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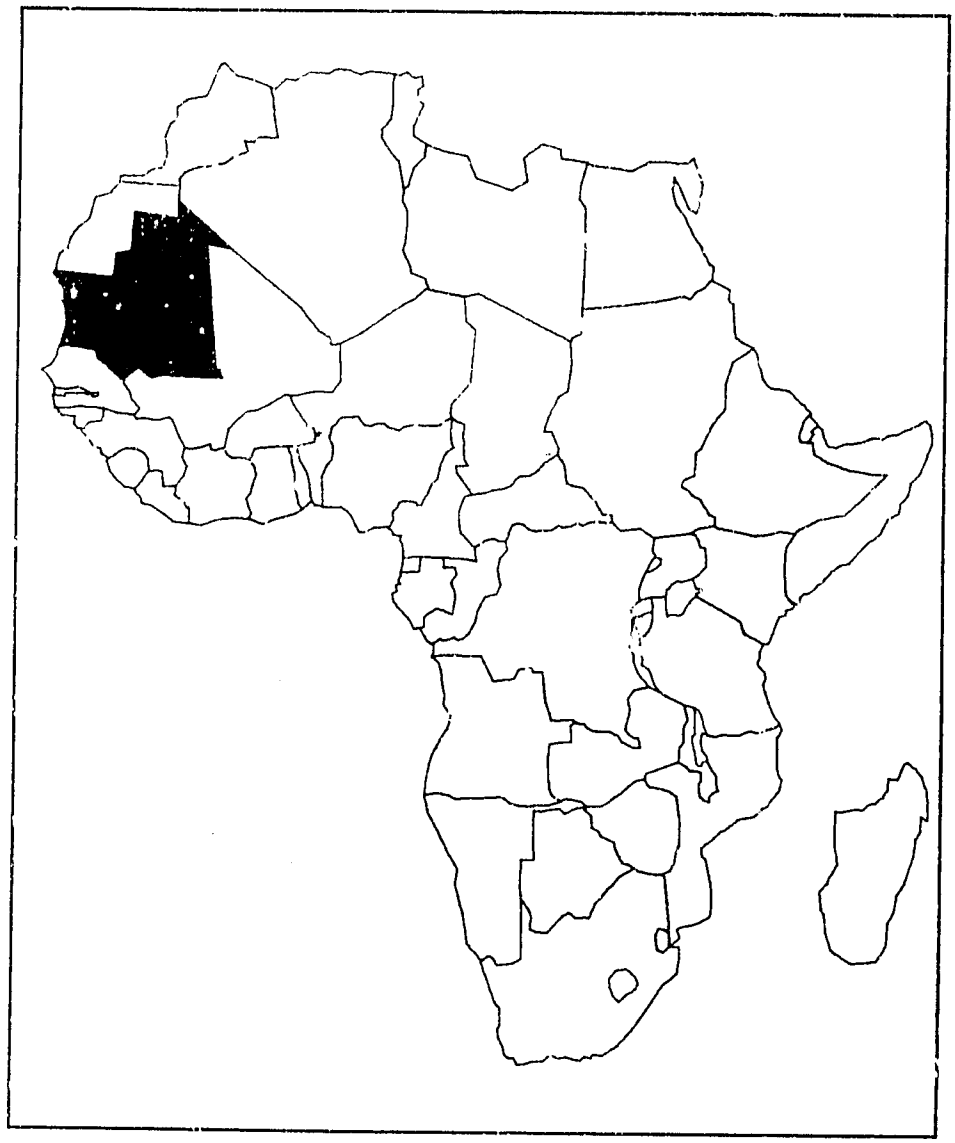
FEWS Country Report **SEPTEMBER 1988**

MAURITANIA

Crop Potential High; Food Imports Still Required

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.

