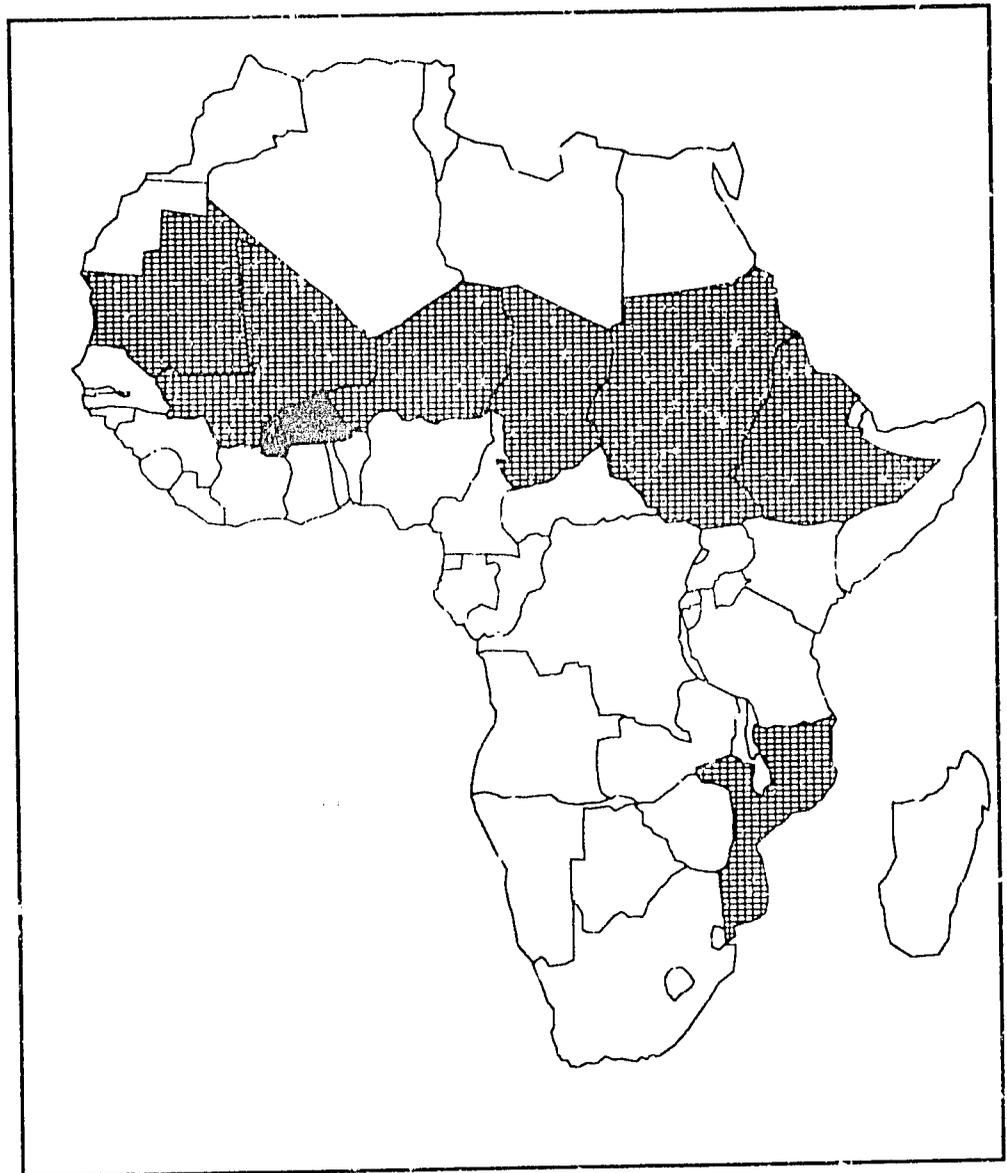


Report Number 2  
November 1986

# FEWS Country Report BURKINA



Africa Bureau  
U.S. Agency  
for International  
Development



# BURKINA

## Revised 1986 Crop Forecast

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Prepared for the  
Africa Bureau of the  
U.S. Agency for  
International Development

Prepared by  
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November 1986

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## INTRODUCTION

This is the second of a series of monthly reports issued by the Famine Early Warning System (FEWS) on Burkina. It is designed to provide decisionmakers with current information and analysis on existing and potential nutrition emergency situations. Each situation identified is described in terms of geographical extent and the number of people involved, or at-risk, and the proximate causes insofar as they have been discerned.

