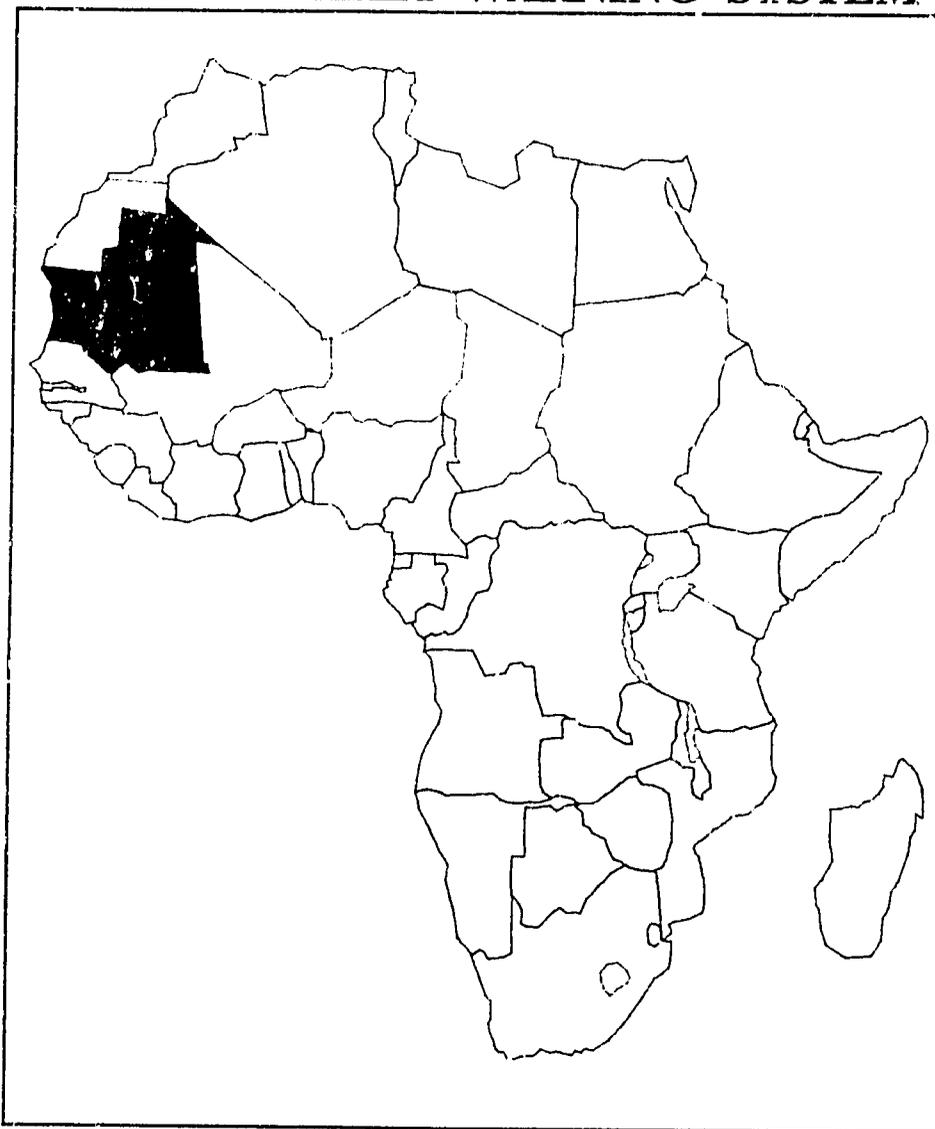


MAURITANIA

Pasture and Croplands Going Strong

FAMINE EARLY WARNING SYSTEM



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.

FEWS Country Reports, Bulletins, Alert Memoranda, and other special studies are prepared for USAID's Africa Bureau by Price, Williams & Associates, Inc.

