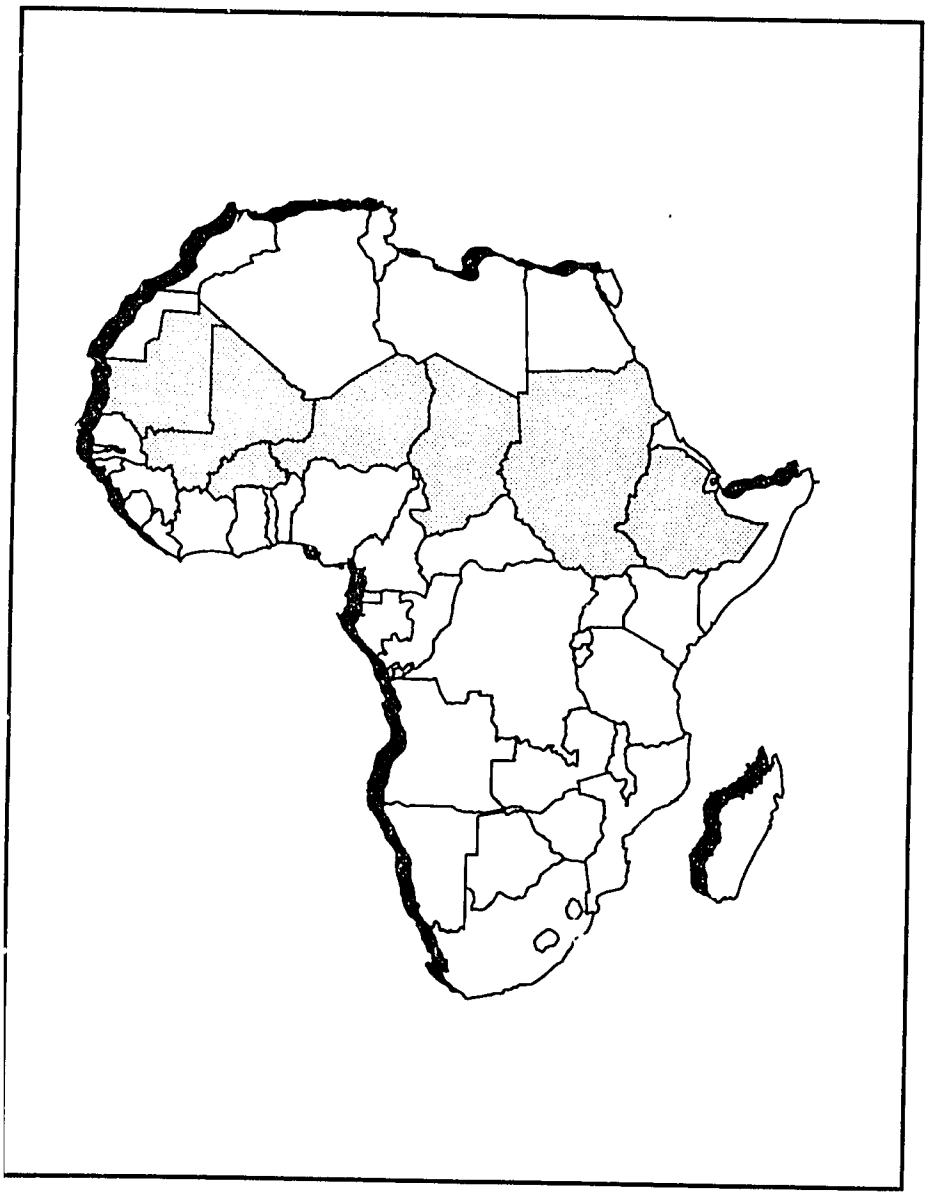
Preharvest Assessment



Contains reports on:

Mauritania

Mali

Burkina

Niger

Chad

Ethiopia

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Preharvest Assessment

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Executive Summary

MAURITANIA

The rainy season ended in early September for most of the main Mauritanian agricultural zones [**Note**: During the production of this document, rainfall levels again increased in many southern areas as a series of moderate to heavy rains moved across southern Mauritania as late as early October]. Rainfall levels through the end of August were approaching (exceeding in some areas) last year's above-average rains with only a few exceptions. Pastures have developed well in the southeastern *wilayas* (regions) of the country, where rainfall has been regular and steady. Favorable conditions for *dieri* (rainfed) and *bas-fonds* (lowland) agriculture could mean better harvests than those of the excellent production years of 1988 and 1989.

MALI

Agroclimatic conditions for the 1994 growing season are the best since the drought years of 1968–73. Hopes are high throughout Mali for an excellent rainfed cereal harvest. Though there remains a potential Desert Locust threat (through the end of the harvest period) to unharvested crops, Mali should not require emergency food aid for 1995.

BURKINA

National cereal production will be above average and no emergency food aid will be necessary during 1995. A cereal production surplus (the fourth in four years) projected at 216,000 metric tons (MT)—11 percent of the 1.9 million MT consumption requirement—assures that adequate cereal will be available. Large areas of below-average production in Houet, Comoé, and Poni will reduce purchasing power in the those provices. Communities in areas of below-average production may require targeted assistance by the Burkina government.

NIGER

Good harvest prospects are expected for the 1994/95 growing season. Substantial rainfall recorded in July and August helped establish most croplands and pastures, but also caused flood and erosion damage throughout the country. If harvest production is above average, Niger should not need emergency food aid during 1995.

CHAD

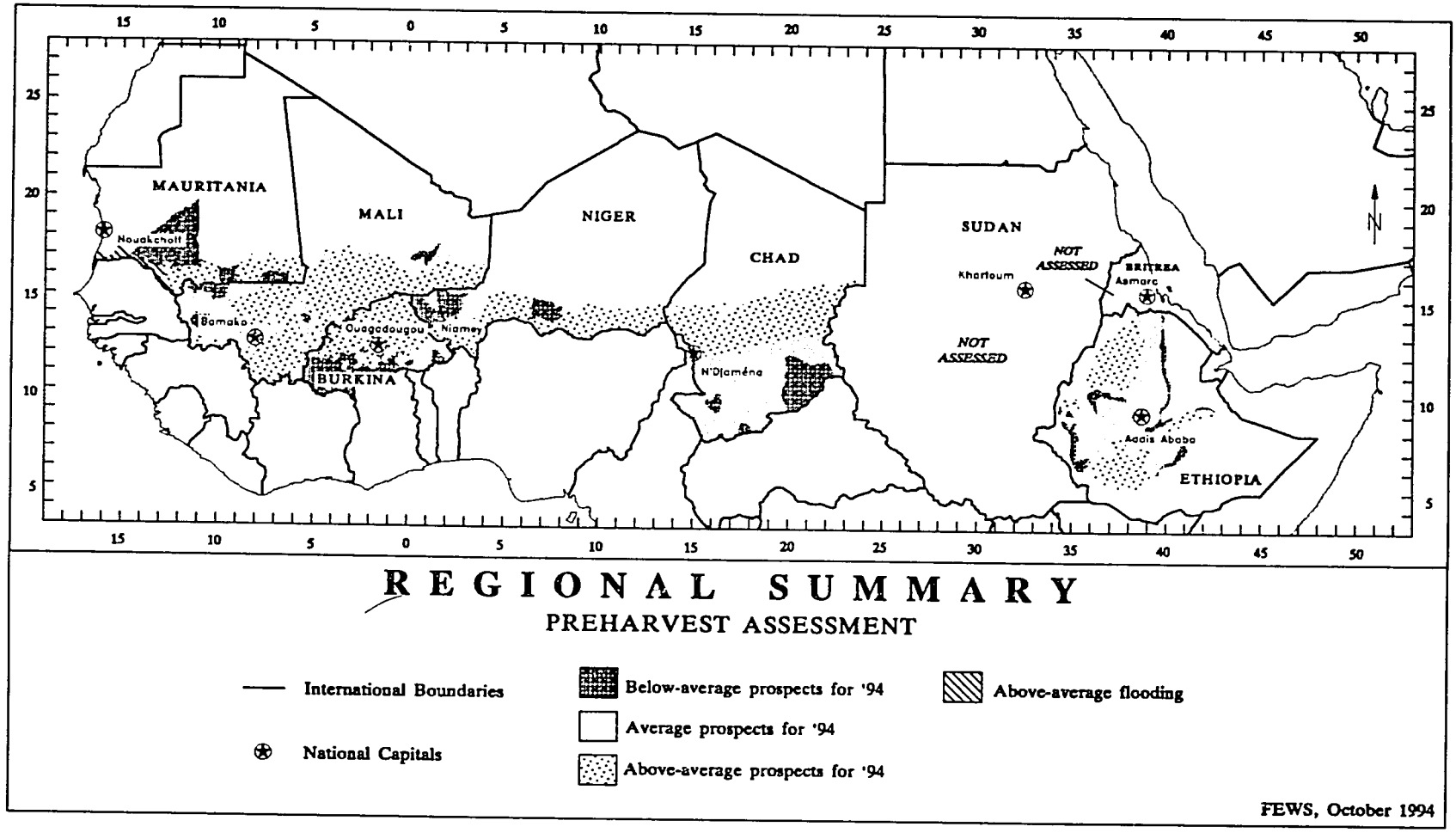
Throughout Chad, average and above-average rainfall were exceptionally well-distributed spatially and temporally. Above-average cereal yields are expected, as are good prospects for off-season agricultural production. Pasture conditions are excellent. National cereal production should meet 1995 national cereal consumption requirements of 927,000 MT. Insecurity, banditry, social disruption, economic stagnation, and political uncertainty are the greatest threats to food security during 1995.

ETHIOPIA

The good *kiremt* (main season) rains and a largely successful 1994 food aid operation have averted the worst-case scenarios of drought and famine. The immediate outlook is now considerably brighter than in June, when the *kiremt* rains were still in doubt. However, the long-term problems of agricultural stagnation and the structural gap between food availability and needs continue.

See page 52 for vulnerability definitions in the FEWS Vulnerability Index

Map 1. Regional Summary: Preharvest Assessment



FEWS REGION
Good Harvest Prospects Across the Sahel; Average Prospects in Ethiopia Leave Significant Food Aid Need

Harvest Prospects

Overall 1994 harvest prospects are about average in Ethiopia; are good-to-excellent in Chad, Niger, Burkina, and Mali; and have strong potential in Mauritania (see Map 1). Ethiopia will have an import requirement of over 700,000 MT of cereal even with the average harvest. Given the weakness of Ethiopia's foreign exchange situation, commercial imports are expected to make up little of the difference. No emergency food aid is needed in the other countries at this time.

Ethiopia's agricultural year began poorly. The first, shorter rainy season (*belg*) began about a month late in some areas and in others was a near total failure. The second, longer rainy season (*kiremt*) started on time, with its rainfall well distributed over time. The outcome of this pattern was a nearly 80 percent loss of short-cycle crops planted during the *belg*, poor production of long-cycle crops planted during the *belg*, and good production of short-cycle crops planted during the *kiremt*. Overall, this should result in only an average harvest.

Although rains across the Sahel were late, they were plentiful in August in Chad, Niger, Mali, Burkina, and southeastern Mauritania. In Chad, August and September rains were especially well distributed spatially and in their timing. This helped to maximize the impact of rains that were in some areas just average. In Mali, Burkina, and Niger, there were locales with dry spells either in June (planting period, necessitating replanting) or in July and August (flowering period, decreasing yield potential). At the same time, areas in the northern Sahel region of Mali and Burkina experienced very heavy rains in August and waterlogging (a different cause of decreased yields) was a concern. In spite of the trouble spots, national harvests are expected to be good, if not excellent, in Chad, Niger, Mali, and Burkina.

In Mauritania, August rains were good in the southeast and south-center, but remained poor in the southwest. Most of Mauritania's rainfed agriculture takes place in the first two zones, and the rainfed harvest, which in normal years contributes about one-quarter of Mauritania's domestic cereal production, is expected to be good-to-excellent. A major portion of lowland recessional production (*bas-fonds*, usually another quarter of annual cereal production) takes place in the southwest, where rains have not been as strong. Starting later in the year than rainfed production, it is not yet clear how the *bas-fonds* will fare this year. A unique feature in this year's growing season has been extensive flooding along the Senegal River. The Manantali Dam (on the upper reaches of the Senegal River, in southwestern Mali) remained open all summer to allow for repairs. This resulted in an annual flood in southwestern Mauritania that is now said to be the most extensive seen in over 20 years. The extensive flooding results in:

- An almost total loss of irrigated crops that normally contribute about one-quarter of Mauritania's domestic cereal production.
- Increases in the potential for river recessional (*walo*) crops, which also usually provide about one-quarter of Mauritania's harvest. Current prospects are the best seen in over 20 years.

The main constraints to *walo* production will be the availability of seed and labor. Walo crops usually are planted in October and November, so it is still too early to tell how well this harvest will turn out.

Rainfall Update

Unlike the usual pattern, the 1994 Sahelian rains have continued through late October (Sahelian rains usually end in late September or early October). This trend has not been mirrored in Ethiopia, where the *kiremt* rains have ended on time. In the Sahel, the continued rains will benefit pasture development, add to flooding for recessional crops, and help complete the development of late-planted rainfed crops. At the same time, late rains may hamper ongoing harvest activities.

Vulnerability

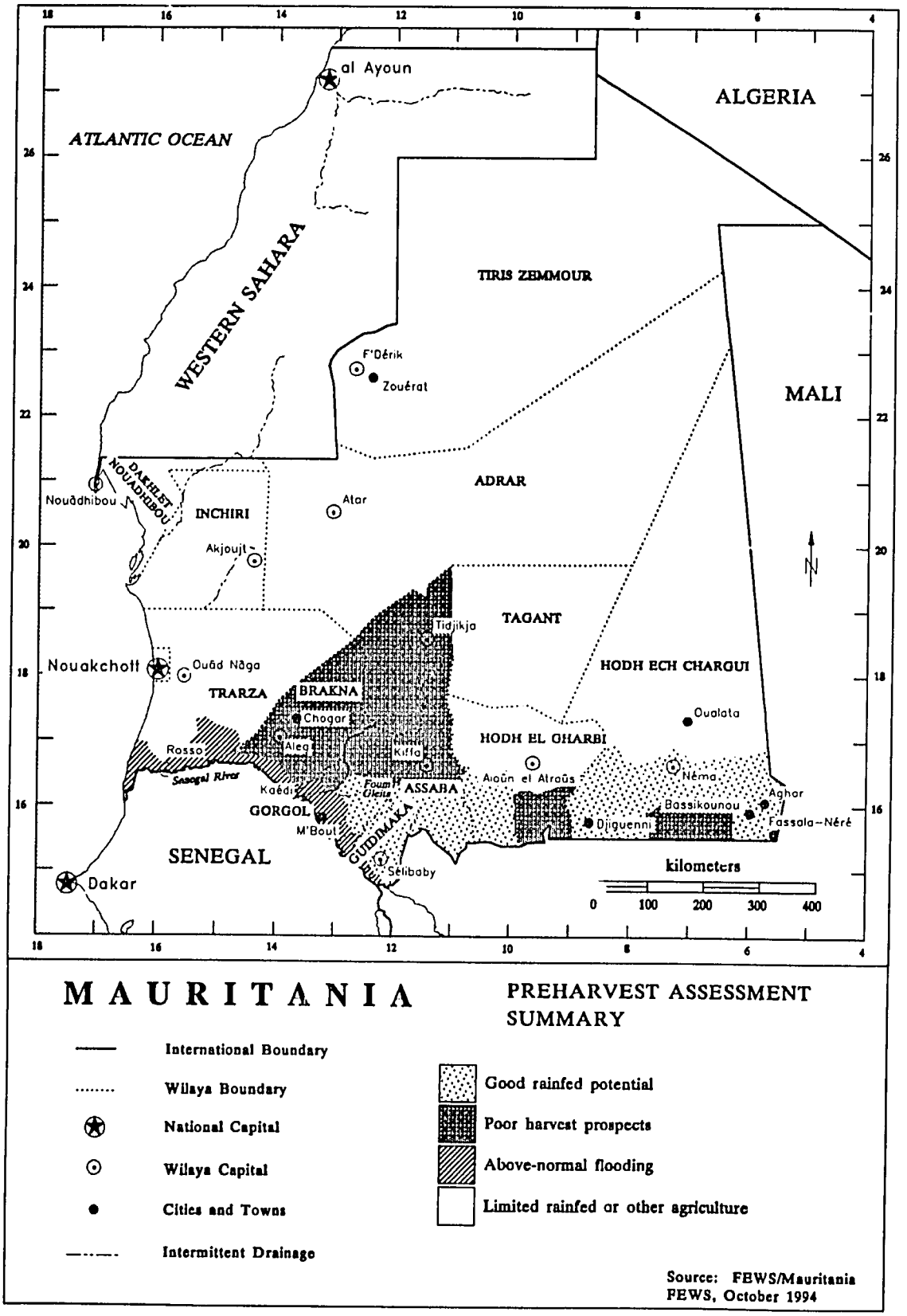
Despite the positive harvest prospects, there are still areas of heightened vulnerability to famine. The main cause of this is not drought, but rather increased civil tensions combined with declining economic conditions.

In Mali and Niger, civil strife is limited to the more northern, pastoral areas. These tensions have restricted herd movement and access to whatever agricultural land that might exist, reducing the ability of residents to produce enough income or food for subsistence. The tensions have also hindered commerce in these areas. In some cases, merchants are able to reach isolated towns only via armed convoy. These problems limit the amount of food available and promote the elevation of consumer prices.

In Chad, there is civil tension throughout the country. Isolated incidents of civil unrest have been reported in several parts of the country and banditry is now widespread. The expectation of banditry puts a damper on the market system above and beyond that already imposed by the country's poor road system.

In Mauritania, a weather-related event has raised political issues that will affect how much land is farmed in the southwest. As noted earlier, this year's flooding of the Senegal River is greater than at any time during the last 20 years, making possible a great expansion of *walo* cultivation. In addition to the flood, there has been a change in land tenure laws affecting these areas within the past ten years and a significant change in the mix of the local population following the April 1989 border events with Senegal. The outcome of this is heightened tensions in some locations as local authorities have attempted to redistribute lands of families having more than one field to "non-owners", who essentially are newcomers to the riverine area since April 1989 and are of a different ethnic group than the original populace. It remains to be seen how much of the flooded *walo* land is actually cultivated. This in turn will affect this year's *walo* harvest production.

Map 2. Mauritania: Preharvest Assessment Summary



MAURITANIA

Ample Mid-season Rains and Flooding of the Senegal River Provide Good Pasture and Expand Recessional Agriculture Output

Based on a report released by FEWS/Mauritania on September 18, 1994

SUMMARY

The 1994 rainy season was excellent in most of the significant agricultural zones of Mauritania. Many rain stations that reported rainfall deficits (compared to 1993) in June and July, received more regular rainfall in August. Locally heavy rains damaged houses and caused some flooding in M'Bout (Gorgol), Chagar (Brakna), and Oualata (Hodh ech Chargui) (see Map 2).

Pasture conditions, according to Normalized Difference Vegetation Index (NDVI) images, are better than last year and better than the 1982-90 average in the southeastern part of the country. The Agricultural Statistics Department of the Ministry of Rural Development and Environment (MRDE) has not yet begun its first field surveys for area planted. A dryspell during early September caused a noticeable brown-down evident in the period's Normalized Difference Vegetation Index images. Rainfed agriculture could be affected by an abrupt end to the rainy season.

Note: As noted in the Executive Summary rains returned to southern agriculture areas during mid- and late September, and were heavy in several areas resulting in crop losses due to flooding. Satellite imagery have not been available since early September, preventing early analysis of the impact of these rains on vegetation.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

The main agricultural schemes in Mauritania are *dieri* (rainfed), *bas-fonds* (depression), *walo* (river recessional), and private and parastatal irrigated rice production.

The *dieri* season begins during late June to early July in the southeastern *wilayas* (regions), and in July to early August in *wilayas* farther west. The harvest period is from October to November. Bas-fonds crops are planted and harvested later, depending on soil types and quantities of water. The *walo* season begins after flood waters recede, usually after the *dieri* harvest in November. The *bas-fonds* harvest period is normally from February to April, but the exact timing depends on flooding and planting patterns. The main irrigated rice season extends from August to November.

To-date, no data are available from the Department of Agricultural Statistics on crop production prospects for this season. The Ministry of Rural Development and Environment (MRDE) has established an objective for global gross agricultural production of 205,154 MT (a 24 percent increase over 1993 estimates) and overall area planted of 198,192 hectares. Final estimates of last year's agricultural production have yet to be published by the MRDE's agricultural statistics department.

Dieri (Rainfed agriculture)

Rainfall through late August was sufficient for normal development of rainfed crops in the southeastern and south-central parts of the country. A continuation of rains into September would contribute to good rainfed harvests in the southern parts of Hodh el Gharbi, Hodh ech Chargui, southern Assaba, Gorgol and Guidimaka *wilayas*. However, recent rainfall data from AGRHYMET[1] supports reports of a dry spell in all of the agricultural areas of the country during the first ten days of September. The NDVI imagery from the first dekad of September showed that a "brown-down" had begun throughout the agricultural and pastoral regions of the country. NDVI values, an index of vegetative vigor, fell from the end of August to the beginning of September in most of southern Mauritania.

In the southwestern *wilayas* (Brakna, Trarza, and northern Gorgol), the rainy season began late. Most of Brakna as well as northern Gorgol should have poor rainfed harvests. There is very limited rainfed agriculture in Trarza Wilaya.

Walo (Flood-recessional agriculture)

According to reports from farmers and other travelers coming from the Senegal River Valley, *walo* lands flooded by mid September exceeded areas inundated last year and are said to be significantly greater than at any time during the last 20 years. Walo area planted and harvest production could be comparable to the excellent years of 1988 and 1989. The greater flooding of the Sengal River also is said to be related to repair work on the Manantali Dam in Mali, which has necessitated large water

1. AGRHYMET is the CILSS (Inter-State Commission for Prevention of Drought in the Sahel) regional center for training and applied agrometeorology and hydrology operations.

releases. Local observers say that residents of villages along the Senegal River could face flooding during late September and early October if water levels continue to rise.

The 1988 and 1989 seasons had the largest surface areas planted in *walo*, according to the Agricultural Statistics Department of the MRDE. Since it is too early to know what area of *walo* lands will be planted and harvested this year (we only know that there has been exceptionally above-average flooding of the river), 1989 *walo* production figures are being used for estimation purposes. The *walo* season (planting) does not begin until after the retreat of flood waters and after rainfed (*dieri*) harvests, usually sometime in November.

Irrigated Agriculture

Water releases from the Manantali Dam have added to the inundation of many irrigated perimeters in Trarza Wilaya as well as two SONADER perimeters in Gouraye in Guidimaka Wilaya, which ruined chances for irrigated farmers in those areas. The targets of SONADER for area sown and yields are included in Table 1, but could change significantly before the end of the season, when a more complete assessment can be made. The Federation of Private Irrigated Farmers has also released estimations of area sown in the private irrigated sector.

Area sown in SONADER irrigated rice could also be reduced because of problems many farmers had in obtaining credit after nonpayment of previous loans.

Decrue SONADER

According to SONADER, 6,678 hectares (ha) will be planted in Trarza and 4,800 ha in Tagant in *decrue* (behind-dam) agriculture. Yields are estimated at 1.2 And 0.8 MT/ha respectively, and projected production is about 9,700 MT net (11,500 MT gross).