MAURITANIA

Agricultural Potential High; Food Imports Still Required

September 1988

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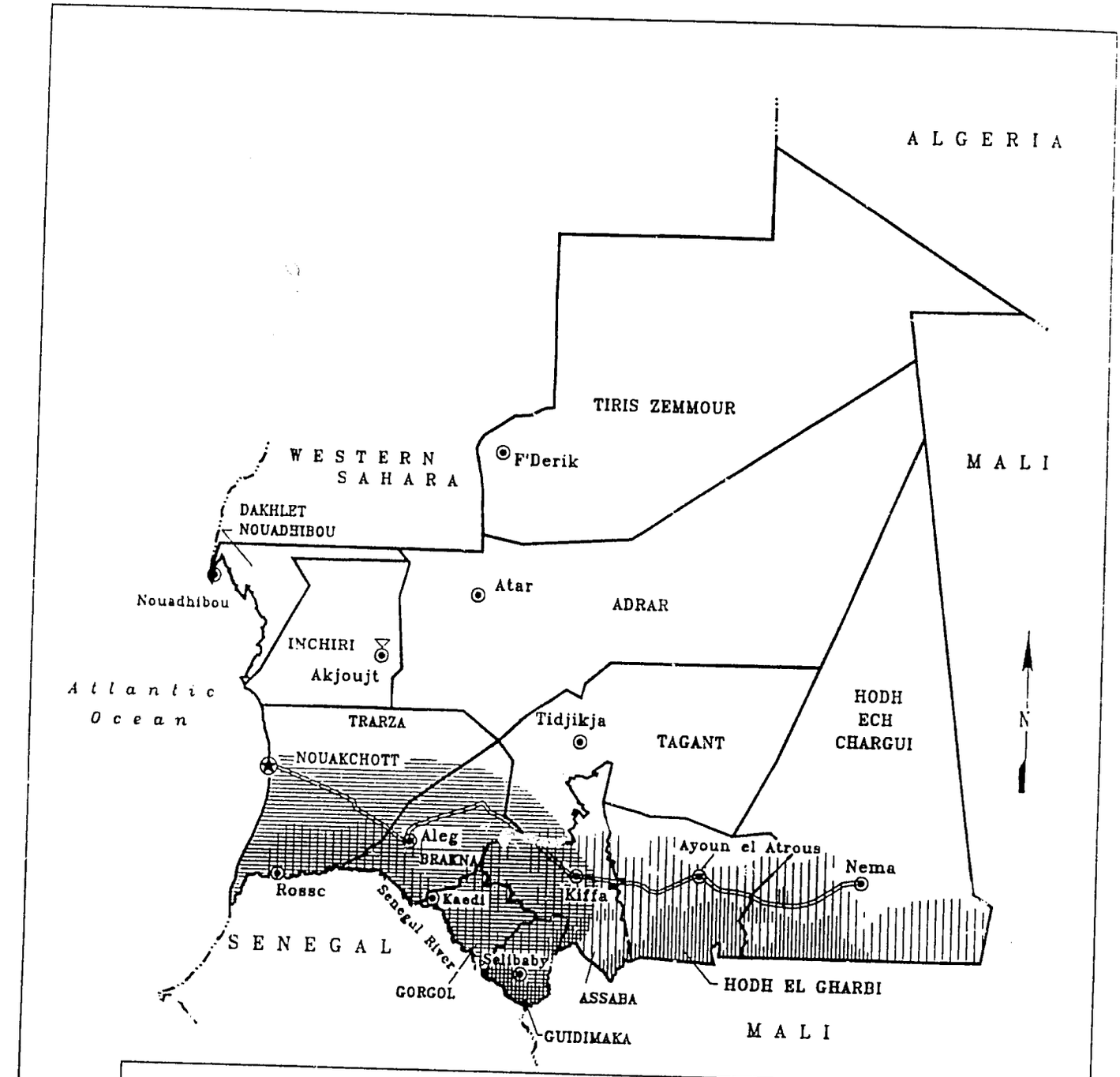
Map 1



Mauritania Summary

Legend

- National Capital
- Regional Capital
- Department Seat
- International Boundaries
- National & Regional Boundaries
- Road
- Area with greatest pasture potential
- Areas with greatest rainfed agricultural potential
- Heavy Desert Locust activity
- Flood emergency affects 4,000 people

0 50 100 150 Miles

0 50 100 150 Kilometers

FEWS/PWA, September 1988

Crop Potential High; Food Imports Still Required

Summary

Mauritania's cereal production should be distinctly higher than in recent years, although it is unlikely to meet more than 50% of the country's food needs. (Local production has tended to supply only 30% of domestic food needs.) As in other countries in the Sahel, the 1988 rains have brought localized flooding. Although late in arriving, local rains have been very beneficial to rainfed, lowland recessional, and wadi recessional agriculture. The rains have also produced good pastures, allowing herders to bring their animals much farther north than in recent years. Current and soon-to-arrive food aid stock will be adequate for Mauritania's needs through the end of 1988.

Agricultural Potential

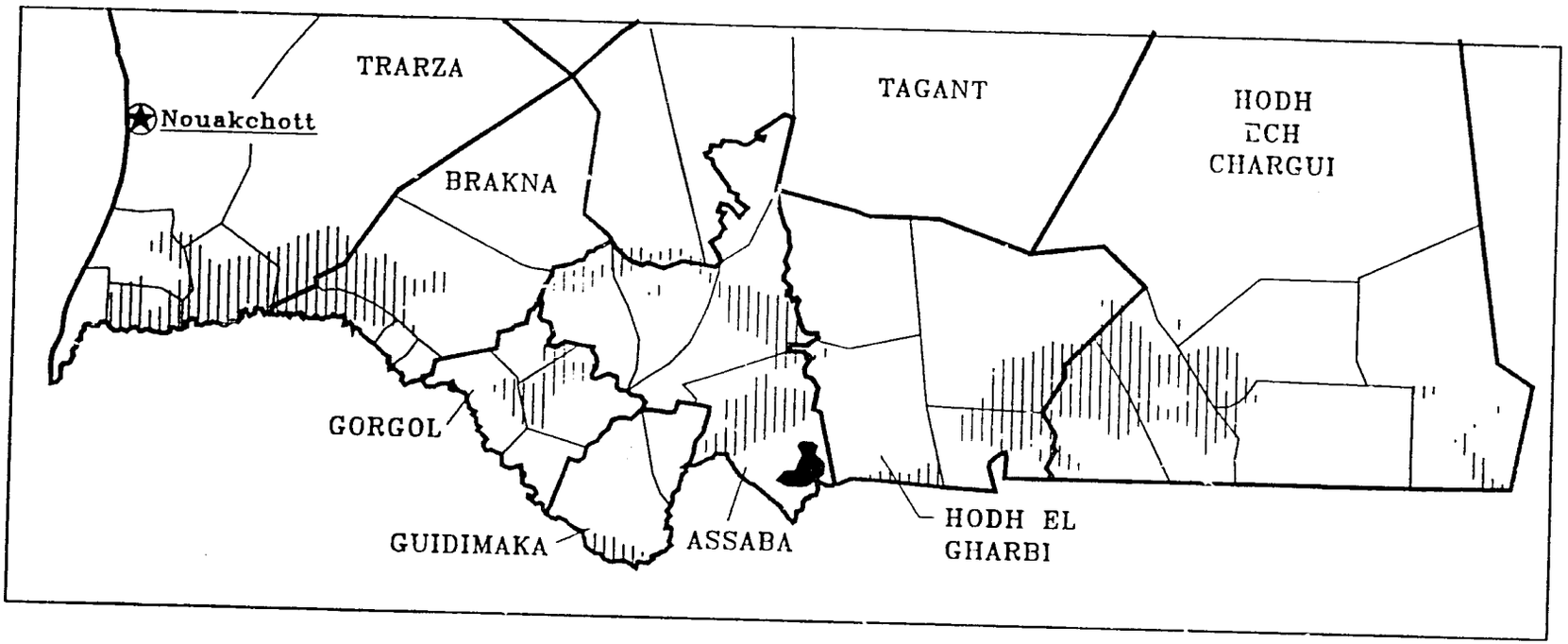
Despite some early problems, Mauritania's 1988 growing season has been marked by strong and steady rains both over rainfed cropping areas and over the watersheds that feed the country's flood, wadi, and lowland recessional territories. Compared to historical norms, steady rains started about a month late. Although a dry spell at the beginning of July forced farmers to replant rainfed crops at the end of that month, rainfall since then has been strong enough to make up for the slow start. Much of Mauritania's agricultural (and pastoral) territory shows much higher vegetation levels (based on NDVI, see inside back cover) than have been seen since 1982. Most of the remainder of the country shows vegetation levels that are close to the historical maximum. In fact, only one small area shows vegetation levels that are significantly lower than the historical maximum (see Map 2). A preliminary estimate of agricultural production should soon be available from the current joint crop assessment mission of the United Nations Food and Agriculture Organization (FAO) and the Interstate Committee to Fight Drought in the Sahel (CILSS).