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

Pasture and Croplands Going Strong

August 1988

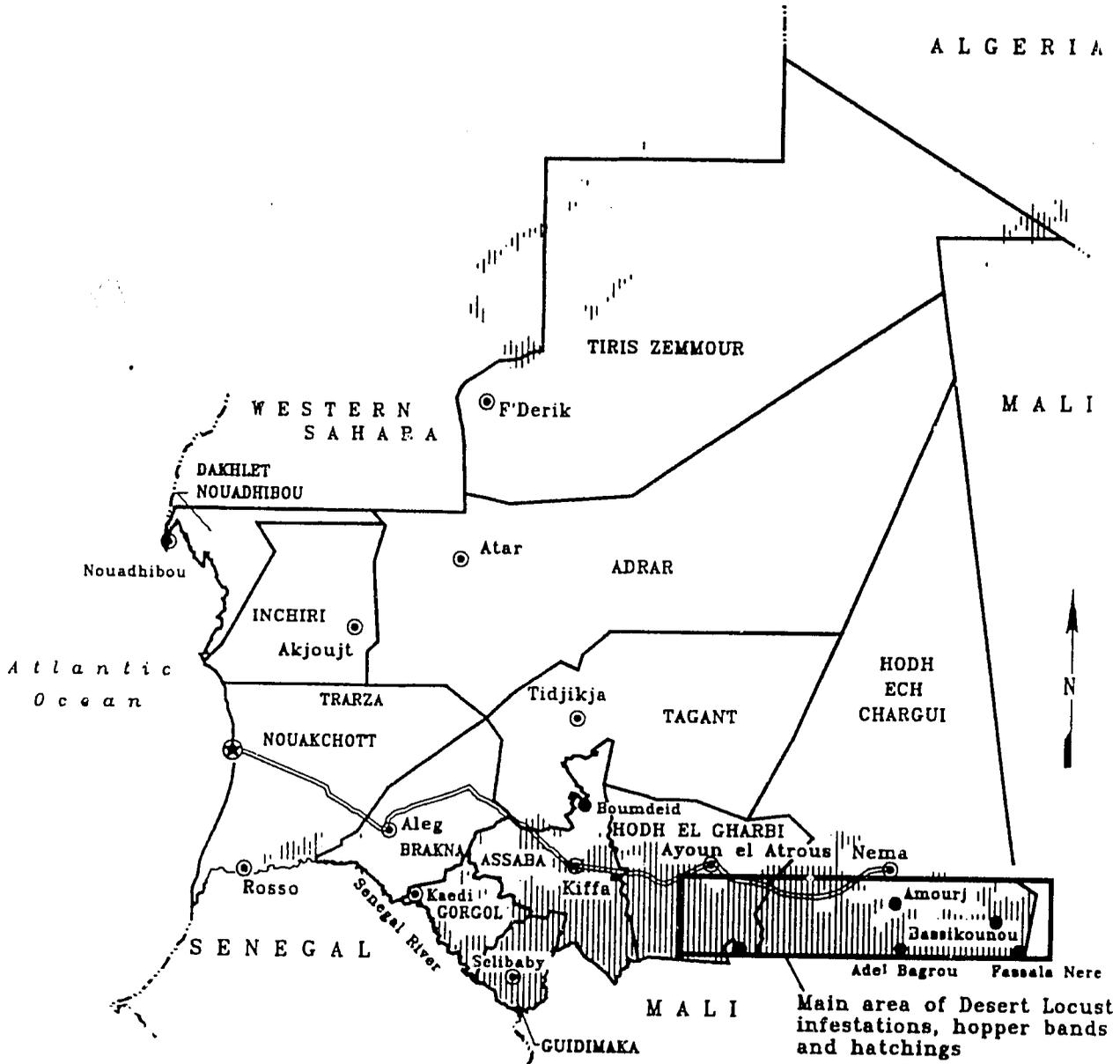
Contents

Summary	3
Mauritania Weather and Vegetation Conditions	3
Agriculture, Pastures, and Pests	5
Food Security	5
Regional Weather and Vegetation	7
Regional Desert Locust Summary	11

List of Figures

Map 1 Summary Map	2
Map 2 Rainfall and Vegetation	4
Map 3 Desert Locusts and Grasshoppers	6
Map 4 Vegetation Above Historic Maximum	8
Map 5 Early August Rainfall	9
Map 6 Late August Rainfall	10
Map 7 Desert Locusts	12

Map 1



Mauritania Summary

Legend

<ul style="list-style-type: none"> ⊗ National Capital ⊙ Regional Capital ● Department Seat ----- International Boundaries ===== National & Regional Boundaries ==== Road 	<ul style="list-style-type: none"> Increase in vegetative vigor, mid July to mid August
--	---

0 50 100 150 Miles

0 50 100 150 Kilometers

MAURITANIA

Pasture and Croplands Going Strong

Summary

Mauritania's growing season is progressing well. Cumulative rainfall in many parts of the country has reached the thirty-year norm, promising outstanding rainfed crop yields and strong pasture development. Wadi recessional, flood recessional, and irrigated crops should also fare well, considering the amount of rain that has fallen over central Mauritania and over the Senegal River's catchment basin. Approximately 10,500 metric tons of food aid will be distributed during the 1988 lean season. While the food stocks are already in the country, logistical constraints may delay the start of distributions until late September. The United States Charge d'Affaires has declared a locust disaster based on late August infestation levels in the southeast, expected locust invasions from the east, and the limited resources for control operations available to the Mauritanian government.

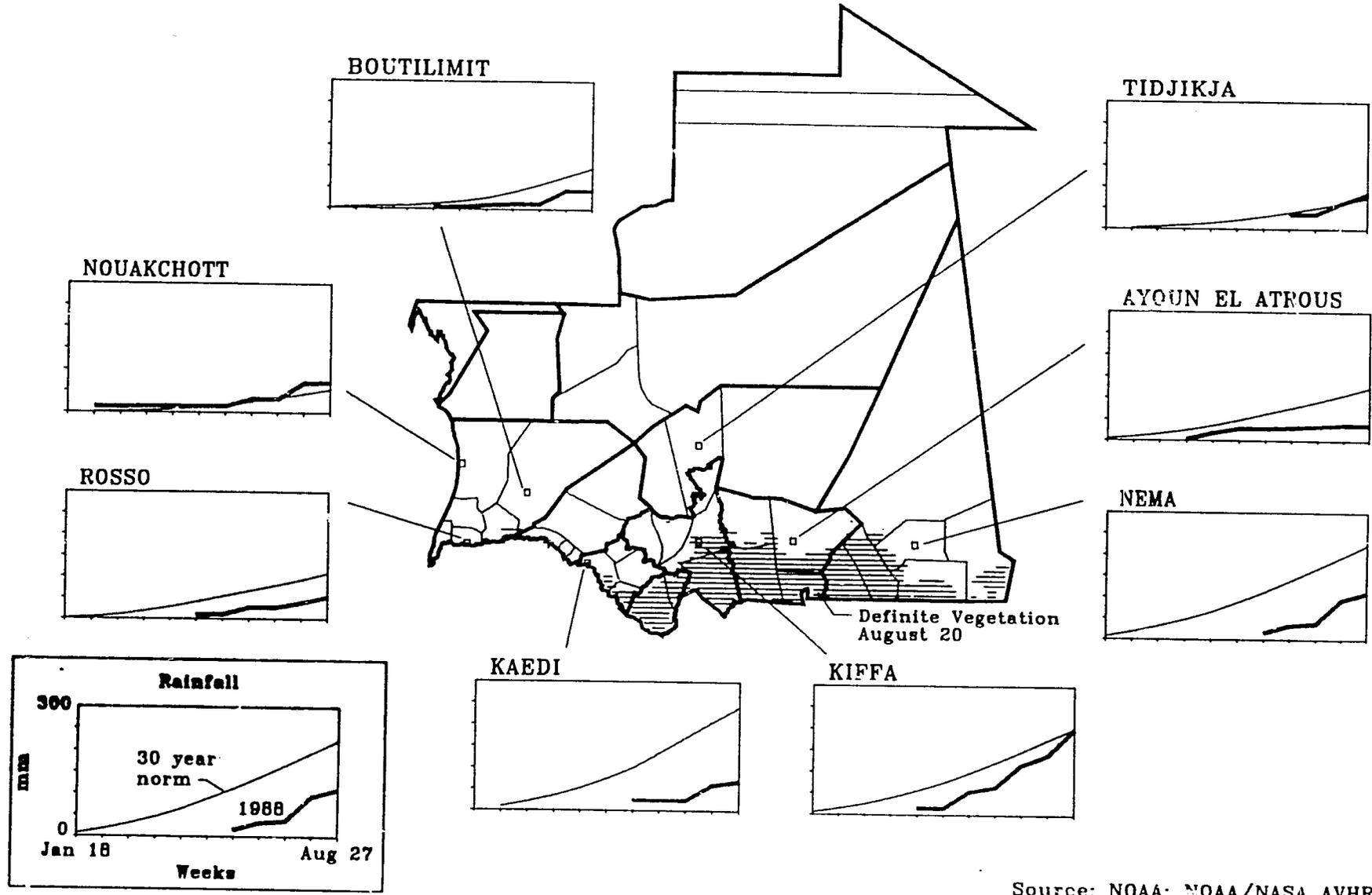
Mauritania Weather and Vegetation Conditions