Bas-fonds (lowland, depression, or behind-dam farming)

All active rain stations in the Brakna, an important area of *bas-fonds* agriculture, reported a late start of the rainy season and poor overall rainfall through the end of August. Though rains returned in mid-September, the affects of the August and early September dry spells is not known but could have some

Table 1. Mauritania: Preliminary agricultural estimates for 1994/95 (*MT*)

Wilaya	Dieri	Walo	Bas-fonds	Decrue SONADER[a]	Traditional Irrigated SONADER[b]	Rice Irrigated SONADER[c]	Irrigated Private[d]
Hodh ech Chargui	19,053	0	10,546	0	0	0	0
Hodh el Gharbi	13,520	0	2,699	0	0	0	0
Assaba	2,044	0	746	0	0	0	0
Guidimaka	7,792	219	300	0	1,287	2,298	0
Gorgol	14,221	10,587	0	0	3,509	4,400	413
Brakna	764	4,433	6,050	0	2,869	3,200	1,018
Trarza	5	3,144	0	6,678	300	10,400	24,768
Tagant	0	0	0	4,800	0	0	0
Total (gross)	57,399	18,383	20,341	11,478	7,965	20,298	26,199
Total (net)	48,789	15,626	17,290	9,756	6,770	12,179	15,719

Total gross and net production by *wilaya*

Wilaya	Total Gross	Total Net
Hodh ech Chargui	29,599	25,159
Hodh el Gharbi	16,219	13,786
Assaba	2,790	2,372
Guidimaka	11,896	9,537
Gorgol	33,130	26,957
Brakna	18,334	14,529
Trarza	45,295	29,709
Tagant	4,800	4,080
Total	162,063	126,129

Notes:

1. a. = Decrue SONADER = flood recessional farming with financing and technical assistance from the agricultural parastatal SONADER.
   b. = Traditional irrigated SONADER = Irrigated traditional crops (millet and sorghum) SONADER.
   c. = Rice irrigated SONADER = Irrigated rice (SONADER).
   d. = Irrigated Private = Private plots of irrigated rice.
2. Estimates for *dieri* were based on 1989 MRDE harvest results, when rainfall levels through the end of August were comparable in rainfed zones.
3. Walo harvests are based on the year on record (1989) with the largest surface area inundated, according to the MRDE.
4. Estimates for *bas-fonds* (lowland) were based on 1993 *bas-fonds* production estimates by the MRDE.

Sources: Department of Agricultural Statistics of the Ministry of Rural Development and Environment, SONADER, Federation of Private Cultivators, FEWS/Mauritania

adverse affects on seasonal *bas-fonds* production. Lacking other information at this time, the MRDE's 1993 estimates for *bas-fonds* production have been adopted.

Pastoral Conditions

Mid-season NDVI images showed pastures in the southeast of the country were in excellent condition, principally in the triangle formed by Bassikounou-Néma-Djiguenni in southern Hodh ech Chargui. Images from early September confirmed AGRHYMET rainfall data and reflected a general "brown-down" of vegetation across much of southern Mauritania.

Pasture and vegetative development appears to have reached its peak during the last ten days of August, though biomass should have benefited from mid-September showers. General comparisons of biomass levels with those for similar periods in 1993 seem to support greater 1994 biomass levels across all of southern Mauritania for the season up to early September—from eastern Gorgol, through Guidimaka, all of Assaba, the southern two and part of the northern two *moughataas* (departments) of Hodh el Gharbi, and all of the southern part of Hodh ech Chargui.

Pests

Desert Locusts—In contrast to 1993, when there were large infestations of Desert Locusts throughout the country, there have been no reports of gregarious (swarming) locust activity thus far in 1994. Scattered individuals, at maximum densities of 15 per hectare, have been reported in southeastern Mauritania, but overall populations are low and damage has been negligible.

Senegalese Grasshoppers—The MRDE crop protection department has received reports of hatchings of Senegalese grasshoppers throughout southern Mauritania (Guidimaka, Assaba, Hodh ech Chargui, and Hodh el Gharbi *wilayas*).

Other pests—There have been several reports of rat infestations in Gorgol Wilaya, especially in the Foum Gleïta area.

Food Stocks and Food Flows

According to the CSA (Mauritanian Food Security Commission), there is a 9,500 MT security cereal stock and a 182 MT supply of cowpeas in Nouakchott. SONIMEX (Societe National d'Importation et Exportation) reported stocks of rice (9,587 MT) and wheat (212 MT) as of late July. SONIMEX is planning to import 15,500 MT of rice and 10,000 MT of wheat.

There are no figures available on commercial stocks or projected imports for the coming year. During 1993, the food aid planning committee used the figure of 213,000 MT as an estimate for commercial imports during 1993/94. The commercial sector has shown itself capable of importing large amounts of cereal. The availability of hard currency is reported to be the only factor limiting larger import purchases.

The WFP and other donors have committed a limited amount of food aid to Mauritania for 1994/95 (see Table 2).

Table 2. Mauritania: Expected food aid for 1994/95 (*MT*)

Donor	Cereal	Quantity
WFP (school feeding)	wheat	3,500
WFP (food-for-work)	wheat	10,000
Italy	rice	5,000
EU	wheat	5,000
Japan	wheat	3,000
Total		26,500

Source: WFP

FACTORS AFFECTING FOOD ACCESS

Projected Food Consumption Needs

It is too early to predict harvest results with much precision. Table 3 presents an approximation of the Mauritanian production deficit. The estimated global net cereal production for 1994/95 is 126,130 MT. The total cereal needs are calculated by multiplying 176 kilograms of cereal/person/year by the total population. This equals a cereal need of about 400,887 MT. The hypothetical production figure of 126,130 MT represents only 31 percent of the hypothetical 1995 Mauritanian cereal needs, leaving a hypothetical production deficit of 274,757 MT.[2]

Economic data

Cereal prices (millet, sorghum, rice) in Nouakchott fell during the month of July, reflecting hopes for a good agricultural season after good early rains. The trend was reversed during August and September (see Table 4).

2. If the older CILSS consumption figure of 165 kilograms per person per year were used, consumption needs would be 375,831 MT, with a production deficit of 249,701 MT, or 33.5 percent of domestic needs.

Table 3. Mauritania: Provisional 1993/94 cereal production balance for Mauritania, by *wilaya* (*MT*)

Wilaya	Projected 1995 population	Cereal needs	Net production	Balance	Percent of needs met
Hodh ech Chargui	254,237	44,746	25,159	-19,587	56
Hodh el Gharbi	189,032	33,270	13,786	-19,484	41
Assaba	195,916	34,481	2,372	-32,109	7
Guidimaka	137,646	24,226	9,537	-14,689	39
Gorgol	207,482	36,517	26,957	- 9,560	74
Brakna	220,345	38,781	14,529	-24,252	37
Trarza	205,597	36,185	29,709	- 6,476	82
Tagant	72,369	12,737	4,080	- 8,657	32
Adrar	68,133	11,991	—	-11,991	—
Inchiri	13,609	2,395	—	- 2,395	—
Nouadhibou	92,990	16,366	—	-16,366	—
Tiris Zemmour	41,280	7,265	—	- 7,265	—
Nouakchott	579,130	101,927	—	-101,927	—
Total	2,277,766	400,887	126,129	-274,758	31
Refugees	70,000	12,320	—	-12,320	—

Note: Per capita consumption rate = 176 kilograms.
Sources: Population projections for 1995 from National Statistics Office, productions estimates from FEWS/Mauritania,consumption rate from CSA.

Source: FEWS/Mauritania

Table 4. Mauritania: Nouakchott cereal prices June–Sept. 1994 (*Ouguiyas per kilogram*)

	June	July	August	September
Millet	55	30	50	55
Taghalit (sorghum)	45	35	45	55
Imported rice	55	60	55	55
Local rice	45	50	50	50

Source: FEWS/Mauritania

VULNERABILITY UPDATE

The FEWS *1994 Vulnerability Assessment* highlighted poor urban populations, geographically isolated agropastoralist populations of Tagant and Ac'rar, as well as various other farmer and herder groups scattered throughout the south of the country. These groups (300,000–400,000 people) were moderately to highly vulnerable.

The situation of poor urban populations (shanty-town residents) identified as "highly vulnerable" in the FEWS *1994 Vulnerability Assessment* remains difficult. If there are improved harvests in the agricultural regions of the country this year, cereal prices in Nouakchott should fall. This should improve access to affordable food for urban populations and could reduce their vulnerability. However, the precariousness of the living situation for a majority of the residents of urban areas, (Nouakchott, the capital, and the two northern industrial cities, Zouerate and Nouadhibou), described in previous reports, remains unchanged. Abysmally poor housing conditions and extremely limited access to health care, combined with high medicine costs, high prices of imported goods and the decline of contracting employment opportunities especially in the fishing sector, continue to affect urban dwellers. According to the National Statistics Office, the population of Nouakchott by mid-1995 will reach over 520,000 and that of Nouadhibou over 90,000, out of the total Mauritanian population of nearly 2.3 million.

The extremely geographically isolated agropastoralist residents of Adrar and Tagant *wilayas* continue to be highly vulnerable (about 28,000 people). There has been negligible rain through the beginning of September at all the reporting stations in both *wilayas*. This will aggravate their situation of chronic food stress. Although the *gueina* (date) harvests have been ongoing over the past two months—offering some relief to hungry residents—poor local agricultural production will be a severe setback for residents in these isolated areas, especially for those in Tagant.

Refugees

The United Nations High Commission for Refugees (UNHCR) reports that the number of Malian refugees in three UNHCR camps in southeastern Mauritania (Bassikounou, Fassala Néré and Aghor) has grown to around 70,000. Refugee numbers continue to climb—last year UNHCR counted 42,000 refugees and two years ago the number was 18,000. In spite of the increases, the condition of refugees is described as satisfactory by UNHCR personnel. The World Food Program reports that there are adequate food supplies for current needs.

Other Vulnerable Groups

Populations of the main rainfed agricultural areas of the country (the southern parts of Hodh el Gharbi and Hodh ech Chargui, Guidimaka Wilaya, and southern Assaba and Gorgol) should have above-average cereal production. Improved production combined

with abundant pastures should reduce the vulnerability levels of smallholders and agropastoralists in these areas.

If the above-average flooding of the Senegal River (some are describing surface areas flooded as being the greatest since the construction of the Manantali Dam) translates into increased *walo* (river recessional) sorghum production, vulnerability levels of populations along the Senegal River Valley should decline. Only after the recession of flood waters (October or November), can the quality of *walo* production confidently be judged.

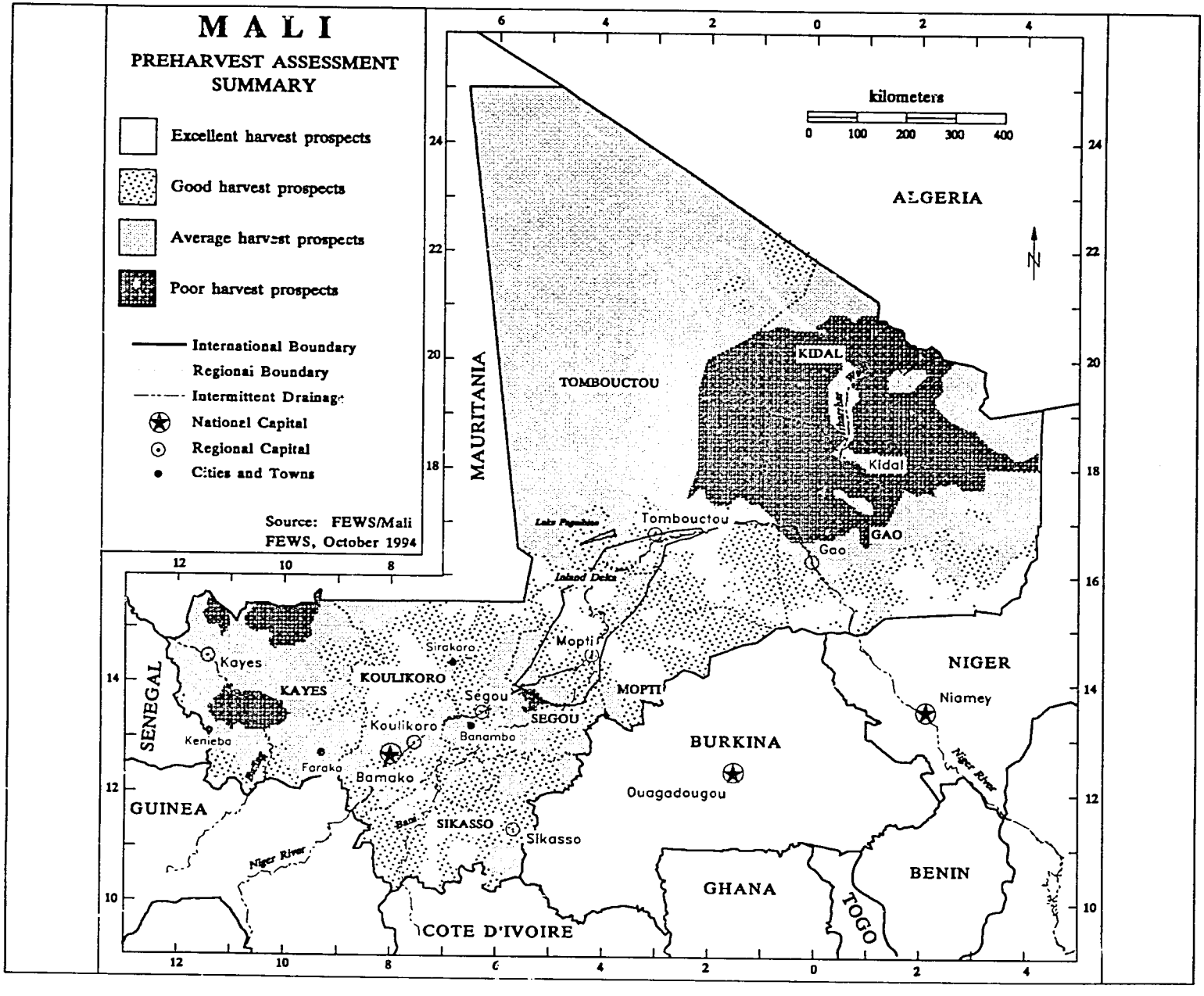
CONCLUSIONS

The rains in the main areas of rainfed agriculture in the country were well spaced and adequate for normal development of crops through the end of August. There was a lull in rainfall during the first ten days of September in most areas, but pasture and rainfed agricultural areas benefited from mid- and late September showers. Pasture conditions are excellent in the southeast of the country. This year, the presence of Desert Locusts has had only minimal affects on agricultural production.

Regular rainfall across the southern agricultural areas during mid- and late September should improve chances for a good or above-average rainfed crop, especially in southeastern and south-central Mauritania. Increased flooding of river-recessional lands along the Senegal River should mean improved *walo* harvest prospects, but also bring floods to villages close to the flood plain. It is not yet known how severely the irrigated sector will be affected by the increased flooding.

Since three of the four main agricultural schemes (irrigated, river recessional, and *bas-fonds*) are not yet begun, or are just underway, it is too early for an accurate overall assessment of the 1994/95 harvest prospects. We do know, however, that even in a good year (production of 130,000 MT, for example), only one-third of the domestic cereal need (roughly 400,000 MT) is met. The production shortfall, as in past years, will have to be addressed through commercial imports or food aid. Last year, it was estimated that private imports totaled 213,000 MT and food aid around 33,000 MT.

Map 3. Mali: Preharvest Assessment Summary



MALI

Exceptional Agroclimatic Conditions Should Lead to an Excellent Harvest

Based on a report released by FEWS/Mali on September 18, 1994

SUMMARY

Excellent agroclimatic conditions have prevailed in Mali since August. Planting started in the Sudanian zone in May and extended to all agricultural areas in July, when rainfall became regular. Area under cultivation has exceeded initial projections by over 10 percent and is greater than last year. Overall crop conditions are very good (see Map 3).

Regular rainfall has contributed to keeping crop pest outbreaks in check and there have been no major pest attacks this year. Some Desert Locust swarms were sighted early in the season, but the magnitude of locust populations are still unknown. With ecological conditions favorable for locust reproduction, Desert Locusts pose a potential threat to late season crops.

Cereal prices remained low in 1994 and have been falling in many markets in July. A good harvest, following the franc Communauté Financière Africaine (FCFA) devaluation earlier this year, will help to stabilize food prices. Urban as well as rural vulnerability to famine should decrease considerably as Malians await an excellent harvest.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

The 1994 rainy season started in May in the Sudanian zone. Early rains were heavy in many areas allowing farmers to start planting 10 to 20 days earlier than normal. A short dry period in June and early July threatened emerging crops. Since July, rainfall has been abundant and regular. Area under cultivation is higher than projected, and higher than in 1993. In mid-September, agriculturally significant rains continued, reducing the possibility of an early end to the season. Cumulative rainfall through mid-September exceeded the 30-year normal (1961–1990) across much of Mali.

There have been no major crop pest attacks this year as regular rainfall has kept crop pests in check. In early September, cereal crops were in the head formation stage, and cotton crops were flowering. Crop conditions were good in most agricultural areas. Adequate soil moisture reserves will allow normal maturation of cereal crops. Torrential rainfall in August accelerated soil erosion, flooded certain low lying areas, and prevented some farmers from maintaining their fields. The most seriously affected areas were in eastern Ségou and southern Mopti regions (see Map 4). Crop yield in some of these areas should decrease as a result. Nevertheless, expected production increases elsewhere should more than offset these pockets of losses. A preharvest analysis shows good to excellent rainfed harvest potential in most agricultural zones (see Map 3).

In northern Nioro and southern Bafoulabé *cercles* (Kayes Region) and southern Macina Cercle (Ségou Region), rainfed harvest prospects are below average, due primarily to a late start-of-season and a short drought in June.

Desert Locusts were sighted in Keniéba and Sirakoro (Kayes), Banamba (Koulikoro), Farako (Ségou), and Bandiagara (Mopti) early in the season. They were heading toward northeastern Mali—a traditional Desert Locust summer breeding ground. Ground surveys have been discontinued this year due to civil insecurity in northern Mali. Good rainfall in August together with high biomass levels created conditions favorable to Desert Locust reproduction. As lush vegetation begins to dryout and rains end, Desert Locust swarms could leave northern breeding areas and move south toward cropland in search of green vegetation.

Following significant seasonal rains, river levels are higher than those registered last year and are close to the long term average. High river levels are important to rice crops in the flood controlled fields of Ségou and Mopti regions, and to recessional agriculture areas. Higher river levels also presage a good catch during the 1994 fishing season.

Pastoral Conditions

This season's rainfall distribution has been good. Normalized Difference Vegetative Index (NDVI) images show a rapid biomass increase in August in pastoral areas (see Figure 1). For a large band in the Sahelian and Sahelo-Saharan zone, NDVI values in late August 1994 are the highest recorded since biomass remote sensing by NOAA satellites began in 1982 (see Map 4). On the ground, herders cannot recall another year of such excellent conditions since before the drought years of 1968–73. Pastures have regenerated and waterholes have been replenished throughout Mali. The outlook for dry season fodder is excellent. In addition, no major outbreaks of animal illness have been reported.

Food Stocks and Flows

As of August 31, 1994, there were approximately 49,000 metric tons (MT) of food aid in Mali. Of this amount, roughly 45,500 MT is part of the national food security reserve. These stocks are prepositioned at eight regional sites and could be drawn upon for any local production shortfalls that may occur in 1994/95.

Map 4. Mali: Exceptional Agroclimatic Conditions

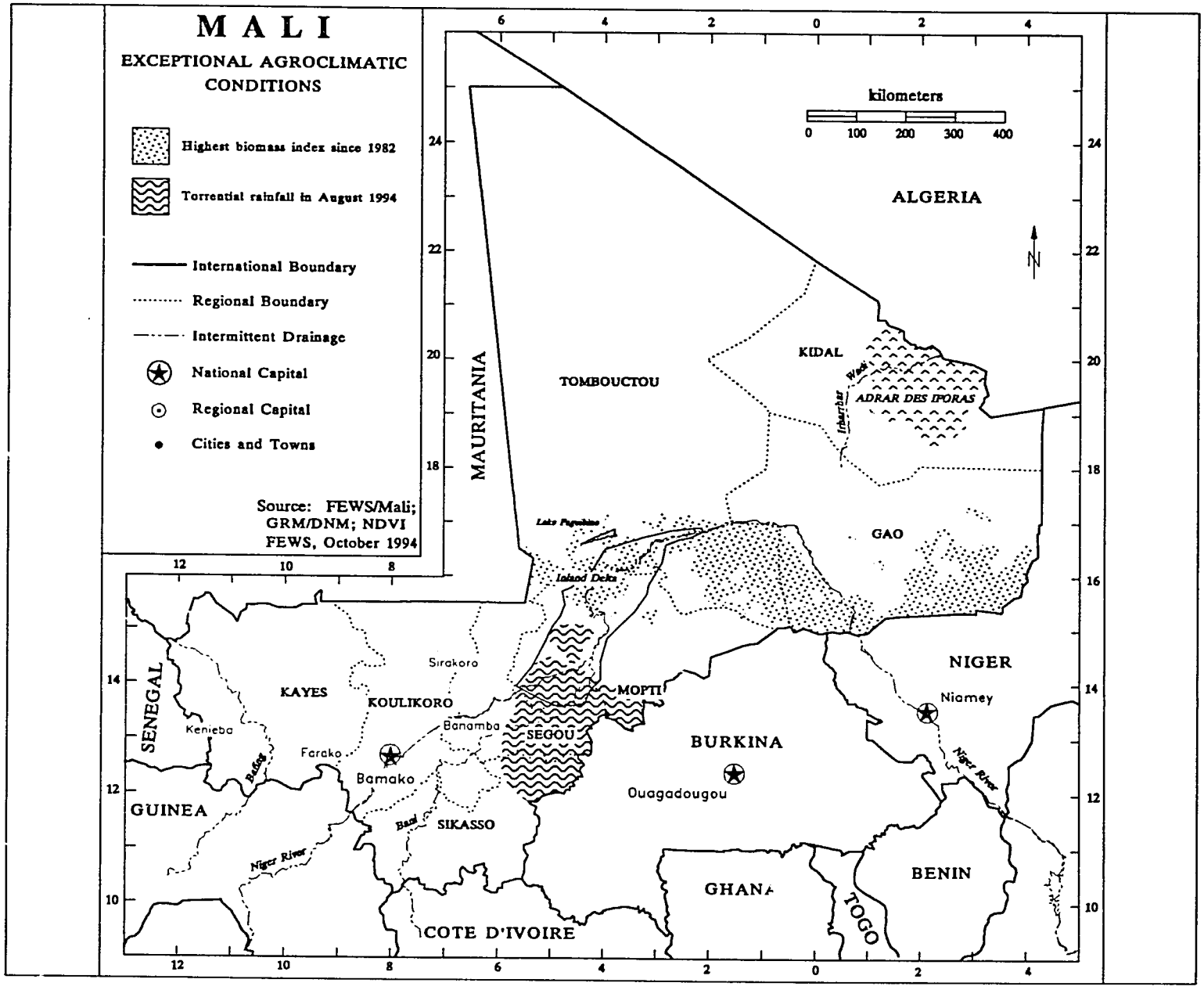
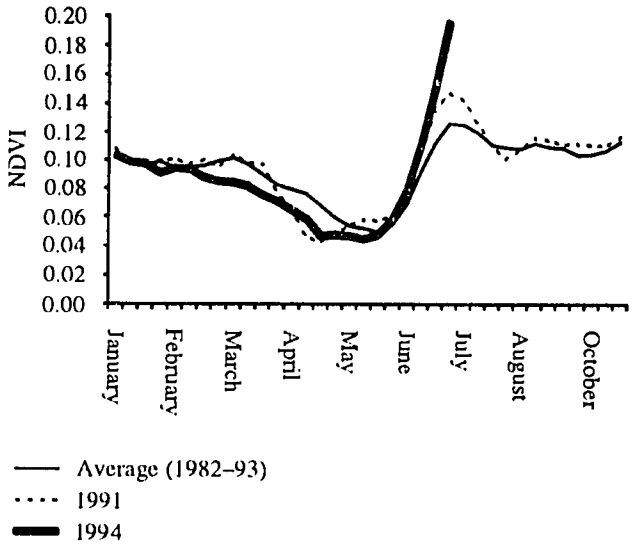


Figure 1. Mali: Biomass evolution—Sahelo-Saharan Zone



Sources: NASA, FEWS/Mali

FACTORS AFFECTING FOOD ACCESS

Projected Food Consumption Needs

Table 5 shows the historical cereal production and consumption levels in Mali. A countrywide consumption rate of 202 kilograms per person per year is used. This estimate comes from a 1988/89 national household budget and consumption survey. The projected mid-1995 national population is 8.98 million with a consumption level that equates to 1.81 million MT. With good to excellent harvest prospects, the 1994/95 production level will probably reach a record level (largest production total to-date is 2.12 million MT from the 1991/92 season), and should cover consumption needs for 1994/95.