Use of the term "at-risk" to identify vulnerable populations is problematical since no generally agreed upon definition exists. Yet it is necessary to identify or "target" populations in-need or "at-risk" in order to determine appropriate forms and levels of intervention. Thus for the present, until a better usage can be found, FEWS reports will employ the term "at-risk" to mean...

...those persons 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.

Perhaps of most importance to decisionmakers, the process underlying the deteriorating situation is highlighted by the FEWS effort, hopefully with enough specificity and forewarning to permit alternative intervention strategies to be examined and implemented. Food assistance strategies are key to famine avoidance. However, other types of intervention can be of major importance both in the short-term and in the long run, including medical, transport, storage, economic development policy change, etc.

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.

Acknowledgment is given to the FEWS Public Health Advisory team in Burkina for the timely and detailed data which are used in the analysis of food production and estimated food requirements.

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FEWS is operated by AID's Office of Technical Resources in the Bureau for Africa in cooperation with numerous USG and other organizations.

## SUMMARY

Emergency grasshopper spraying continued throughout October, with approximately 130,000 ha reportedly treated by aerial spraying. Plans were to continue the spraying operations through the end of October. Spraying appears to have been successful in limiting serious crop damage in the central and southern provinces. The 1986 rainy season is over, and in review, the cumulative rainfall approximated or exceeded the 30 year average at six of ten rain stations, although localized drought conditions have been reported. Overall, the projected national crop harvest appears to be good this year due largely to increases in estimated crop areas under cultivation over previous years. The 1986 harvest has begun, and a forecast of cereal production based on revised estimates of crop areas and crop yields is for a harvest approximately 4.5 percent greater than that of 1985. The estimated gross production in sorghum equivalents is 1,663,600 mt. After accounting for waste and milling losses, net production should be approximately 203,200 mt less than Burkina's total cereal requirements. Regional surpluses are anticipated in most southern provinces, whereas deficits are forecast for northern provinces.

## Key Issues

- o The Government of Burkina (GOB) favors redistributing available cereal stocks from surplus to deficit provinces prior to importing food from external sources. Given that the GOB lacks the necessary funds to redistribute cereal stocks, donor assistance will likely be needed.
- o Although the spraying program appears to have been helpful in controlling grasshopper damage to the 1986 crops, egg masses laid by this year's swarms pose a serious grasshopper threat to next year's crops.

## November Indicators

- o The sorghum harvest has begun in the central provinces, and the maize harvest is well under way in the southern provinces. The annual cereal harvest is normally completed in December.

## CROP PESTS

The emergency grasshopper spraying program continued in October, with aerial spraying operations in the northern provinces of Soum, Oudalan, Seno, and Yatenga (Map 1). Over 130,000 ha had been treated by small planes by the end of October. Helicopter surveys of grasshopper distributions and densities have covered 17,400 square kilometers. A total of 127,000 ha around Djibo, Ouahigouya, and Dori were reported to be infested by grasshoppers. Helicopter surveys were conducted between October 16 and 21 in areas near the towns of Gorom, Aribinda, Djibo and Kongoussi. In some areas, grasshopper densities exceeded 25 hoppers per square meter.

Densities of 14 grasshoppers per square meter were noted as far south as Kongoussi in Bam Province. The task of targeting areas for aerial treatment has been complicated by shifting movements and densities of hopper swarms. Damage to crops and natural vegetation was noted in many of the survey inspections, but no estimates are available regarding the impact of grasshopper damage on the 1986 harvest. The emergency spraying operation appears to have been successful in helping to control potential damage to the 1986 harvest.

## RAINFALL

The rainy season has passed in Burkina, and rainfall will continue to decline throughout the remainder of 1986. Since the harvest has already begun, any additional rainfall should have little impact on Burkina's 1986 crop production.

