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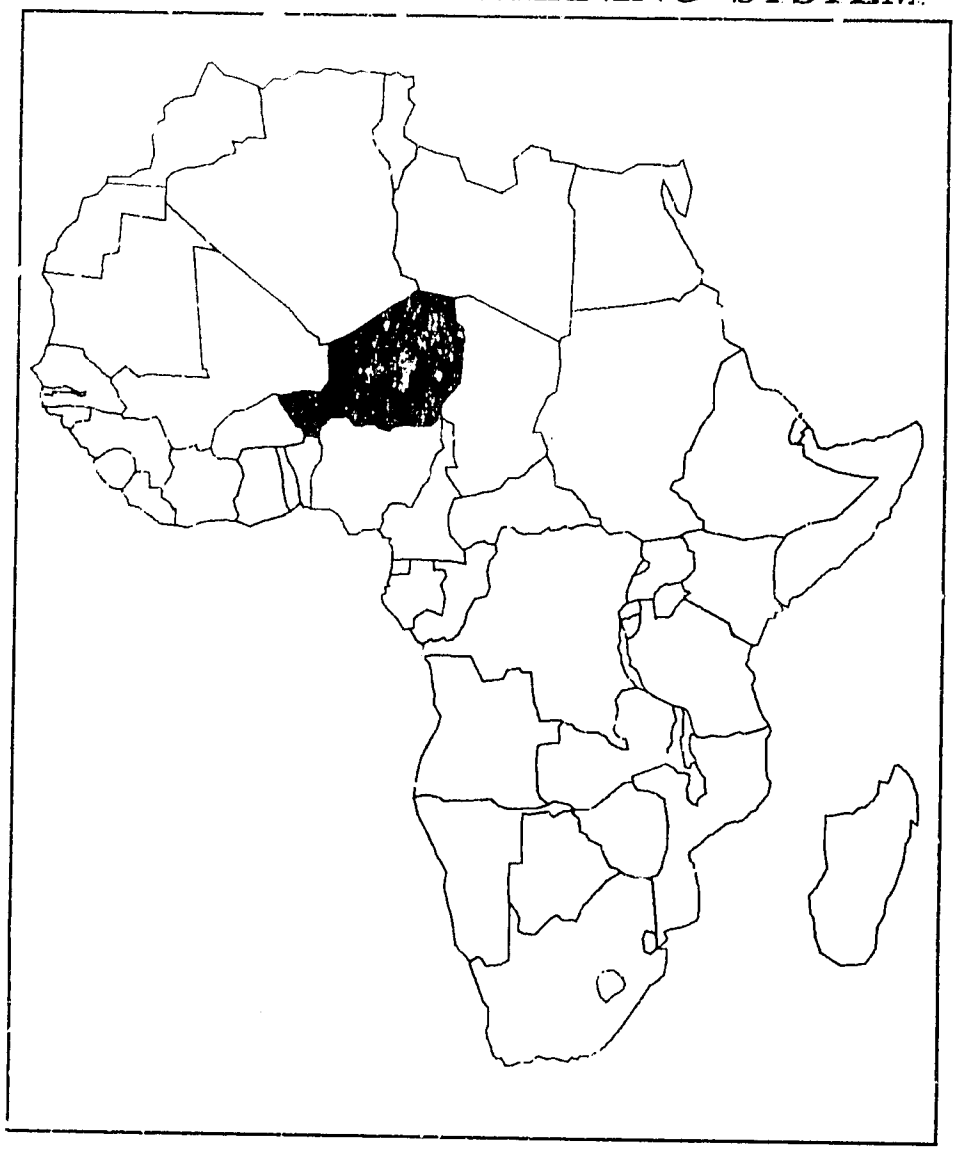
FEWS Country Report **OCTOBER 1988**

NIGER

A Two Million Ton Harvest?

FAMINE EARLY WARNING SYSTEM



Produced by the Office of Technical Resources - Africa Bureau - USAID

FAMINE EARLY WARNING SYSTEM

The Famine Early Warning System (FEWS) is an Agency-wide effort coordinated by the Africa Bureau of the U.S. Agency for International Development (USAID). Its mission is to assemble, analyze and report on the complex conditions which may lead to famine in any one of the following drought-prone countries in Africa:

- **Burkina**
- **Chad**
- **Ethiopia**
- **Mali**
- **Mauritania**
- **Mozambique**
- **Niger**
- **Sudan**

FEWS reflects the Africa Bureau's commitment to providing reliable and timely information to decision-makers within the Agency, within the eight countries, and among the broader donor community, so that they can take appropriate actions to avert a famine.