By the end of August, cumulative rainfall in central and west-central Mauritania had reached the thirty-year average (see Map 2). This is outstanding, as annual rains in Mauritania have been declining steadily since before the 1950s. At mid August, the Intertropical Convergence Zone (ITCZ, see inside of back cover) over Mauritania was at 24° N, a ten-year high. Unofficial sources report that water is already filling the dam at Aleg in Brakna Region. The rain over central Mauritania has begun to dampen wadis running off the Tagant Plateau and collect behind other inland barrages. Cumulative rainfall in the southwest and upper southeast, while well below the norm, is still at least as high as last year (excepting Kaedi).

Current Normalized Difference Vegetation Index (NDVI, see inside of back cover) imagery shows definite vegetation as far north as 17° N in the center and southeast of the country (see Map 2). The most current image (from mid August) reflects rainfall from July and early August. Areas in southern Mauritania in which NDVI has increased since mid July (implying a response to rainfall) extend farther north than does the zone of current vegetation. Imagery from late August and early September will probably therefore continue to reflect this northward march of vegetation.

Mid-August vegetation levels are much higher this year throughout Mauritania's agricultural zone than they were in 1986 and 1987. The picture is not as clear cut, however, when 1988 vegetation levels are compared with those of 1985 (a year of very strong vegetation levels). As of mid August, areas not doing as well as in 1985 include southern Maghama Department (Gorgol Region), southern Kankossa Department (Assaba Region), and scattered patches throughout the southeast.

Rainfall and Vegetation Levels



Source: NOAA; NOAA/NASA AVHRR GAC FEWS/PWA, August 1988

Agriculture, Pasture, and Pests

Barring an early cessation of the rains, rainfall and satellite imagery seen so far indicate that 1988 should be an excellent year for rainfed and wadi recessional agriculture (better than both 1986 and 1987). At mid August, crops were sprouting in the Hodh regions, growing well in Guidimaka Region, and being planted in Gorgol and Brakna regions. The tracks of some wadis are already discernable in satellite imagery (as increased vegetative vigor), implying the presence of sufficient water for plant growth. Depending upon the amount of rain in central areas, flooding could destroy some inland barrages (as happened last year at Boumdeid Town, Assaba Region), preventing wadi recessional cultivation in limited areas. (There have been no such reports yet in 1988, however.) The irrigated harvest should also be greater than that of 1987, as more acreage has been put into irrigated production. Heavy rains over the Senegal River catchment basin below the Malian Manantali Dam promise a decent flood for the fall flood recessional growing season. It is not yet clear how this year's water release from the Manantali Dam will affect the timing of the flood. Before the dam came on line, the flood usually peaked at mid September. Last year, no water was released and rain over downstream tributaries was insufficient to flood the Senegal.

This should be an excellent year for Mauritania's herds as well. Improved grazing is especially important in the far southeast, where many animals were lost during 1987 because of a lack of pasture. This year, grasses in these areas are reported to be well developed. While providing relief, however, one year of excellent pasturage will not be enough to rebuild herds to pre-drought numbers.