Cumulative rainfall approximated the thirty year average for rain stations in the southern and central provinces of Naouri, Bulkiemde, Poni, Mou Houn and Kadiogo. As a result of near normal rainfall in these provinces, the crop yield outlook is good.

The rain stations at Fada N'Gourma and Dori recorded cumulative rainfalls 35 percent below their thirty year averages (Table 1). Rains were poor at Bobo-Dioulasso, but according to field reports, the rainfall was distributed throughout the growing season so that crops in Houet Province were not adversely affected by moisture stress. The rain deficits recorded by these three stations approximates that which was recorded during the drought of 1984.

**Table 1 1986 Rainfall Summary By Rain Station (mm)  
Ranked by Percent Mean To Date**

| Station        | Province  | October<br>1-10 | 1986<br>Total | % Mean<br>To Date |
|----------------|-----------|-----------------|---------------|-------------------|
| Po             | Naouri    | 24.5            | 1,052.5       | 118.7             |
| Saria          | Bulkiemde | 4.0             | 933.5         | 116.8             |
| Gaoua          | Poni      | 39.5            | 1,087.7       | 111.2             |
| Dedougou       | Mou Houn  | 12.1            | 813.6         | 97.4              |
| Boromo         | Mou Houn  | 8.3             | 842.9         | 93.2              |
| Ouagadougou    | Kadioge   | 3.5             | 763.8         | 91.0              |
| Ouahigouya     | Yatenga   | 8.1             | 585.5         | 89.0              |
| Bobo-Dioulasso | Houet     | 14.1            | 827.9         | 78.9              |
| Fada N'Gourma  | Gourma    | 6.5             | 578.6         | 64.1              |
| Dori           | Seno      | 0.0             | 330.5         | 61.4              |

Sources: Agrometeorological Bulletins. GOB National Meteorological Office. Average 1951-1980.

## 1986 HARVEST

Prospects for the 1986 harvest are good for most of Burkina, except for the northern Sahelian provinces of Seno, Oudalan, and Soum. Early harvests are reported in several unspecified northern provinces in response to crop stress caused by drought and grasshopper attacks. Crops in the central provinces of Burkina are at maturity, and sorghum crops planted early in the year are being harvested in some areas. In the southern provinces, crops are reported flowering and maturing.

Burkina is currently projected to produce 1,663,600 metric tons in sorghum equivalent cereals in 1986, which is 11 percent more than the estimate presented in the FEWS October Burkina report (See Appendix I for a definition of sorghum equivalence). The projected increase since the October report is primarily a result of new estimates of cropped areas released by the Ministry of Agriculture in Burkina, and secondarily due to revised crop yield estimates provided by the National Oceanic and Atmospheric Administration (NOAA). According to the current estimate of gross production, the total tonnage for all cereals should exceed the 1985 harvest by approximately 4.5 percent, and should exceed the 1984 harvest by 51 percent (Table 2). Rice is the only cereal crop expected to decrease from last year's production.

**Table 2 Burkina Annual Cereal Production.**  
(Thousands of Metric Tons, Gross Production)

| Crop         | 1984           | 1985           | Est.<br>1986   | % Of<br>1984 | % Of<br>1985 |
|--------------|----------------|----------------|----------------|--------------|--------------|
| Sorghum      | 597.9          | 796.5          | 828.7          | 138.6        | 104.0        |
| Millet       | 416.8          | 586.6          | 630.6          | 151.3        | 107.5        |
| Maize        | 62.2           | 142.6          | 149.9          | 241.0        | 105.1        |
| Rice         | 16.1           | 50.9           | 40.3           | 250.3        | 79.2         |
| <b>Total</b> | <b>1,093.0</b> | <b>1,576.6</b> | <b>1,649.5</b> | <b>150.9</b> | <b>104.6</b> |

### Sources:

GOB Ministry Of Agriculture data as reported in the FEWS/BURKINA September Report, 1986.  
Burkina Faso Yield Forecast. NOAA/NESDIS/AISC.  
Assessment No. 2, Oct. 1986.

