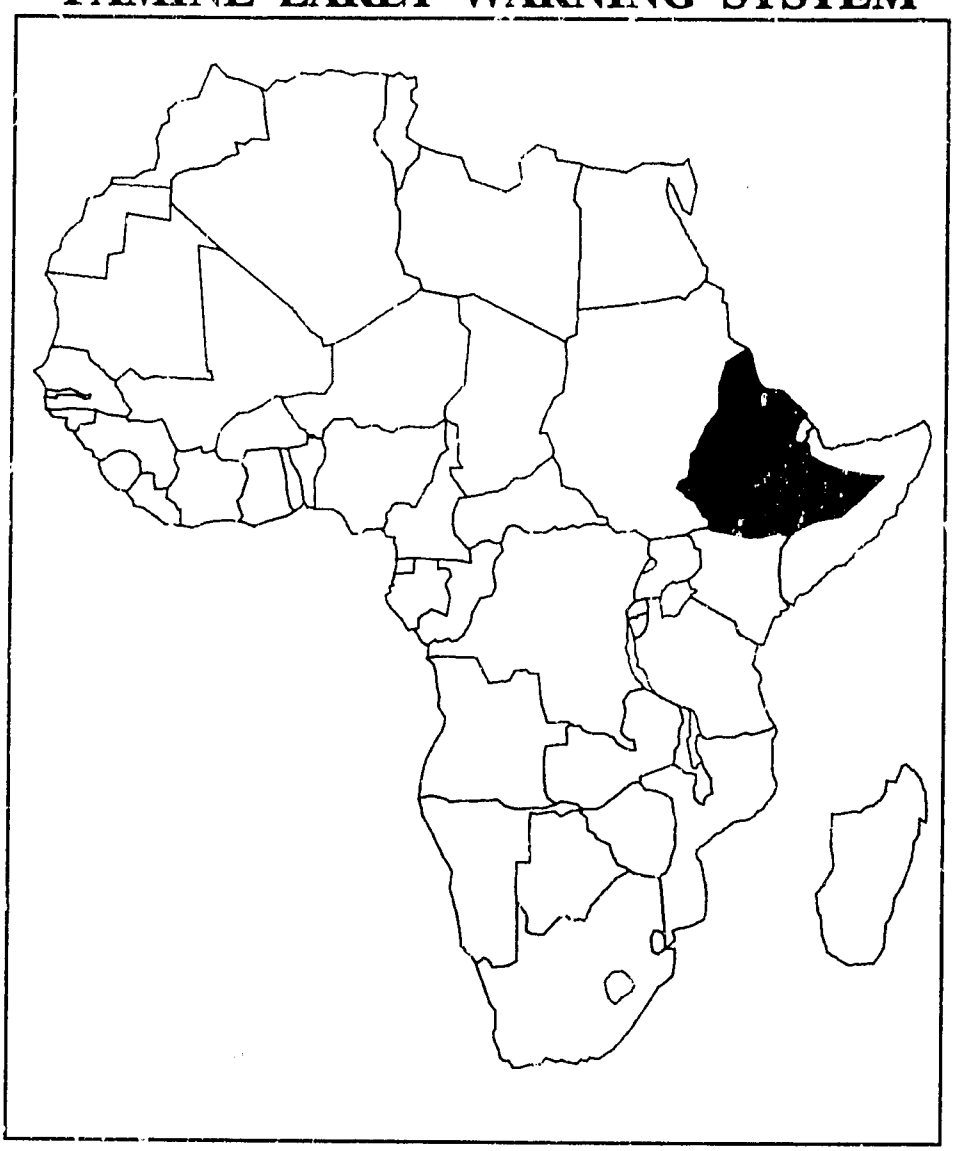
ETHIOPIA

Locust Activity Increases

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 (for more information on FEWS publications turn to the back inside cover of this report): 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' 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.