The main constraints on overall production this year will have been the amount of manpower and seed available and the delayed start to the season. This year, about 6,700 Nouakchott residents took advantage of the annual free-transport campaign to return from the city to their farming areas for the start of planting. In 1987, the number transported was 8,000. This decline may indicate less than optimal manpower levels for the 1988 growing season.

Rainfed Agriculture

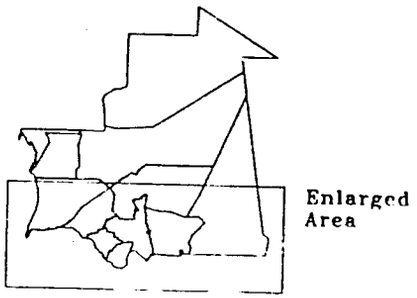
For the most part, cumulative rainfall in the southeast (the main millet and sorghum producing area) has been better than that of last year and close to the 30-year average. Mauritania's 1987 net rainfed production (75,000 metric tons) was more than 30% higher than that of 1986. Rainfed production should be higher still in 1988.

Growing Season NDVI
1988 vs Maximum Levels Over the Previous Six Years



Vegetation levels for season higher than in previous six years

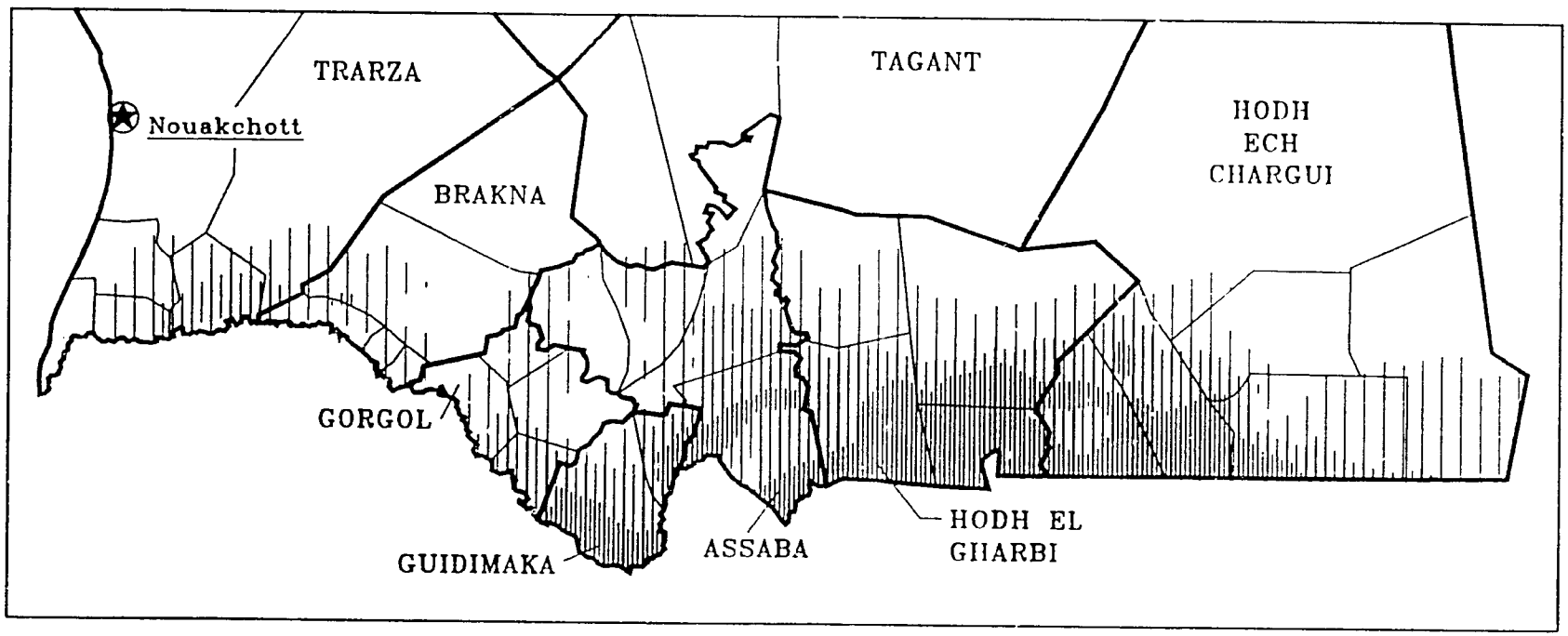
Vegetation levels less than maximum seen in previous six years



