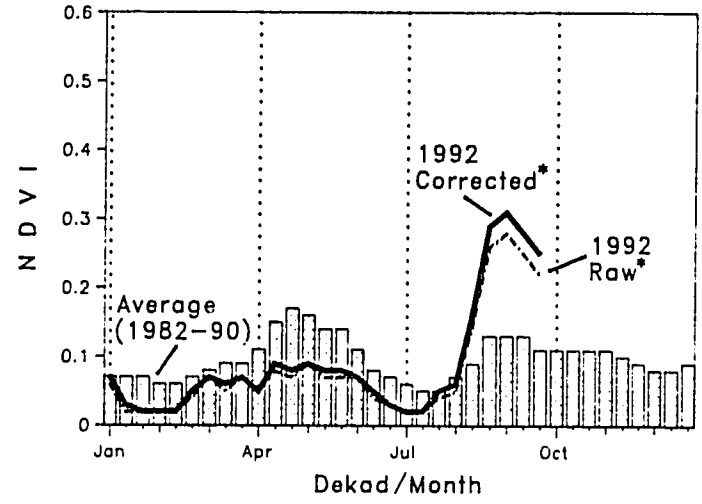
Source: NOAA/NASA GAC NDVI
Note: Gray areas contain better-than-average vegetation levels, black areas contain worse-than-average vegetation levels, striped areas represent cloud cover.

graze in areas that are traditionally used later in the year. It also remains to be seen what impact the excessive rain has on the recharge of wells in the area, many of which have run dry and necessitated an emergency water supply program.

CONCLUSION

The above discussion of NDVI imagery has been related to the vegetation signal as seen by the satellite, with a ground resolution of up to seven kilometers. The satellite is looking at the total vegetative signal. In pastoral areas this will likely be principally grass, although there may be some scattered agriculture and natural, non-grass vegetation. In wetter regions, we are looking at a melange of crops, trees, bushes, natural annual vegetation and so on. We would repeat the caution then that we not looking at agricultural production with these images. Rather, we can make suggestions that, for example, vegetative conditions in the West would suggest that if people planted, one would expect to see good production levels.

Figure 12: Ethiopia & Eritrea, NDVI Time Series showing Pastoral Peak (Gewane W., Chercher A., Harerghe Region)



Source: NOAA/NASA GAC NDVI
Note: A 'dekad' is a ten-day period.
*See Appendix B for discussion of 'raw' and 'corrected' NDVI.

The next stage of a food-security evaluation will be to determine levels of agricultural production. This is a process that will develop over the coming months. NDVI analysis will serve as a useful tool in this process. It is hoped to marry the NDVI analysis with ground-based estimates of agricultural production in Ethiopia and Eritrea. This has been the case in recent years but unfortunately, this year one of the ground components will be missing. That component is the Central Statistics Authority (CSA) survey of forecast agricultural production (see Appendix B for further discussion).

In the meantime, the assessment mission received a preliminary forecast of agricultural production from the Agricultural Marketing Corporation. The forecast calls for an increase in national production of 5% compared to last year, but there is marked spatial variation in production changes. Increases in production are forecast for the central highland areas while drops in production occur in the western periphery.

Given the strong NDVI curves for the western region, we would surmise that predicted drops in production here relate to reductions in planted area, purportedly due to insecurity problems. Please note that the AMC was anxious to point out that this is a preliminary analysis, and it may be that forecast is too strong a label at this point in time. The AMC is, in fact, in the process of conducting some field surveys to, amongst other aspects, refine these figures.

APPENDIX B: Ethiopia & Eritrea, Notes on Data Quality and Availability

Correction of NDVI imagery

As part of the assessment mission, an attempt was made to derive a preliminary correction factor for the effect of atmospheric contamination from the June 1991 eruption of the Philippines volcano Mt. Pinatubo. Scientists at the U.S. National Aeronautic and Space Administration (NASA) are working on a more complete correction procedure, but testing of the initial results in collaboration with FEWS revealed some shortcomings. NASA is reworking the software and data, but new imagery was not available in time for this mission. As a stopgap measure, we have used some of the earlier NASA results to give us an empirical 'feel' for the magnitude of the correction. In the end, the NDVI values were increased by 11%, a modest increase, less than that used for a similar exercise in November 1991. These increased values are labeled 'corrected' on time series shown in this chapter. The original values are labeled 'raw.'

No CSA Agricultural Forecast Survey in 1992 or 1993?