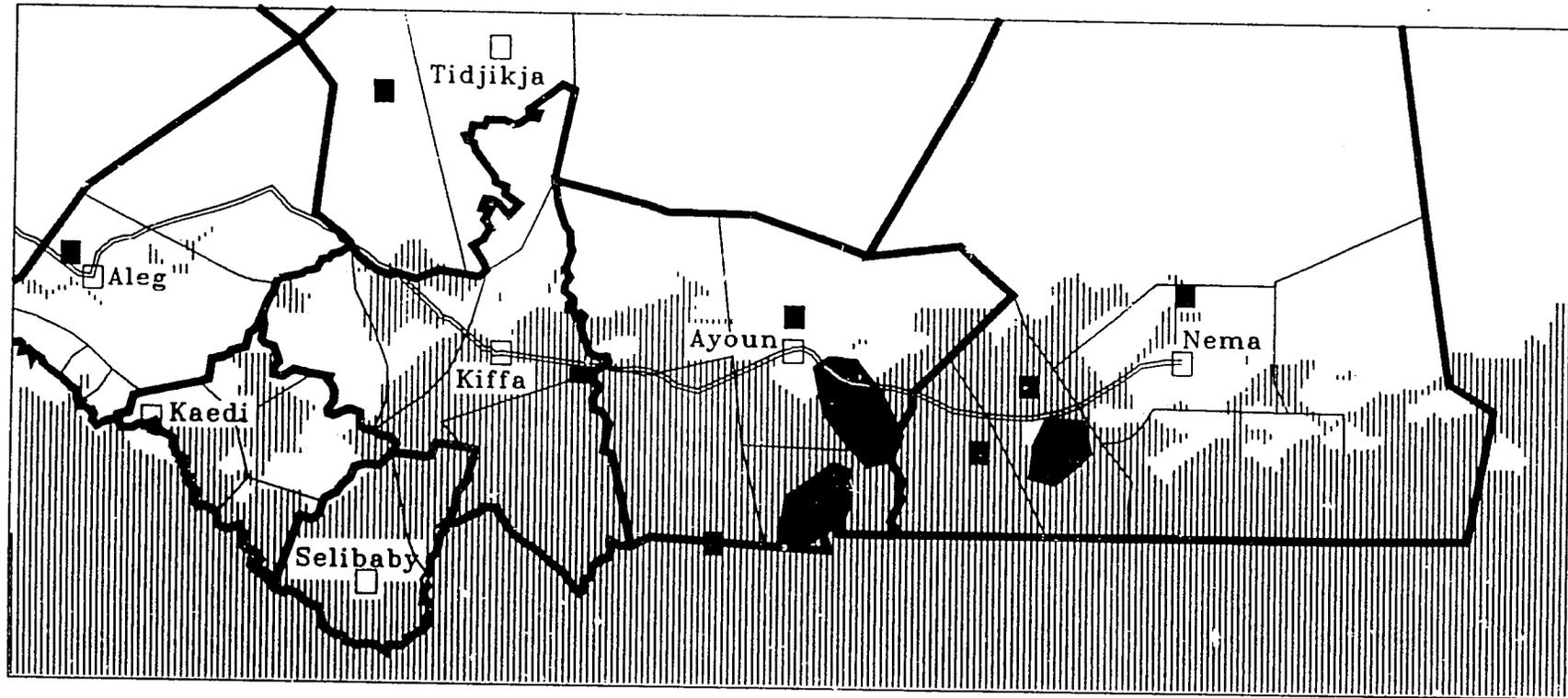
According to local newspaper reports, this year's date harvest is poorer than in previous years. Post-harvest prices have remained at 300 Ouaghiya (UM) per kilogram, rather than falling to the usual post-harvest price of 100 UM. Meanwhile, dates imported from Algeria and the Middle East are selling for 250 UM per kilogram. This year's fall in production is larger than usual. It continues a decline that started with the drought in the early 1970s and is tied in part to falling aquifer levels and encroaching dunes. Dates are the mainstay of Mauritania's oases. A drop in date production could indicate a parallel drop in income and in the ability to purchase food, and hence an increase in vulnerability to food crisis.

The Mauritania Crop Protection Service (CPS) and the United Nations Food and Agriculture Organization early warning system for Mauritania report that both Desert Locusts and grasshoppers (*Oedaleus senegalensis*) are present in significant densities in both Hodh el Gharbi and Hodh ech Chargui regions (see Map 3). Locust eggs laid in these areas during July were hatching by mid August. The recently hatched locusts should breed by the end of September. Current conditions in the Hodh regions are excellent for breeding and survival. Rainfall in southeast Mauritania is unlikely to be so heavy as to cause a dispersal of locust populations, as is happening in the eastern Sahel. Rather, the locusts will probably remain where they are until they are pushed out of the area by a shift in the ITCZ. Mauritania's locust and grasshopper control apparatus is already stretched thin and Desert Locusts now in Chad pose a threat of further infestations. The United States (US) Charge d'Affaires has declared a locust disaster on the basis of these conditions. The declaration allows the US Office of Foreign Disaster Assistance to proceed with technical assistance to the CPS and with the purchase and pre-positioning of needed pesticides.

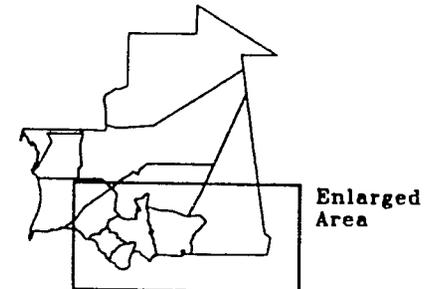
Food Security

The Mauritanian Food Security Commission (CSA) has revised its April food aid distribution plan in order to account for a Saudi distribution of 3,500 MT of grain to Brakna and Trarza regions. A total of 7,240 metric tons (MT) of food aid are scheduled to be distributed by the CSA in the rest of the country during the 1988 lean season. The planned distributions will provide 50 MT of grain and 10 MT of complementary commodities per household in all the areas earlier identified by FEWS as being at

Desert Locusts and Grasshoppers



- , ■ Area of locust/grasshopper infestation
- ▨ Increase in vegetative vigor, mid July to mid August
- == Permanent road



Source: Mission Cables; FEWS/Mauritania
 NOAA/NASA AVHRR GAC Imagery
 FEWS/PWA, August 1988

risk. The population of the areas at risk totals about 312,000 people, although the exact percentage of people at risk within each area is not known.