The growing season has been approximated as June 11 through September 30

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

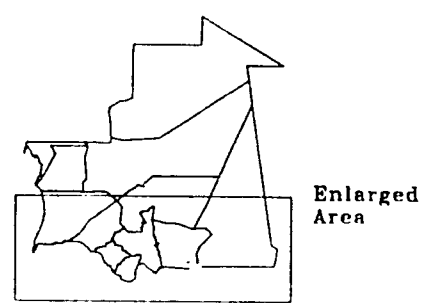
Growing Season NDVI
1988 Levels



Highest NDVI: Areas of best rainfed yield potential

Middle Range NDVI: Possible extent of rainfed agriculture

Lower NDVI: Probable extent of pasturage



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

Even though total rainfed production should be good, there are still a few localities within the traditional rainfed zone that have not received the long and steady rains seen elsewhere. Chief among these are the southeast corner of Hodh ech Chargui Region, a patch at the southern end of the border between Hodh ech Chargui and Hodh el Gharbi regions, and a strip across Guidimaka Region and through southern Assaba Region. These areas are visible on Map 3 as gaps in the area showing the best rainfed crop yield potential.

Flood Recessional Agriculture

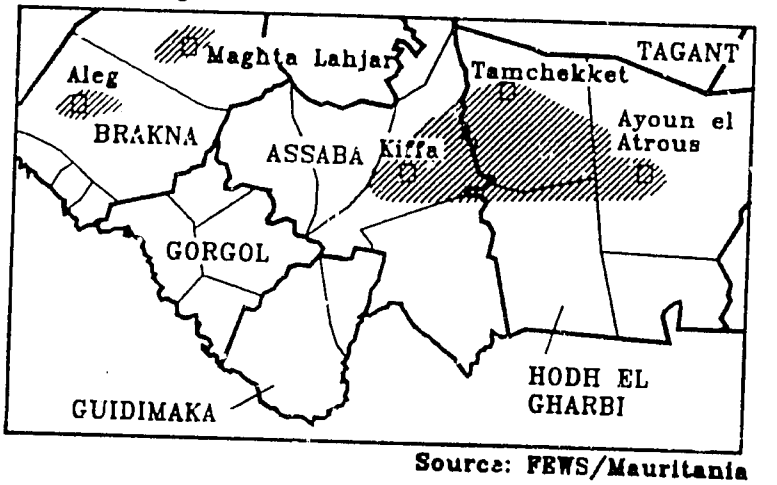
This year, the Senegal River is experiencing its highest flood in over 20 years (the crest at Kaedi was 11.5 meters, the highest level since 1975). When compared to floods since the turn of the century, however, this year's level is considered average. In 1987, the Senegal River did not flood downstream from Kaedi (Gorgol Region), effectively preventing flood recessional agriculture in Brakna and Trarza regions. The current flood has occurred without the benefit of water from the Manantali Dam, which is situated on a major branch of the Senegal River in Mali. A controlled release of water from that dam planned for the month of October should help maintain the height of the Senegal, allowing recessional areas to remain flooded for a beneficial duration. The full extent of this year's flood is not certain, but will at least be greater than the 48,000 hectares (ha) inundated by the somewhat weak flood of 1970. (In 1987, the area flooded was 24,000 ha and flood recessional agriculture produced only 14,000 metric tons (MT) net of maize and sorghum.)

Lowland and Wadi Recessional Agriculture

Both the lowland and wadi recessional harvests should show a marked improvement over last year's combined production of 8,000 MT. In Mauritania's southwest, the rains started fairly late this year, but have climbed dramatically toward the long-term averages since the beginning of August. There has been little to no rainfed agriculture in this area over the last several years. While cumulative rainfall this year has topped 300 millimeters (mm) in some areas of the southwest, it is unlikely that the rainy season will have lasted long enough to permit a good yield. The rainfall will at least be beneficial to lowland recessional agriculture. (Note: Lowland recessional cultivation takes advantage of water that collects in depressions either from runoff or by a general increase in the water table. As the resulting pool shrinks at the end of the rains, crops are planted in the moist soil around the pool's edge.)

Rains over the Tagant Plateau have been much heavier this year than in the recent past, allowing the dams and dikes on the various wadis flowing from that area to fill well. The first areas to receive good flows were near Aleg and Maghta Lahjar of Brakna Region and within the triangle formed by Ayoun el Atrous, Tamchekket, and Kiffa (see Map 4). Moderate rains continued in the area through mid-September, which should have allowed streams farther south to fill well, compensating for poor rains along the Brakna-Gorgol border.