FEWS relies on information it obtains from a wide variety of sources including: USAID Missions, host governments, private voluntary organizations, international donor and relief agencies, and the remote sensing and academic communities. In addition, the FEWS system obtains information directly from FEWS Field Representatives currently assigned to six USAID Missions.

FEWS analyzes the information it collects, crosschecks and analyzes the data, and systematically disseminates its findings through the following publications:

- **FEWS Country Reports** - produced monthly during the growing season, and bimonthly during the rest of the year, and
- **FEWS Bulletins** - produced every ten days during the growing season.

In addition, FEWS serves the USAID staff by:

- preparing **FEWS Alert Memoranda** for distribution to top USAID decision-makers when dictated by fast-breaking events;
- preparing **Special Reports, maps, briefings, analyses, etc.** upon request; and
- responding to **special inquiries**.

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The work of the FEWS Field Representatives is coordinated by **Tulane University's School of Public Health and Tropical Medicine.**

NOTE: This publication is a working document and should not be construed as an official pronouncement of the U. S. Agency for International Development.

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October 1988

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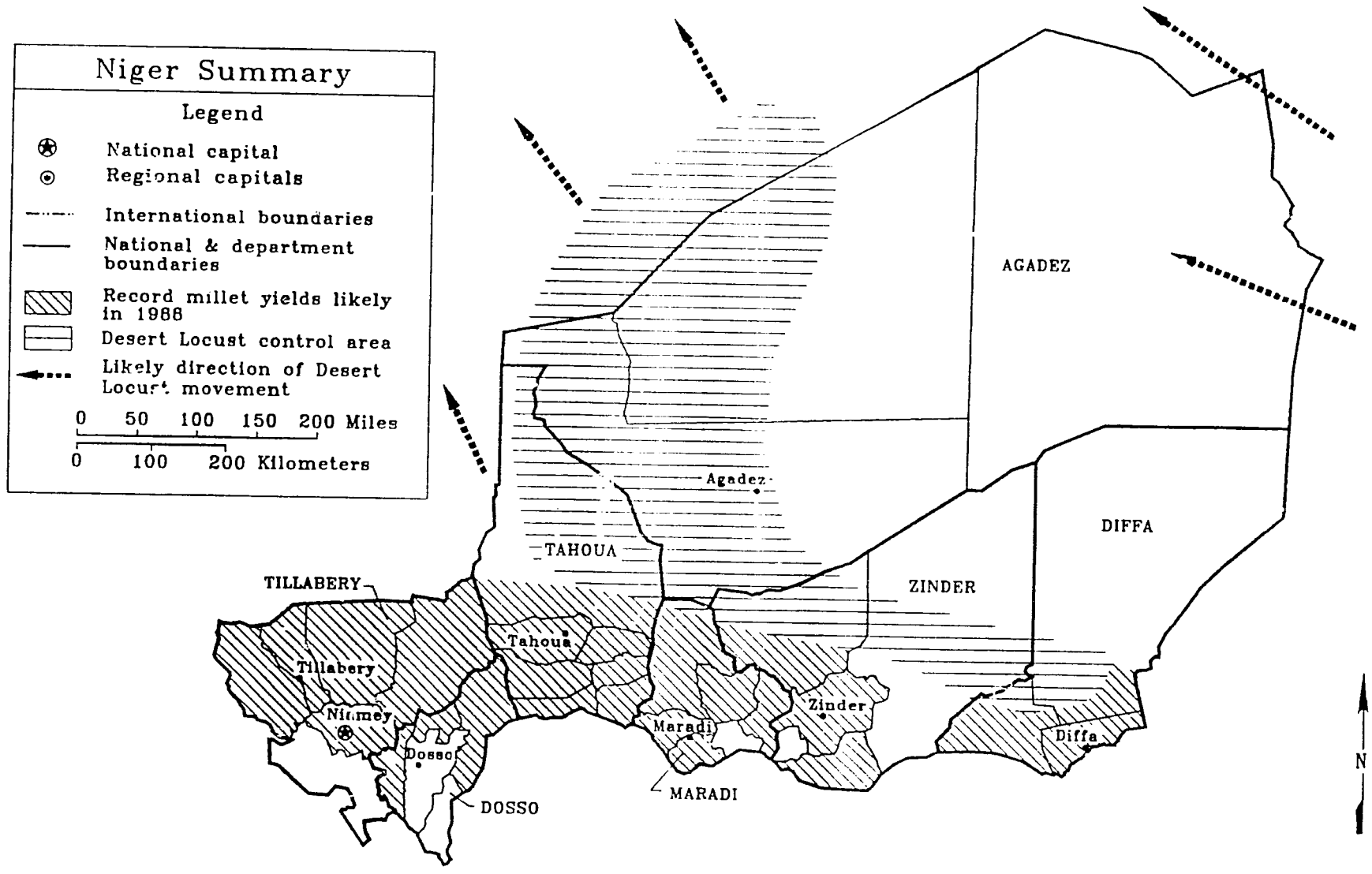
Map 1



FEWS/PWA September 1988

A Two Million Ton Harvest?