Compared with the October FEWS report, production estimates have significantly increased in Poni (+136%), Bougouriba (+124%), and Boulgou (+82%) due largely to substantial increases in the estimated areas under cultivation. The only decreases in expected harvests are noted in the northern provinces of Burkina including Seno

(-16.2%), Yatenga (-15.3%), Soum (-6.7%) and Oudalan (-4.3%) where, due to dry conditions, crop yield estimates were reduced as much as 40 percent from the October estimate. Of the 34 provinces in Burkina, half are expected to exceed the 1985 sorghum equivalent harvest (Appendix I).

Regionally, Burkina will likely have good harvests in the southwestern, central, and southeastern provinces and less bountiful harvests in the north (Map 2). The provinces of Comoe, Houet, Kenedougou, Kossi, Mou Houn and Sourou in the southwestern regions of Hauts-Bassins and Volta-Noire are expected to have relatively high yields in all of the cereal crops (Appendix II).

Although the rain station in Houet province recorded only 78.9 percent of the 30 year average cumulative rainfall, field reports indicate that rains were sufficiently distributed throughout the growing season so that crops were not affected by moisture stress. The central provinces of Bazega, Bulkiemde and Oubritenga should also produce good harvests due to a combination of average yields and large areas of cereal crops under cultivation. Likewise, the southeastern region of Burkina including Gnagna, Gourma, and Boulgou should have sizeable harvests for the same reason. The low expected yields for the Sahelian provinces of Seno, Soum and Namentenga will likely result in poor harvests even though these provinces have sizeable areas under sorghum and millet cultivation.

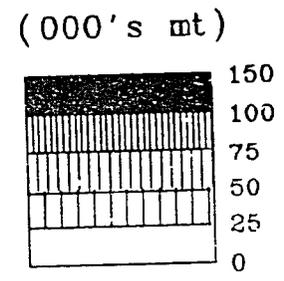
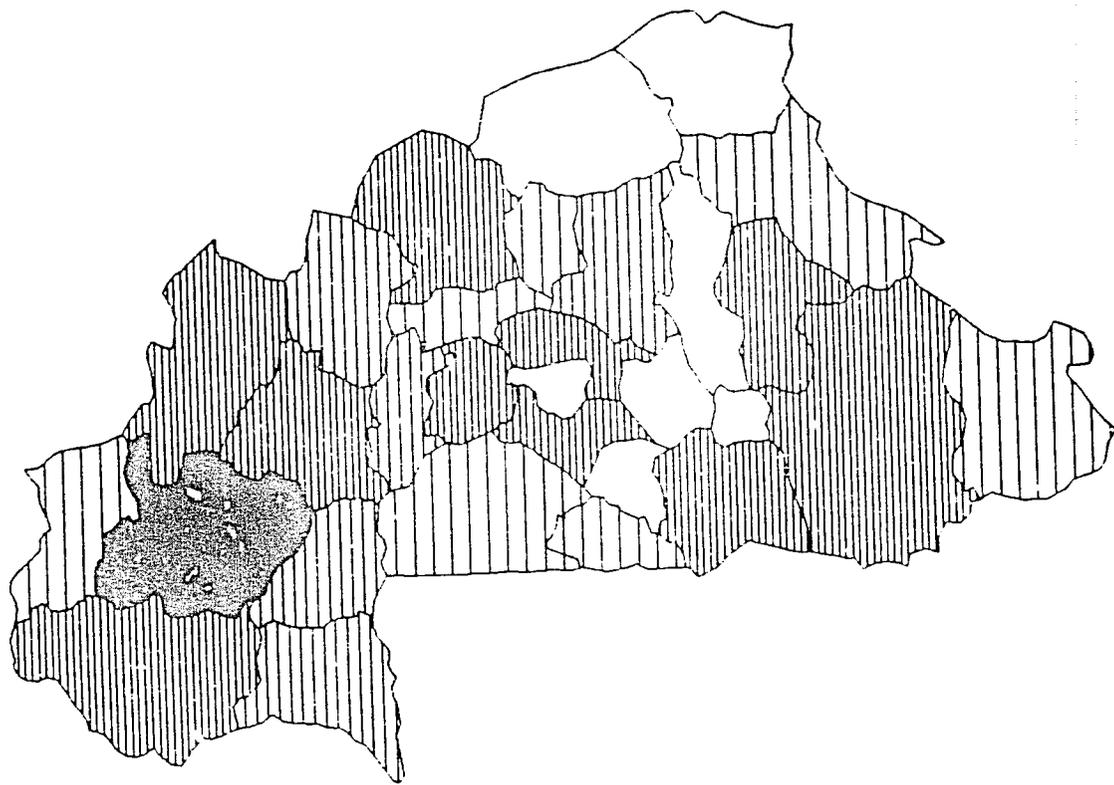
## **FOOD REQUIREMENTS**