ETHIOPIA

Locust Activity Increases

August 1988

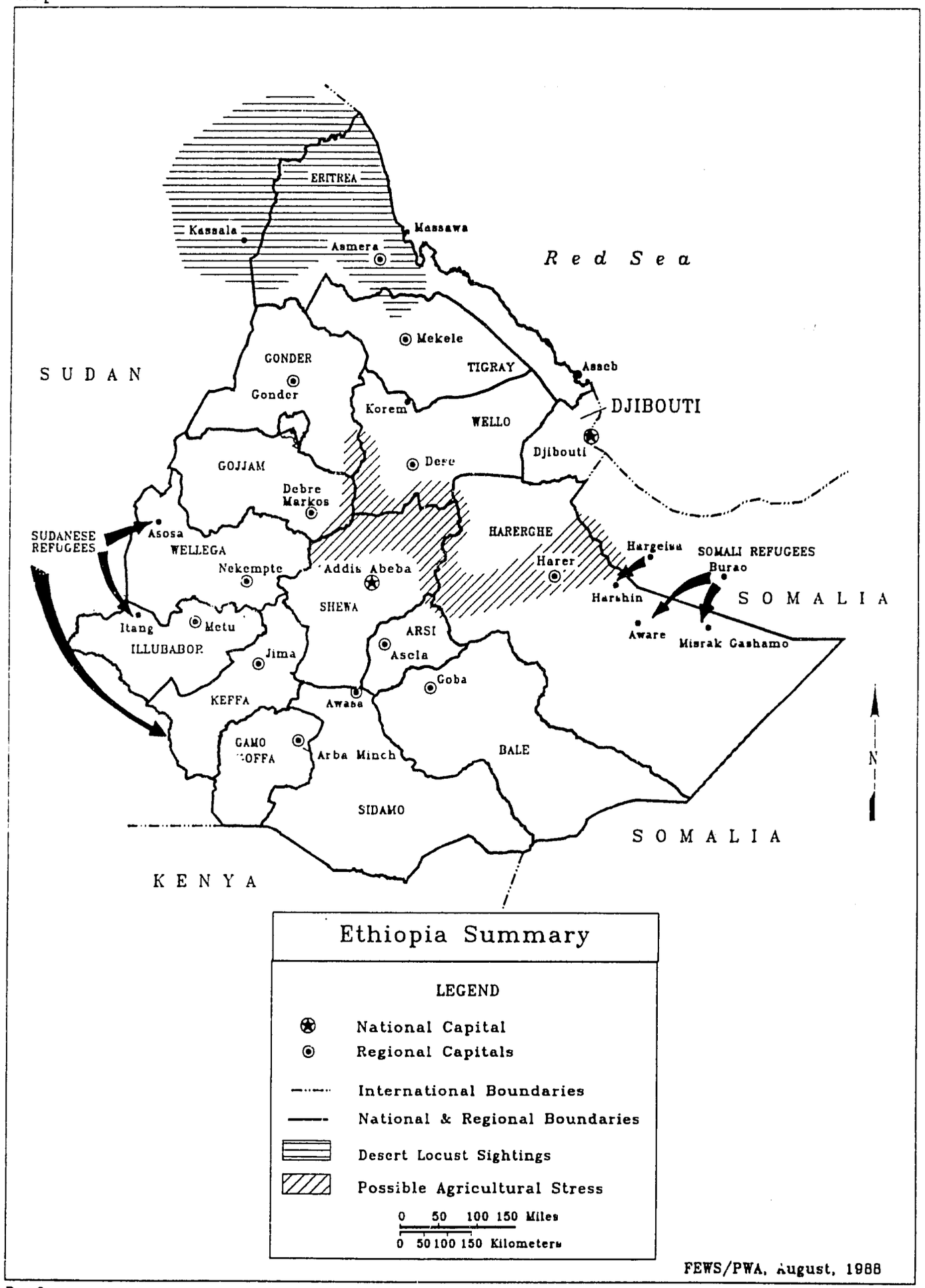
Contents

Summary	3
Rainfall and Crop Conditions	3
Locusts	4
Refugees	4
Regional Weather and Vegetation	4
Regional Desert Locust Summary	6

List of Figures

Map 1	Summary Map	2
Map 2	Recent Locust Activity	5
Map 3	Early August Rainfall	7
Map 4	Vegetation Above Historical Maximum	8
Map 5	Desert Locusts	9