Summary

The 1988 national millet harvest could surpass 1,575,000 metric tons (MT), based on analyses of rainfall and satellite imagery. This would be 100,000 MT above the previous production record. The combined millet and sorghum harvest may reach close to two million metric tons. Most agricultural areas will experience their best harvests ever, in terms of yield and production. National estimates based on field surveys will be available soon. Desert Locust survey and control operations continue in the north, although the threat of any damage to current crops (now being harvested) is minimal. Grain prices continue to fall amidst expectations of a good harvest.

Harvest Prospects in Niger

By all accounts, harvest prospects appear to be better in 1988 than they have been since the beginning of the decade. Gross national production of both millet and sorghum could approach the two million metric ton mark, making 1988 a far better year than any previous ones. National surveys will eventually produce preliminary estimates of potential yields and harvest size. In the meantime, information available from season-long satellite coverage of rainfall and vegetative conditions permits some speculation. The rainy season was marked by a normal start, plentiful and regular rainfall across most of the country, few significant dry periods during the growing period, and a normal finish. Rainfall and vegetative conditions in all the arrondissements were almost uniformly better in 1988 than in even the best years (for each arrondissement) earlier in this decade. Satellite imagery of vegetative conditions (NDVI, see back cover) indicates that 1988 growing conditions were far better in most arrondissements than during 1985 and 1986, when excellent national harvests were produced. It is not difficult to suggest, therefore, that yields may be as good or better than in those years.

Table 1 compares vegetative conditions in 1988 to the vegetative conditions and yields of the best previous years in each arrondissement, and provides estimates of 1988 yields and production based on these comparisons.

Table 1: Gross Millet Production Scenarios for 1988

A Arrondissement	B 85-86 Avg Area Planted (HA)	C Best Yield Year Since82	D Compare 88 NDVI to Best Yield Year[1]	E Best Yield Since82 (KG/HA)	F 5%Better Yield[2] (KG/HA) (E*105%)	G 10%Better Yield[2,3] (KG/HA) (E*110%)	H GrosProd. IfBstYld (MT) (E*B)	I GrosProd. If5%Better (MT) (F*B)	J GrosProd. If10%Better (MT) (G*B)
Diffa	25200	1985	MB	517	543	569	13028	13680	14333
Maine Soroa	25195	1985	MB	450	473	495	11338	11904	12471
N'Guigmi	2756	1985	MB	417	438	459	1149	1207	1264
B. N'Gaoure	137403	1983	MB	432	454	475	59358	62326	65294
Dogondoutchi	197292	1985	MB	512	538	563	101014	106064	111115
Dosso	169832	1982	S	450	450	450	76424	76424	76424
Gaya	68090	1986	S	612	612	612	41671	41671	41671
Loga	70350	1985	B	441	463	463	31024	32575	32572
Aguie	74974	1986	S	616	616	616	46184	46184	46184
Dakoro	132600	1985	MB	435	457	479	57681	60565	63449
G. Roumdji	104991	1983	B	500	525	525	52496	55120	55120
Madarounfa	95248	1985	MB	566	594	623	53910	56606	59301
Mayahi	132143	1985	MB	450	473	495	59464	62438	65411
Tessaoua	112334	1986	B	569	597	597	63918	67114	67063
Filingue	190253	1987	MB	385	400	400	73247	76101	76101[4]
Kollo	150798	1985	B	603	633	633	90931	95477	95455
Ouallam	112324	1983	B	338	355	355	37966	39864	39875
Say	69906	1986	S	639	639	639	44670	44670	44670
Tera	161835	1986	B	461	484	484	74606	78336	78328
Tillabery	84521	1985	MB	457	480	503	38626	40557	42489
B. N'Konni	85654	1986	MB	605	635	666	51820	54411	57002
Bouza	70612	1982	MB	450	473	495	31775	33364	34953
Illela	77500	1986	MB	501	526	551	38828	40769	42710
Keita	52507	1986	B	518	525	525	27199	27566	27566[4]
Madaoua	60551	1987	MB	699	734	769	42325	44441	46558
Tahoua	88103	1986	MB	405	425	446	35682	37466	39250
T. Tabaraden	14619	1987	MB	464	487	510	6783	7122	7462
Goure	55842	1985	S	475	475	475	26525	26525	26525
Magaria	165716	1983	MB	554	582	609	91807	96397	100987
Matameye	57919	1983	S	584	584	584	33825	33825	33825
Mirria	207505	1985	MB	510	525	525	105828	108940	108940[4]
Tanout	133178	1985	MB	428	449	470	57000	59850	62594[4]
TOTAL	3187747			501	520	533	1578100	1639561	1676960