Burkina will require approximately 1,600,200 mt of cereals to feed an estimated 1986 population of 8,334,207 people during the crop year 1986/1987 (Appendix III). This requirement is based on an assumed consumption of 192 kg per person as estimated by the USAID Mission in Ouagadougou. Consumption of cereals probably varies regionally within Burkina due to the availability (or lack thereof) of alternative food sources. However, per capita cereal consumptions by province are not currently available.

The estimated gross production of 1,663,600 mt, when adjusted for waste and milling losses (16%), should result in a net production of 1,397,000 mt of sorghum equivalent cereals. The expected production (without accounting for stocks and commercial imports) is approximately 203,200 mt less than the population's cereal requirement. Even though Burkina is likely to produce 4.5 percent more cereals than 1985, the net harvest is still 12.7 percent less than the population's estimated cereal needs.

# ESTIMATED 1986/1987 CROP PRODUCTION

## Sorghum Equivalents



FEWS/PWA November, 1986

In addition to government stocks (100,800 mt estimated as of August), there are an estimated 340,000 mt of cereals in the form of private, donor, and on-farm stocks in Burkina (Table 3). Donor stocks in Burkina consist of World Food Program (WFP) and Catholic Relief Services (CRS) reserves. With commercial imports of 50,000 mt, and additional donor imports of 10,500 mt, the total cereal surplus is likely to be 298,100 mt for the crop year 1986 (See also Appendix IV).

The estimate for gross 1986 cereal production does not account for potential crop damage from pests such as grasshoppers. The grasshopper situation in Burkina is serious, but there have been no estimates on the extent of crop damage. In extreme situations, the damage from pests can result in sizeable reductions of potential cereal harvests within provinces.

**Table 3 Estimated Food Supply In Metric Tons**

|  |                |                  |
|--|----------------|------------------|
| <b>Estimated Net Production<br/>(Sorghum Equivalent)</b> |                | <b>1,397,000</b> |
| <b>Stocks</b>  |                |                  |
| <b>GOB</b>   | <b>100,800</b> |                  |
| <b>Private</b>   | <b>30,000</b>  |                  |
| <b>Donor</b>   | <b>10,000</b>  |                  |
| <b>On-Farm</b>   | <b>300,000</b> |                  |
| <b>Subtotal</b>  |                | <b>440,800</b>   |
| <b>Imports</b>   |                |                  |
| <b>GOB Wheat</b>   | <b>30,000</b>  |                  |
| <b>GOB Rice</b>  | <b>20,000</b>  |                  |
| <b>Private Donor</b>                                     | <b>10,500</b>  |                  |
| <b>Subtotal</b>  |                | <b>60,500</b>    |
| <b>Total Estimated Supply</b>                            |                | <b>1,898,300</b> |
| <b>Total Estimated Needs</b>                             |                | <b>1,600,200</b> |
| <b>Estimated Food Surplus</b>                            |                | <b>298,100</b>   |

**Source:**

FEWS/Burkina August and September Reports, 1986.

Burkina's national food supply, when including estimated stocks and projected food imports, suggests a surplus for the 1986 crop year. There will, however, likely be severe provincial deficits even after accounting for the GOB cereal stocks within the provinces (Map 3). According to current forecasts, 15 provinces will have cereal deficits in 1986.