On meeting with Ato Girma Tadesse of the CSA, we learned that there will be no CSA survey for either forecast capability or an assessment of the 1992 harvest production. This is because all CSA enumerators and regional officers are preparing for the forthcoming population census. Cartography training (about two months) is almost complete. The next stage will be to carry out the census cartography (twelve months) and then up to two months of actual enumeration. Such timing would not permit the carrying out of agricultural surveys by CSA this year or next. There are some hopes to carry out field trips to agriculturally important areas and use farmers' comments on this year compared to last to adjust last year's production figures. However, such an approach cannot hope to cover the same sample size as the traditional CSA surveys, which go back to the early 1980s.

By way of possible substitute, the AMC will be carrying out a preliminary estimate of the 1992 production, to be completed in late October. However, the AMC uses CSA data from the previous year as a basis for their projects, an approach that could have difficulties in 1993. The annual FAO seasonal assessment (in November) has also traditionally used CSA's early results and results from the previous year to form a basis for their own assessment. Data for 1992 will not be available to FAO this year, presumably making their work more difficult.

In addition, the CSA uses their enumerators to collect commodity price data over a large sample of markets for the RRC. This data collection has stopped, leading to a deterioration in the quality of a large data base used by FEWS. The RRC has started to employ their own data collectors, but this is for a smaller number of markets than the CSA sample, and a data hiatus is inevitable.

APPENDIX C: FEWS Matrix of Vulnerability

Level of Vulnerability	Conditions of Vulnerability	Typical Coping Strategies and/or Behaviors	Interventions to Consider
SLIGHTLY VULNERABLE	**Maintaining or Accumulating Assets and Maintaining Preferred Production Strategy**	**Assets/resources/wealth:** either accumulating additional assets/resources/wealth or only minimal net change (normal "belt-tightening" or seasonal variations in) assets, resources or wealth over a season/year. i.e., coping to minimize risk. **Production Strategy:** any changes in production strategy are largely volitional for perceived gain, and not stress-related.	**Developmental Programs**
MODERATELY VULNERABLE	**Drawing-down Assets and Maintaining Preferred Production Strategy**	**Assets/resources/wealth:** coping measures include drawing down or liquidating less important assets, husbanding resources, minimizing rate of expenditure of wealth, unseasonal "belt-tightening" (e.g., drawing down food stores, reducing amount of food consumed, sale of goats or sheep). **Production Strategy:** only minor stress-related change in overall production/income strategy (e.g., minor changes in cropping/planting practices, modest gathering of wild food, inter-household transfers and loans, etc.).	**Mitigation and/or Development: Asset Support** (release food price stabilization stocks, sell animal fodder at "social prices", community grain bank etc.)
HIGHLY VULNERABLE	**Depleting Assets and Disrupting Preferred Production Strategy**	**Assets/resources/wealth:** liquidating the more important investment, but not yet "production," assets (e.g., sale of cattle, sale of bicycle, sale of possessions such as jewelry). **Production Strategy:** coping measures being used have a significantly costly or disruptive character to the usual/preferred household and individual lifestyles, to the environment, etc (e.g., time-consuming wage labor, selling firewood, farming marginal land, labor migration of young adults, borrowing from merchants at high interest rates).	**Mitigation and/or Relief: Income and Asset Support** (Food-for-Work, Cash-for Work, etc.)
EXTREMELY VULNERABLE or AT-RISK	**Liquidating Means of Production and Abandoning Preferred Production Strategy**	**Assets/resources/wealth:** liquidating "production" resources (e.g., sale of planting seed, hoes, oxen, land, prime breeding animals, whole herds). **Production Strategy:** Seeking non-traditional sources of income, employment, or production that preclude continuing with preferred/usual ones (e.g., migration of whole families).	**Relief and/or Mitigation: Nutrition, Income and Asset Support** (food relief, seed packs, etc.)
FAMINE	**Destitute**	**Coping Strategies Exhausted:** no significant assets, resources, or wealth; no income/production.	**Emergency Relief** (food, shelter, medicine)

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. 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.

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, high, 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, with local convective activity organized by westward moving "Easterly Waves."

NDVI - Normalized Difference Vegetation Index (NDVI) images are created at the laboratory of the National Aeronautics 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 estimates of current rainfall based on cold cloud duration as measured by thermal infrared radiometers on the METEOSAT satellite. The estimates are calculated every 10 days 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.