Sources: Direction des Etudes, Programmation et Statistiques Agricoles yields, subjective interpretations of 1982-88 NDVI integral and decadal imagery by FEWS/PWA.

[1]Note: MB (B, S) = 88 NDVI much better (better, same) than year of best yield between 1982-87.
[2]Exceptions to formula for columns F and G: if D = S (same), use E.
[3]Exceptions to formula for column G: if D = B (better), use F.
[4]Exceptions to formula for columns F & G: if 1980 or 81 was best yield year, use that year yield.

Vegetative conditions in 1988 were equal to, or in most cases much better than, those of the best previous year in any of the arrondissements (see Column D). If the general relationship between NDVI and yield established in research applies, 1988 yields in each of the arrondissements could equal or surpass the best yields on record. Assuming that this may be the case, multiplying Column E by Column B projects the size of the 1988 gross millet harvest (shown in Column H). Using these assumptions, gross production could total approximately 1,578,000 MT, approximately 125,000 MT more than the previous best harvest (1985). Statistics on area planted, gross production, and average yield for the national millet crop in previous years are shown below.

Table 2: Historical Millet Production

Year	Planted ('000 HA)	Gross Production (MT)	Yield (KG/HA)
1987	3,016	996,000	330
1986	3,239	1,383,000	427
1985	3,168	1,449,000	457
1984	3,025	771,000	255
1983	3,135	1,298,000	414
1982	3,083	1,292,000	419
1981	3,038	1,313,000	432
1980	3,072	1,362,000	443

Source: DEPSA

In some of the arrondissements, vegetative conditions during 1988 were significantly better than during the best yield years between 1982 and 1987. If one assumes that the 1988 conditions were largely a consequence of the precipitation pattern and that previous yields were constrained, in part, by soil moisture levels, then several scenarios for potential 1988 yields and production can be examined:[1]

- Column I of Table 1 shows the impact on the local and national harvests if a 5% rise in yield were assumed only for those arrondissements in which 1988 vegetative conditions were better or much better than during the previous best yield year. Gross national production would increase 59,000 MT above the total figure shown in Column H.

- Column J of Table 1 shows the impact on local and national harvests if yields were to rise 10% above the previous best yield for only those arrondissements in which 1988 vegetative conditions are much better than in the year of the best previous yield. Gross national production would increase about 100,000 MT over the total shown in Column H.

Prospects for the sorghum crop are as good as those for the millet crop. Nevertheless, because of a limited number of appropriate growing sites, sorghum production does not vary much from year to year if rains are adequate. Gross sorghum production could be slightly above the previous highs of 1980 (367,995 MT) and 1987 (365,847 MT).

[1]Column D of Table 1 indicates whether 1988 vegetative conditions (as seen in season-long NDVI imagery) were much better (MB), better (B), or largely the same (S) as those during the best yield year. The comparison is a subjective interpretation. The yield scenarios discussed here are not intended to suggest that research has yet established a quantitative relationship between yields and the growing conditions seen in NDVI.

Rains in Niger

The rainy season is winding down on schedule, allowing the harvest to occur on time. The majority of agricultural areas benefitted from above-average rains that were well-spaced throughout most of the season. Almost all rain stations reported rains better than the mediocre 1987 totals, except for semi-desertic Tillia and Tasker. Similarly, most stations received more rain than the 20-year average, with the exceptions of Filingue, Tahoua, Aguie, and Tessaoua. Many stations reported 1988 rainfall levels that surpassed even the 30-year average.

Desert Locusts in Niger

The likelihood of crop damage by Desert Locusts is now almost nil. Significant populations are still found around N'Guigmi and north and west of Agadez; these areas will need control until late in this year. Swarms from other countries (Chad and Sudan) are still possible, but these would be moving toward winter breeding areas in Northern Africa. Niger may face a significant threat from Desert Locusts next summer.

Cereal Prices

Cereal prices in Niamey, as in the rest of the country, are dropping significantly in anticipation of a good harvest. Between September 1 and October 6, millet prices fell from 104 to 72 FCFA (a 30% decline), sorghum fell from 107 to 71 (a 34% decline), maize from 117 to 91 (23%), and niebe from 238 to 157 (34%).