Map 4: Filling Dams



Source: FEWS/Mauritania

Broken dams are a potential problem in the wadi recessional areas. Reports of such damage in Hodh ech Chargui, Hodh el Gharbi, and Assaba regions are now being confirmed. There has been severe flooding in and near the city of Akjoujt in Inchiri Region, well outside of the usual agricultural zone. Some houses reportedly stood one meter deep in water, and two nearby dams were broken by heavy flows. The loss of the dams will hinder the wheat cultivation that takes place in the area. Relief was quickly provided to the affected people in this city of 4,000.

Irrigated Agriculture

The area of land cultivated in irrigated crops during 1988 is reported to have increased over the 1987 amount. This repeats the pattern seen in 1987, when irrigated lands were increased from 8,300 ha to 12,600 ha. While the total increase for 1988 is not yet known, at least 300 ha were added to irrigated lands in Gorgol Region. Considering that yield for irrigated crops does not change appreciably from year to year, Mauritania's 1988 irrigated production should be at least as good as, if not better than, last year's net production of 32,000 MT.

Pastoral Potential

Pastures remained strong through the end of September, although vegetation images suggest that pastures have begun their annual decline. The possible extent of decent pasture this season is shown in Map 3. This level of vegetation extends farther north than was apparent for either 1986 or 1987. Pasturage has been reported in Trarza and as far north as Tagant, although the grasses are too sparse to be picked up by vegetation imagery.

This summer of good pasture will improve the condition of those herds in the far southeast that were reported to have been greatly weakened by a near lack of rainfall in 1987. One year of good fodder is not enough, however, to make up for years of poor conditions. It will take several more years of good pastures for Mauritania's herds to recuperate.