Map 1



FEWS/PWA, August, 1988

ETHIOPIA

Locust Activity Increases

Summary

Recent sightings of mature egg-laying Desert Locusts across Eritrea indicate the likely beginning of a long and difficult period of locust infestations. Control operations are currently limited in scope and will require substantial external inputs to be effective. Conflict in many of the locust breeding areas will hamper control efforts. Rainfall continues to be excellent across most of Ethiopia, favoring crop development and further locust population increases. Prospects for the main season harvest later this year are improving with each week of rain. Rainfall continues to be plentiful and well timed over most of the western, central and northern areas of the country. The flow of Somali refugees is slowing. Poor crop conditions in Somalia's marginal northern farming areas will have an uncertain impact on further refugee movements. The influx of southern Sudanese into western Ethiopia continues at high levels. The need for cereals and supplementary foods is still critical for both groups of refugees.

Rainfall and Crop Conditions

Rainfall continues to be copious, falling regularly across most of Ethiopia. Farmers in most of the west, in much of the Central Highlands, and in south-central farming areas will continue to see average to above-average crop development during this period. Farming conditions in most of the north have been average to above average, and may be helping to inhibit the movement of people away from their villages, despite the conflict and a precarious food supply. Farmers in lowland areas in the Blue Nile Valley and the eastern slopes of the Central Highlands experienced poor conditions for planting long-cycle crops due to poor rains in May and June. Since then, rains have been generous and will allow short-cycle crops planted in June and July to develop. The Harerghe Highlands also initially experienced poor conditions, but rains have improved recently, except in the marginal farming areas around Jijiga.

An analysis of satellite imagery of northern Somalia, the home of most of the Somali refugees in Ethiopia, shows that vegetative conditions in farming areas are similar to those in Jijiga. In areas to the northwest of Hargeisa (Somalia), rains were average in April but stopped slightly early in May and have not resumed. Since then, vegetative conditions have declined steadily to well below average levels. On the basis of this evidence, it would appear that any agricultural harvests likely to take place in the next several months will be well below average. Whether poor agricultural conditions would increase the flow of refugees to Ethiopia is not certain. Nevertheless, prospects of a poor harvest could tend to slow down voluntary repatriations to Somalia, even as the levels of conflict there subside.

Locusts

Desert Locust activity is increasing. The excellent rains during the last half of July and most of August in prime breeding areas are sustaining levels of soil moisture and vegetation required to foster egg-laying. Sightings of mature, breeding Desert Locusts have been reported along the Sudanese border (see Map 2) in the extreme north, down into Tigray, and possibly into the Asseb administrative region. Most of the sightings from late July through mid-August were concentrated in Eritrea, especially in and around Asmera. The source for the swarms was either Sudan or the Arabian Peninsula. Current weather and wind patterns suggest that during August more swarms will be blown into Ethiopia from either of these two locations.

Control efforts by the Ministry of Agriculture have been of limited effectiveness due to the harsh nature of the terrain, the limited mobility of the control teams, and the conflict in Eritrea. The Desert Locust Control Organization (DLCO) has two planes that it may be able to put into Ethiopia, although financial problems may delay this option. As of August 20, there were few donor pledges of assistance to the control effort. The Food and Agriculture Organization (FAO) has pledged $ 200,000 for helicopter surveys and control operations. In addition to more helicopter flying time, control efforts need more pesticides, backpack sprayers, and dry-cell batteries. USAID is studying how it might best render assistance to the effort.

Toward the end of August, large-scale hatching and hopper band formation can be expected in Eritrea and elsewhere in northern Ethiopia. Depending primarily upon the location of the Inter-Tropical Convergence Zone when the bands become swarms, the locusts will either move southward along the coast, jump across the Red Sea to the Arabian Peninsula, or both. If the swarms move south, they might eventually reach breeding areas in Somalia or further south in Kenya. Sometime in the early winter months, they might turn around and move northward, putting some crops in Ethiopia and Sudan at risk before the harvest period.