Regional Weather and Vegetation

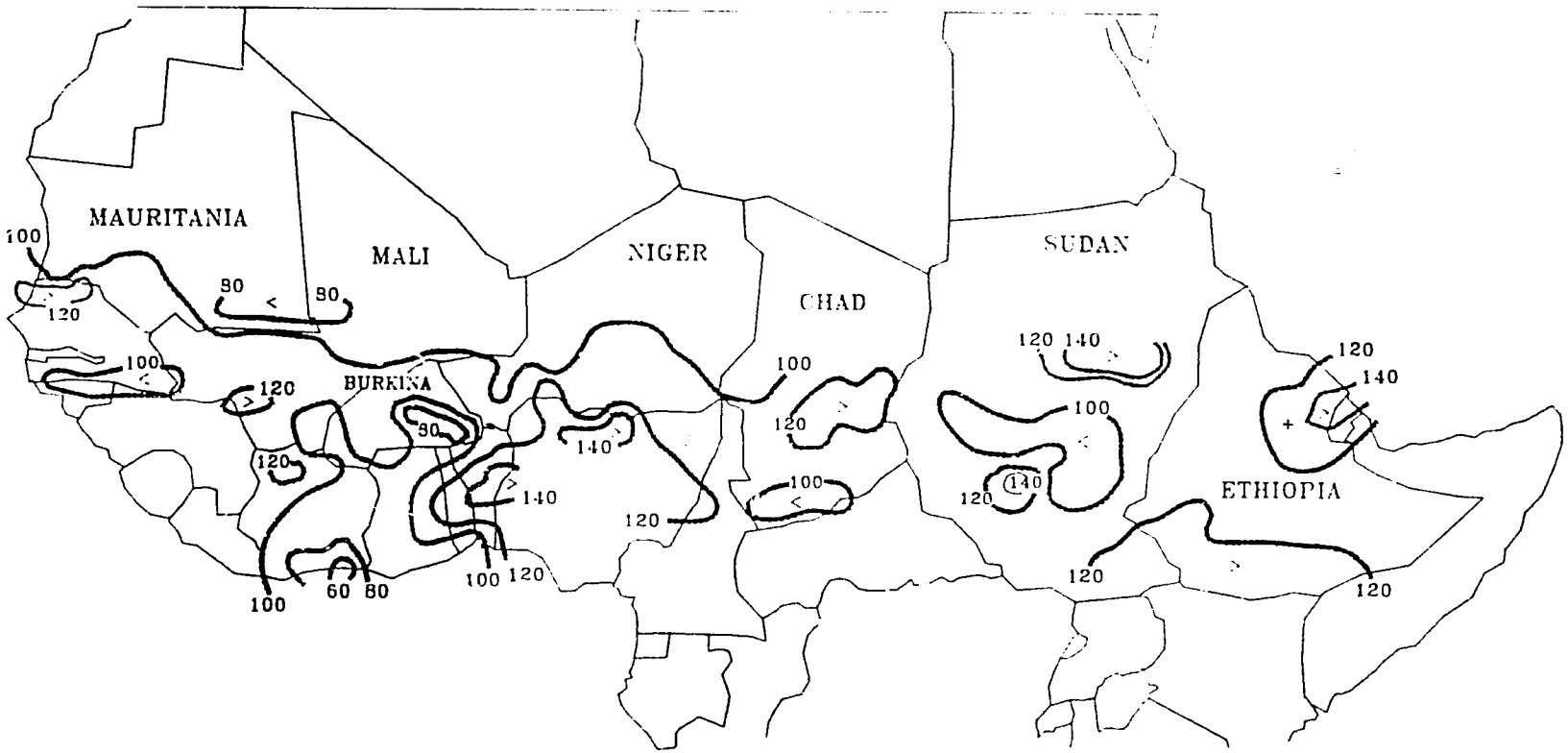
The 1988 growing season was unusual in that the Intertropical Convergence Zone (ITCZ, see inside of back cover) moved farther north and remained there longer than at any other time in the last ten years. As a result, rainfall across the FEWS-monitored countries, particularly in the northern fringes of the Sahelian zone, were generally well above amounts received since the late 1960s. Many stations even approached or surpassed the recently unattainable 30-year average (1951-1980). During late August, the ITCZ reached its northernmost position over West Africa at 23° N. This is approximately 4° N of its average position (1977-1987) for that time period (a degree at these latitudes represents approximately 110 kilometers). At the same time, the ITCZ was also well north of its average position over East Africa, accounting for the heavy rains in Sudan and Ethiopia during late August and early September. By the end of September, the ITCZ was still much higher than usual, located at 18° N for only the second time for that period in the last ten years (the ITCZ's ten-year September norm is 17° N). By early October, however, the average ITCZ had moved well south (as low as 11° N over eastern Sudan). The ITCZ's general southward trend signals the end of the rainy season across the Sahel, in Sudan, and northern Ethiopia.