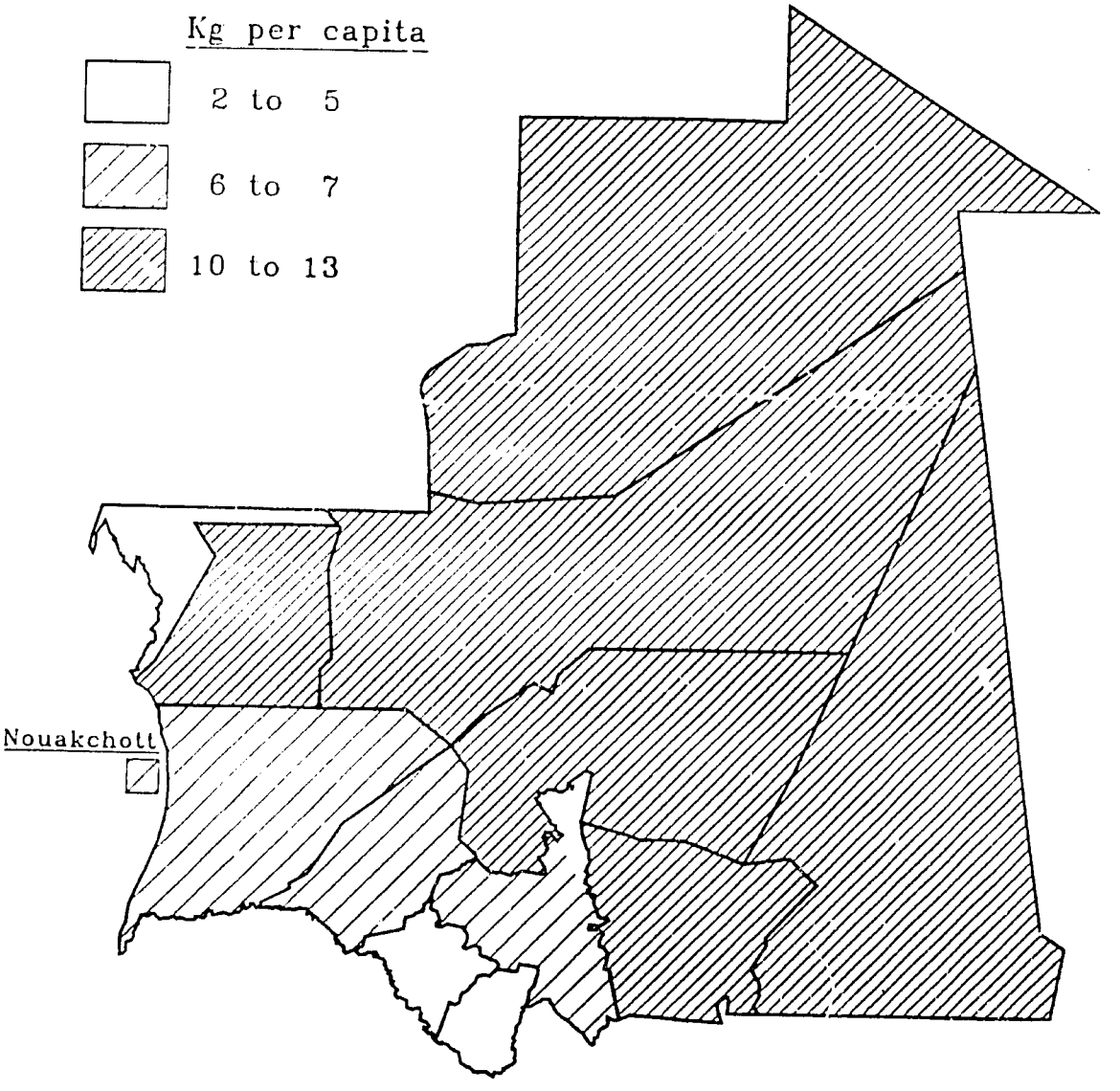
Locusts

Desert Locusts have been present all summer in various parts of southeastern and central Mauritania, where the well spaced rains provided an excellent environment for their breeding and development. By the end of September, swarms and hopper bands were moving to the north, west, and south out of these areas. Locust swarms in southwest Mauritania are now laying eggs, and are likely to continue doing so through the end of October. The unpredictability of the rainy season in this area makes it difficult to say whether the rains will continue into November or end abruptly, removing the condition (moisture) that is necessary for the eggs to hatch. A team of locust control experts that visited Mauritania at the end of September has determined that the situation is sufficiently grave and geographically defined to warrant the use of medium-size aircraft (DC-3s), but not so grave or widespread as to require the larger DC-7s. The situation could change rapidly, depending upon how quickly the rainy season ends (see the Regional Desert Locust Summary, below).

Food Security

The total amount of food aid pledged for Mauritania's free distribution programs in 1988 was raised to 21,620 MT by new food aid pledges received during the month of August. This is just above the 20,000 MT target for 1988 free aid set by the donors in conjunction with the Mauritanian Food Security Commission during 1987. The new free-stock pledges were for 5,120 MT from the World Food Program (WFP) and 1,000 MT from the Federal Republic of Germany. In addition, pledges for price-support stocks are close to the 51,000 MT target set last November, and a stock of 6,520 MT of flour has been set aside for food-for-work projects over the rest of the year.

Planned Food Aid Distributions
November 1987 through August 1988

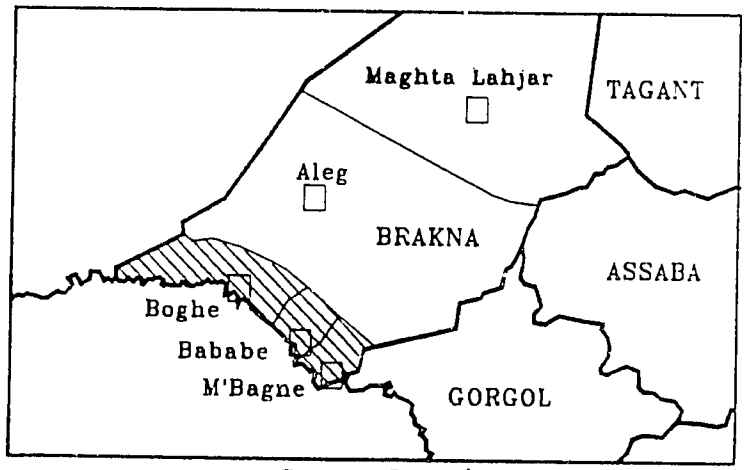


Source: FEWS/Mauritania; CSA;
Saudi Arabia Red Crescent
FEWS/PWA, September 1988

Since November, 14,900 MT of free distribution stocks have been programmed for Nouakchott and all 13 regions (see Map 5). The bulk of that food was pre-positioned at regional and department centers during August for subsequent distribution. Of the new food stocks pledged by WFP, 4,300 MT of food stocks are to be programmed for Adrar, Hodh el Gharbi, Hodh ech Chargui, and Tagant regions for the rest of 1988, while the remainder is to be set aside for new food emergencies, should they arise.

During the month of September, 625 MT of grain were distributed by the Saudi Arabian Red Crescent Society in Boghe, Bababe, and M'Bagne departments of Brakna Region (see Map 6). These departments, situated along the Senegal River, were cited in July as having especial food security problems -- there was no recessional or rainfed harvest in these departments during 1987, and also no rainfed harvest in Boghe Department during 1985 or 1986.

Map 6: September Food Aid Distributions



Source: FEWS/Mauritania; Saudi Arabia Red Crescent Society

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 during the last ten years. As a result, rainfall across the FEWS-monitored countries, particularly in the northern fringes of the Sahelian zone, was 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° north 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 ITCZ had moved well south (as low as 11° N over eastern Sudan), but still remained slightly north of its usual position. The ITCZ's generally southward trend signals the end of the rainy season across the Sahel, in Sudan, and northern Ethiopia.