Table 5. Mali: Production and consumption levels 1985/86–1993/94

Season	Gross production (MT)	End-of-season population	National consumption (MT)
1985/86	1,584,701	7,541,466	1,523,376
1986/87	1,589,047	7,679,958	1,551,352
1987/88	1,512,475	7,823,365	1,580,320
1988/89	2,040,698	7,971,863	1,610,316
1989/90	1,985,158	8,125,644	1,641,380
1990/91	1,599,084	8,284,900	1,673,550
1991/92	2,116,174	8,449,905	1,706,881
1992/93	1,538,643	8,620,923	1,741,426
1993/94	2,073,365	8,798,324	1,777,261

Sources: National Direction of Statistics and Computing (DNSI), National Direction of Agriculture (DNA)

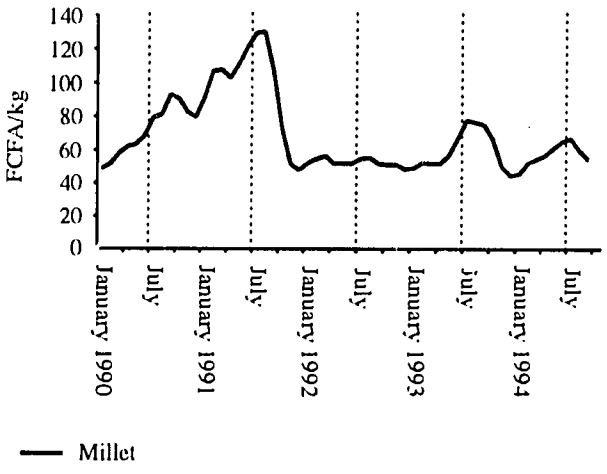
As for individual cereal, Mali usually produces a surplus of millet and sorghum and has a slight rice deficit. The 1994/95 harvest will follow this same trend. The rice production deficit should be smaller than in previous years due to high river levels and increases in area planted. Increases in area planted were partly prompted by an increased demand for locally produced rice after the January 1994 FCFA devaluation, which made imported rice too expensive.

Economic Data

Figure 2 shows cereal prices in the Sahelian zone for the past five years. Cereal prices during the first half of 1994 remained similar to those observed in three of the last four years. Prices reached a maximum in July, then began to decline rapidly. This price drop reflects the good harvest prospects and encourages merchants and villagers to release their remaining grain stocks onto local markets. In other years of average to above-average harvests, the maximum price was reached later (in August) and the drop was less rapid. The early and rapid price decline in 1994 is another confirmation of the excellent harvest expected in Mali.

Sociopolitical Events

Figure 2. Mali: Millet prices for Sahelian Zone markets—1990–94



Sources: Mali/Market Information System (SIM), FEWS/Mali

Civil insecurity persists in northern Mali. Bandit attacks have affected agropastoral activities in northern Ségou, northwestern Mopti, Tombouctou, Gao, and Kidal regions. Many farmers reduced the time spent working in their fields out of concern for personal safety. Others abandoned their fields altogether while fleeing to more secured zones. It is not possible to estimate the decrease in area planted due to insecurity. However, some local nongovernmental organizations in southern Tombouctou Region have put the decrease in area planted at around 20 percent. Similarly, herders are avoiding northern areas because of potential cattle raids, even though pasture conditions in northern Mali are better than at any time since 1968.

Insecurity has also disrupted normal market activities in Tombouctou, Gao, and Kidal regions. Private traders have cutback transporting foodstuffs to northern Mali. The northernmost region of Kidal continues to face a serious food shortage prob-

lem. Kidal is now supplied only via Gao, and insecurity also limits access to this route. In Kidal, a sack of rice is now 70,000 FCFA, when available. The same bag costs 23,500 FCFA in Bamako. Kidal was last supplied in mid-July.

VULNERABILITY UPDATE

The FEWS *1994 Vulnerability Assessment* identified nearly 432,000 persons in Tombouctou, Gao, and Kidal regions as highly to extremely vulnerable to famine. With increasing insecurity in these areas since May, the vulnerability status of these persons has actually increased. The essential cause of their vulnerability is civil strife, and the current excellent harvest prospects will have little positive impact on their food security status.

Elsewhere, about 1,239,000 herders and farmers in Kayes, Koulikoro, Ségou, and Mopti regions were identified as moderately to highly vulnerable to famine in May. Besides those in northern Kayes and eastern Ségou regions, persons in this group are now facing excellent harvest prospects. Their vulnerability status is decreasing as they enter the harvest period. For those in northern Kayes Region, a long tradition of remittances from overseas relatives, as well as improved civil security, will lessen their vulnerability status. For the farmers in eastern Ségou, a good irrigated rice harvest, coupled with other irrigated and recessional crops, should make up for the shortfall in rainfed cereal production. Their vulnerability status also should decrease.

CONCLUSIONS

An excellent agricultural harvest is expected, but in northern Mali, vulnerability to famine has increased due to continuing civil insecurity. Despite good agroclimatic conditions, production will be poor in the north due to reductions in area planted and lack of field maintenance. Elsewhere, crop conditions are good to excellent. Pastoral conditions are similarly good. In expectation of a good harvest, cereal prices have started to decline in most markets. No major areas of deficits are expected. With a good harvest prospect, food security should continue to improve in 1994/95, except where civil insecurity is the constraint. Any local shortages should be met through normal commercial exchanges and existing government stocks. No emergency food aid imports should be required.

METHODOLOGY ANNEX

The 1994 FEWS Mali *Preharvest Assessment* is based primarily on data processed with a Geographic Information System (GIS). In GIS analysis, different types of geographic data, called layers, are superimposed to obtain the final result. Elements of each layer do not need to conform to the same boundaries. This is the major difference between GIS analysis and the traditional method of "tabular" analysis in which input data are often summarized for a set of administrative units.

For the 1994 Preharvest Assessment, four major components (layers) were used—rainfall, start-of-season, mid-season biomass, and price trends. For each layer, 1994 data were categorized in accordance to their contribution to agropastoral prospects. Five categories were created: very poor, poor, average, good and excellent.

Rainfall component

This component is the composite result of comparing May, June, July, and August rainfall amounts to the 30-year mean (1961–90). The classification process is based on the departure of 1994 data from the mean. However, areas that received more than 100 mm above normal rainfall have their category downgraded because of the harmful effects of waterlogging that occurred. Map ML-1 shows the result.

Start-of-Season component

The start-of-season is defined as the point in time when the biomass index begins a sustained increase leading towards a seasonal maximum. The start-of-season is calculated using NDVI images. The 1994 start is compared to the 12-year average (1982–93) and categorized according to their departure from average. Map ML-2 shows the result.

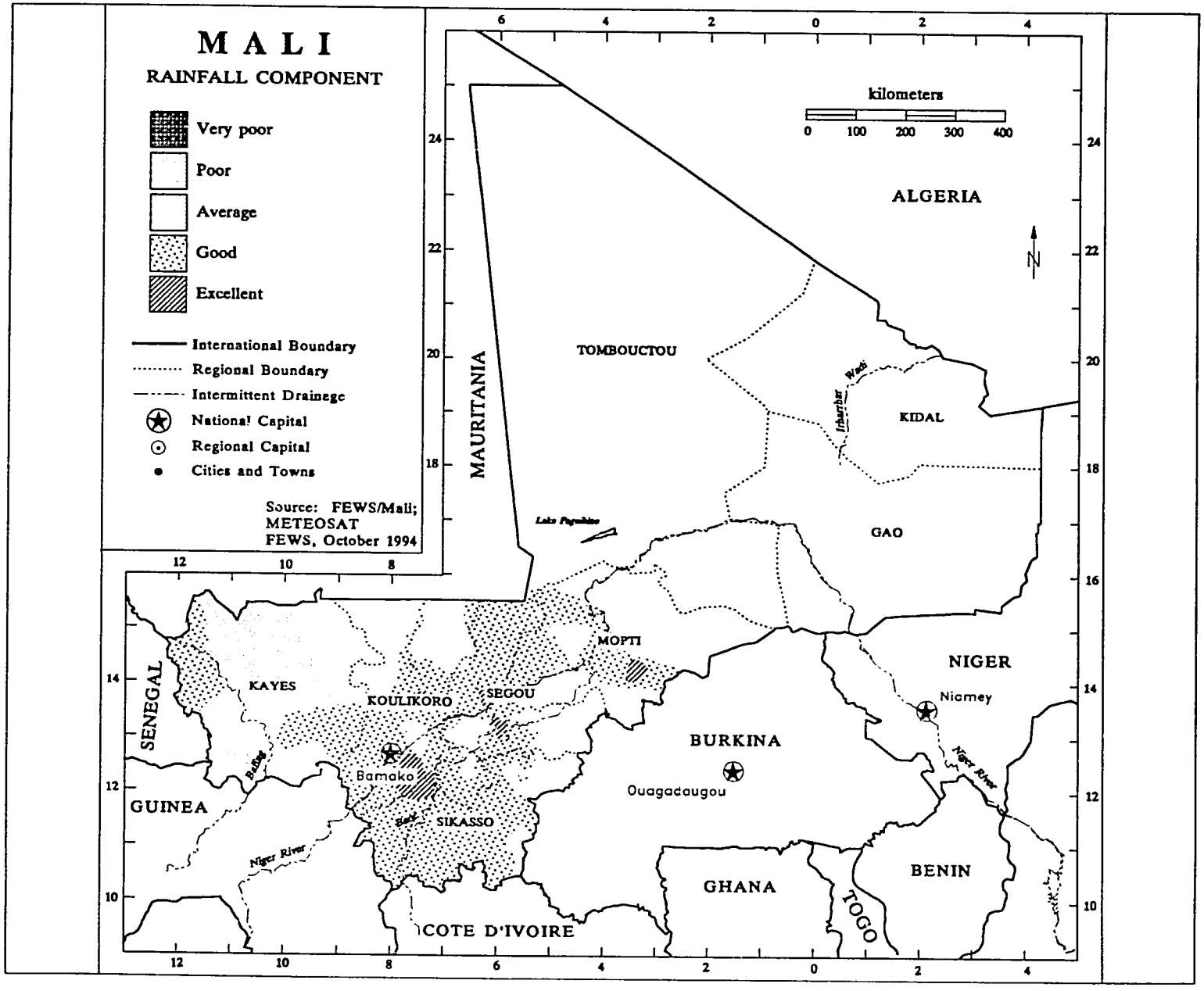
Mid-Season Biomass component

Studies on the relationship between NDVI and crop yield in the Sahel have indicated a strong correlation between mid-season biomass and production. Mid-season biomass in the preharvest analysis is calculated as the sum of NDVI during July and August, as well as the highest NDVI value during this same period. The two values are compared to their respective 12-year averages (1961–90) and the results are averaged to obtain the classes for this component. Map ML-3 shows the result.

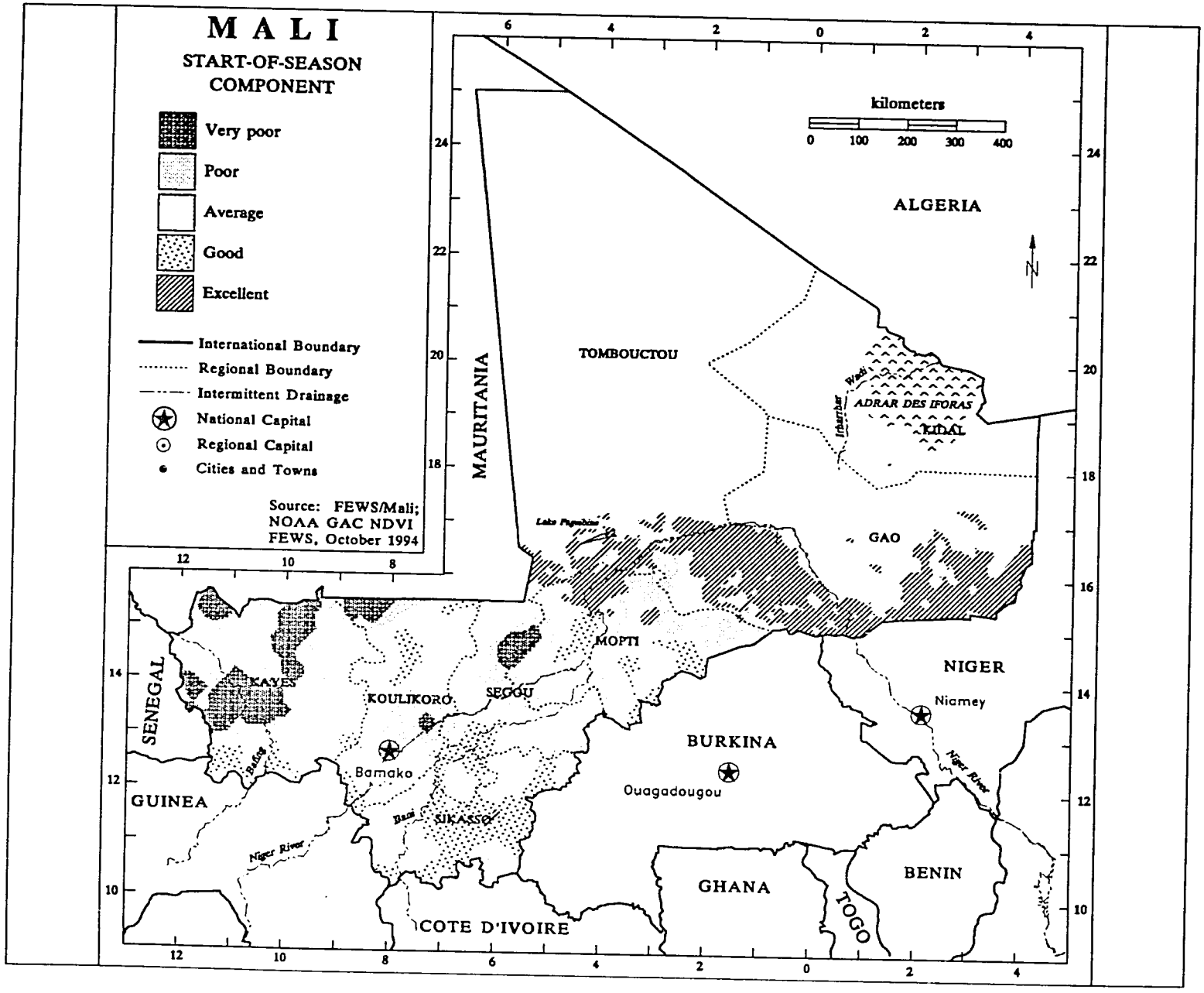
Price Trend component

Changes in cereal prices during the preharvest period reflect the perception of the upcoming harvest. If farmers and traders anticipate a good harvest, they will release their remaining grain stocks onto the market and prices will fall as a result. However, if the harvest outlook is not good, farmers and traders tend to hold on to their stocks. Cereal prices will then remain stable or even increase. To create this component, millet prices from July to September are examined and categorized according to the direction and magnitude of the price change. This is the only layer in which administrative units are used due to the lack of a market catchment map. Each administrative unit is assigned the rating from the nearest market. Map ML-4 shows the result.

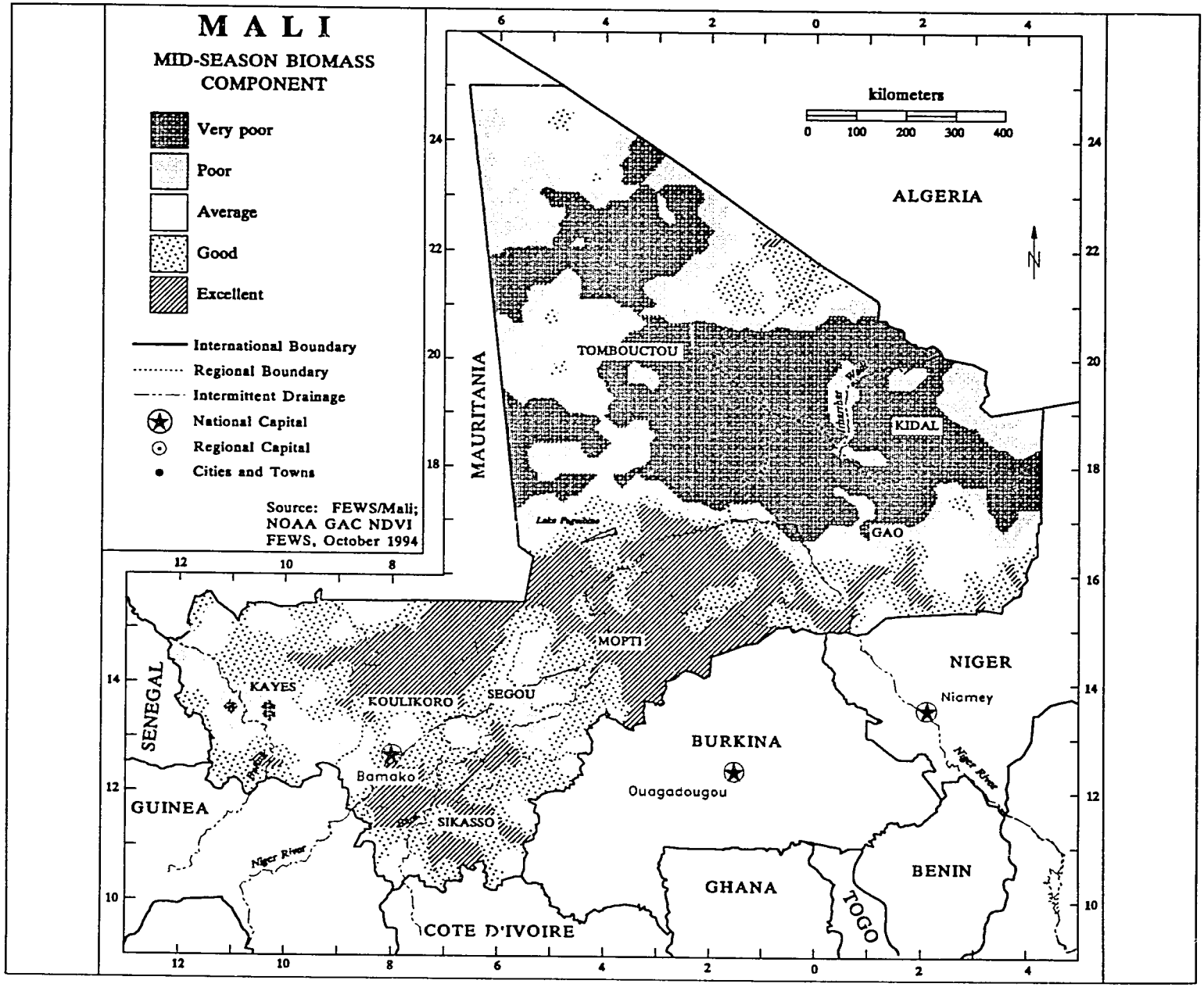
Map ML–1. Mali: Rainfall Component



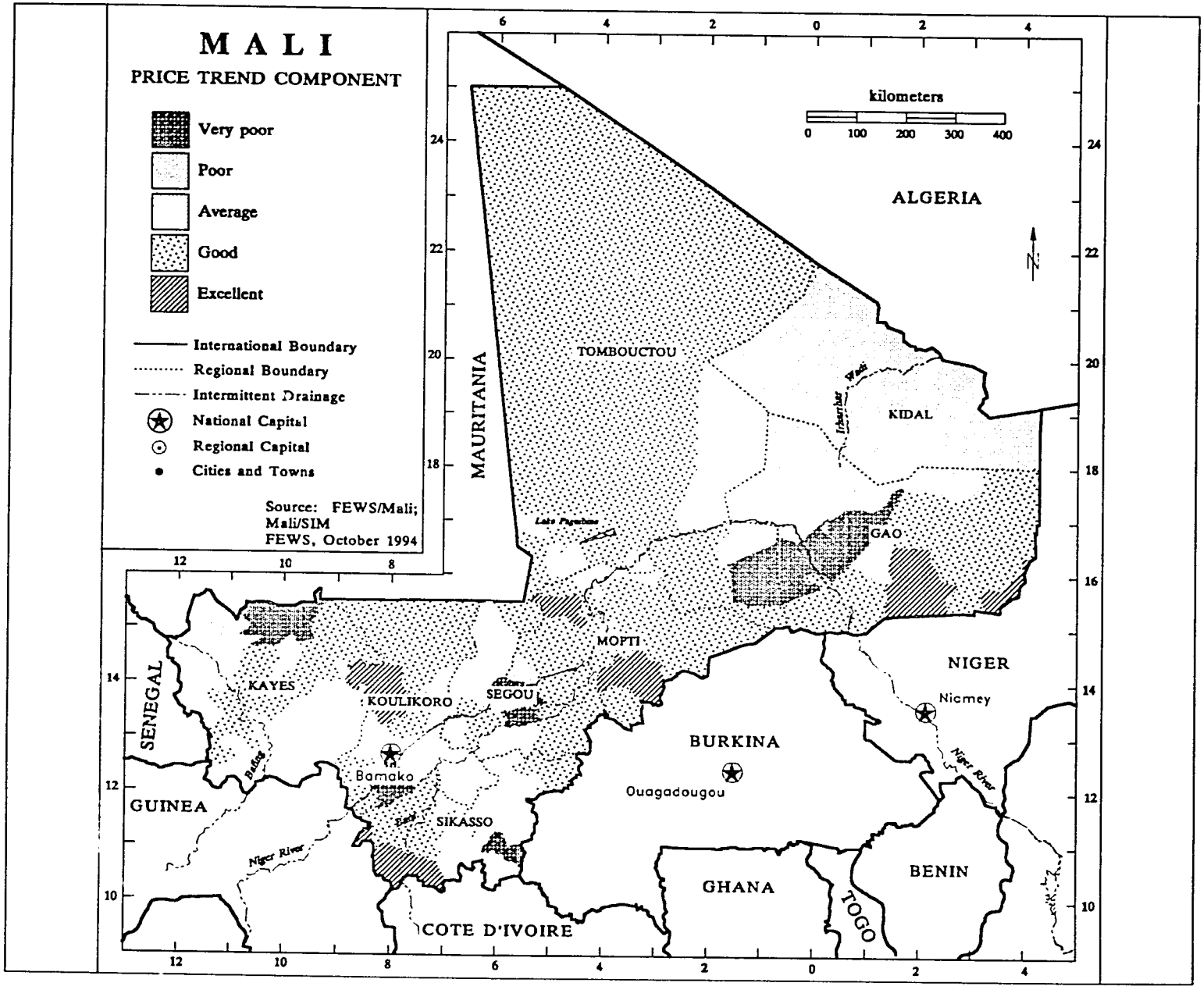
Map ML–2. Mali: Start-of-season Component