# ESTIMATED 1986/1987 CEREAL SURPLUS & DEFICIT

Sorghum Equivalents, GOB Stocks Included



Kadiogo Province faces the highest cereal production deficit owing to the agriculturally unproductive urban population in the capital of Ouagadougou. Yatenga and Kouritenga are also estimated to be major deficit provinces which face cereal shortages of more than 27,000 mt even after GOB stocks within the provinces are included. Yatenga ranks sixth out of 30 provinces in the projected 1986 harvest, but the sizeable population creates a deficit situation. Although Kouritenga does not have a large population to feed, it is not expected to harvest enough cereals to meet the needs of its population due to small estimated areas under cereal cultivation.

When the projected food deficit is expressed as a percent of the province's food requirements, Kouritenga Province is projected to have the worst cereal deficit which is 71.3 percent less than its population needs (Map 4). Other provinces meeting less than 40 percent of cereal requirements include Oudalan (-64.2%), Kadiogo (-57.4%), Soum (-54.4%), Ganzourgou (-48.9%), Sissili (-45.0%), and Passore (-41.7%). These deficit provinces should be considered as targets for the redistribution of food from provinces expecting large surplus harvests such as the provinces of Gourma (51.5%), Kenedougou (48.5%), Gnagna (42.8%), and Mou Houn (34.3%).

Cereal surpluses and deficits pictured in Maps 3 and 4 reflect estimated 1986 production and GOB cereal stocks by province. The distribution of estimated private, donor and on-farm stocks is not available. Consequently, the maps reflect a partial picture of the projected cereal surplus and deficit by province since nearly 340,800 mt of cereal stocks are not included in the data used to generate the maps. In addition, alternative sources of food and regional trade are not taken into account by these maps.