Refugees

In the East, the flow of Somali refugees into Ethiopia appears to be abating. In mid-August, up to 3,000 refugees were arriving per day in refugee camps. Late in the month, this flow had diminished, perhaps reflecting the lowered levels of conflict reported from Somalia. As of August 24, the planning figure for the number of refugees requiring assistance through the rest of the year stood at 200,000 in Harshin and Hartisheikh and at 150,000 in Aware. The number of refugees in the Misrak Gashamo area is still "awaiting clarification"; estimates suggest 60,000 as a minimum. A shortage of water is still the major concern at the camps. Recent distributions by the World Food Program (WFP) alleviated immediate food concerns, although a substantial shortfall of cereals and supplementary foods remains.

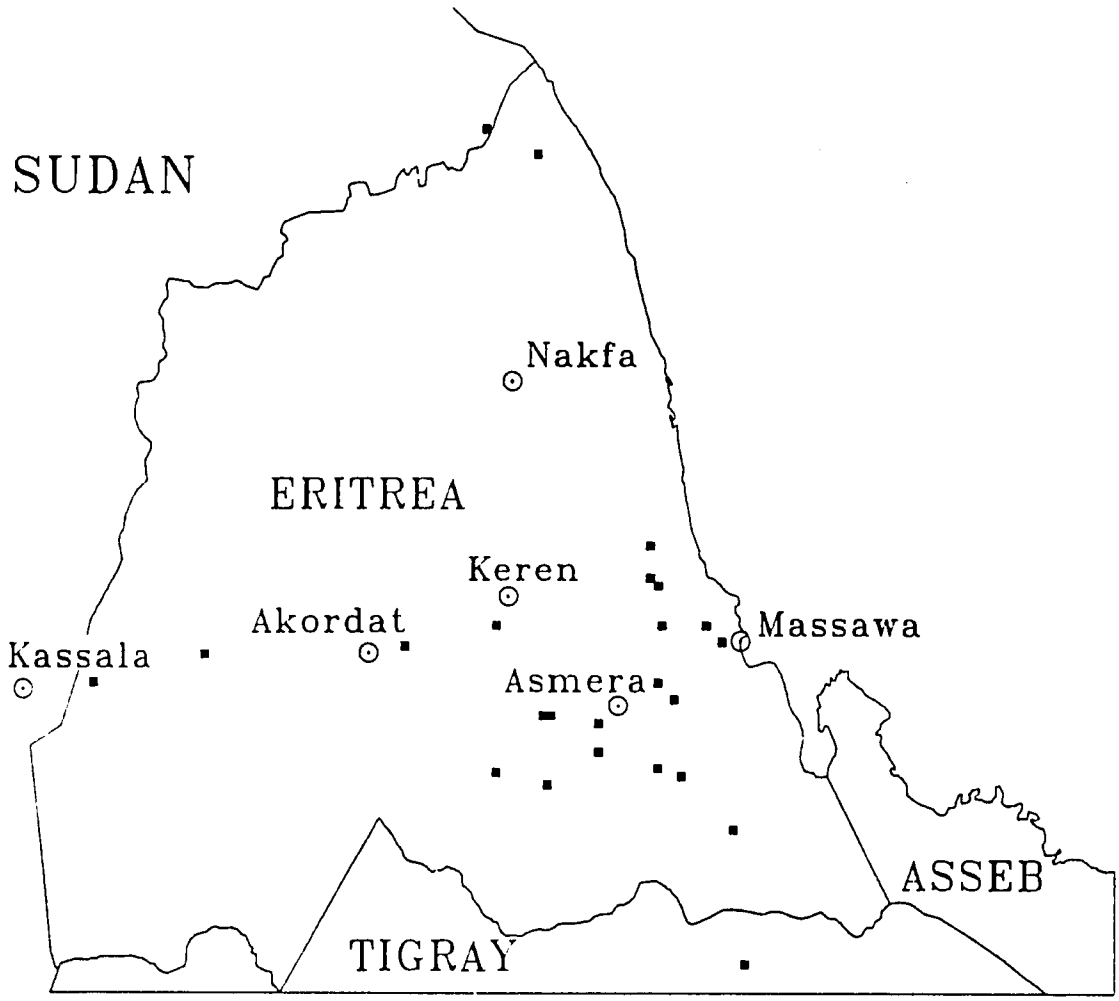
In the west, WFP reports that influxes of refugees from Sudan continue to be very heavy. An estimated 5,000 refugees, most of whom were in very poor condition, arrived during the first ten days of August. The planning figure for refugees requiring assistance in 1988 has been increased from 315,000 to 450,000. Cereals and supplementary foods are still in short supply. WFP is requesting that donors respond "urgently and generously to the UNHCR appeal."