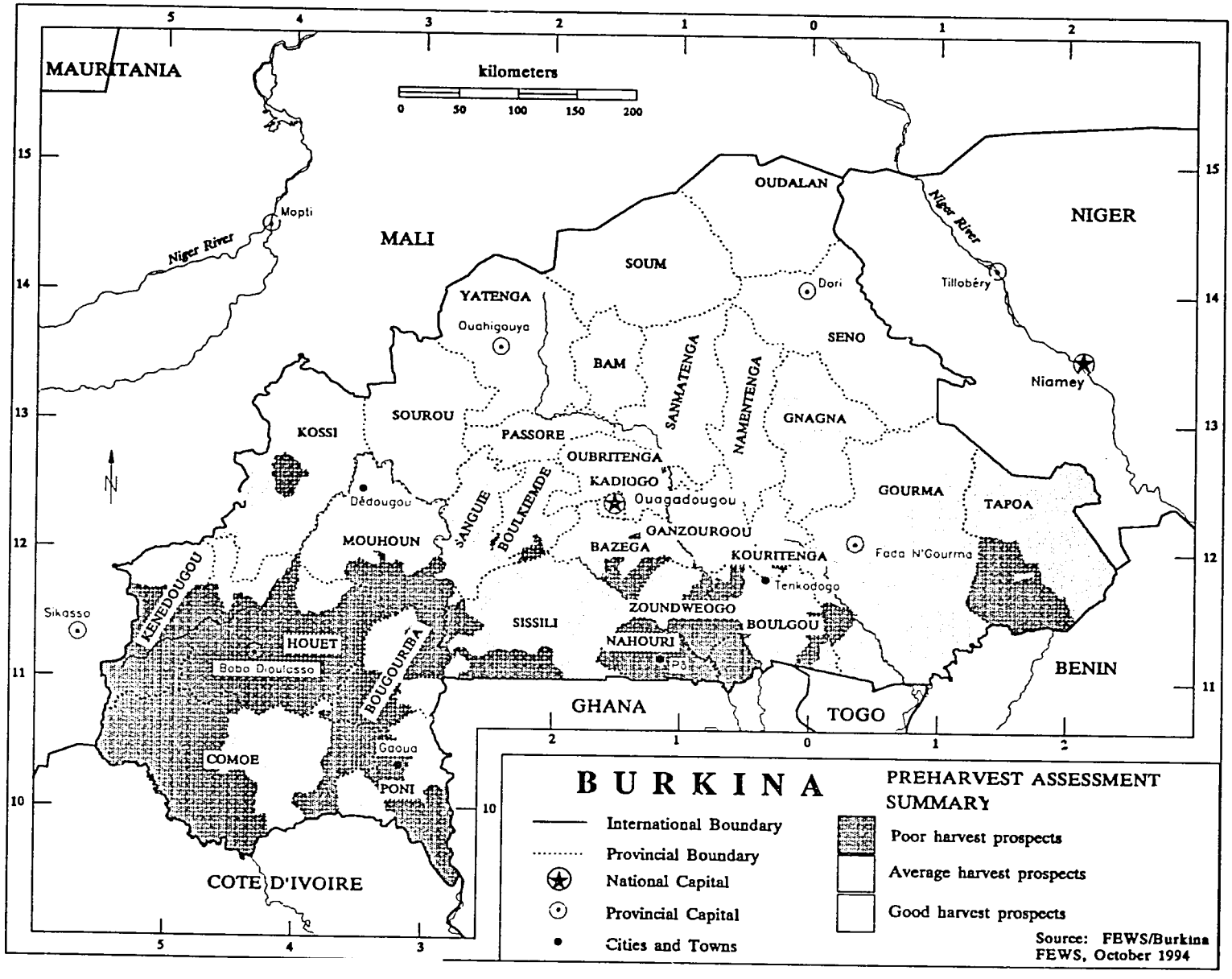
Map ML–3. Mali: Mid-season Biomass Component



Map ML–4. Mali: Price Trend Component



Map 5. Burkina: Preharvest Assessment Summary



BURKINA

Very Good Agriculture Conditions Promise Above-average Harvest Production

Based on a report released by FEWS/Burkina on September 7, 1994

SUMMARY

FEWS/Burkina projects a national cereal production surplus for 1994/95 of approximately 216,000 metric tons (MT). If these early projections are accurate, this surplus will provide citizens throughout the country with easy access to low-priced cereal. However, there will still be pockets of below-average production in Bougouriba, Boulgou, Comoé, Houet, Kénédougou, Nahouri, Poni, Tapoa, and Zoundwéogo provinces. The below-average production will degrade the purchasing power of smallholder farmers in these nine provinces, but will not increase their vulnerability to famine. In other parts of the country, production should be far enough above average that the production shortfall in the nine usually highly-surplus provinces will not be felt outside of those provinces (see Map 5).

The 1994 growing season began much later than usual in Kénédougou, Houet, Bougouriba, Poni and Comoé. Cumulative rainfall was below average at Poni and Houet rainstations for the period April–June 1994. Poor rainfall in Nahouri, Boulgou, and Zoundwéogo during June reduced plant stands and retarded growth of sorghum. The poor conditions in these provinces, at planting time and later in June, will reduce the provinces' cereal production to below the long-term average. North of Ouagadougou, cereal are in very good condition and the harvest outlook is good.

Cereal crop production that is slightly below average over relatively small areas has never presaged famine in Burkina. An occasional year of below-average production is normal for Burkinabé farmers. Even a large-scale crop failure, if confined to one season, should not cause famine. For example, the crop failures of 1990 created a cereal deficit of 475,000 MT (using a net cereal per capita annual consumption rate of 190 kilograms). Emergency assistance amounted to less than 100,000 MT and there was no mass migration, starvation, or large-scale community breakdown.

FACTORS AFFECTING FOOD AVAILABILITY

Cereal Crop Production

Cereal production is the primary source of food and household income in Burkina. General qualitative indicators of annual cereal production include rainfall distribution (spatially and temporally) and the progression of NDVI during the growing season. If rainfall is well distributed over space and time, soil moisture will be adequate to support cereal growth. For soils in Burkina, rainfall amounts of over 40 millimeters per dekad (10-day period) are usually enough for cereal growth during June, July, and August. Unfortunately, rainfall data are not readily available. There are only 12 rain stations that have so far reported data for 1994. For these reasons, FEWS/Burkina uses rainfall data occasionally, as a part of the convergence of evidence approach. Cumulative rainfall over an important period serves as anecdotal information to support other information such as NDVI data.

NDVI measures the photosynthetic activity of vegetation. Effective rainfall (useful for plants) is key to photosynthetic activity. Rainfall that runs off, evaporates quickly, or infiltrates below the root zone of vegetation is not effective. Since the photosynthetic activity of vegetation in Burkina is responding only to effective rainfall, NDVI is a good indicator of effective rainfall. In addition, NDVI data are available for all of Burkina for areas that are seven kilometers by seven kilometers. This spatial detail makes NDVI a good tool for identifying the spatial extent of drought stress on vegetation.

During the critical planting period of April, May, and June, cumulative rainfall recorded at several southern Burkina stations was below the 30-year average. For example, cumulative rainfall at Gaoua (Poni Province) was 48 percent of normal, and at Bobo-Dioulasso (Houet Province) it was 69 percent of normal. The below-average rainfall delayed planting and caused moisture stress that will reduce production. In northern Burkina, the season began normally and there has been enough rainfall for crop growth for the whole season.

The progression of NDVI can help identify the times and places of moisture stress. For example, a late beginning of sustained increases in NDVI suggests a late start of the rainy season. Similarly, decreases in NDVI values during the vegetative and flowering period of crops (July through August) over an area, suggest moisture stress that could reduce cereal production. There is a good correlation between the difference from average of these two indicators and net cereal production.

Early in the season, the NDVI progression was very irregular over southwestern Burkina (see Figure 3—Bobo-Diallasso in Houet and Map 6). This resulted in late planting in Poni, Comoé, Kénédougou, Bougouriba, and Houet. Irregular NDVI progression during July and August reduced total values to less than average, especially in Nahouri, Zoundwéogo, Boulgou, and Tapoa (see Figure 4—Pô in Nahouri). Areas where the NDVI total is less than average will likely have a below-average agricultural season (see Map 7).

Map 6. Burkina: Start of 1994 Rainy Season

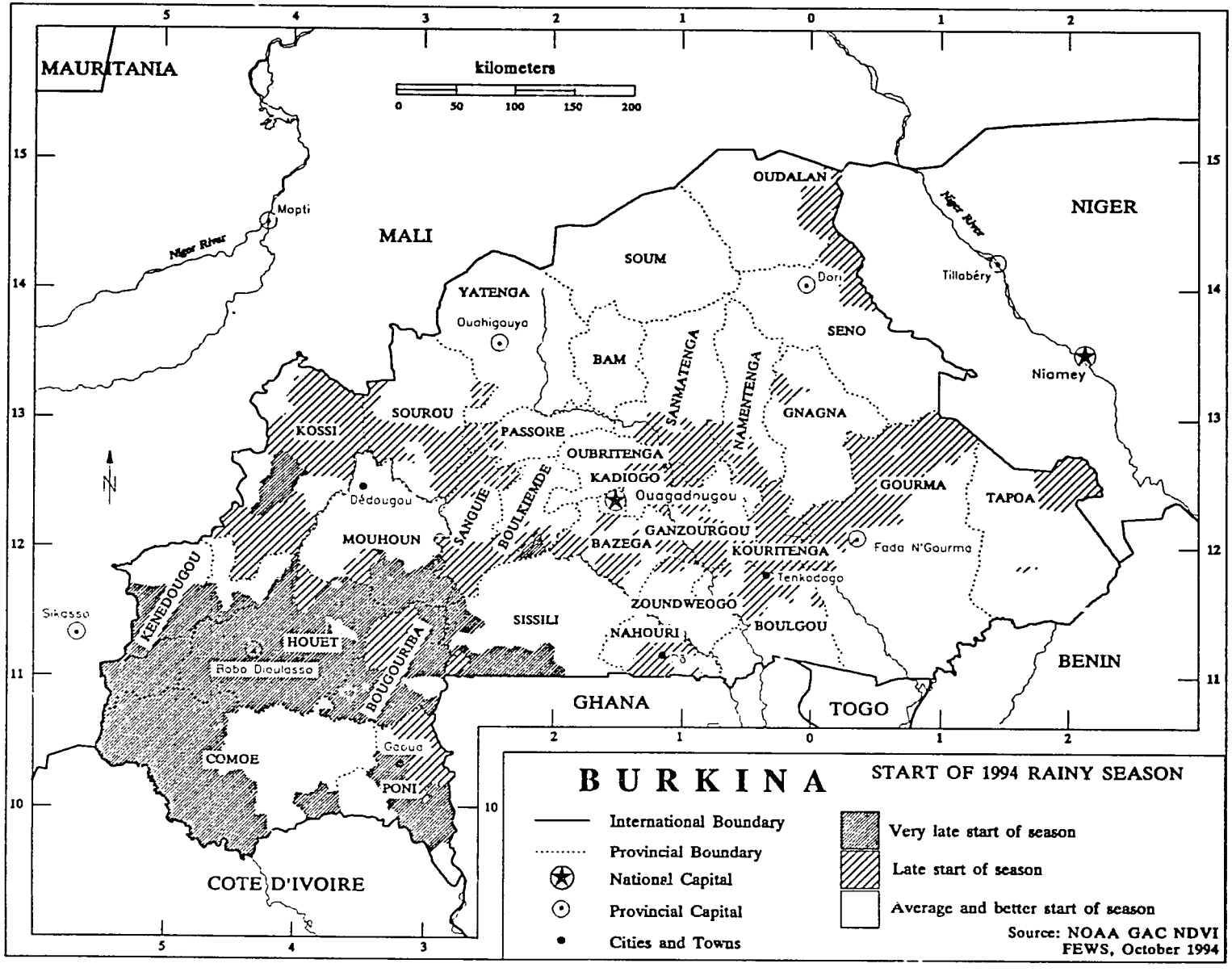
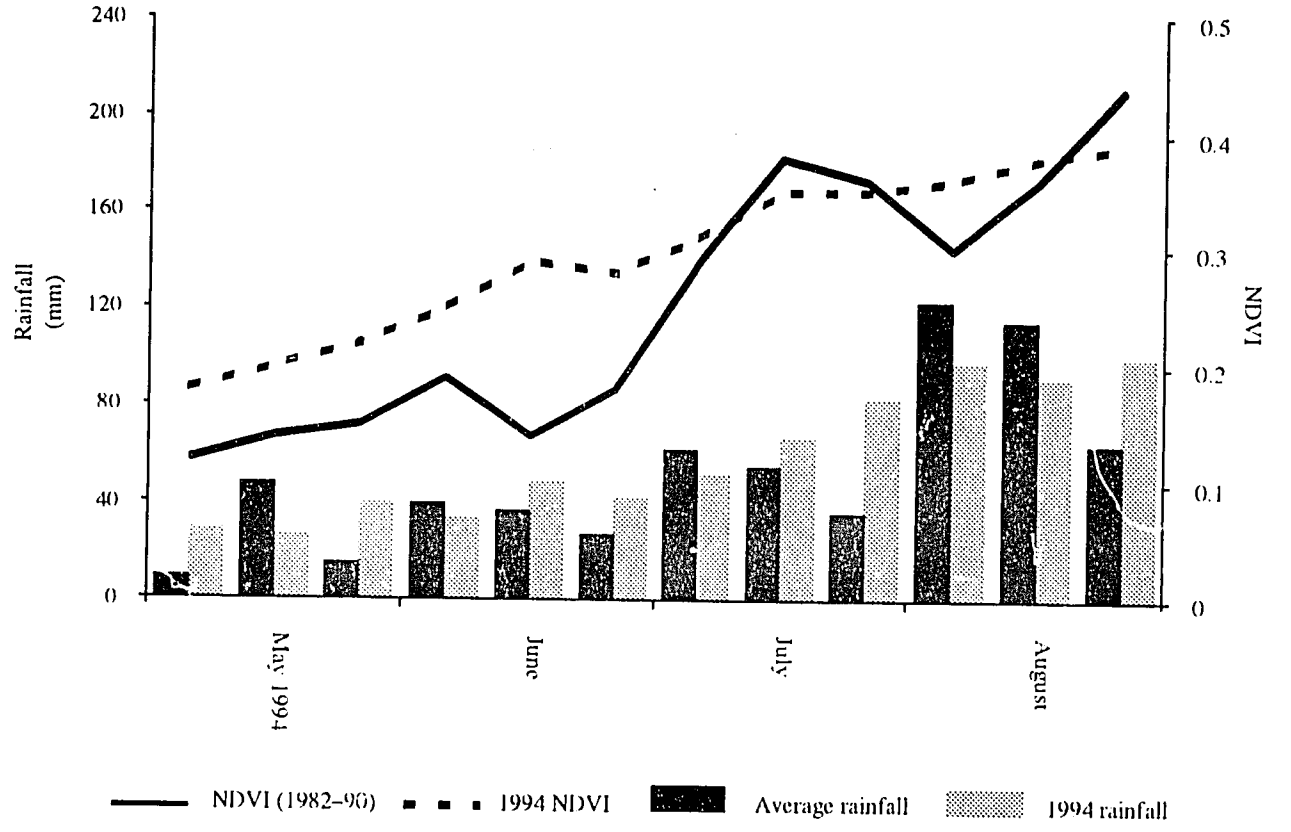
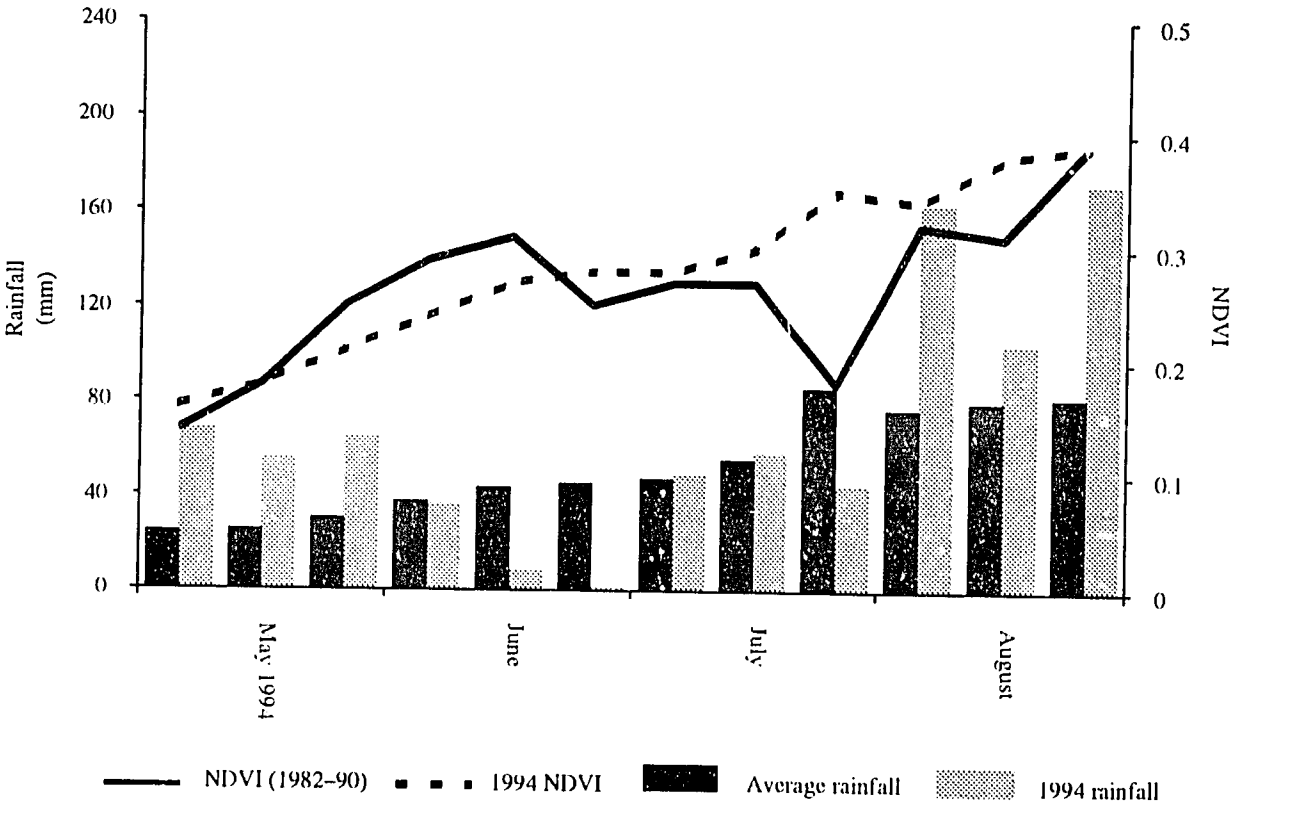


Figure 3. Burkina: Bobo-Diolasso, Houet Province—NDVI and rainfall values thru August, 1994



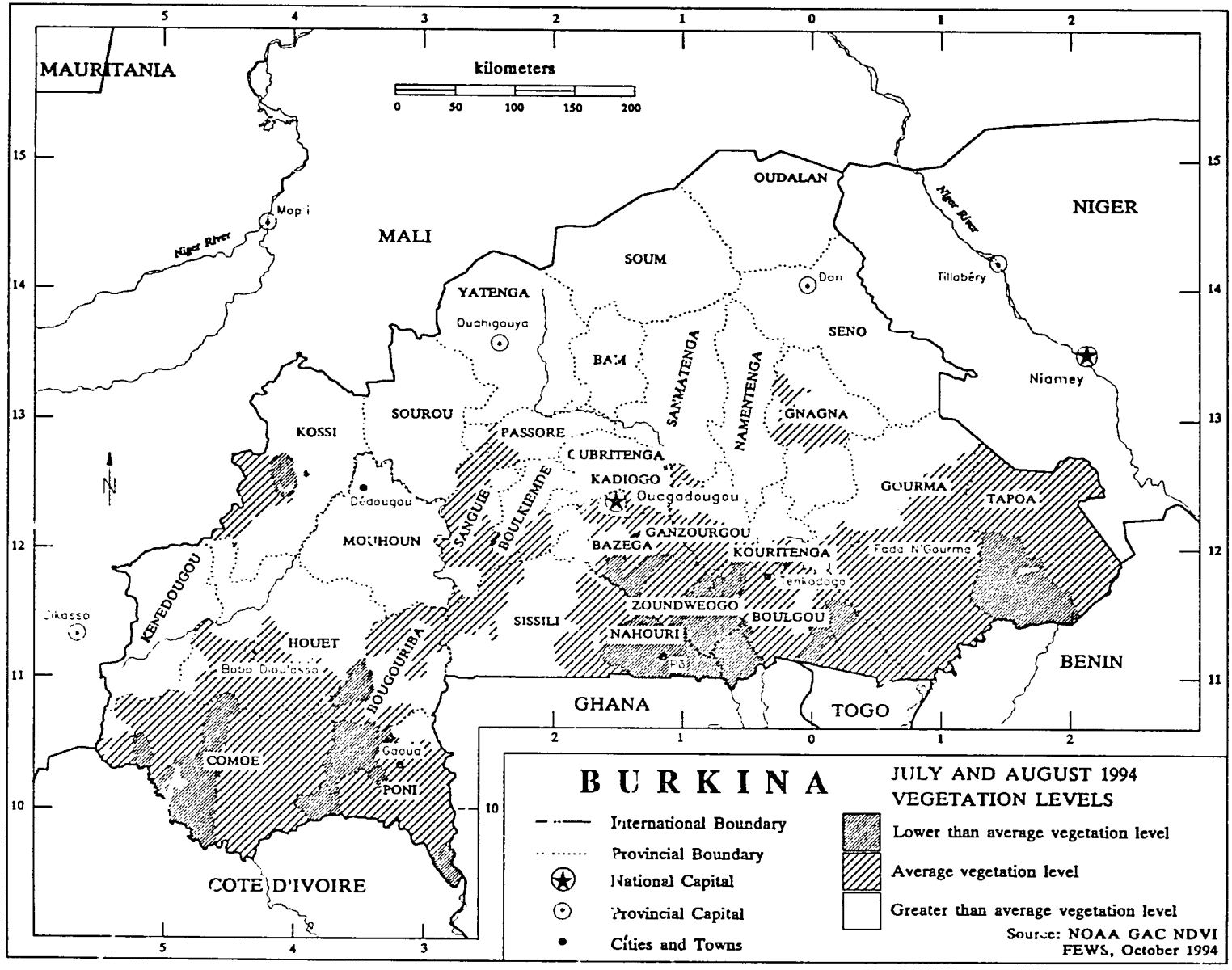
Sources: NOAA/GAC NDVI, GOBF/METEO, FEWS/Burk

Figure 4. Burkina: Pô, Nahouri Province—NDVI and rainfall values thru August, 1994



Sources: NOAA/GAC NDVI, GOBF/METEO, FEWS/Burkin

Map 7. Burkina: July and August 1994 Vegetation Levels



Poor rainfall will likely reduce cereal production in these areas. However, the rains were not poor enough to cause a total crop failure (inclusive of fruits, yams, cotton, peanuts, rice, and market gardens).

Using NDVI data, FEWS/Burkina projects national net (85 percent of gross) cereal production for 1994/95 at 2.1 million MT (see Table 6, p. 26). This will create a national cereal production surplus of 216,000 MT. Losses due to pest infestations or an early end of the rainy season would reduce this projection.

Pastoral Conditions

Pasture quality did not constrain livestock production in 1994. Pastures developed early in eastern Burkina, and are currently in excellent condition throughout the country. The early development of pastureland greatly reduced herd movements during May and June.

Food Stocks and Flows

An assessment of existing stocks and planned imports for 1994/95 shows there will be no significant changes in programmed food aid or commercial imports. Increases in cereal production will be available to replenish on-farm stocks.