Cumulative rainfall through the end of September was generally equal to, or above, the long-term (1951-1980) average in FEWS-monitored countries (see Map 2). The only large Sahelian area that had received less than average cumulative rainfall was in southern Gourma Province (south of Fada N'Gourma Town) in Burkina. In the first ten days of October, the 25 millimeter isohyet was located near Cap Vert (Senegal), rising toward Tidjikja (Mauritania), and then falling south and east toward Bamako (Mali), into southern Burkina, across the southernmost parts of Niger, and into southern Chad. Heavy rains continued to fall in parts of southern Chad. Some localities received over 50 millimeters during the first ten days of October, and rainfall levels may have reached 150 mm or more in the southwest. Rainfall in south central Mauritania was locally unusually heavy, with 60 to 100 millimeters recorded at some stations. Heavy and regular rains continued through the middle of

Rainfall

Percent of Normal

June 1, 1988 – September 20, 1988



Source: JAWF assessments
FEWS/PWA, September 1988

October in eastern Sudan. Rains continued in Ethiopia as well, with much of the Blue Nile watershed in that country receiving up to 100 mm of rain. The above-normal rainfall in these areas will eventually bode well for Lake Nasser and Egyptian irrigated agriculture, where water shortages have had serious impact.

Persistent and abundant rains during August and early September brought flooding, with consequent loss of life, homes, and crops in Burkina, Niger, Chad, and Sudan. Late September floods are reported to have damaged small dams and dikes in Mauritania, as well. Reports indicate that among western Sahelian countries, Chad has been the hardest hit by floods. Flooding occurred in the Gezira and in other irrigated areas of Sudan in August and early September, as a result of local rainfall and the rise of the Blue Nile.

Satellite imagery indicates that vegetative growth has already reached a peak and is now declining in many parts of the Sahel, Sudan, and Ethiopia (see Map 3). A more general decline can be expected to reach the remaining areas in coming days, as the rainy season draws to a halt. Rangelands are starting to dry up, crops are maturing and being harvested, and the dry cool season is beginning. AGRHYMET, the regional agro-meteorological facility, indicates that soil moisture levels in much of the Sahel are sufficient for the remaining long-cycle crops to survive until harvest. Notable exceptions to this include the area around Nema and Kiffa in Mauritania, an area near the towns of Podor and Matam in Senegal, areas in the Mopti and Gao Regions of Mali, and an area around Ouahigouya in northern Burkina.

Seasonal vegetation levels across the Sahel and in Sudan are much higher than average (see explanation of NDVI on inside back cover of this report), and in many places are above the maximum levels recorded (since 1981 when NDVI imagery became available). At the least, these elevated values would imply a great improvement in pasturage over previous years. In agricultural areas, the high NDVI values probably also herald better-than-average, if not record, grain yields.