A transport strike in May made it difficult for the CSA to keep up with the demand for sales stocks (also called price support) outside of Nouakchott while simultaneously distributing free food. CSA stock delivery decisions are now backlogged several months, and it is doubtful whether free distributions will take place before the end of September.

This year's strong pastures will help those grain-poor people -- who have livestock -- to weather the delay of aid. The pastures will allow these families to maintain their animals close by, so that milk (an important lean season food) will be readily available. In the meantime, those destitute families with no access to herds will either go hungry, go further into debt, or both. While sales stocks are not available at CSA, cereals do exist on the private market. The accessibility of these food stocks to poorer populations is not clear at this time.

Earlier in the year, the donors and the CSA had set a ceiling of 20,000 MT of grain for free distribution during 1988. As of early August, 15,500 MT of that amount had been pledged, including 7,000 MT of carryover stock, 3,500 MT donated by Saudi Arabia, and 5,000 MT transferred from sales budgets to free aid budgets by the US and Spain. Approximately 10,000 MT of US grain pledged to price support sales arrived in early August. A second tranche of 10,000 MT is to arrive in late September. Spain has pledged an additional 4,000 MT of grain for the sales program.

During July, Medecins Sans Frontières (MSF, or Doctors Without Borders) completed nutrition surveys as part of an assessment of risk in the production-deficit areas, including Nema Town and two arrondissements each in Amourj and Bassikounou departments of Hodh ech Chargui Region. The surveys were conducted using weight-for-height as the measure of nutritional status. The levels of severe malnutrition in Nema Town and in the central arrondissements (Amourj and Bassikounou) were sufficiently high (13.1%, 11.1%, and 10.5% severe malnutrition, respectively) to justify previous concern. The current situation may be mitigated by food aid and the return of the rainy season, but MSF questions whether food aid targeted to the most needy (who are defined by official lists drawn up in 1984 and 1985) will actually reach those most at-risk (i.e., children under five, Touareg immigrants, and the more isolated villages off the main roads). MSF's nutrition findings also corroborate previous assessments of the vulnerability of indigent Touaregs in these areas, although the surveyors note that the Touareg population has shrunk to 500 families, or about 1,500 people. The Touareg population will likely shrink further as pastures continue to improve in Hodh ech Chargui and neighboring Mali.

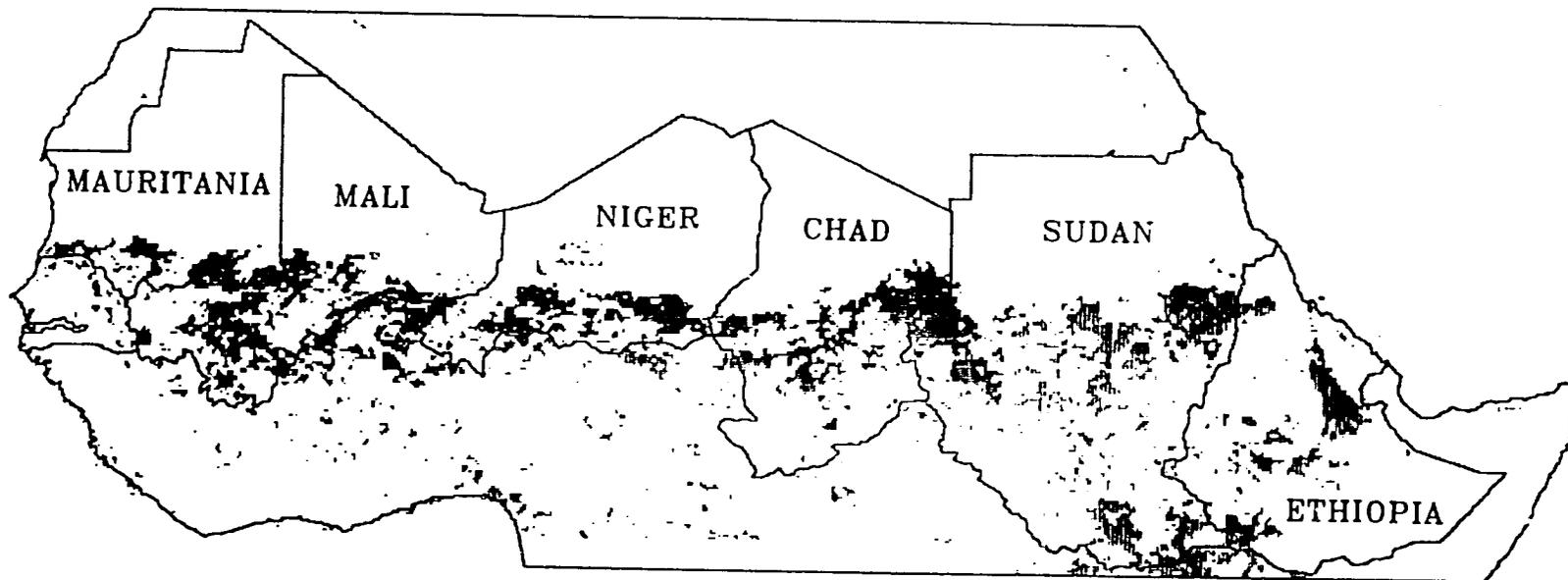
Regional Weather and Vegetation

The Intertropical Convergence Zone (ITCZ) has been further north and has remained north longer than at any other time during the last ten years. The average ITCZ was hovering at about 21° N during the last ten days of August. Normally, the ITCZ is at 19° N during this period. As a consequence of the ITCZ holding such a northerly position, the rains have moved well north, creating good pastures farther north than in recent years (see Map 4). The unusually northerly position of the ITCZ is evident in the mid-August report of 64 millimeters (mm) of rain at Moudjeria (central Mauritania) -- an area which last year had only 6mm of rain and the year before had none.