FACTORS AFFECTING FOOD ACCESS

Cereal Balance

Most income for the poorest Burkinabé comes from cereal production. FEWS/Burkina assesses food access for smallholder farmers by using the cereal balance, expressed as per capita production, and its difference from average (columns 6 and 7 of Table 6). This difference is an indicator of where smallholder farmers may need to use more of their household resources for purchasing food than they might normally have produced.

In 1994, nine provinces may have below-average production because of the late start of the season and poor growing conditions in July and August. These provinces are Bougouriba, Boulgou, Comoé, Houet, Kénédougou, Nahouri, Poni, Tapoa, and Zoundwéogo. These provinces are high-quality agricultural areas that usually produce surplus cereal. The loss of this surplus cereal on the market could lead to price increases in these areas. However, it should have a negligible effect on the vulnerability of smallholder farmers living in affected regions because of several consecutive good production years.

Projected Food Aid Needs

If the current cereal production projections are supported by harvest production, Burkina will not need emergency food aid in 1994/95 (see Table 6). However, the GOBF may need to target food aid or other income supporting activities to people in areas where cereal production was below average, and where there are more smallholder farmers. Income support would reduce the likelihood that smallholder farmers will sell off household assets to purchase cereal.

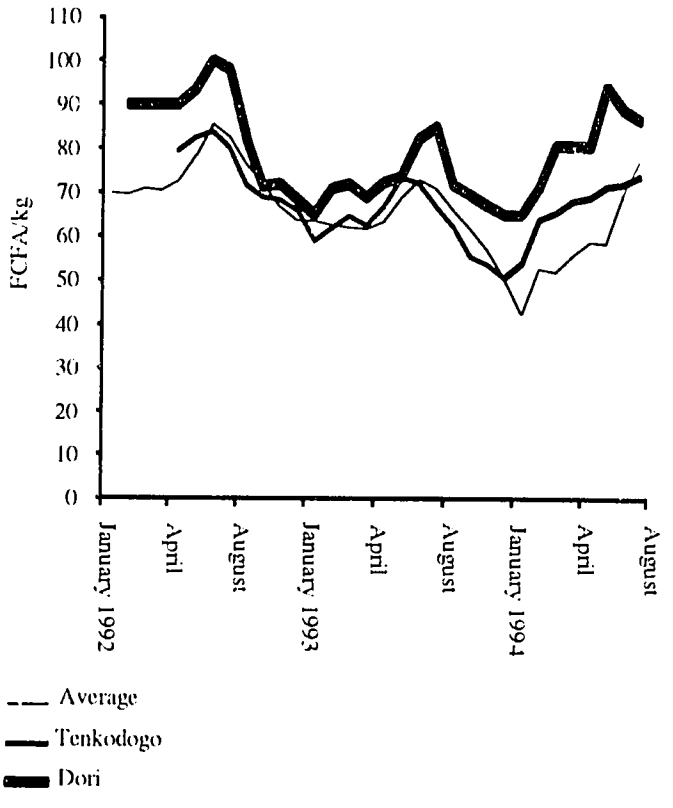
Price Information

SONAGES (Société Nationale de Gestion des Stocks de Sécurité, ex OFNACER) price data show nearly average nominal millet prices for the January—August 1994 period. However, in markets in the region affected by the June drought (Tenkodogo in Boulgou Province) prices have increased more rapidly than normal since June (see Figure 5). This greater than average increase in this area is due to poor growing conditions in the southern Burkina. Farmers are holding on to their stocks until the success of the growing season is known. In contrast, in areas where the quality of the season is better than average (Dori in Séno Province) cereal prices began falling in June (see Figure 5).

Depressed cereal prices have made it easier for smallholder agriculturists in most cereal deficit areas to purchase cereal. It is likely that cereal prices will drop further in November in response to 1994 harvest quality.

For livestock producers, the number of sacks of millet purchased with the income from the sale of one goat (terms of trade) is a good indicator of the relative purchasing power of livestock sellers. Goat prices, which remained steady throughout 1993, began to increase in 1994. Goat price increases (and price changes for other livestock) are a result of the devaluation of the franc Communauté Financière Africaine (FCFA) in January of 1994. Following the devaluation, coastal countries can no longer buy meat from Europe and Argentina, and so must depend on Sahelian sources. Additional livestock price

Figure 5. Burkina: Millet prices for Tenkodogo and Dori markets compared to the national average, 1/92–8/94



Sources: SONAGES, FEWS/ Burkina

Table 6. Burkina: Preliminary FEWS-projected cereal production and balance for 1994/95

Province	1 December 1994 population (000)	2 Net projected need (000 MT)	3 FEWS projected net production (000 MT)	4 FEWS projected balance (000 MT)	5 Per capita net production 1994 (kg/capita)	6 Average (kg/capita)	7 Difference (kg/capita)
Bam	184	35	64	29	350	161	189
Bazèga	385	73	76	3	200	196	4
Bougouriba	259	49	54	5	210	253	-43
Boulgou	483	92	63	-29	130	162	-32
Boulkiemdé	399	76	66	-10	170	146	24
Comoé	329	62	66	4	200	241	-41
Ganzourgou	239	45	57	12	240	183	57
Gnagna	305	58	77	19	250	190	60
Gourma	378	72	95	23	250	224	26
Houet	826	157	127	-30	150	194	-44
Kadiogo	845	160	15	-145	20	14	6
Kénédougou	181	34	48	14	270	283	-13
Kossi	432	82	185	103	430	308	122
Kouritenga	247	47	40	-7	160	123	37
Mouhoun	376	71	99	28	260	234	26
Nahouri	130	25	10	-15	80	109	-29
Namentenga	225	43	65	22	290	159	131
Oubritenga	366	69	88	19	240	178	62
Oudalan	130	25	21	-4	160	120	40
Passoré	230	44	71	27	310	151	159
Poni	275	52	47	-5	170	202	-32
Sanguié	250	48	48	0	190	177	13
Sanmatenga	422	80	96	16	230	152	78
Séno	292	56	89	33	300	182	118
Sissili	321	62	64	2	200	185	15
Soum	246	47	69	22	280	128	152
Sourou	367	70	119	49	320	182	138
Tapoa	209	40	37	-3	180	85	-5
Yatenga	570	108	145	37	250	127	123
Zoundwéogo	198	38	34	-4	170	201	-31
Total	10,103	1,919	2,135	216			

Notes : Units are rounded and totals reflect rounding errors. Numbered columns are explained below:

1. Provincial population projections for December 1994 are exponential extrapolations of 1985 census figures (Institut National de la Statistique et de la Démographie) using province-level growth rates. Burkina's national annual growth rate is 2.6 percent.

2. Net projected need for Burkina is assumed to be 190 kilograms per person per year. This is a CILSS convention for reporting at the national level, but is not a CILSS country standard. Net need is a less meaningful figure at the subnational level because large cities create distortions.

3. FEWS-projected net production (85 percent of gross for most cereal) is a function of the quality of the growing season. The quality of the season is the difference from average of the start-of-season and the difference from average of total NDVI during July and August, expressed as the normalized anomaly index. This index value was used to adjust the standard deviation of 1984-92 average per capita production for each department to produce the production per capita. Using the standard deviation in this way gives an estimate of cereal production that considers the variability of annual cereal production. Production estimates were calculated by multiplying the per capita production by the population of the department in December 1994. Department totals were summed to get provincial estimates.

4. The FEWS/Burkina-projected balance equals projected net production minus need.

5. Per capita production in 1994 is the rounded value of projected net production divided by the population.

6. Average per capita production is for 1984-92. It is an indicator of "normal" cereal production in each province and is calculated from Government of Burkina Faso (GOBF)/ Ministry of Agriculture (MARA) final production estimates for each year. The years 1984-92 were chosen for the average because they use a consistent method for sampling. The data for 1993 are unavailable.

7. Difference from average of per capita production shows where people expect an above-average (positive values) or a below-average (negative values) cereal crop.

Source: FEWS/Burkina

increases and exports will help reduce agropastoralist vulnerability.

VULNERABILITY UPDATE

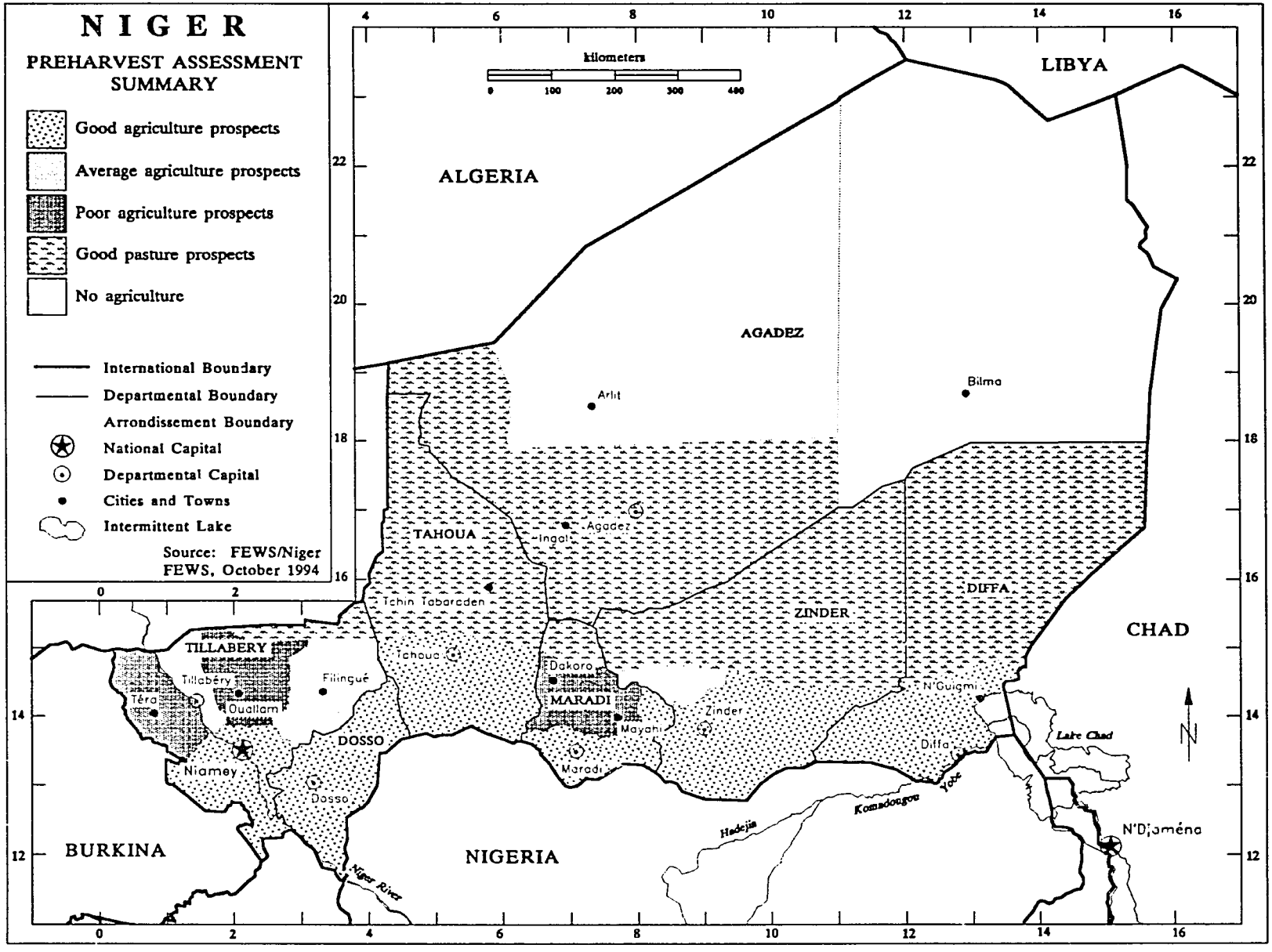
Due to three consecutive years of above-average cereal production (1991–93), almost everyone in Burkina is only slightly vulnerable. Throughout much of Burkina, 1994 promises to be another good agriculture production year. Because the provinces of Bougouriba, Boulgou, Comoé, Houet, Kénédougou, Nahouri, Poni, Tapoa, and Zoundwéogo had above-average production last year, local below-average production will not seriously affect the vulnerability of smallholders. In addition, because of the national surplus, cereal prices will not increase substantially.

Above-average cereal production in the rest of the country will reduce vulnerability of smallholders who will continue to acquire resources for developing the community resource base.

CONCLUSIONS

Emergency assistance to Burkina will not be necessary in 1995. Early projections by FEWS/Burkina (at the end of August 1994) of national cereal production for 1994/95 is 2.1 million MT. This implies a production surplus of 216,000 MT over consumption needs. The surplus will assure cereal availability and reduced cereal prices throughout the country. FEWS/Burkina and other organizations will monitor the end of the cereal production season for conditions that would alter these early projections (pest activity and an early end to the rains).

Map 8. Niger: Preharvest Assessment Summary



NIGER

Good Harvest Prospects and Adequate Pastures Highlight Good Agriculture Season

Based on a report released by FEWS/Niger on September 18, 1994

SUMMARY

FEWS/Niger projections indicate that national cereal production could reach nearly 2 million metric tons (MT), similar to the exceptional year of 1988. This level of harvest should meet national consumption requirements, although some arrondissements will still have localized shortages. Harvest and pasture conditions look promising (see Map 7). However, continued civil strife will negatively affect food security, especially in pastoral areas north of the agricultural zone. Vulnerability levels will be lessened in all areas except where crop prospects are marginal (e.g., northern Tillabéry and central Maradi departments) or where civil unrest continues to impede the movement of goods and services.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

The 1994/95 agricultural season was established by the end of August, and cumulative rainfall through the first week of September was well above average throughout most of the country. The Ministry of Agriculture (MOA) reported that nearly 100 percent of the villages in the agricultural zone had planted by the end of July, compared to only 85 percent in July of 1993, a near-average year for cereal production. The Niger River level and flow rate were also well above average for late July.

Planting was late however, in the northern part of Tillabéry Department (Téra and Ouallam arrondissements) and in the central part of Maradi Department (Dakoro and Mayahi arrondissements) due to insufficient rainfall.

Field reports and Normalized Difference Vegetation Index (NDVI) imagery also indicate an abundance of vegetation in both the agricultural and pastoral zones. An above-average year for cereal production is likely, approaching the 1988 record harvest of over 2 million metric tons (MT), net. This does not account for crop loss due to pests. While there have been rare sightings of Desert Locusts, there have been some isolated cases of grasshoppers, other insects, and birds attacking crops throughout Niger.

The substantial rainfall recorded in July and August was good for most croplands and pastures, but caused damage in some areas. Heavy rains and flooding resulted in over 30 reported deaths, damage to more than 3,000 homes and structures. The damage left over 50,000 people without shelter and at least 12,000 hectares of productive were laid waste, including nearly 2,000 hectares of irrigated perimeters and rainfed rice paddies along the Niger River (about 8,000 MT in terms of production loss). In response to the Government of Niger's (GON) request for disaster assistance, the U.S. Embassy declared a flood disaster on August 29, 1994. This declaration provided immediate access to $25,000 of Office of Foreign Disaster Assistance (OFDA) funds to assist with emergency relief efforts.

Pastoral Conditions

Pastoral regions benefited from the substantial rains in July and August. MOA estimates that the 1994 production of biomass in both the agricultural and pastoral zones will be excellent. The abundance of pasture can also be inferred based on NDVI imagery, which shows pasture zones well above average (see Map 8). One field report from Tchin-Tabaraden states that the pasture is the best that anyone in the village can remember. A few pockets of average or slightly below-average biomass production persist around Filingué, northern Tillabéry, southeast of Dakoro, and near Ingal.

The abundance of grazing land has slowed the movement of herds into the agricultural zones to the south, and reports indicate that most herds are grazing in the southern fringe of the pastoral zones. This will help reduce grazing pressures and potential conflicts for biomass resources in the agricultural zones. Although pasture conditions are good, the security situation could still inhibit the movement of some herders who might otherwise move further to the north.

Food Stocks and Flows

The current level of available stocks, including commercial, government and on-farm stocks, are estimated at 100,000 MT. Other cereal inputs, including commercial cereal imports and program food aid imports are estimated at 60,000 MT. Although not included in the cereal balance calculations, the *niébé* (cowpea) production is also expected to be excellent.

FACTORS AFFECTING FOOD ACCESS

Projected Cereal Production and Consumption Requirements

To provide an estimate of cereal production (millet and sorghum) and a preliminary cereal balance, the following assumptions were made: The agroclimatic characteristics of this year were matched to a similar year in the recent past (1988); and the rainfall quantity and patterns this year are similar to that year (1988). In general, the arrondissement-level production in 1988 was over 20 percent, and sometimes 30 and 40 percent, higher than the five-year average (Table 7). Analysis of the MOA production figures, which are obtained by multiplying the yield times the area planted, indicate that area planted at the arrondissement level has not changed significantly in the past few years.

Table 7. Niger: Historic cereal production figures for rainfed millet and sorghum
(net, '000 MT)

Department	1989/93 Average production	1988/89 Final production	1993/94 Final production	1994/95 Estimated production
Agadez	1	1	1	1
Diffa	27	31	18	32
Dosso	280	279	345	336
Maradi	387	480	396	465
Tillabéry	297	372	329	356
Tahoua	282	335	314	338
Zinder	359	479	365	431
Total	1,633	1,977	1,768	1,959

Sources: MOA, FEWS/Niger

Therefore, a conservative estimate for 1994 as a good year would be to assume the same area has been planted, and use the most recent five-year average production (1989–93) plus 20 percent at the arrondissement level. Using these production figures, the estimated net production for 1994/95 is over 1.9 million MT. The margin of error in this approach is about 150,000 MT in the final production figure, for a 10 percent change in the input values (either yield or area planted).

To compute a preliminary cereal balance, two different consumption rates are used. One is used by FEWS/Niger, and the other by the GON. Both consumption rates are based on a 1991 FAO standard which uses 2,200 calories per person per day to determine consumption needs. This daily consumption figure is converted to annual cereal equivalents (in kilograms/person/year) based on the relative percentage that cereal contribute to the annual caloric intake. This percentage is slightly different for nomadic and urban groups (70 percent) as compared to rural sedentary groups (80 percent). The final figure is then reduced by a 'table loss' factor. In this case, USAID Niger and FEWS/Niger use 13 percent and the GON uses 20 percent. This results in the following consumption rates (kilogram/person/year) for the two different groups:

	FEWS/USAID	GON
Nomadic, Urban	190	200
Sedentary Farmers	220	250

Currently, given the two approaches, results of the GON and FEWS/ Niger cereal balance processes will be different by 240,000 MT, not to mention the inherent errors in the production estimates of over 150,000 MT. This difference is critical for making and responding to food aid requests once the final harvest figures are reported. The results of using the same production estimates and the two different consumption rates are shown in Table 8. The consumption figures are based on the population from the 1988 census multiplied by arrondissement-level growth rates and does not account for reduced consumption needs due to seasonal migration. The cereal production balance shows a deficit ranging from 9,000 MT to nearly 250,000 MT. This basic total rainfed production balance simply takes into account the production of cereal (millet and sorghum) relative to the population in that area.

Regardless of the absolute figures and procedures, the trends are consistent at the department level. Departments that normally show deficits or have highly variable production include:

- Agadez—not a cereal production area and is mostly dependent on the southern zones for cereal.
- Diffa—typically produces only half of it's cereal consumption needs.
- Tillabéry—shows up particularly deficit because it includes the urban population of Niamey in the calculation.
- Tahoua—variable, depending on the year.

If the harvest is in fact good, the mostly deficit departments (Agadez, Diffa, and Tillabéry) will depend on the surplus available from the other four departments.

Table 9 shows the provisional national cereal balance for 1994/95 for the two scenarios when we consider other cereal sources. When projected off-season and irrigated cereal production are included in the calculation, the projections range from a surplus of over 46,000 MT to a deficit of 193,000 MT. When other cereal from available stocks and imports are included, the values range from a surplus of over 200,000 MT to a slight deficit of about 30,000 MT.

Cereal and Livestock Price Data

Millet prices increased steadily from March and April until mid- to late July. The normal market trend is for prices to rise until sometime in July and then begin falling during July and continue falling at least through October. In general, 1994 prices appear to be following that trend in all regions, with the exception of Agadez, where millet prices continue to rise.

Though August price information was not available at the time of writing, millet prices as of the end of July were over 100 FCFA per kilogram (FCFA/kg) in Agadez, over 90 FCFA/kg in Diffa, Tahoua, and Tillabéry, and near 70 FCFA/kg in Zinder, Maradi, and Dosso. July millet prices are about 15 percent higher than the 1989–93 average for July in Tillabéry, Tahoua, Maradi, and Zinder. In contrast, July millet prices in Agadez were close to 50 percent higher than average, prices in Diffa were about 30 percent higher than average, and Dosso

Table 8. Niger: Preliminary 1994/95 cereal production projections for rainfed millet and sorghum
(net '000 MT)

Department	1994/95 Department production	FEWS 1994/95 estimated needs	GON 1994/95 consumption needs	FEWS production balance	GON production balance
Agadez	1	60	65	-59	-64
Diffa	32	43	48	-11	-16
Dosso	336	286	324	50	13
Maradi	465	388	436	77	29
Tillabéry	356	469	523	-113	-167
Tahoua	338	342	385	-4	-47
Zinder	431	380	426	51 5	
Total	1,959	1,968	2,207	-9	-248

Source: FEWS/Niger

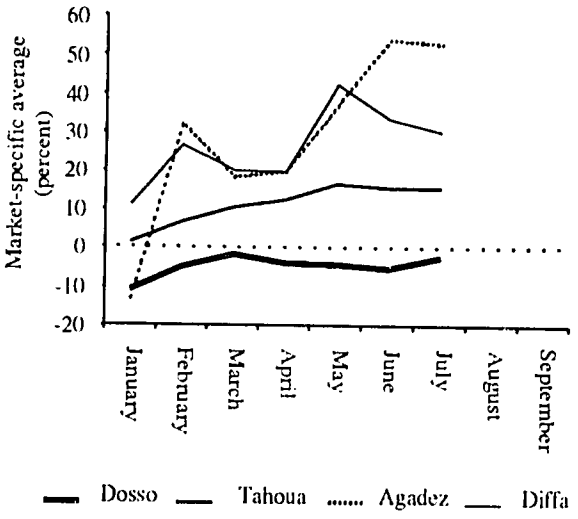
Table 9. Niger: Provisional 1994/95 cereal balance
(net production '000, population '000)

	FEWS	GON
National cereal consumption		
Rate (kg/cap/yr)	190/220	200/250
Population (1994/95)[1]	9,201	9,201
Total requirement[2]	1,968	2,207
National cereal production		
Net rainfed millet/sorghum[3]	1,959	1,959
Net irrigated production[4]	40	40
Net off-season production[4]	15	15
Total net production	2,014	2,014
Production balance[5]	46	-193
Other cereal inputs		
Available stocks	100	100
Cereal imports	60	60
Estimated cereal balance	206	-33

Notes: 1. FEWS/Niger population projections are from the GON 1988 Census based on population growth rates published by the GON Census Bureau in 1992.
2. Consumption requirement equals the rural rate times the rural sedantary population plus the urban/nomad rate, times the urban and rural populations.
3. USAID/FEWS Niger rainfed production estimate based on the GON/MOA 1989/90 statistics for 1988-93 production; all production figures are net of gross by 85 percent.
4. GON/MOA statistics used for 1985 to 1992 production. Irrigated and off-season cereal production, which includes rice, wheat, sorghum and maize, is estimated at last year's levels, as reported by the MOA.
5. Estimated balance equals estimated production minus the consumption requirement.