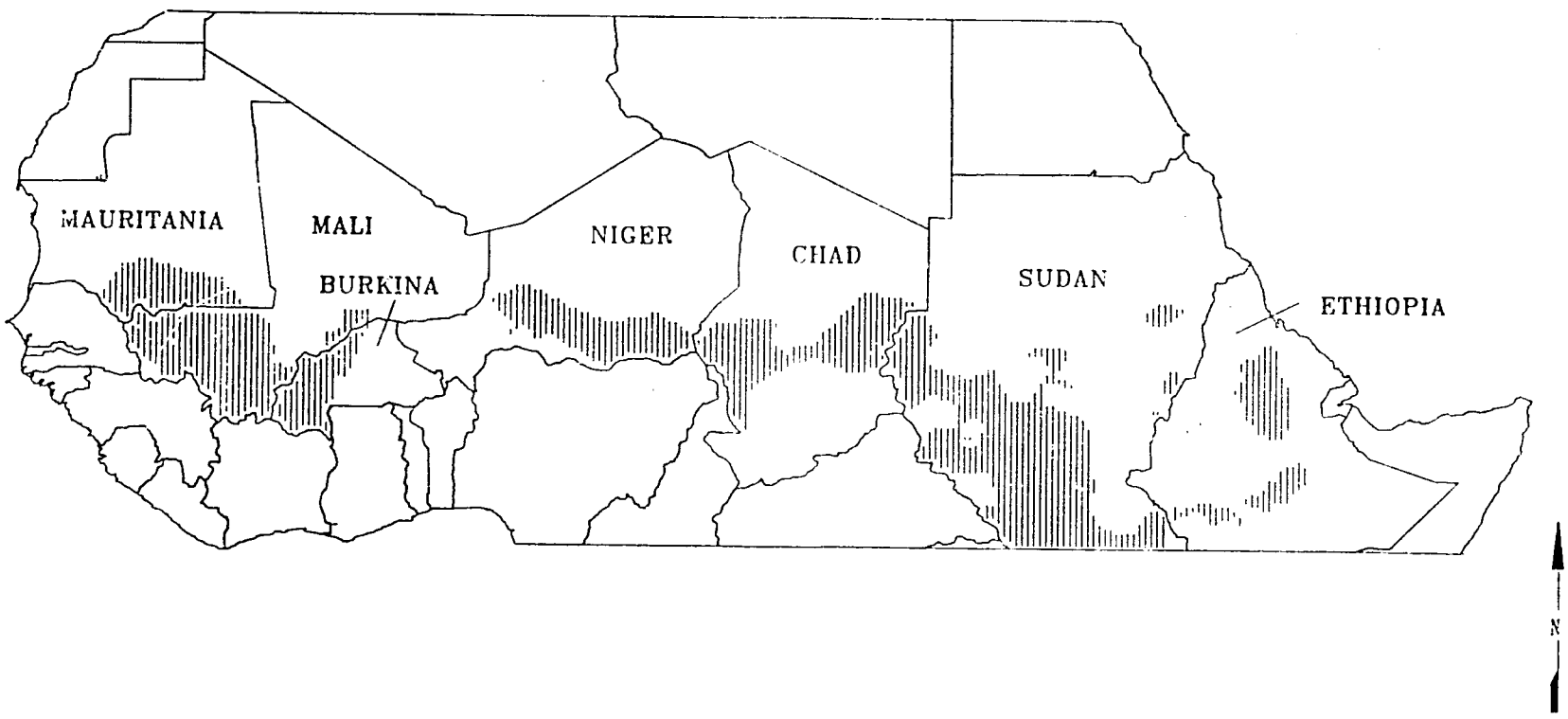
Rivers in all the FEWS-monitored countries are reflecting the extremely good rainfall of this rainy season. The Senegal River at Kaedi (Mauritania) rose to its highest level since 1975, despite the filling of the Manantali Dam in Mali. The Manantali Dam is scheduled to have a controlled release in October. By the end of September, the Niger River had started to recede from average to above-average levels in Mali, and was still rising in Niger, where local rains had already pushed the river's level to record heights. The Blue Nile, at Khartoum, reached its highest level since 1946 at the beginning of September.

Regional Desert Locust Summary

Starting in late September, heavy locust activity has developed in southwestern Mauritania (see Map 4). While the ITCZ moved south rapidly in the east, it has remained farther north over Mauritania, helping to push swarms from southeastern Mauritania to the north, west, and south. The locusts are present in all stages in Mauritania from emerging hopper to egg-laying adult, with egg laying expected to continue through October. As rangelands begin to dry in the infested areas, the likelihood of infestation of any rainfed crops and recessional crops along the Senegal River will increase. (Desert Locusts generally do not infest crops when grasses are available, as grasses are their preferred food.) The future movement of swarms arising in Mauritania will depend on the position of the ITCZ. If the ITCZ remains in the north, swarms may continue to move southward into Senegal, where moderate infestations have already been reported. When the ITCZ finally moves south along the western end, any remaining swarms will likely move northward, as usual, to winter breeding grounds in northern Mauritania, Western Sahara, Morocco, and Algeria.