For FEWS-monitored countries, cumulative rainfall for the first ten days of August showed a generally favorable pattern (see Map 5). Heavy rainfall in the western Sahel continued through the end of August (see Map 6). With these heavy rains, northwestern Senegal approached 100% of normal cumulative rainfall after experiencing a significant rain deficit through mid August. Two areas in the Sahel had also received less than 75% of normal rainfall at mid August: a crescent shaped area around Senegal's Cape Vert including the towns of Kaolack and Diourbel and an area in southern Gourma

Much Stronger Vegetation than Historical Maximum

August 11-20, 1988 vs 1982-87 Maximum for Same Decade



 Stronger than historical maximum

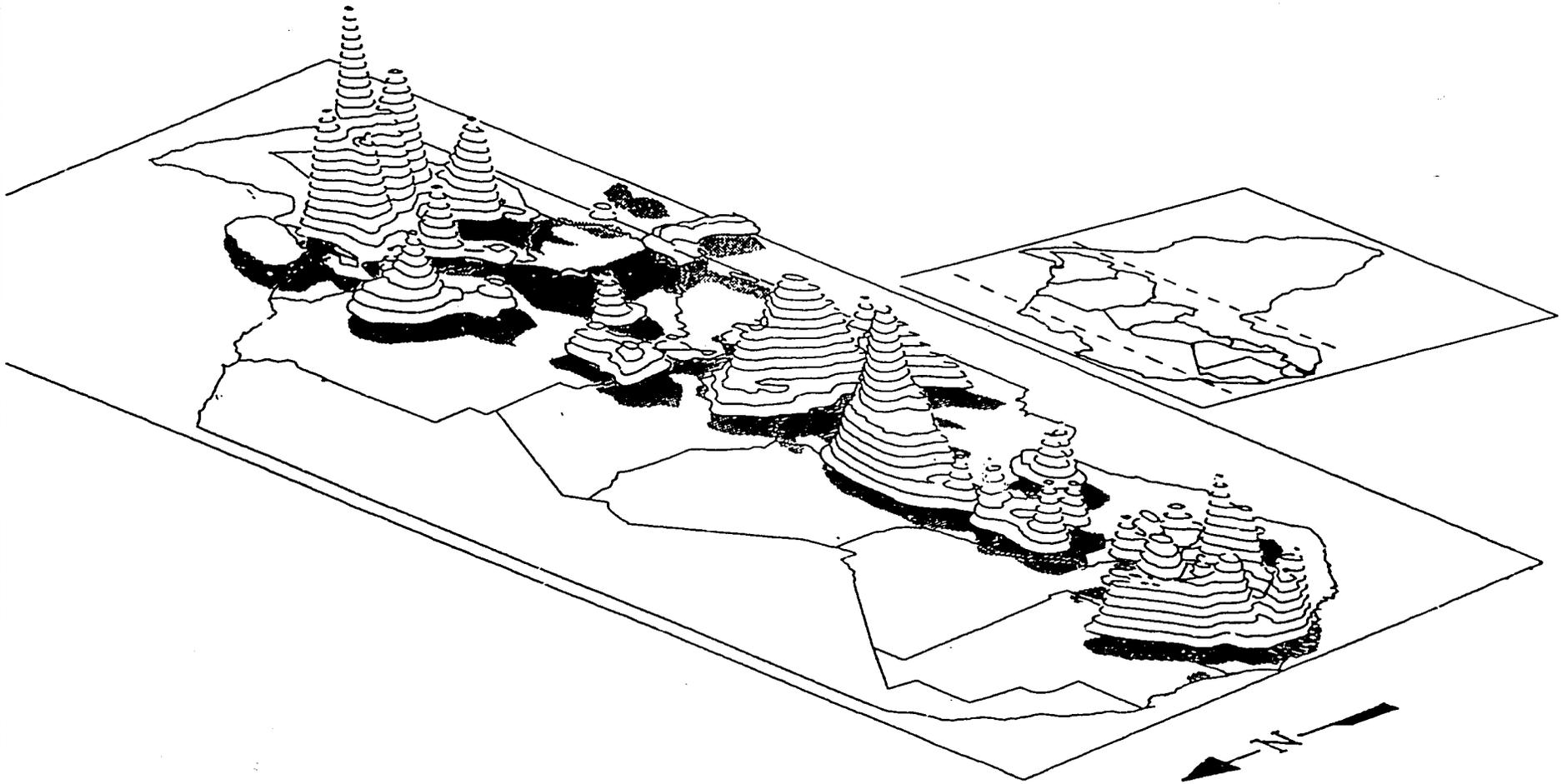
 Much stronger than historical maximum



Source: NOAA/NASA GAC Imagery
FEWS/PWA, August 1988

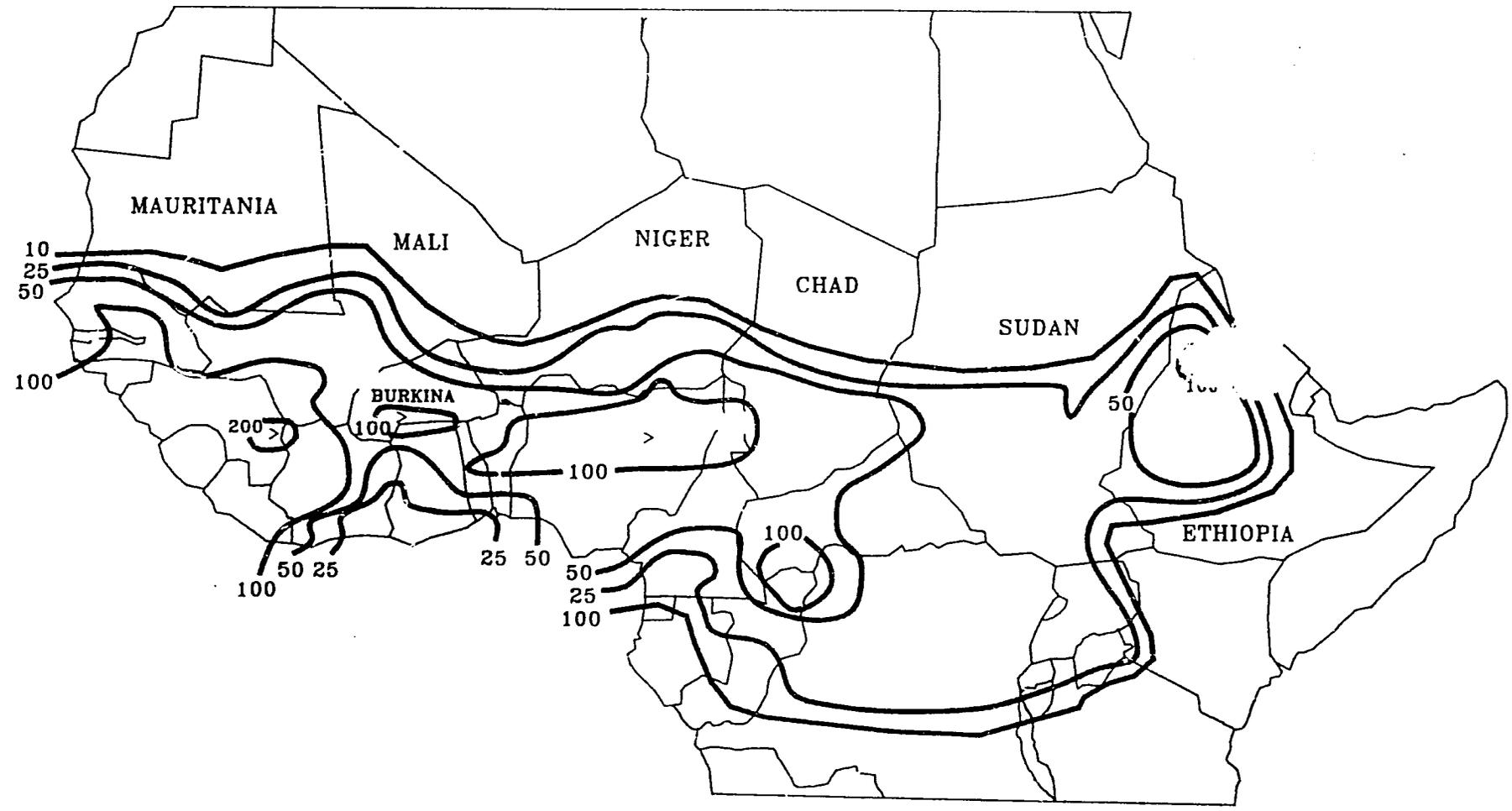
Early August Rainfall

Contour Interval Equals 5mm



Rainfall

August 24-30, 1988



Source: JAWF assessments
FEWS/PWA, August 1988

Province (south of Fada N’Gourma Town) in Burkina. The abundant to torrential rains during the final ten days of August has brought these areas close to 100% of cumulative rainfall for the season. The regional agricultural weather facility AGRHYMET indicates that cumulative rainfall levels in most of the Sahel outside of Mauritania and northern Senegal are now sufficient for short-season crops to last until harvest, even if the rains were to stop on September 1.