Source: FEWS/Niger

Figure 6. Niger: 1994 nominal millet prices for four markets



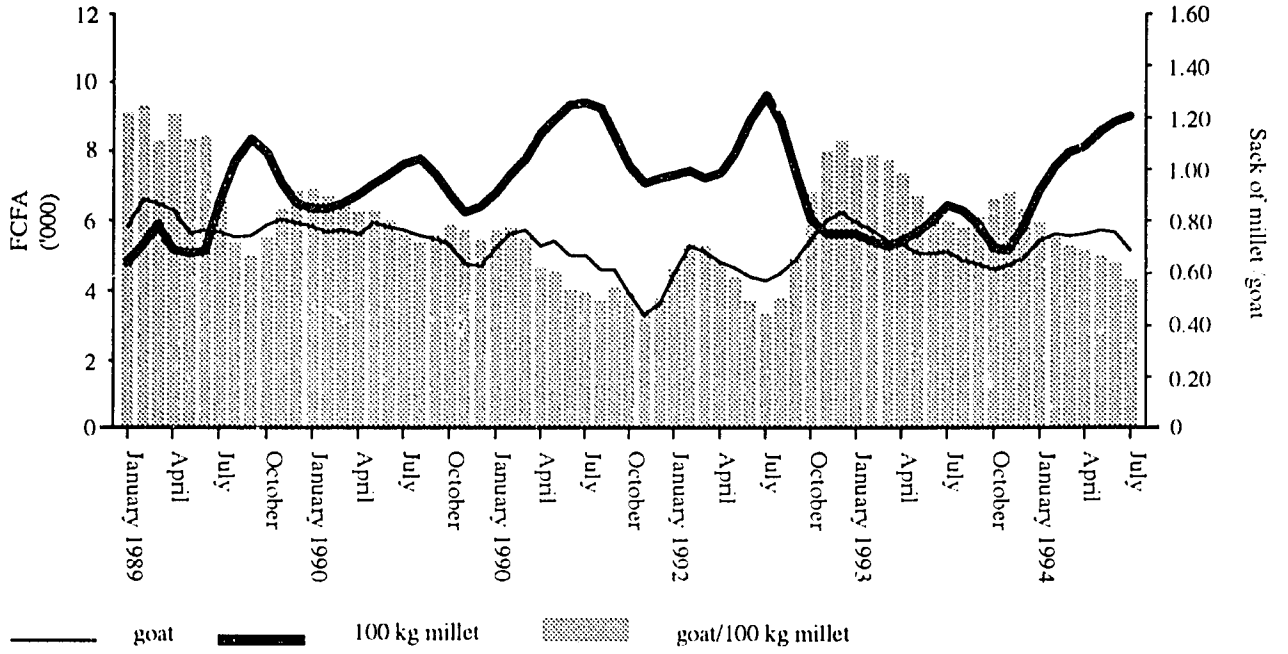
Sources: OPVN, FEWS/Niger

prices have been just below average since the beginning of the year (see Figure 6). July 1994 were higher than those of year (1993) throughout the country over 40 percent higher in Agadez and Diffa, 30 percent higher in Tahoua, 20 percent higher in Maradi, Tillabéry, and Zinder, and 10 percent higher in Dosso.

Livestock price data (adult male goat) through July show that prices across the country are decreasing slightly (following the annual trend), although they are generally higher than last year or when compared to the average (1989–93). Goat prices are about average in Agadez, Diffa, Tahoua, and Tillabéry, and over 30 percent above average in Dosso, Maradi, and Zinder. When compared to this time last year, goat prices are about the same in Diffa, up by 10 percent in Tahoua and Tillabéry, up by 25 percent in Agadez, and up by over 60 percent in Dosso, Maradi, and Zinder.

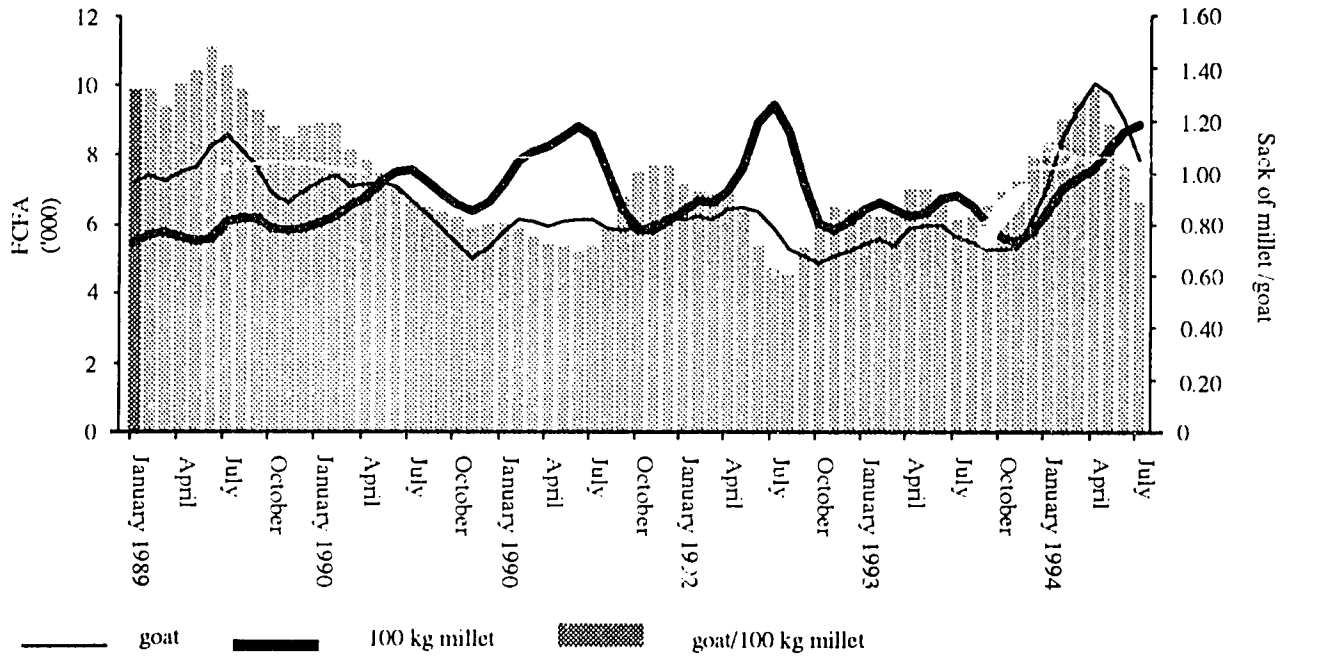
The combination of relatively high cereal prices and dropping animal prices have led to a marked decline in animal terms of trade for herders, especially in Agadez, Diffa (see Figure 7), and Tahoua (see Figure 8) departments. This situation should improve as the harvest begins, driving down cereal prices. The generally higher prices for millet and goats is due, in part, to the devaluation of the franc Communauté Financière Africaine (FCFA) in January and changes in import and export policies with Nigeria.

Figure 7. Niger: Diffa—millet for goat terms of trade



Sources: OPVN, MINAG, FEWS/Niger

Figure 8. Niger: Tahoua—millet for goat terms of trade



Sources:OPVN, MINAG, FEWS/Niger

Economic Situation

The economy of Niger during the past year has been influenced by several major events. The devaluation of the FCFA in January, along with changes in import and export policies with Nigeria, resulted in an overall increase in consumer prices of over 40 percent. One study, part of the USAID-supported PASPE project (Projet d'Analyse et de Suivi de la Politique Economique), evaluated these effects along the Niger-Nigeria border. Their results show that the *naira*-to-FCFA exchange rate remained relatively constant and uniform since devaluation (at around 90 *naira* per 1,000 FCFA). Prices of tradeable goods increased quickly in January but have remained stable at these higher levels since May; exports to Nigeria, especially livestock, increased sharply in January and remain at higher than normal levels; and, imports from Nigeria declined drastically in late January and remain very low.

In addition, a seven-week general strike from May through July effected daily operations and data collection activities at local ministries. During the strike, essential services such as utilities, transportation, and communication continued to function. The GON is still attempting to hold the line on wage increases to allow the recent devaluation to play out. An oil strike in Nigeria (which recently ended) caused gas shortages and increased gas prices, especially in the border areas, but the situation appears to be returning to normal.

VULNERABILITY UPDATE

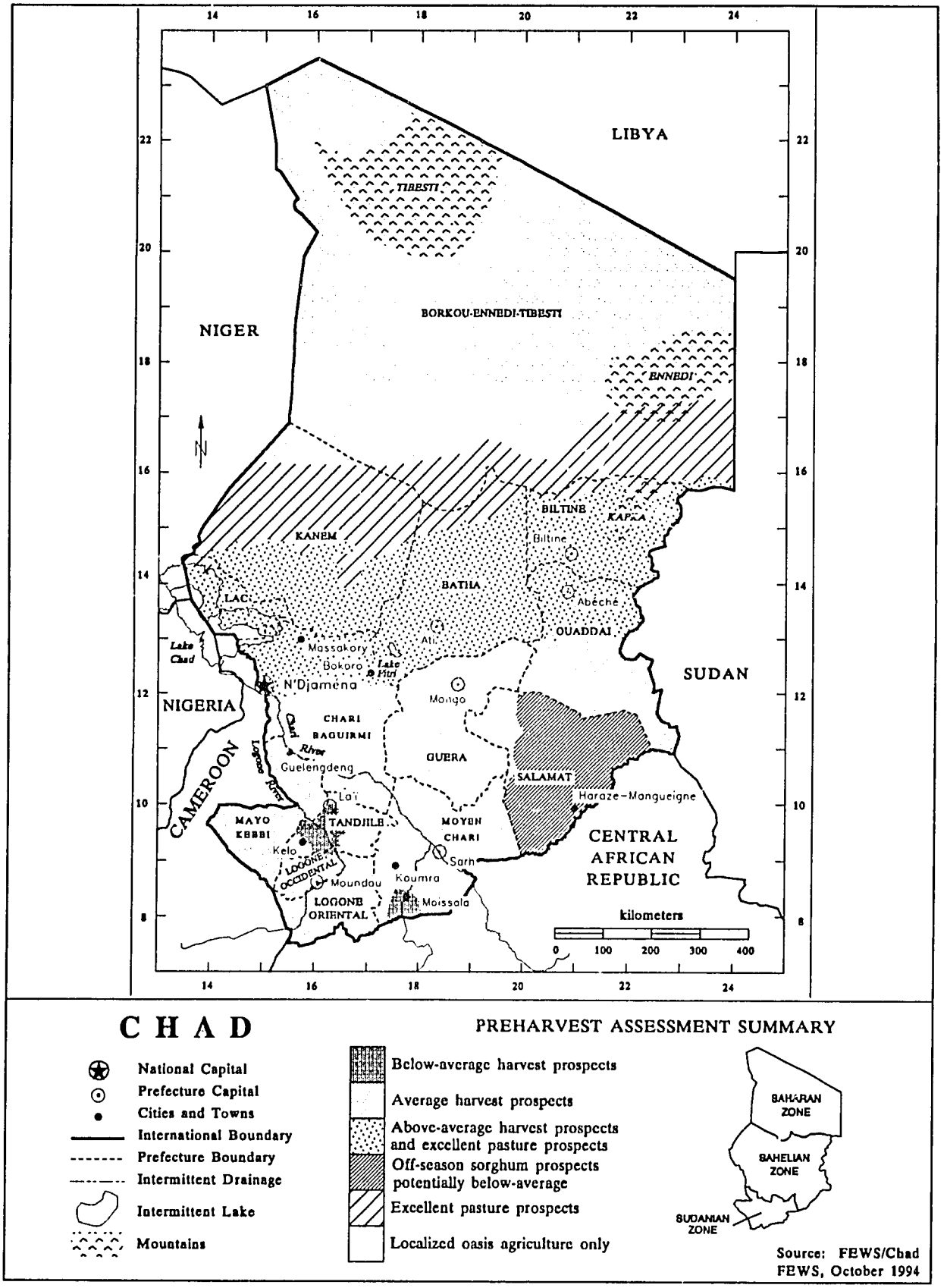
Due to the favorable rains, the vulnerability of many of the 400,000 moderately vulnerable people reported in the FEWS *1994 Vulnerability Assessment* will be reduced, as will the vulnerability level of the approximately 80,000 herders, farmers and urban dwellers in Agadez Department and another 100,000 farmers and herders in northern Tillabéry Department (especially Ouallam Arrondissement) estimated to be highly vulnerable in the FEWS *1994 Vulnerability Assessment*.

The Ouallam area still has the poorest crop prospects. Even an average harvest would not likely make up for the chronic food security conditions. The civil security situation keeps the population in Agadez highly vulnerable, as they depend on the movement of surplus grains from southern departments. Generally good pasture conditions should reduce the vulnerability of herders throughout the country.

CONCLUSIONS

A good harvest is expected for the 1994/95 agricultural season and Niger will not likely need emergency food aid assistance in 1995. However, even with a bountiful harvest nationwide, several areas of the country will be deficit in terms of cereal consumption needs, affecting approximately 200,000 people in Agadez and Tillabéry departments. Good pasture prospects should keep the herders in the pasture zones and avoid increased pressure on the agricultural zones. The continuation of civil strife will negatively affect food security in many agropastoral (marginal) and pastoral areas.

Map 9. Chad: Preharvest Assessment Summary



CHAD

National Capital
Prefecture Capital
Cities and Towns
International Boundary
Prefecture Boundary
Intermittent Drainage
Intermittent Lake
Mountains

PREHARVEST ASSESSMENT SUMMARY

Below-average harvest prospects
Average harvest prospects
Above-average harvest prospects and excellent pasture prospects
Off-season sorghum prospects potentially below-average
Excellent pasture prospects
Localized oasis agriculture only

Source: FEWS/Chad
FEWS, October 1994

CHAD

Average and Above-average Zonal Rainfall Contributes to Good Harvest Prospects

Based on a report released by FEWS/Chad on September 16, 1994

SUMMARY

The early 1994 season rains were below average, and much of Chad had received less than average cumulative rainfall by the end of July. Heavy rains in August were spread throughout the country, and by the end of August most of the country had received average or above-average cumulative rainfall. Unusually well distributed in time and space, however, this average rainfall is expected to result in above-average yields of all rainfed crops. Biomass in Sahelian pastures has been higher than normal, and pastures this year extend into the Saharan zone. As of mid-September Sahelian populations consumed early harvests of wild grass seed (kreb). Vulnerability to famine has diminished throughout the country. Cereal prices in some Sahelian and Sudanian zone markets have dropped in anticipation of good cereal harvests.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

Steady, well-distributed rainfall without intermittent dry periods has been the most remarkable characteristic of the 1994 rainy season in Chad. Area planted to food crops in 1994 was normal or slightly above normal. The northern Sahel and southern areas of B.E.T. Prefecture received rainfall well in excess of average precipitation. Salamat, eastern Moyen Chari, and southeastern Guéra prefectures received below-average rainfall through the end of August.

The exceedingly good distribution of rainfall for crop production is creating optimism for higher than normal yields and above-average cereal production throughout the country. Even risky, late plantings of millet in the Sahel are expected to produce satisfactory yields, if rainfall continues into mid-to-late September as forecast. Abundant late season rainfall will create favorable conditions for off-season production of recessional *bérberé* sorghum. However, flooded rice acreage in Tandjilé and Logone Oriental prefectures is estimated at 40 percent below the 1993 acreage, due to a lack of sufficient rice seed following 1993's poor harvest and subsequent food deficit.

Normalized Difference Vegetation Index (NDVI) images for the end of August show that well-distributed rainfall has led to normal vegetation levels in the center and south of Chad, and higher than normal vegetation levels in the northern part of the country (see Map 9). River levels have risen sufficiently for normal flooding of the rice-growing zone in Tandjilé and Logone Oriental prefectures. The rivers failed to flood in these areas in 1993 and contributed to serious local cereal deficits. Wild grasses, called *kreb* (*Brachiaria kotschyana* and *Echinocloa colona*), which are collected along waterways and natural depressions, have reached maturity and are providing food to Sahelians before the millet harvest.

The 1994 cropping season has thus far been free of serious crop pest attacks. Early armyworm attacks in Mayo Kebbi and Moyen Chari prefectures disappeared after heavy rainfall events in July and August. The Desert Locust situation has been calm in 1994, though continued humid conditions in the Saharan zone continue to create favorable breeding conditions. Birds damaged crops in Kanem Prefecture and large areas of millet were reseeded. Given plentiful supplies of wild grasses, extensive damage to cereal crops from bird attacks is not expected, but isolated areas around nesting grounds may suffer losses.

Continued civil struggle and insecurity have hindered agricultural and commercial activities throughout southern Chad and in parts of eastern Chad. Crop, livestock, and commercial losses attributable to banditry, rebel attacks, and government counterattacks cannot be estimated from anecdotal information, but insecurity remains an important factor constraining access to food.

Pastoral Conditions

Excellent rainfall distribution and quantities from July to mid-September in the northern Sahelian prefectures of Kanem, Batha, Ouaddaï, and Biltine have given rise to excellent pasture conditions. An estimated 80 percent of the livestock in the semi-arid zone of Chad follows an annual pattern of migration from south to north for summer grazing. Excellent pasture conditions and continued rainfall in September will prolong grazing and delay departure toward southern locations. NDVI images show significant greenness (pasture) from 100–200 km further north than is normally observed by the end of August. Maximum NDVI at the end of August in the northern subprefectures of the Sahelian zone was significantly higher than 1982–1993 average values. Prolonged grazing of herds in northern pastures should reduce livestock losses due to pests and diseases which are more acute in southern locations. However, insecurity and armed attacks on livestock herds hinder movement of herds to favorable environments, and could diminish potential gains from this year's excellent pasture conditions.

Food Stocks and Flows

The national security stock consists of approximately 1,600 MT of cereal following early 1994 distributions. Household and commercial stock levels were also drawn down by low production and high cereal prices. Production in 1994 is expected to be above average throughout the country, which should increase household and commercial stocks. National security stocks will be reconstituted by the European Union (9,000 MT), France (4,000 MT), and the World Bank (10,000 MT). Meeting these three pledges will fully reconstitute the security stock.

FACTORS AFFECTING FOOD ACCESS

Food Consumption Needs

Chad's estimated 1995 population of 6,580,850 people is based on 1993 census data and an annual growth rate of 2.3 percent. Approximately 927,898 MT of cereal will be required to meet food needs in the coming year (see Table 10). Well-distributed rainfall in average and above-average amounts, normal cereal acreage planted, absence of serious pest attacks, average and above average expected yields, and good prospects for off-season agriculture will result in sufficient cereal production to meet national cereal requirements.

Ten percent less cereal production than estimated above would only result in a national cereal production deficit of approximately 85,000 MT. Regional deficiencies might appear in Salamat, Moyen Chari, and Tandjilé prefectures (see Map 9), but the commercial sector could be expected to supply cereal to these areas at a reasonably low cost.

Economic Data

Cereal prices remained high throughout the country through the end of July. The average price of millet in 33 Sahelian markets rose to a season high of 158 FCFA/kilogram in July. The average price of sorghum in eight southern Chad markets rose to a season high of 149 FCFA/kilogram in early August.

Complete price data for August are not available, but reports of significant changes in cereal prices have been received from individual markets. The price of millet in Abeché has apparently dropped following an early and plentiful harvest of *kreb*. A good *kreb* harvest and promising millet production should result in lower millet prices in Biltine, Ouaddaï, and Batha prefectures. High millet prices in N'Djaména did not begin to decrease in early September, possibly due to border

Table 10. Chad: 1994 Cereal production balance by *prefecture*

Zone/Prefecture	1995 Estimated population	1995 Esitmated cereal needs (MT)	1994/95 Estimated cereal per capita production (MT)	1994/95 Estimated production (MT)	Approximate production balance (MT)
Saharan Zone					
B.E.T.	73,888	10,418	—	—	-10,418
Sahelian Zone					
Batha	301,478	42,508	160	48,236	5,728
Biltine	195,822	27,611	160	31,331	3,700
Chari Baguirmi	756,228	106,628	160	120,997	14,369
(N'Djaména)	554,195	78,141	—	—	-78,141
Guéra	320,921	45,250	160	51,347	6,097
Kanem/Lac	553,646	78,064	160	88,583	10,519
Ouaddaï	575,519	81,148	160	92,083	10,935
Salamat	194,635	27,444	120	23,356	-4,088
Sahelian total	2,452,444	486,794	132	455,933	-30,861
Sudanian Zone					
Mayo Kebbi	858,415	121,036	170	145,930	24,894
Tandjilé	479,562	67,618	140	67,139	-479
Logone Occidental	476,317	67,161	160	76,211	9,050
Logone Oriental	460,831	64,977	170	78,341	13,364
Moyen Chari	779,393	109,894	145	113,012	3,118
Sudanian total	3,054,518	430,686	157	480,633	49,947
Total Chad	6,580,850	927,898*	142	936,566	8,668

Notes: This table presents an estimation of prefecture-level 1994 per capita cereal production. Chad's cereal production generally supplies adequate supplies during years of above average rainfall. After weather, the labor supply is the main constraint to greater cereal production, hence the use of per capita production as the object of estimation. The prefecture per capita production was adjusted upwards or downwards from self-sufficiency as a function of a subprefecture-level matrix of indicators including: cumulative rainfall to the end of August compared to long-term average cumulative rainfall, maximum NDVI (vegetation) values at the end of August compared to the long-term average maximum, acreage planted (where available), and recent cereal price information (where available).

* = With a consumption requirement of 141 kg/person/year.

Source: SAP/Chad

closures to imports from Cameroon and Nigeria, the N'Djaména population's limited access to wild foods that have been available in abundance in rural Chad, and flooding that prevented traders from traveling any distance from the city.

August sorghum prices decreased in Moundou and Kélo, but not in Koumra and Sarh. Early harvest of maize and sorghum and promising cereal crops in Mayo Kebbi, Logone Occidental, and Logone Oriental prefectures could account for cereal price reductions in Moundou and Kélo. Later than normal planting, below-average rainfall in the east, and uncertainty concerning cereal production may be causing sorghum prices to remain high in Moyen Chari Prefecture.

Average terms of trade of sheep for millet remained very unfavorable for livestock owners and herders (at 46 kilograms of millet for the sale of one sheep) through the end of July (see Figure 9). These are the lowest terms of trade seen since July and August of 1991. Further declines in millet prices should improve the terms of trade for livestock herders.

Heavy rainfall in most parts of the country resulted in damage to Chad's fragile dirt road system, which continues to suffer from a lack of maintenance. Commercial transport has come to a halt in many areas. Access to food products is generally limited to products that are available locally. Despite this, widespread suffering is not expected because local cereal production should be sufficient to meet cereal needs in most localities.

Insecurity in many parts of the country continues to disrupt commercial activity and discourages investment and economic growth. This further reduces general accessibility to food.