Regional Weather and Vegetation

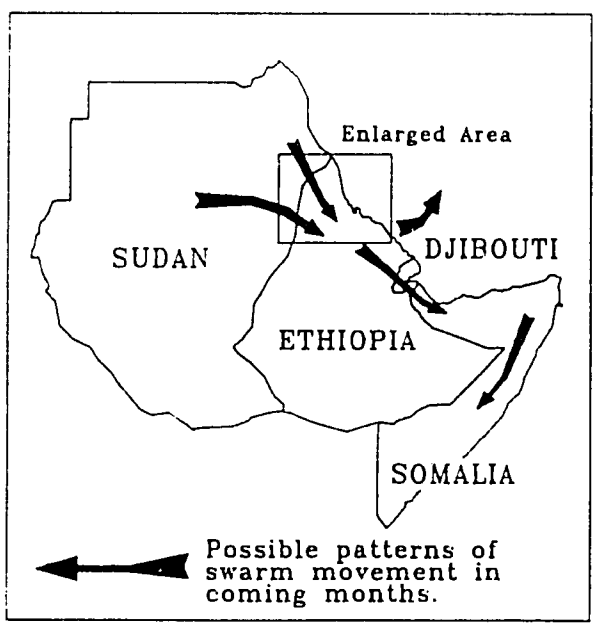
Unusually heavy rains fell over northern Ethiopia's Blue Nile catchment basin and normally dry Red Sea Coast during the last week of July and the first week of August. Much of northern Ethiopia received over 100 millimeters between July 27 and August 2. Heavy rainfall was evident much farther north than usual in Sudan as well, causing severe flooding in Khartoum and other nearby areas. The very heavy rainfall in northern and central Ethiopia is especially worrisome. Although the Blue Nile is

Map 2

Recent Locust Activity



▪ Locust sightings
July 25 – Aug 13



FEWS/PWA, August 1988

not expected to crest at Khartoum until September, by mid August its excessive height had already caused back-flooding of the White Nile.

The rainy season continues to progress very well over most of the Sahel. The Inter-Tropical Convergence Zone (ITCZ) is still unusually far north, hovering around 19° north and above. Some exceptions to this promising trend should be noted in Senegal, where the rainy season started late. For FEWS-monitored countries, cumulative rainfall for the first ten days of August showed a generally favorable pattern (see Map 3). Only two areas within the FEWS countries have received less than 75% of historical average rainfall: southeastern Burkina Faso and an area south of Khartoum. Southern Mali, western Burkina, the eastern half of Niger and all of Chad continue to show above-normal rainfall. Southeastern Mauritania is doing particularly well in a band approximately 100 kilometers wide along the Mali border. This is particularly good news for rangelands in the southeastern corner of Mauritania.

The upper Senegal River catchment basin is receiving average and above-average rainfall, which should bring a good flow to the Senegal from the Faleme and other tributaries below the Manantali Dam. High water levels should benefit the October-November flood recessional agriculture on the lower reaches of the Senegal. The Niger and its tributaries are generally at higher levels than last year, except at Banankoro and Koulikoro, Mali (where water levels are similar to those of last year at this time).

By early August, satellite imagery showed substantial green-up extending as far north as 17° north in Mauritania, 13.5° north in western Sudan and 16° north in eastern Sudan. Some green-up is also apparent in Mali's Adrar. While no increase in vegetation levels was visible in southwestern Niger and in the bulk of Burkina during early August, these two areas still display above-average vegetative conditions. 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 sorghum and maize.