The persistent and abundant rains have brought flooding and loss of life and have destroyed homes and crops in Burkina, Niger, and Chad. Reports indicate that, among Sahelian countries, Chad has been the hardest hit by floods. Heavy and regular rains also continued through the end August in eastern Sudan (moving toward Khartoum), aggravating the floods there. There are reports of flooding in Sudan’s Gezira and in other irrigated areas in Sudan. Rains have continued in Ethiopia as well, with much of the Nile watershed in Ethiopia receiving up to 100 mm of rain.

The Senegal River has been rising at Bakel, indicating a good flow of water from the Falemé and other Senegal River tributaries. The Niger River and its tributaries are also doing well to date. The Niger is doing particularly well in Niamey as a result of record-breaking flows from right-bank tributaries. Both the White Nile and Blue Nile rivers are higher than is normal at this time of year.

By mid August, satellite imagery showed substantial green-up extending as far north as 18° N in Mauritania, 17.4° N in eastern Chad, and 17.2° N in eastern Sudan. Some green-up is also apparent in Mali’s Adrar and the Air Mountains of Niger. Areas in central Ethiopia that were previously of concern because of below-average vegetative conditions were covered by clouds in the most recently available images. A strong upsurge in NDVI now would not necessarily reflect a favorable outlook for this area’s long growing season crops (sorghum and maize).