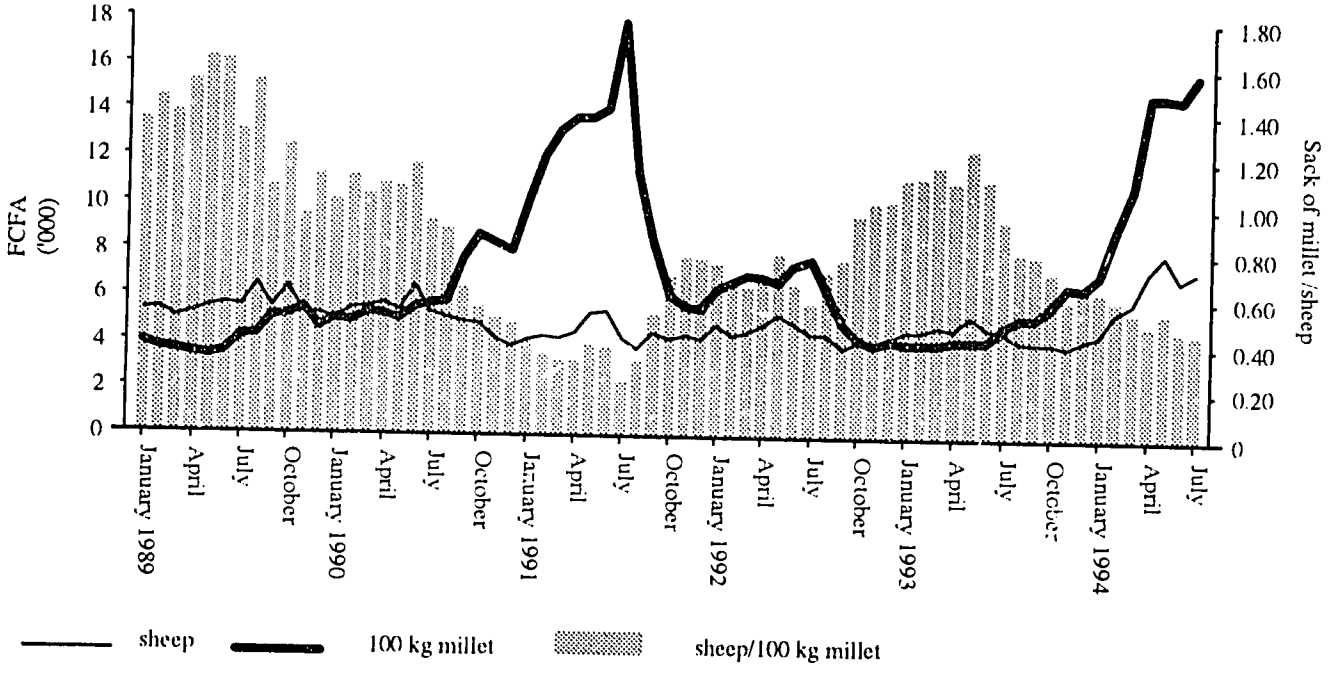
VULNERABILITY UPDATE

Changes in the vulnerability of 451,000 Sahelians identified as extremely vulnerable in the FEWS *1994 Vulnerability Assessment* depend on the quality of the 1994 season's harvest. Given normal or above-normal rainfall totals and excellent distribution of rains, early and abundant harvest of *kreb*, and development of good pasture conditions, the vulnerability of this group has been reduced to moderate-to-high.

The populations dependent upon flooded rice production in Tandjilé and Logone Occidental prefectures (approximately 170,000) are less vulnerable due to prospects for excellent rice yields. Average cereal production is expected in these areas, though rice production may remain below average due to lack of sufficient seed (see Map 8). Rice acreage is estimated at 60 percent of 1993 acreage. However, good rice yields, more extensive planting of sorghum and millet, and good rainfall distribution are expected to compensate for lower rice acreage. Recent drops in cereal prices in Moundou and Kelo confirm expectations of good cereal harvests in southwestern Chad.

In August, administrators in Haraze-Mangueigne Subprefecture of Salamat Prefecture sent alarming messages of food shortages in half of the subprefecture villages, resulting from heavy losses to birds of off-season sorghum crop harvested in early 1994. The food security committee allocated 180 MT of cereal from security stocks and the Minister of Ag-

Figure 9. Chad: Sheep for millet terms of trade—average of 33 Sahelian markets



Source: SAP, FEWS/Chad

riculture and Environment made arrangements for low-altitude drops of cereal from military aircraft, but these have not yet occured. These areas, albeit isolated, are normally less vulnerable than others due to reliable rainfall, low population density, and dependence on more stable, off-season sorghum production. Late-season rainfall may bring these areas closer to normal cumulative rainfall and provide good conditions for off-season sorghum production.

Flooding of urban areas from rainfall run-off to low-lying areas in N'Djaména, Sarh, Laï, Guelengdeng, and others have resulted in crumbling of mud houses, inaccessibility via roads, alarming deterioration of health conditions, and many homeless families from the poorest segment of urban populations. An outbreak of cholera was reported in N'Djaména in July, and health officials worried that continued flooding would render increasingly large populations susceptible to outbreaks of disease. The present vulnerability of the N'Djaména population is high due to continued high cereal prices in N'Djaména and lack of access to early season food sources that are available to rural Sahelian populations.

The overall socioeconomic and political situation in Chad makes all Chadians at least moderately vulnerable to famine, despite an exceptionally good 1994 rainy season. Ongoing problems include:

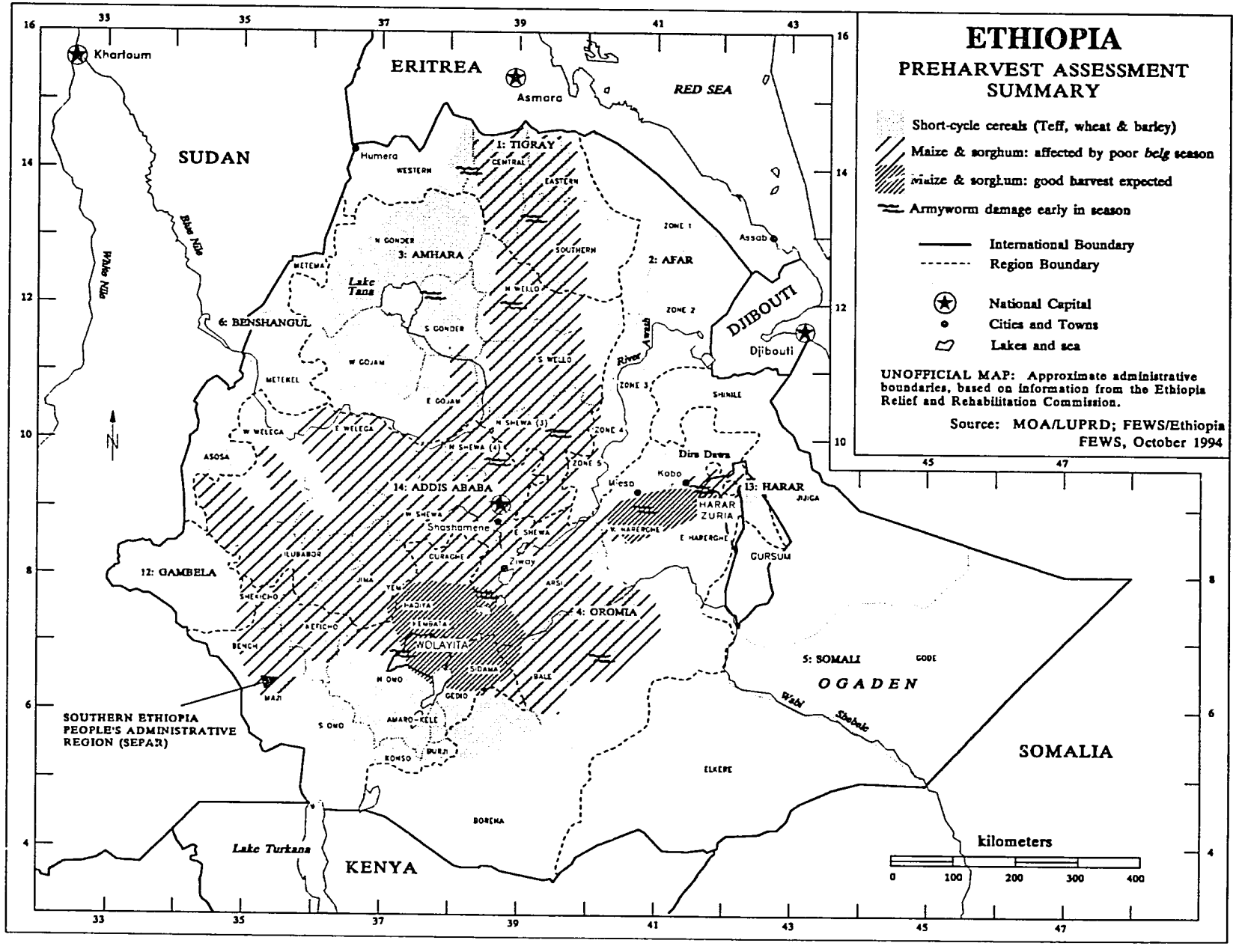
- A national school system that is in disarray following many months of public sector strikes, nonpayment of past salaries to teachers, and devaluation that has significantly increased school costs;
- A stagnant national economy that shows no signs of recovery from a devaluation that increased general prices in N'Djaména by 58 percent since early January 1994.

The outcome of democratic reform efforts are uncertain due to Chad's long history of political turmoil.

CONCLUSIONS

Adequate, and in some areas above-average, rainfall has mitigated the potentially widespread food insecurity and possible famine facing many Chadians after the 1993 season. Over the coming months, market prices are expected to decrease throughout Chad and help reduce overall vulnerability. Groups identified in the FEWS *1994 Vulnerability Assessment* as extremely or highly vulnerable (approximately 900,000 people) are now considered only moderately to highly vulnerable. 1994 cereal production is expected to meet 1995 cereal consumption requirements. No donor assistance should be required beyond the 23,000 MT already pledged for replenishment of national food security stocks.

Map 11. Ethiopia: Preharvest Assessment Summary



ETHIOPIA
Crisis Eases—Significant Structural Food Gap Remains

Based on a report released by FEWS/Ethiopia on September 19, 1994

SUMMARY

Weather conditions during 1994 can be described as widespread agricultural drought during the first half of the year (belg season), followed by good rains in the second half (kiremt season). The effect of this mixed pattern on the meher (main) harvest is likely to be a shortfall in production of long-cycle cereal (maize and sorghum), which are the cheapest bulk staples, but high production of short-cycle grains (teff, wheat, barley, and pulses–see Map 11). Provisional forecasts of the harvest are somewhere between last year's 6.9 million metric tons (MT) and the 1992/93 record of 7.5 million MT. Late-season pests or unfavorable weather could still damage standing crops.

Carryover and buffer stocks are expected to be significantly higher at the end of 1994 than at the same time last year. This factor, together with USAID/Ethiopia's forward planning of deliveries for 1995, should provide a comfortable time-margin for planning any further food shipments.

The good kiremt rains and a largely successful 1994 food aid operation have averted the worst-case scenarios of drought and famine. The immediate outlook is now considerably brighter than in June, when the rains were still in doubt. However, the long-term problems of agricultural stagnation, and the structural gap between food availability and needs, continue. Even the most optimistic forecast of the 1994/95 meher and the 1995 belg harvests implies a 1995 import requirement of nearly 725,000 MT.

FACTORS AFFECTING FOOD AVAILABILITY

Agricultural Conditions

Rains

The two agricultural rainy seasons, the *belg*–February to May and the *kiremt*–June to September, have been very different in character this year. The *belg* rains started late throughout Ethiopia, after an extended and severe dry season. In most areas they ended early or near their normal time, resulting in greatly shortened growing seasons in both cases. The exception was southwestern Ethiopia (North Omo, including Wolayita), where, although the rains were a month late, they were adequate in quantity and extended unusually into June, merging with the *kiremt* rains. In the north and east rainfall amounts during the *belg* season were very poor.

The *kiremt* rains started on time in most places and largely followed their "normal" pattern (through mid-September). The delay of one or two weeks in some areas was within the normal range of seasonal variation. Alternating rainy and sunny days provided favorable conditions for crop growth, unlike last year when extended dry spells were followed by damaging downpours.

Analysis of Normalized Difference Vegetation Index (NDVI) images (through mid-September) clearly shows the contrast between the two seasons. The *belg* seasonal average shows a clear pattern of below-average vegetation along the escarpment of the northeast Highlands, the eastern Highlands, the mid-south (particularly East Shewa, Arsi, Bale and Sidama), and the west (particularly Ilubabor, Jima, Kefficho and Shekicho–see Figure 10). During the middle of the *kiremt* season, the July–August average showed a very different picture. Most of the country showed average or above-average vegetation, with scattered below-average readings (see Figure 11). Areas where these below-average levels may be worrying are Western Tigray and western North Gonder, Eastern and Southern Tigray, escarpment areas of North and South Wello and North Shewa, parts of East Harerghe, including the Dire Dawa area, and much of Bale. In general, NDVI imagery of the *kiremt* season confirms a marked improvement over *belg* season conditions.

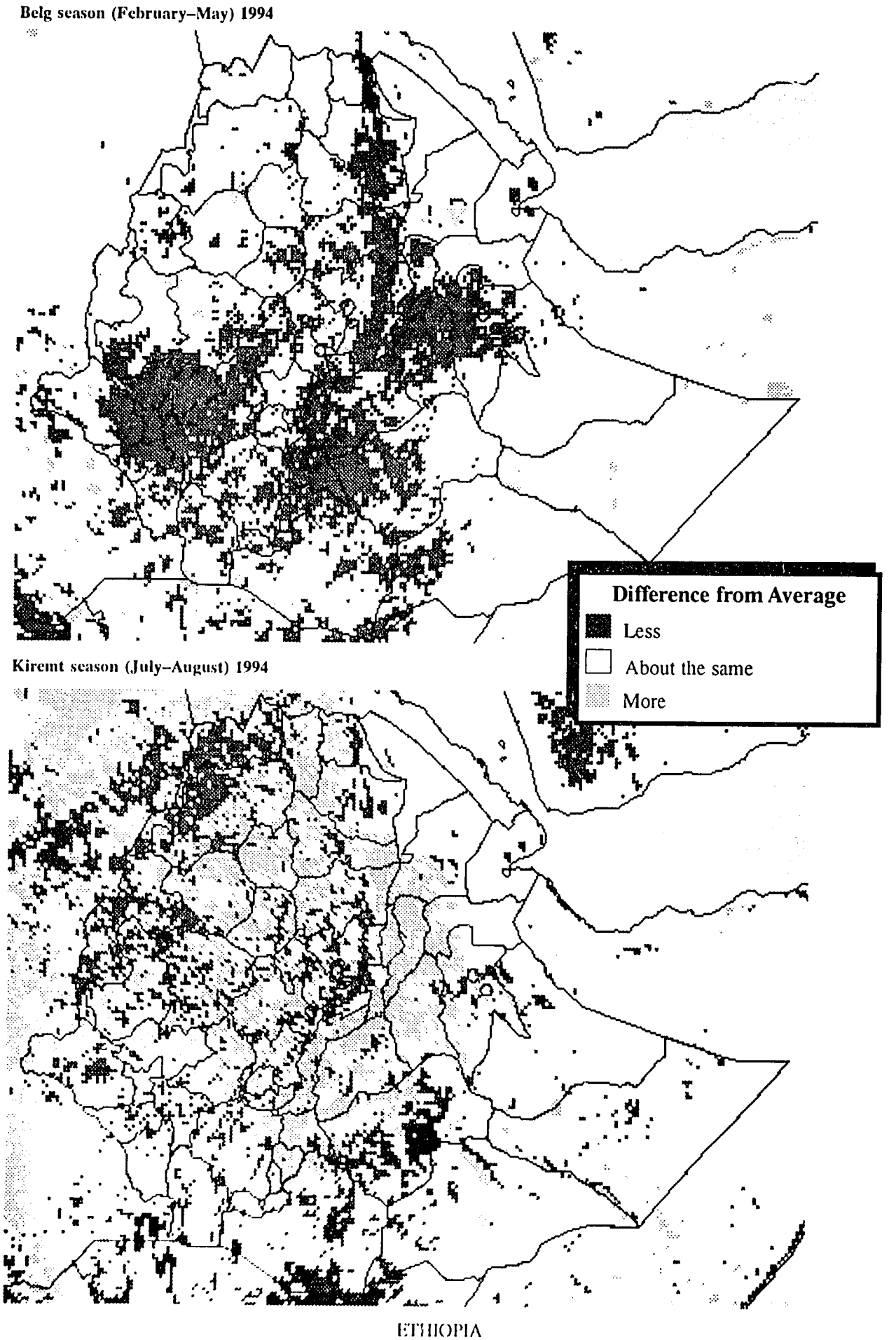
The expected impact of this mixed seasonal pattern on food-crop production is discussed in more detail below, but in summary it means a very poor 1994 *belg* harvest, a much-reduced growing season and therefore low production of long-cycle crops (maize and sorghum). Conditions have generally been very favorable for good production of short-cycle *meher* (main harvest) crops including: *teff*, wheat, barley and pulses.

Inputs

Following the poor situation in June with a failed *belg* season, delayed planting of long-cycle cereal, and around 7 million people on food aid, the Transitional Government of Ethiopia (TGE) made a concerted, though late, effort to maximize production from the *kiremt* rains. They introduced easy credit terms for fertilizer and distributed seed and oxen under a safety-net program in various localities (particularly in western Ethiopia). As a result, fertilizer sales (which had been very low until late June) reached a record high of 187,000 MT by the end of August—nearly twice as much as last year and 20 percent above the previous record sales in 1992. Public-sector (AISE) records up to the end of July show that, while close to half of the 122,583

Note: See page 51 for an explanation of the acronyms used in this section.

Figures 10 and 11. Ethiopia: 1994 NDVI vs. average seasonal cumulative



MT sold to the peasant sector went to the habitually high-fertilizer-using zones of East Gojam (8 percent), West Gojam (12 percent), East Shewa (12 percent), and Arsi (14 percent), efforts were made to distribute the stocks more widely. Sales to farmers had reached 37 percent of target in Tigray, 63 percent of target in the Southern Ethiopia Peoples Administration Region (SEPAR), 73 percent of target in Oromia (Region 4), and 83 percent of target in Amhara (Region 3). However, the pan-territorial pricing policy continues to impede the flow of fertilizer to areas with high delivery costs. While the sales figures are impressive, most of the fertilizer will have been used on lower-yielding short-cycle crops (*teff*, wheat, and barley), as the credit scheme came too late for use on the higher-yielding long-cycle crops (maize and sorghum). Also, it is questionable how much of the fertilizer sold has actually been used on this year's fields, given the lateness in the season, the unlimited quantity each purchaser could buy on credit, the relatively low price (6 Birr below last year's, at 143 Birr per quintal–appx. 100 kilogram), and the certainty of prices rising later. It is reasonable to assume that some fertilizer is now being held in stock by farmers. Nevertheless, high fertilizer use and potentially higher yields are expected from short-cycle crops in the high-input areas.

Plow oxen have been in very short supply for the main harvest preparations because of losses (mainly sales) during the prolonged dry season and poor *belg*, and to the worsening *trypanosomiasis* (sleeping sickness) problem in western Ethiopia. Due to the long dearth of pasture, the remaining oxen were very weak. Consequently, land preparation for *meher* crops was further delayed while oxen regained strength after grasses started to regenerate, and was inadequate in many areas since there was only one plowing instead of the three. These factors are expected to have a widespread negative impact on yields.

Seed availability was a constraint in many areas, particularly where the lateness or failure of the *belg* rains forced farmers to switch from maize and sorghum to short-cycle crops (*teff*, wheat, barley, and pulses). Some efforts were made to respond to this need in various areas by TGE and nongovernmental agencies. Complete data on seed distributions were not available for this report. In general, limited access to suitable seeds due to high prices (*teff* seed was particularly expensive, but all grain prices were high this year), consumption of stocks, and non-availability of alternative short-cycle seeds is likely to have a negative impact on production.

Pests

Crop looses due to pest damage are normally significant in Ethiopia. The lack of access to pesticides is an important constraint to productivity. The worst outbreak of **armyworm** (*Spodoptera exempta*) in Ethiopia for many years occurred in Borena in mid-April, and spread to most parts of the country, except the extreme high and low altitude areas, by June. A major control operation that utilized a total of 241,663 liters (52,681 kilogram) of pesticides was considered largely successful in averting potentially vast destruction. Actual crop damage was difficult to assess. Large areas of maize and sorghum were reported to have been plowed under, particularly in Tigray Region and East and West Hararghe zones (although drought stress on these crops was already so bad that it is difficult to separate the effects of armyworm). Replanting was generally with shorter-cycle seeds (*teff*, barley, or pulses). Crop losses in other regions are thought to be insignificant. The infestation subsided by mid-August, and no further breeding is expected for the current season. Local resurgences (e.g., in North and South Wello in August) were not considered a serious threat.

The DLCO warned of a possible infestation of grain-eating breeding colonies of **quelea birds** (*Quelea quelea*) from September onward. The birds were sighted in the Rift Valley area (Ziway), and on pastoral grasses in Jijiga.

The **sweet potato butterfly** (*Acrea acerata Hew*) devastated the expected February–May harvest of this important crop in Wolayita, contributing to the collapse of the local food economy and thousands of famine deaths earlier this year.

Weeds may have a significant impact on yields in western Ethiopia, due to inadequate land preparation. Other perennial uncontrolled pests such as **African bollworm** (*Helicoverta armigera*) and **stem borers** (*Chilo pratellus* and *Buseola fuscea*) (on maize and sorghum) will undoubtedly destroy their usual share of the harvest. However, there are no reports of the exceptionally high infestations suffered last year as a result of the mid-season dry spells. **Stem rust** (*Tuccinia graminis*), reported by FAO last year to be a major threat to the widely used improved *enkoy* wheat variety, normally emerges near to harvest time (November/December).

The **Wello bush cricket** (*Decticoides brevipennis*), a major nonmigratory cereal pest found only in Ethiopia and Eritrea, can be expected to emerge as usual from late September on. It infests all the major *teff*-growing areas of Tigray, North and South Wello, North and South Gonder, East and West Gojam, North, East, and West Shewa (Oromia Region) and North Shewa (Amhara Region), and particularly tends to damage late-planted *teff*, which matures after the natural vegetation has dried. No reports of this pest have yet been received, but given the very large areas of *teff* planted this year, it could cause significant grain-loss and will be monitored.

Overall grain losses to pests so far in 1994 have been no worse than usual, but there is still a considerable period of risk before the harvest. Stem rust and bush crickets, both late-season pests, could have an important impact on the final harvest of wheat and *teff*.

Harvest Prospects

The combination of the factors above gives a mixed outlook for the *meher* harvest. In general, the agriculture period in Ethiopia,[1] normally described in terms of the two rainy seasons, can be more clearly explained as the following three overlapping cropping cycles:

- Belg production of short-cycle crops (wheat, barley, some *teff* and pulses)—planted mostly between January and March and harvested mostly in July and August. Only limited areas can produce a *belg* harvest, although in some localities it provides half or more of the annual

1. This is a generalization —not all agricultural areas follow this pattern (see, for example, the comments on Wolayita under "Vulnerability Update").

grain production. Nationally, the *belg* harvest varies from around 5 to 11 percent of the year's grain production.

- Maize and sorghum, i.e. long-cycle, coarse-grain, or "stalk" crops—generally sown between March and May and harvested between October and January. These are normally included in the *meher* harvest, but sometimes classed as *belg* crops. The common practice of harvesting "green" maize around July as a hungry-season crop further confuses the usual seasonal classification. Maize and sorghum together account for around 40 percent of the country's yearly grain production.[2]
- Meher production of the short-cycle crops *teff*, wheat, barley, and pulses—sown after the start of the *kiremt* rains and harvested from October to January. These contribute about half of the annual grain harvest.

The first significant feature of the 1994 agriculture year was the very poor outcome of the *belg* harvest. Early (June) production estimates, based on reports of area planted, were overly-optimistic. The success rate of the planted crops was low in most areas. Unofficial Ministry of Agriculture estimates now put the harvestable area at around 72,000 ha, and the expected production at about 68,000 MT. The RRC estimates total 1994 *belg* production at around 100,000 MT. These estimates represent a range of only 14 to 20 percent of the planned, or "normal", *belg* production of 500,000 MT. The worst affected areas were in the north and east, including Southern Tigray, North and South Wello, and West Harerghe (see Map 11). Southern Tigray and East and West Harerghe had a total failure of the *belg* harvest. SCF-UK reports that one-third of villages surveyed in North and South Wello (where *belg* production is much more important than in Southern Tigray and West Harerghe) reported a total crop failure. Conditions in North Shewa were slightly better than in North and South Wello. North Omo and Bale, where the *belg* harvest is very important, fared relatively better. However, the *belg* season was late and there was a large drop in production even in these areas. It is presumed that failed *belg* area was resown, but information is not available on the likely crop mix.