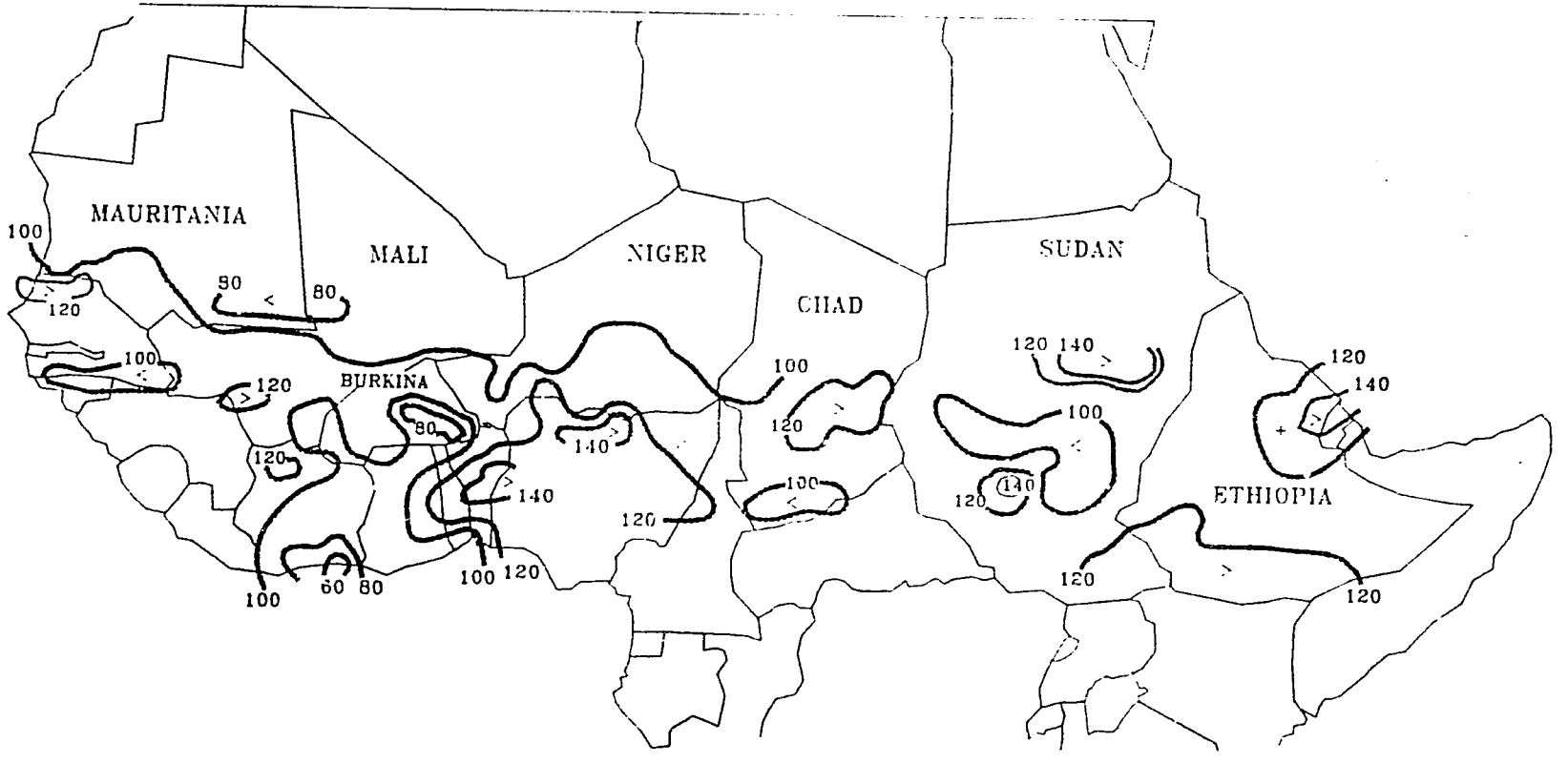
Cumulative rainfall through mid October appeared generally equal to, or above, the long-term (1951-1980) average in FEWS-monitored countries. Map 7 shows an estimate of the percent of average cumulative rainfall through September 20. Normal seasonal declines in rainfall continue on a north/south gradient, with the 25 millimeter isohyet (October 1-10) generally south of the Sahelian countries. Rain continued to fall in parts of southern Chad. Some localities received up to 50 mm during the first ten days of October. Heavy and regular rains appeared to continue through the middle of October in eastern Sudan. Rains continued in Ethiopia as well, with part of the Blue Nile watershed in that country receiving up to 100 mm of rain. The above-normal rainfall there 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

Rainfall

Percent of Normal

June 1, 1988 - September 20, 1988



Source: JAWF assessments
FEWS/PWA, September 1988

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. Local rainfall and the rise of the Blue Nile caused flooding in the Gezira and in other irrigated areas of Sudan in August and early September.

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 8). A more general decline can be expected to reach the remaining areas in coming days, as the rainy season draws to an end. Rangelands are starting to dry up, crops are maturing and being harvested, and the dry cool season is beginning. The regional agro-meteorological facility, AGRHYMET, 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 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.