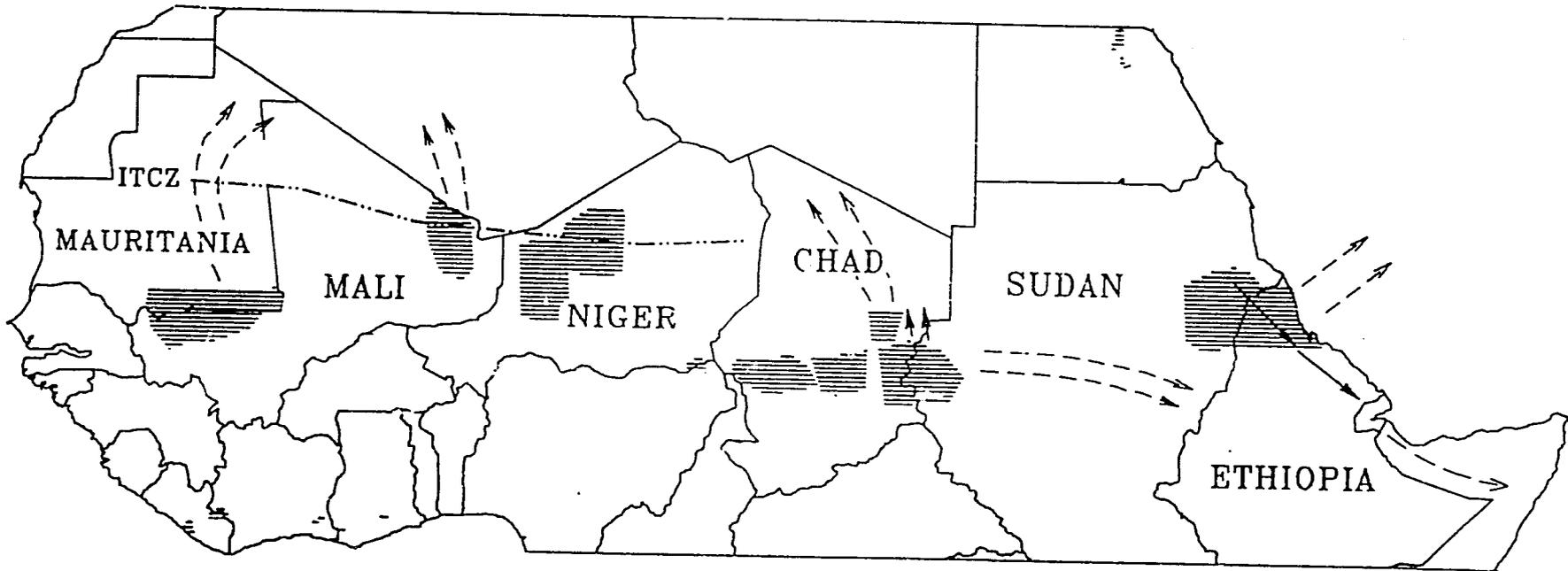
Satellite imagery for mid August confirms the impression that cumulative rainfall this year is considerably greater than in the past several years (see Map 4). Vegetation levels across the Sahel and in Sudan are much higher than the maximum levels for mid August during the last seven years. At the least, these elevated values would imply a great improvement in pasturage over previous years. In agricultural areas, the high NDVI values probably herald similarly high grain yields. Late July and August rains have raised NDVI levels above the historical maximum along the escarpment in Tigray and Wello regions of Ethiopia. Other areas of Ethiopia, particularly the Hararghe and Bale highlands, still display below-average vegetation levels.

Regional Desert Locust Summary

Large desert areas in all the Sahelian countries have been showing above-average vegetative conditions this summer, reinforcing the likelihood that Desert Locusts will find favorable conditions in most of their traditional winter breeding areas. An overall late start in the summer breeding cycle has limited the number of generations to two in most areas, instead of the three feared earlier. As a consequence of the rapid northward movement of the ITCZ and rains, the locusts have been pulled north, keeping them away from the most important grain-producing areas of the Sahel and limiting the amount of crop damage. Desert Locusts are now in greater numbers farther north (and in more remote areas) than has been usual over the past several years. This makes the job of crop protection services more difficult as locusts must be controlled over larger and less accessible areas. The most serious Desert Locust outbreaks (shown on Map 7) remain:

- in east-central Chad and bordering areas of Sudan, and
- west of Niger’s Air Mountains.

Desert Locusts To August 30



-  Desert Locust sightings
-  Current movement of swarms and hopper bands
-  Possible future movement



SOURCE: Mission Cables; AID/OFDA/DLTF;
NOAA/NASA AVHRR GAC Imagery: NOAA
FEWS/PWA, August 1988

Rains over Chad's initial infestation areas have been heavy enough to drive the locusts northward. The position of the ITCZ over eastern Chad and western Sudan will determine the direction in which the locusts will fly. If the ITCZ remains to the north, the accompanying winds will push the locusts to the north and west, into the desert and away from croplands. If the western end of the ITCZ swings south, the Desert Locusts will be funneled into generally advantageous winter breeding grounds in Ethiopia and Somalia. So far, Chad's Desert Locusts are known to be moving north from the country's eastern Sahel. The infestations in northern Niger are important both because of their size and because of their inaccessible location, making control of the area difficult.

Less serious, but still important, outbreak areas include:

- the border area between western Mali and southern Mauritania,
- the Adrar des Iforas in Mali,
- a long band across southern Niger,
- west-central Chad, and
- the border area between Kassala Province in Sudan and Eritrea Region in Ethiopia (these areas might become very important later in the season).

The southern Niger outbreak zone and the Mali-Mauritania area contain some recent vegetative growth and recently emerged larvae, but these areas are not considered as great a threat as the outbreak areas in Chad and western Sudan. In southern Niger, the swarms are broken and scattered, making imminent gregarious behavior unlikely; in Mali and Mauritania, the individual infestations are small (making control a bit easier than in other parts of the Sahel).

Recent rainfall in summer Desert Locust breeding areas on the Red Sea Coast has significantly improved breeding conditions. In the fall, Desert Locusts could pose a serious threat to both Sudanese and Ethiopian agriculture.

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). The images are derived from Global Area Coverage (GAC) approximately 4 km resolution images 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.