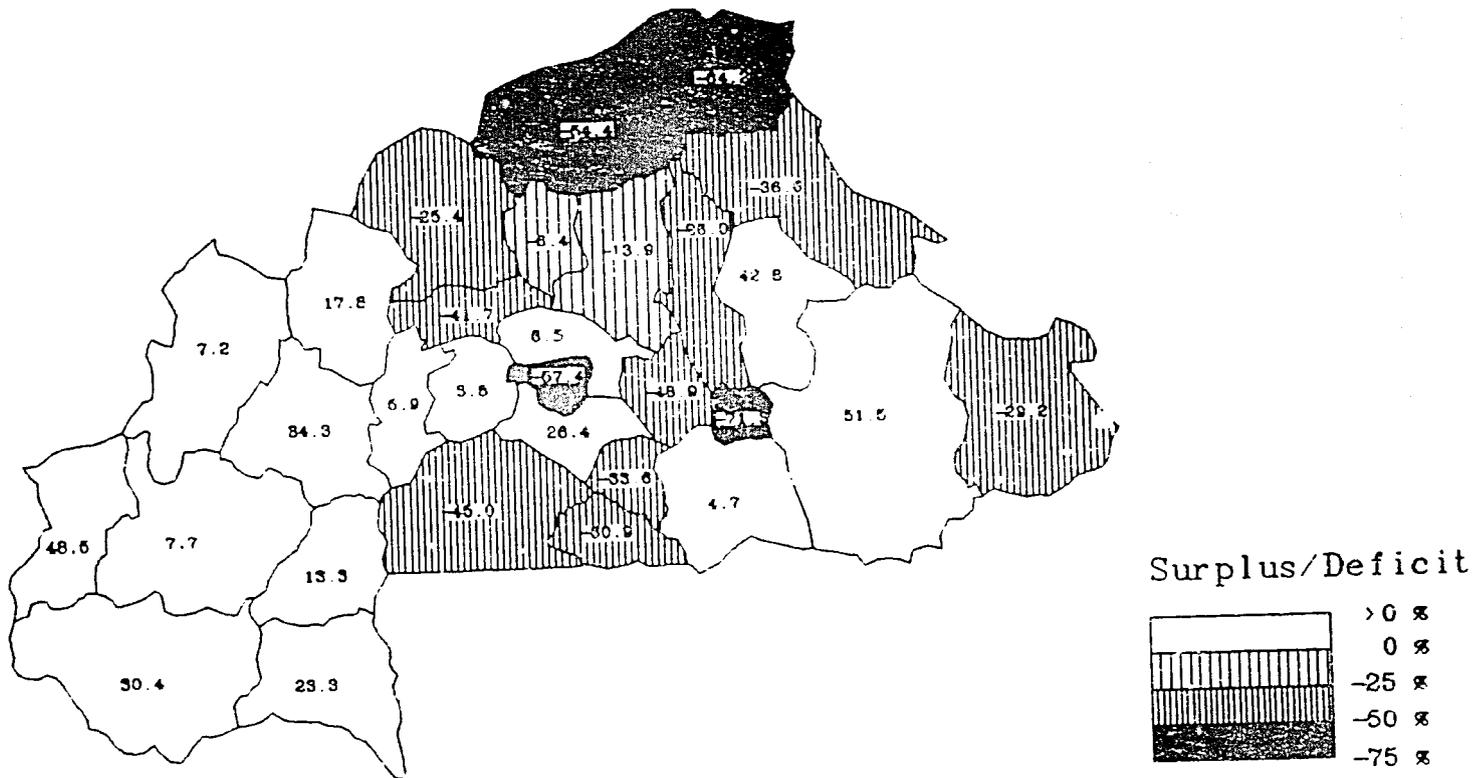
## **FOOD ASSISTANCE**

The regional disparities in estimated cereal production versus population requirements suggests that Burkina will need assistance in 1986/1987 to redistribute cereal from net surplus provinces to deficit areas. The GOB, according to the USAID Mission in Ouagadougou, encourages food self sufficiency, and prefers the use of existing national food stocks as well as purchases from the internal commercial market prior to importing food from external sources. As of August, the GOB had approximately 100,800 mt of cereals in storage throughout Burkina (Appendix IV). The government, however, has limited financial resources with which to fund the redistribution of food from surplus to deficit areas.

# ESTIMATED 1986/1987 CEREAL SURPLUS & DEFICIT

Expressed As A Percent Of Food Requirements

GOB Stocks Included



USAID has committed 24,629 mt in food commodities to Burkina for fiscal year 1987 under the P.L. 480 Title II program (Table 4). This food will be distributed through the Maternal and Child Health, School Feeding, Other Child Feeding, Food for Work, and General Relief programs administered by Catholic Relief Services (CRS).

**Table 4. USAID P.L. 480 Title II, Burkina  
Second Quarter, Fiscal Year 1987  
(Metric Tons)**

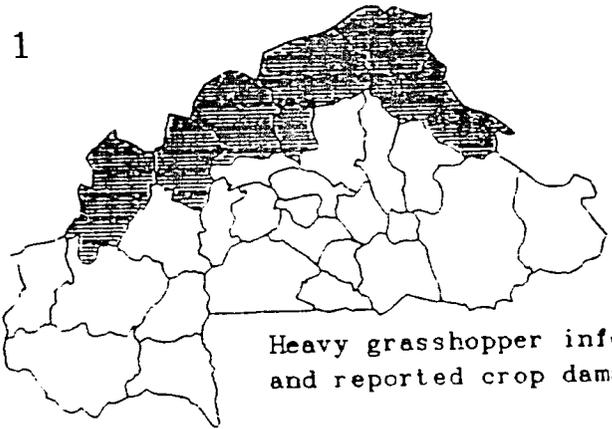
| Commodity     | Committed | Call      |         |
|---------------|-----------|-----------|---------|
|               |           | Forwarded | Balance |
| Cornmeal      | 14,246.9  | 7,122.9   | 7,124.0 |
| Milk Powder   | 6,902.3   | 3,276.0   | 3,626.3 |
| Vegetable Oil | 3,479.5   | 1,994.8   | 1,484.7 |

Source: USAID Mission Cables.