This production loss is not directly accounted for in the food balance estimates given in this report (see Table 11), which focus on food availability for 1995. The expected loss of 1994 *belg* production was taken into account by the TGE in its revised April appeal for food aid. It is hoped that the distributions since then will have partly filled the gap in the affected areas.

More important for this assessment, the short and late 1994 *belg* rains have had a significant negative impact on the land preparation, sowing, and maturation of the long-cycle sorghum and maize crops. Throughout Ethiopia, these crops were sown one to three months late due to the lack of rain. Land preparation was inadequate, due to the scarcity and weakness of draft animals. In some areas, particularly the northeast Highlands (Eastern and Southern Tigray, North and South Wello, parts of North Shewa), sorghum and maize crops were largely destroyed after planting by drought stress and/or armyworm attacks.

Elsewhere (East and West Gojam, East and West Welega, West Shewa, Arsi, Bale, and parts of East and West Harerghe), yields are expected to be low. Production losses are likely to be more marked in lowland areas, which are generally drier and hotter. However, in the important surplus-producing areas supplying the Shashamene market (i.e., the former South Shewa Region),[3] the condition of long-cycle cereal is reported to be good. Overall, EGTE (which monitors production closely in purchasing areas) expects the marketed quantity of maize to be below what was hoped for, though probably higher than last year's very poor supply.

In contrast, greatly increased areas have been planted with short-cycle *meher* crops as a result of farmers resowing failed or pest-damaged maize and sorghum fields, or simply changing their plans in favor of faster-maturing crops because of the rainfall pattern. The increase in area planted, together with high fertilizer use and good weather conditions, is expected to ensure a very good harvest of these food-grain crops and of oilseeds. Teff, in particular, should be more plentiful than usual. However, two major questions remain:

- *Can the total quantity of short-cycle crops compensate for the lost quantity of maize and sorghum?* The answer is probably no, as the short-cycle crops all produce much lower yields per hectare. In good soils and under good conditions, maize and sorghum can produce 1.6 to 1.8 MT/ha; short-cycle cereal 0.8 to 1 MT/ha; and pulses 0.4 to 0.6 MT/ha (unofficial Ministry of Agriculture estimates). Even with a concentration of fertilizer use on the short-cycle crops, there is likely to be a loss in the total tonnage of grain produced.
- *What impact will the expected dramatic change in the composition of the grain supply have on food-security?* Maize and sorghum are by far the most important staple cereal in terms of quantity for the poorer, more vulnerable population groups in both rural and urban areas. They are the cheapest staples to buy (followed by barley, which is also likely to be in short supply due to the poor *belg* harvest). The past year has shown that virtually all vulnerable groups are market-dependent to some extent, and that soaring prices of the cheaper grains can alarmingly devalue their meager purchasing power. The short-cycle crops, though lower-yielding, are all higher-value (i.e., more expensive per kilogram). While many farmers will gain from the increased income, it is likely that poor and famine-prone groups will be net losers from the change in crop composition. The underdevelopment of internal markets, the lack of import mechanisms for cheaper grains, and the absence of an export market for *teff* will make it difficult to realize the exchange value of the higher-priced crops in terms of cheaper bulk staples.

2. There is some evidence that the proportion of maize and sorghum in the national diet has risen in recent decades: CSA production estimates show that the two crops combined accounted on average for around 33.8 percent of total yearly cereal production from 1961 to 1970; 41.3 percent from 1971 to 1980; and 47.7 percent from 1981 to 1991 (when CSA agricultural data-collection was suspended).

3. On the new provisional map, this approximately means the southern part of East Shewa Zone in Region 4, Alaba, Kembata, and Tembaro (AKT) Zone, Sidama Zone, and other neighboring parts of the Southern Region (SEPAR).

Table 11. Ethiopia: 1995 Consumption and provisional cereal balance

	Optimistic forecast	Pessimistic forecast
National cereal consumption		
Rate (kg/cap/yr)[1]	135	135
Population (mid 1995 projection)[2]	56,368,620	56,368,620
Total requirement (MT)	**7,609,764**	**7,609,764**
National cereal production		
Projected *meher* harvest 1994/95 (MT)[3]	7,300,000	6,900,000
Assumed "normal" *belg* harvest 1995 (MT)[4]	500,000	500,000
Gross domestic food-grain production 1995 (MT)[5]	7,800,000	7,400,000
15 percent nonfood uses (MT)[6]	-1,170,000	-1,110,000
Total net production	6,630,000	6,290,000
Cereal balance (MT)	-979,764	-1,319,764
Carryover stocks from 1994 (MT)[7]	240,000	240,000
Approximate 1995 import requirement (MT)[8]	**-739,764**	**-1,079,764**
Alternative calculation of needs, based on higher consumption rate		
"Target" (kg/cap/yr)	180	180
Total requirement (MT)	10,146,352	10,146,352
Total net production	6,630,000	6,290,000
Approximate (alternative) 1995 import requirement (MT)	**-3,276,352**	**-3,616,352**

Notes: 1. Per capita grain consumption = The "status quo" figure of 135 kilograms of grain/person/year, which represents a very low total average calorie intake of around 1,500 per day, is used by FAO on the basis of historical production/population figures. The "target" figure of 180 kilograms represents an average daily intake of 2,000 calories, which has been cited as a Government target for improved nutrition. This target figure also corresponds to the standard full food-aid ration of 15 kilograms (180/12) per person per month. Calculations assume that 86 percent of calories in the average Ethiopian diet are from grains, and that the average calorific value of grains consumed is 3,500 kcal/kilogram.

2. Population projection = calculated from the CSA estimate for mid-1994 (as used in the FAO assessment), plus 2.9 percent annual growth. The population census previously planned for May 1994 has been postponed to October.

3. Projected *meher* harvest = FAO estimates for the past seven years are used as a baseline (see text).

4. 1995 *belg* = In order to forecast the production-consumption balance for 1995, it is necessary to account for next year's *belg* harvest. Half a million tons is the "planned" or "normal" figure used by the RRC and other Government agencies. However, there will of course be no basis for a real forecast of the 1995 *belg* harvest until March–April 1995 at the earliest. This year has shown that the success or failure of the *belg* can have a significant impact on the food balance.

5. Food-grains = cereal + pulses.

6. Non-food uses = seed, animal feed, brewing, and post-harvest storage losses. *Source*: FAO.

7. Carryover stocks = Provisional forecast of Government and donor/NGO/RRC stocks at the end of calendar year 1994, based on USAID,WFP, and EGTE projections (see text).

8. Import requirement = NB assumes no exports and no private stocks (see text).

Source: FEWS/Ethiopia

Quantitative Forecasts

September is very early to forecast the quantity of production, as a number of factors including weather and pests could still significantly affect the harvest outcome. Also, the baseline statistics on crop production are very weak. For consistency and comparability with other reports, the FAO production estimates for the past seven years ("Crop and Food Needs Assessment for Ethiopia", December 1993) are used as a baseline for the provisional forecasts that follow. However, the FAO may revise their 1993/94 forecast downwards during the December 1994 reassessment.

Caveats aside, there is a general consensus among TGE and donor representatives that the 1994/95 *meher* harvest will fall somewhere above the 1993/94 level (6.9 million MT) and below the 1992/93 record (7.5 million MT). This prediction is reflected in the "optimistic forecast" column of Table 11, which shows the implications of a harvest of 7.3 million MT. However, given all the known factors and remaining uncertainties described above, FEWS/Ethiopia believes it is still questionable whether the harvest will really be much above last year's in total tonnage. A lower estimate of 6.9 million MT (about the same as 1993/94) is shown as the "pessimistic forecast."

Pastoral Conditions

The major pastoral areas have different rainy seasons from the farming areas. The southern and southeastern pastoral areas (the Ogaden Desert in Somali Region, Borena Zone in Oromia, and South Omo in SEPAR) receive their main rains

during March and April, with secondary rains during October and November. The northeastern pastoral lowlands (Region 2, Afar) follow the *belg/kiremt* pattern, with secondary rains during February and March and main rains between July and September.

The Afar Region was exceptionally dry until June, causing stressed conditions and emergency food needs that were met by aid distributions. Due to the lack of water and pasture, many people and animals were concentrated in the dry-season grazing areas around the River Awash when the river flooded, following rains upstream in the catchment area. It is not clear if any major livestock losses resulted. Since then, the *kiremt* rains have been good and pasture recovery is strong (see Figures 10 and 11 and compare the images for the *belg* and mid-*kiremt* seasons). However, pastoral economies are slow to recover from drought and it may be some time before the impact of the present good rains can be judged.

In Borena and South Omo, a delay in the 1994 spring rains following very poor October–November rains in 1993 and a severe 1994 dry season, produced acute food stress and unusual livestock losses in the first quarter of the year. The rains finally came in late March, and pasture conditions started to recover. The distribution of rain was patchy, however, and the degree of economic and food-security recovery is not clear. Food aid distributions continued in both zones after the spring rains.

Assessments of Somali Region have been hampered by insecurity and political tensions. Conditions there are thought to be generally satisfactory, except in the areas bordering East Harerghe and Bale, where water shortages are reported. In the central Ogaden Desert, riverbank harvests following the spring rains are thought to have been reasonable. The NDVI imagery shows vegetation levels close to average for both seasons. The October–November rains will be important for Borena, South Omo, and Somali Region.

Livestock conditions in other agropastoral and agricultural areas are a cause of concern because of the cumulative effect of the severe dry season, late *belg*, and widespread food shortages. Field reports from northern and western Ethiopia in particular suggest a significant loss of livestock resources this year due to the combination of pasture and water scarcity (inability to keep the animals through the dry season), disease (particularly *trypanosomiasis* in the west), and sales in exchange for highly-priced grain. Combined with probable drought-induced livestock deaths in Afar Region and Borena and South Omo zones, there is likely to be an overall depletion of livestock assets carried over into the coming year. This implies a further erosion of coping capacity among vulnerable groups, and a repeat of the scarcity of draft power for next year's growing season.

Food stocks & flows

Carryover food aid stocks for relief and regular programs are currently projected to stand at around 140,000 MT by December 31. In addition, the main TGE stockholder, EGTE, is aiming for an end-of-year stock of 100,000 MT. This target is not expected to be filled from domestic purchases. A large proportion is likely to come from program (structural) food aid and USAID Title III wheat pledged for 1994. It is not yet clear whether this EGTE stock target can be met, or whether it will really be in addition to the food-aid carryover. The figure is therefore likely to be adjusted during the December reassessment, but is tentatively included in the current projections, giving a total carryover stock of 240,000 MT.

No information is available on private stocks. Household carryover stocks in most rural areas are zero, given this year's conditions. Some urban households and traders can be presumed to be holding stocks, but the quantity cannot be assessed.

No projections of import and export trade are available for 1995. However, they are both likely to be small and to cancel each other out to a large extent. In recent years, FAO has estimated grain exports at around 50,000 to 65,000 MT, and cross-border imports (mainly from Sudan) at around 50,000 MT. No commercial imports of food have been made through official channels this year. This is likely to again be a policy issue for 1995.

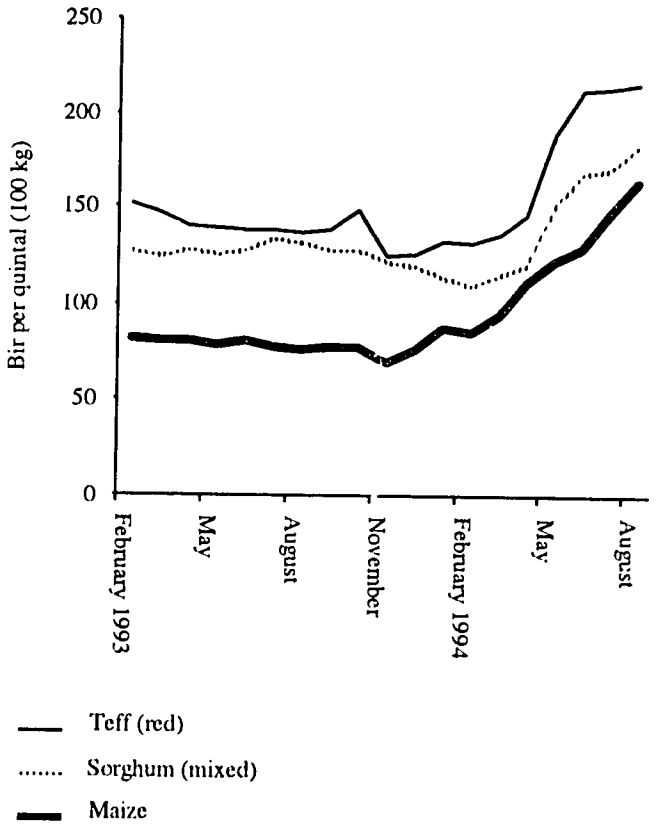
The projected carryover of 240,000 MT is one-third higher than last year's level of 163,000 MT (FAO/WFP). However, as stressed in previous FEWS reports, Ethiopia has a large structural food deficit even in good years. The carryover stocks will not meet the 1995 production shortfall. Provisional parameters for the import requirement after deduction of stocks are in the range of 740,000 to 1,000,000 MT, depending on the final harvest outcome (see Table 11 for an explanation of this calculation, and a summary of all the estimates used in this report). These figures will be refined in December, when production and stock positions should be clearer.

By the end of this year, the Emergency Food Security Reserve (EFSR) is expected to come close to its original target stock-level of 205,000 MT for the first time since its establishment in 1992. This is not included in the calculation of carry-over stock, since it is intended as a permanent strategic reserve and can only be released against new food aid pledges. However, this comfortable stock level should give considerable leeway for logistical planning during 1995.

USAID/Ethiopia food aid plans

USAID/Ethiopia has already taken steps to preposition 39,500 MT of additional Title II emergency commodities against anticipated 1995 CY (calendar year) requirements, with delivery in December–January, plus an estimated 40,000 MT of Title III commodities from the 1994 FY Ethiopia program and fallout funds from other countries (delivery expected between December and March). These shipments were planned in expectation of a 1995 structural import requirement of up to 1,000,000 MT, and are in addition to the previously planned Title II regular program of 60,000 MT and an undetermined quantity of Title III program food aid for 1995. This advance planning by USAID/Ethiopia, combined with the full stocking of the EFSR, should greatly help to provide flexibility for the scheduling of other deliveries which was sorely lacking at the beginning of 1994.

Figure 12. Ethiopia: Staple cereal prices—Addis Ababa wholesale market



Sources: EGTE, FEWS/Ethiopia

FACTORS AFFECTING FOOD ACCESS

Projected Food Consumption Needs

Table 11 compares the provisional forecasts of production with consumption needs at a national level (data are not available to disaggregate these figures by region). The main table calculates consumption needs and the projected import gap using the 135 kilograms per capita grain consumption rate used by FAO/WFP. As with the harvest estimates, this is used to ensure comparability. However, FAO/WFP recognizes that this "status quo" rate, based on historical production divided by population estimates, represents a nutritionally unsatisfactory intake of around 1,500 kcal/per person/per day. Recalculation on the basis of the TGE target of 180 kilograms per person per year (equivalent to about 2,000 kcal/day) produces a near four-fold increase in the import requirement (see Table 11).

Economic Data

FEWS has previously reported on steep grain price rises, and their food security implications, throughout the country since the end of 1993. Figure 12 shows that the monthly average prices of the cheapest staple grains in Addis Ababa were again higher in August than July. However, weekly prices show some signs of stabilization during the second half of August. In Ethiopian grain markets, it is too early to see any reflection of harvest expectations. The prices of cheaper, long-cycle cereals and their terms of trade with the short-cycle crops could be particularly important given the shift in harvest composition described above.

VULNERABILITY UPDATE

The current assessment of harvest prospects falls roughly in the middle range of scenarios outlined in the FEWS *1994 Vulnerability Assessment*. The production deficit (see Table 11) is provisionally forecast at between 980,000 and 1,320,000 MT. The good *kiremt* rains fortunately have prevented the worst-case scenario from materializing. The relief food aid operations during 1994 were generally successful in preventing widespread famine deaths, destitution, and population upheavals. The only notable exception was in the Wolayita area during the first half of 1994. However, that crisis has now subsided. Consequently, no population groups in Ethiopia are currently considered to be extremely vulnerable (i.e., at imminent risk of starvation). Longer-term vulnerability, however, is likely to have been worsened by the stresses of this year (such as the loss of livestock assets, debts which will have to be paid from the coming harvest, and the toll on human nutrition including child development). The following areas merit close attention:

- **Wolayita, North Omo Zone, SEPAR Region**—This is the only part of Ethiopia where a large number of confirmed famine deaths were suffered this year. Wolayita has an extremely complex and intensive cropping calendar, in which the same land is used repeatedly through the year for different crops. The 1994 crisis followed a poor 1993 *meher* harvest, a near-total loss of the spring sweet-potato crop, then a delay to the 1994 *belg*. It will take more than one good rainy season to recover from these shocks. There was a widespread sense of relief when the rains finally started in March and then continued through June, allowing the *belg* crops to mature. From July onwards, green maize started to be harvested and the condition of late-planted maize and other short-cycle crops (haricot beans and *teff*) now in the field is reported to be good. However, 1994 *belg* production is believed to have been below average. Also, the effects of late *meher* planting due to the late *belg* harvest have not been assessed, but are expected to reduce yields. It is feared that large quantities of *meher* maize (planted for harvesting in October) will be eaten fresh to fill short-term food needs, rather than dried for storage and later use.

  Root crops are also vitally important in this area. Earlier in the year there were reports that *enset* (a banana-like crop) was being over-harvested because of the crisis, and that long-term productivity of the plants might therefore suffer. Questions also remain about the viability of the next sweet potato harvest (due in October from plantings in May), given the very high uncontrolled

pest damage to the last crop. Meanwhile, grain prices remain very high. These factors suggest that the current mood of relief may be short-lived, and that the food supply situation should be closely monitored over the coming months.

Tigray Region, North and South Wello, and the North Shewa(s) zones—The *meher* harvest conditions (for short-cycle crops) look good and production prospects are much better than last year. However, the widespread failure of the sorghum crop (the major bulk staple in these areas) could have a significant impact on people's access to enough food, particularly if the prediction of relatively high prices of sorghum and maize due to an overall production shortfall proves correct. For Tigray, this may be balanced by a major increase in the area of sorghum planted by commercial farmers in Humera (Western Tigray) this year. The carry-over impacts of the recent bad year are also likely to raise vulnerability, as poorer farmers may have to sell or hand over a large part of their crop to pay debts incurred in the hungry season. The loss of assets, particularly livestock, will also take more than one good season to recoup.

East and West Hararghe zones—There are mixed reports on food security in these zones. Overall, the *kiremt* season is reported to have been good after the near-total failure of the *belg*, and current harvest prospects are much better than last year. However, in some areas, including the surroundings of Dire Dawa and Kobo, weather conditions have been less promising. Combined with early-season armyworm damage, the poor *belg* significantly delayed the planting and development of long-cycle crops. CARE/CEFIS estimates, for example, that the crops around Mieso may need steady rains through the end of October to ensure the harvest. In the CARE operational areas, it is hoped that the distribution of shorter-maturing maize and sorghum varieties will have mitigated the impact of the *belg* failure. SCF-UK continued to find falling child nutritional status in the old *awrajas* of Harar Zuria and Gursum in July. However, no reports of malnutrition related deaths could be found despite specific questioning in the rural areas by CEFIS staff.

Unexpected food problems this year in pocket areas of **Ilubabor** and **Jima** zones of Oromia Region are attributed to a long-term erosion of productive capacity due to the decimation of plow oxen by the spread of *trypanosomiasis*, plus a short-term shock from the failure of the *cheffe* maize harvest (planted on drained swamps and waterlogged areas during December and January for harvesting during June and July). For the current *kiremt* season, maize and sorghum yields in Ilubabor in particular are expected to be depressed by late planting and poor land preparation. Short-cycle crops are unlikely to compensate fully for the lost tonnage. Consequently, the lowland areas are now considered moderately vulnerable.

Bale Zone of Oromia Region—This area appears, from the rainfall and NDVI data, to have had a poor year. Additional information and ground truthing is necessary, particularly in the lowlands.

Vulnerability levels in the pastoral areas of **Borena**, and **South Omo** zones, and **Afar Region** are still unclear. All three areas suffered periods of acute drought in 1993 and early 1994, and the impact on livestock assets has not been fully assessed.

- Poorer, market-dependent populations are now considered highly vulnerable[4] due to the sustained steep rises in grain prices throughout 1994. Targeted sales of EGTE stocks through TGE *kebele* shops in Addis Ababa and some other major towns will have improved the access to food of many of the poorer urban people, but they do not seem to have had any noticeable impact on open-market prices. Grain prices have been so high this year that there is likely to have been some asset-stripping among poorer urban households, raising their long-term vulnerability. When the harvests start to come, in most farming households should be less dependent on the markets for food purchases, at least for a few months. After that time, the price levels of staple grains in the rural areas will again become a critical indicator of food access. As discussed earlier, the expected shift in the crop mix of this year's harvest towards more expensive grains is likely to adversely affect this group.

CONCLUSIONS

Following the poor *belg* rains and rising emergency food needs in the first half of 1994, the good *kiremt* rains have brought a wave of relief and optimism to Ethiopia. The worst-case scenario of drought did not materialized this year, and the relief operation which is now beginning to wind down has been an overall success in averting famine.

Without detracting from these successes, this report cautions against becoming too optimistic. Long-term problems of famine vulnerability and low agricultural productivity remain. In fact, vulnerability is likely to have increased by the stresses of 1993/94 (though it is hoped they were mitigated by food aid distributions). The structural gap between food availability and food needs remains. Preliminary forecasts in this report show that the minimum import requirement, assuming a very good conclusion to the current agricultural season and an excellent *belg* harvest next year, is close to 725,000 MT.

In the short term, a much better harvest than last year's can be hoped for, but is not yet assured. The projected end-of-year stock position and forward planning of USAID/Ethiopia food deliveries puts the TGE and donors in a much more comfortable position to plan food logistics for 1995. Harvest assessments are due to be made by the RRC/Regional Governments (late September); EGTE (September/October); and FAO/WFP (November).

Given the expected relative scarcity of maize and sorghum in the coming year, USAID and other donors should consider the commodity composition of their 1995 food shipments, building on USAID's success this year in convincing the TGE to accept a part of Title III shipments in sorghum instead of wheat.

4. In FEWS terminology, the "coping strategies being used have a significantly costly or disruptive character." See also the FEWS Vulnerability Matrix p. 52.

Acknowledgements

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AISE—Agricultural Inputs Supply Enterprise—formerly AISCO
CARE—International in Ethiopia
DLCO-EA—Desert Locust Control Organization for Eastern Africa
EGTE—Ethiopian Grain Trade Enterprise—formerly AMC
FAO—United Nations Food and Agriculture Organization
FARM-Africa
FHI—Food for the Hungry International
ILCA—International Livestock Center for Africa
Ministry of Agriculture—Regional Bureaus of Regions 3, 4 and Southern Region/SEPAR
NMSA—National Meteorological Services Agency
NCA—Norwegian Church Aid
NTCC—National Trypanosomiasis Control Center
ORA—Oromo Relief Association
REST—Relief Society of Tigray
RRC—Relief and Rehabilitation Commission [Early Warning & Planning Services]
SCF-UK—Save the Children Fund/United Kingdom
UN-EUE—United Nations Emergency Unit for Ethiopia
USAID—United States Agency for International Development
WFP—United Nations World Food Program

FEWS Vulnerability Index

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, unseasonable "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 life-styles, 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 nontraditional 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 use 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 depend on 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 orbit 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 percent (based on a comparison with ground data). At a dekadal (ten-day) scale, 80 percent 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.