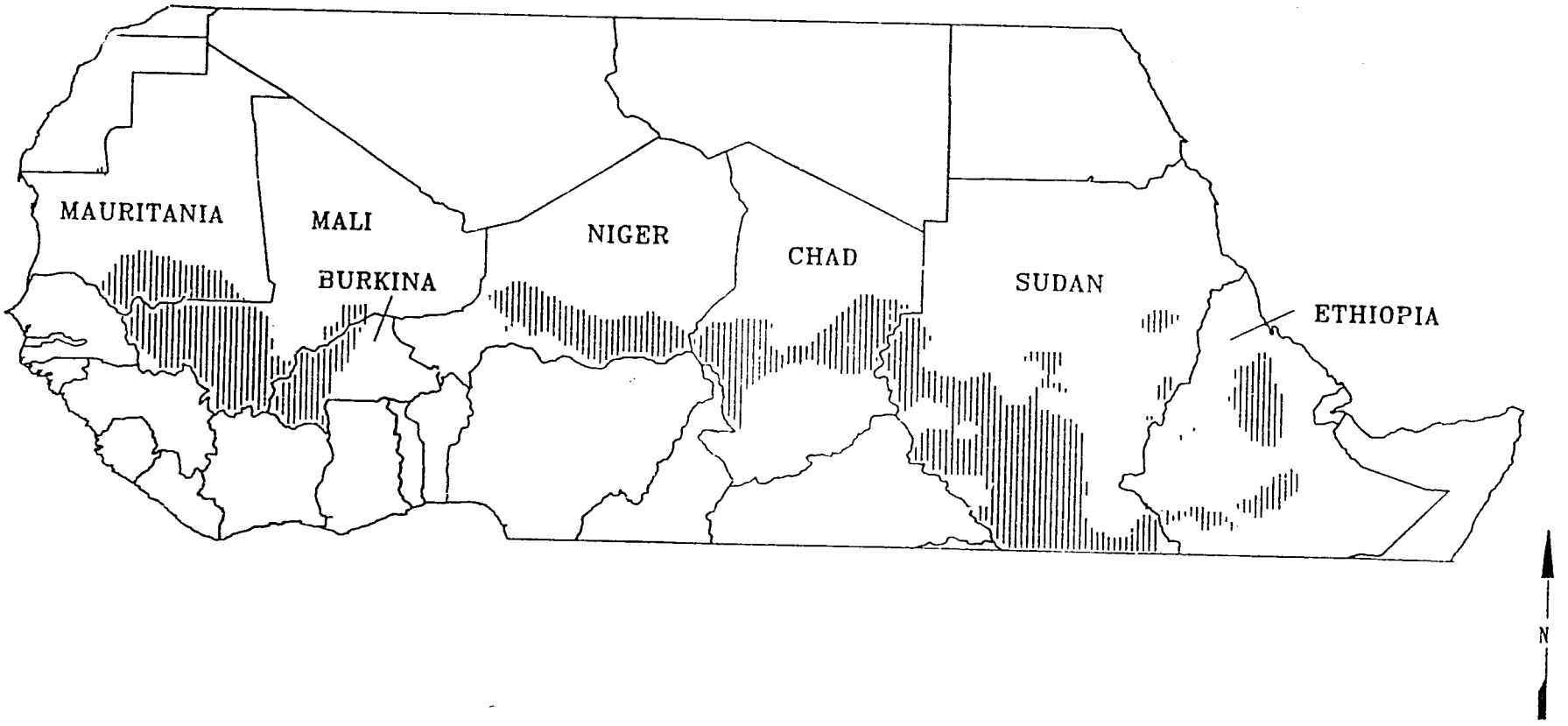
Regional Desert Locust Summary

Starting in late September, heavy locust activity developed in southwestern Mauritania (see Map 9). While the ITCZ moved south rapidly in the east, it remained farther north over Mauritania, and the resulting prevailing winds have helped push swarms from southeastern Mauritania to the north, west, and south. Locusts in Mauritania are in all stages of development 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 threat to 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.

Despite earlier indications that Desert Locust infestations would be a serious problem for crops in Chad, surveys during 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

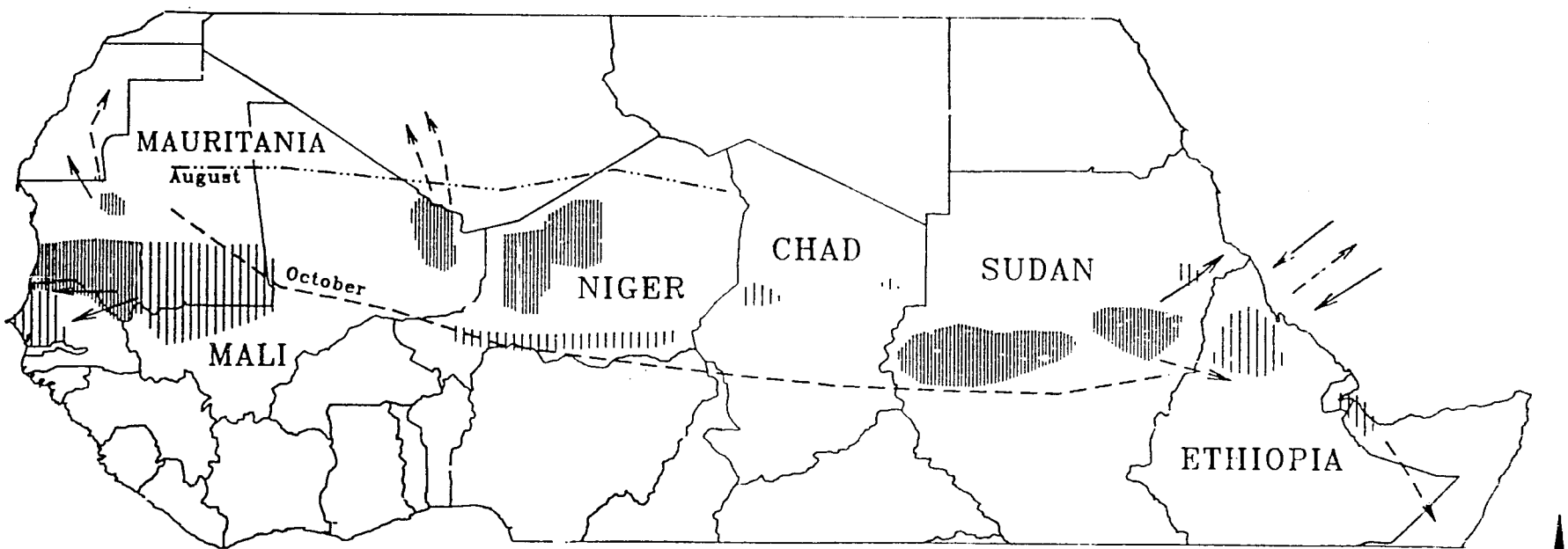
Areas of Declining Vegetation



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

resources. The problem has been exacerbated by the 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, and
- 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

$$(\text{infrared} - \text{red}) / (\text{infrared} + \text{red})$$

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.