Map 3

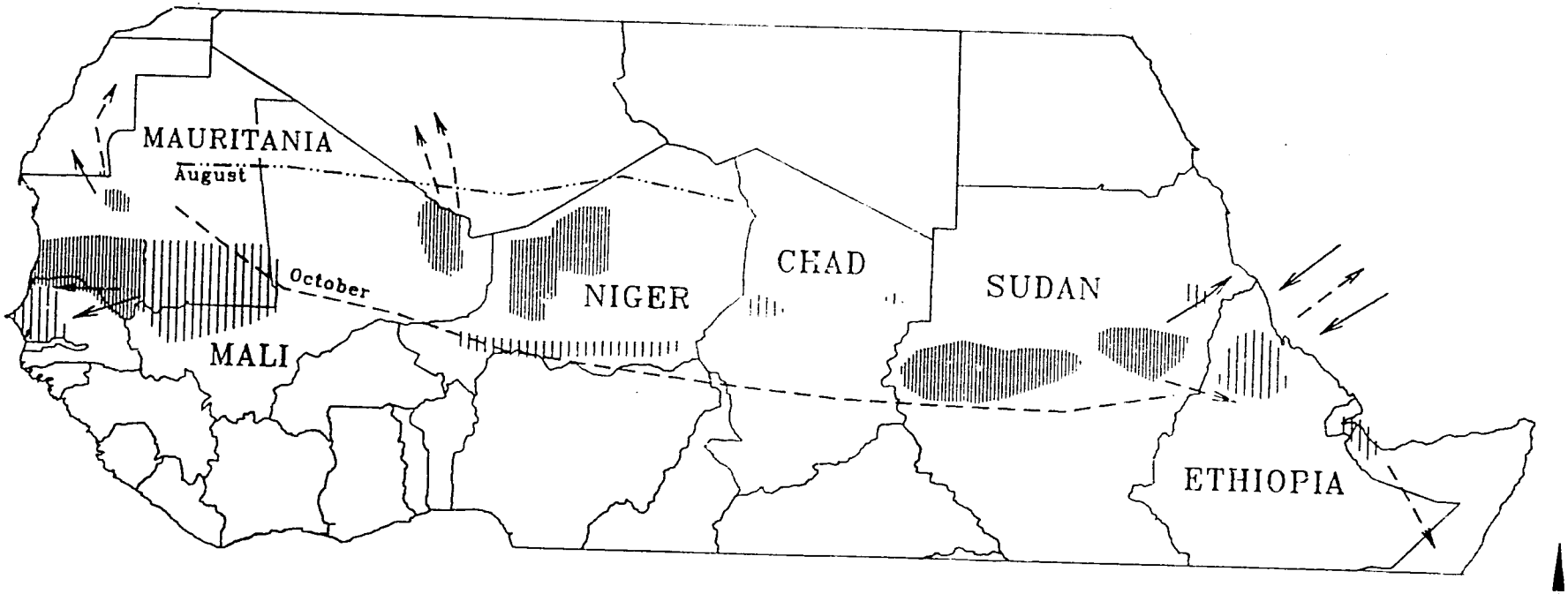
Areas of Declining Vegetation



Source: NOAA/NASA, AVHRR GAC Imagery
FEWS/PWA, October 1988

Desert Locusts

To September 30



→ Current movement of swarms and hopper bands

--> Possible future movement

—·—· Average ITCZ at end of August

--- Average ITCZ in early October

Heavy Desert Locust activity

Light and moderate Desert Locust activity

SOURCE: Mission Cables; AID/OFDA/DLTF; NOAA
FEWS/PWA, October 1988

Despite earlier indications that Desert Locust infestations would be a serious problem for crops in Chad, surveys in September have found few bands or swarms. It is likely that heavy rains over Chad's initial infestation areas drove the locusts first northward, and then out of the territory surveyed by national crop protection services. Second generation locusts should soon be hatching in the east. Known egg fields are under surveillance, with the hope that newly emerged hoppers can be sprayed quickly

Infestations in western Sudan have remained intense. The swarms from these areas have moved north and east across the northernmost limits of rainfed agriculture, where they have caused some crop damage in localized areas. Control efforts in Sudan have been frustrated by a lack of personnel and resources. The problem has been exacerbated by a lack of transport facilities to move what few resources exist to where they are needed. Locust swarms in eastern Sudan have become more important, and are moving north and east toward winter breeding grounds along the Red Sea coast. Because the ITCZ has dropped rapidly in the east, swarms now near the Red Sea coast may be blown toward Saudi Arabia; swarms south of the ITCZ may be blown east and south across Ethiopia into Somalia.

Infestations in and near the Air Mountains of northern Niger are still the target of major control efforts. The greatest locust activity is to the west of the Air Mountains. Desert Locust activity in Mali's Adrar des Iforas includes locusts in all stages of development. The ruggedness of the terrain complicates the control activities currently underway.

Less serious, but still important, outbreak areas include:

- the border area between western Mali and southern Mauritania,
- a long band across southern Niger,
- west-central and northern Chad,
- residual infestations in northern Ethiopia, and new infestations in Djibouti and northwestern Somalia. Recent aerial surveys of northern Ethiopia have found only moderate swarm activity. Individual swarms have recently been noted in Djibouti and northwestern Somalia, probably marking the beginning of movement to winter breeding grounds in Somalia.

Key Terms

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

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

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

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