Satellite imagery for early August confirms the impression that cumulative rainfall this year is considerably greater than in the past several years (see Map 4). This is especially true for Sahelian Chad and western Sudan below 15° north, and in the normally desertic Butana area of Kassala Province in eastern Sudan. Vegetation levels in all three of these areas are much higher than the maximum levels for early 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 may herald similarly high grain yields, although it is still possible for rainfed crops to fail should the rains cease after mid August. Scattered patches of historically high NDVI are also visible in agricultural and pastoral areas in the rest of the Sahel, including Desert Locust breeding areas in Mali's Adrar and in the vicinity of Niger's Air Mountains. In Ethiopia, recent rains have raised NDVI levels above the historical maximum along the escarpment in Tigray and Wello Regions. Other areas of Ethiopia, particularly the Hararghe and Bale highlands, still display below-average vegetation levels.

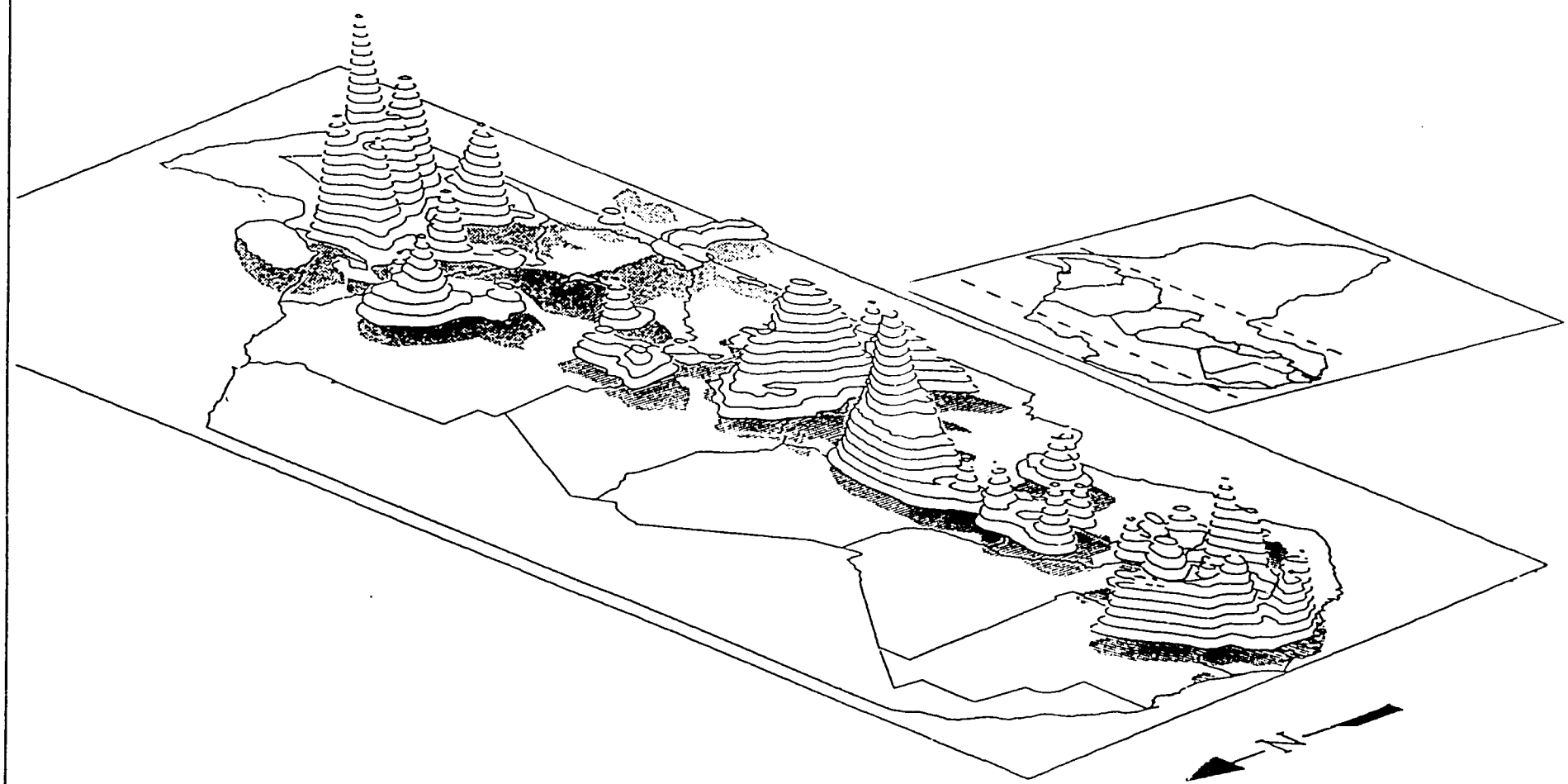
Regional Desert Locust Summary

Large desert areas in all the Sahelian countries show above-average vegetative conditions this summer, reinforcing the likelihood that Desert Locusts will find favorable conditions in most of their traditional breeding areas. However, an overall late start in the locust breeding cycle may limit the number of generations to two in most areas, instead of the three feared earlier. The most serious Desert Locust outbreaks (shown on Map 5) remain:

- in east-central Chad and bordering areas of Sudan, and

Early August Rainfall

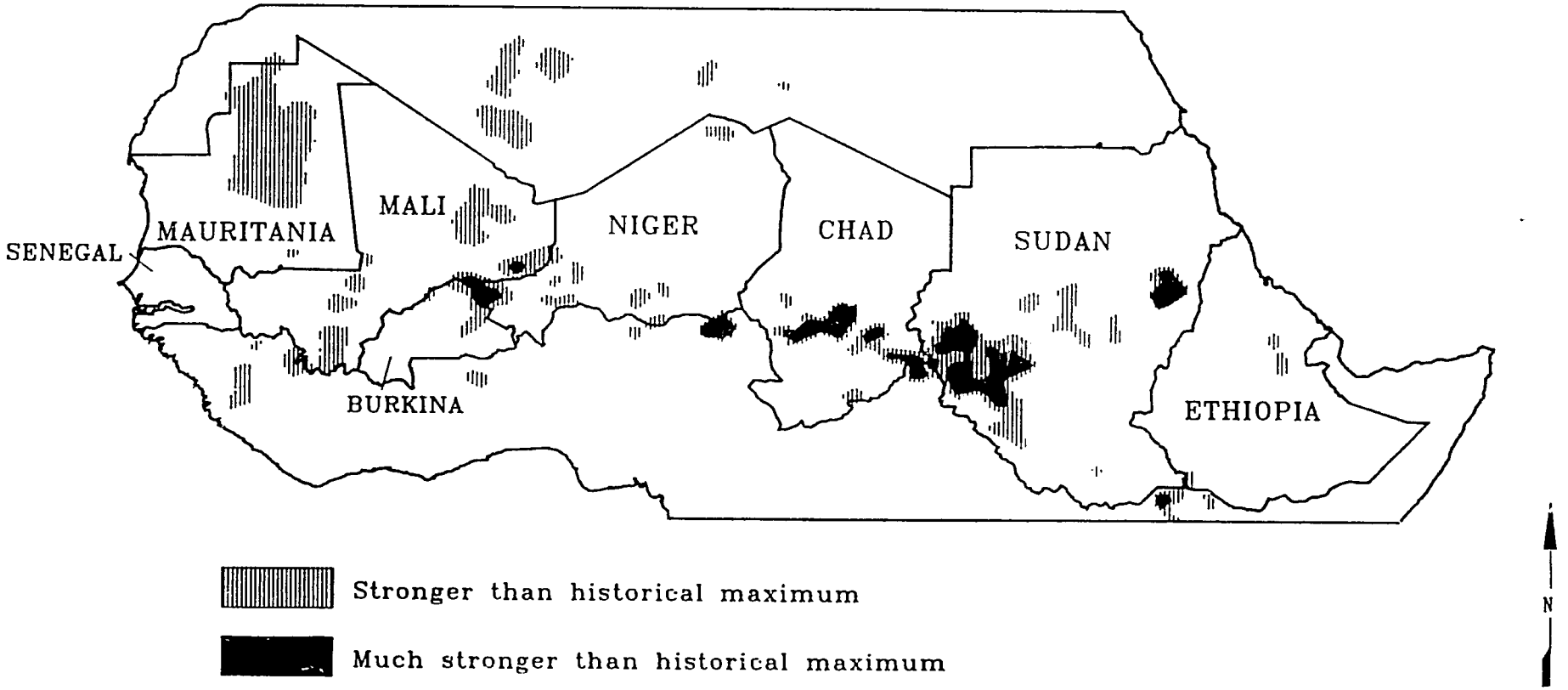
Contour Interval Equals 5mm



FEWS/PWA, August 1988

Much Stronger Vegetation than Historical Maximum

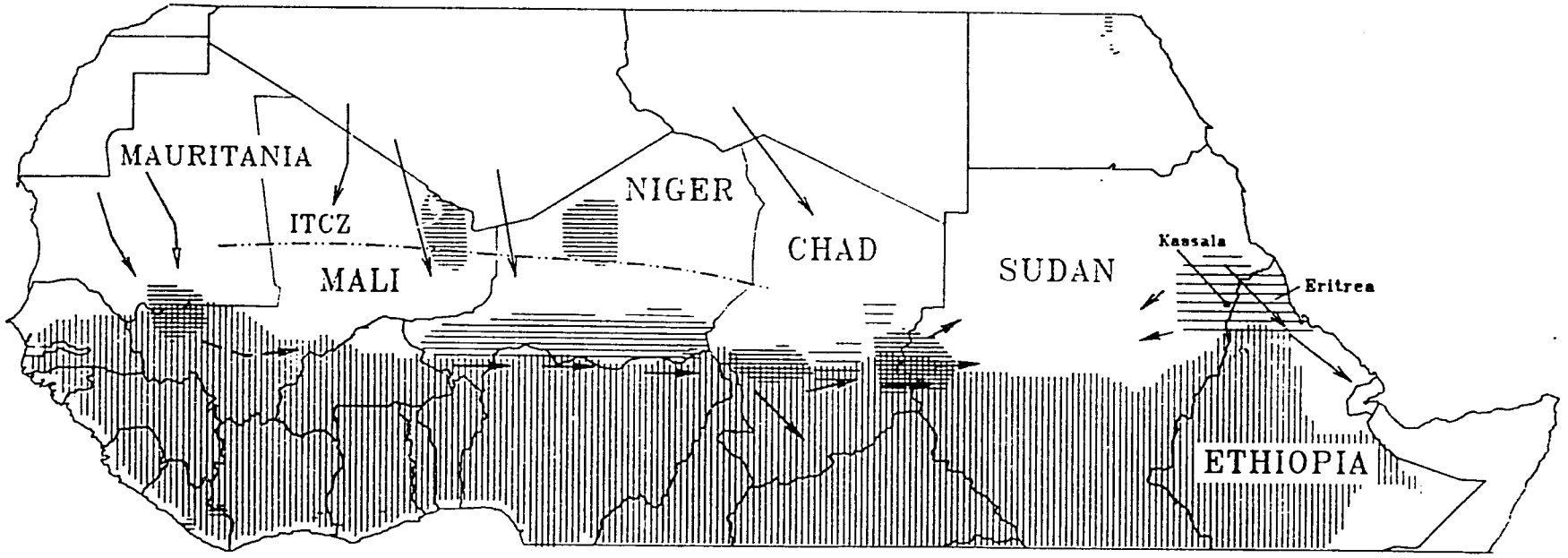
August 1–10, 1988 vs 1982–87 Maximum for Same Decade



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

Desert Locust Swarms

To August 10



Vegetation index of 0.1 or above, July 1–31

Major Desert Locust sightings

Scattered and broken Desert Locust Swarms

→ Recent movement of swarms and hopper bands

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

- west of Niger's Air Mountains.

The infested areas in Chad and western Sudan coincide with areas of persistent cloud cover, which would imply a beneficial environment for locust development. Control efforts in eastern Chad are impeded by the delayed arrival of a spraycraft, which sustained storm damage while laying over in Niger. The position of the Inter-Tropical Convergence Zone (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. 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 could significantly improve 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 Inter-Tropical Convergence Zone (ITCZ) is a warm, moist weather front which originates in equatorial regions and tends to move northward during the Spring and Summer in response to normal global weather patterns. As it oscillates northward, the ITCZ collides with cold air masses descending from Europe, producing the Sahelian rainy season. 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.