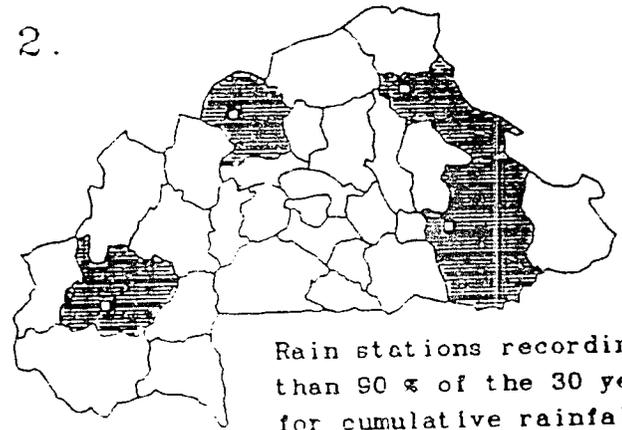
**COINCIDENCE OF  
AT-RISK FACTORS**

Topics discussed in this report which negatively affect the potential crop harvest include crop pests, and below normal cumulative rainfall. If these factors are compared with provinces which are forecast to have deficit harvests, an inference can be made as to which provinces might be particularly at-risk given combinations of at-risk factors (Map 5). The northern provinces of Yatenga, Bam, Soum, Oudalan and Seno have been reported to contain at least two of the mentioned at-risk factors. Areas within these provinces should be monitored through 1987 for possibly severe food shortages.

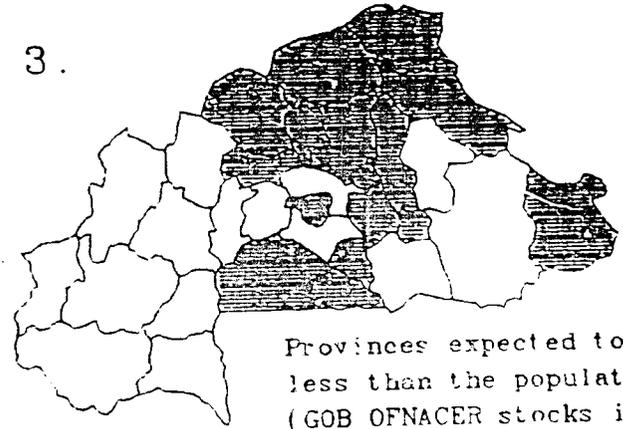
# COINCIDENCE OF AT-RISK FACTORS



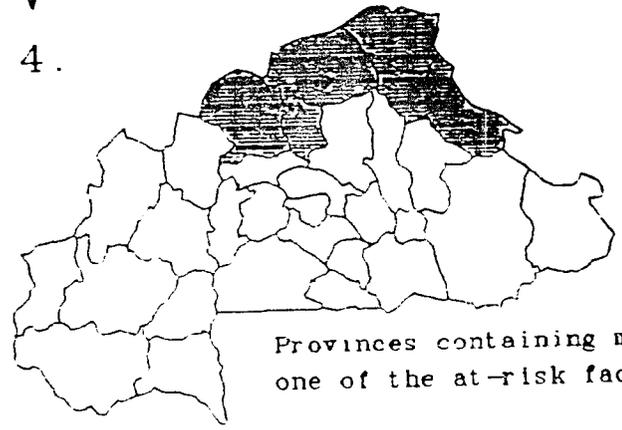
Heavy grasshopper infestation and reported crop damage.



Rain stations recording less than 90% of the 30 year ave. for cumulative rainfall.



Provinces expected to produce less than the population requires. (GOB OFNACER stocks included)



Provinces containing more than one of the at-risk factors.

FEWS/PWA November, 1980

## APPENDIX I

## BURKINA 1988 ESTIMATED CEREAL PRODUCTION

In Sorghum Equivalence, Thousands of Metric Tons

| Province   | 1984<br>PROD | 1985<br>PROD | '84/'85                   |                     | NOVEMBER<br>FORECAST | % OF<br>OCTOBER<br>ESTIMATE | % OF<br>1985<br>PROD | % OF<br>1984<br>PROD | % OF<br>84/85<br>AVERAGE |
|------------|--------------|--------------|---------------------------|---------------------|----------------------|-----------------------------|----------------------|----------------------|--------------------------|
|            |              |              | AVE. YIELD<br>( '85 Area) | OCTOBER<br>FORECAST |                      |                             |                      |                      |                          |
| BAM        | 18.8         | 33.3         | 33.6                      | 36.0                | 36.0                 | 102.9                       | 108.1                | 101.7                | 107.2                    |
| BAZEGA     | 66.6         | 81.3         | 82.4                      | 91.6                | 91.6                 | 100.0                       | 112.6                | 162.0                | 111.1                    |
| BOUGOURIBA | 44.3         | 68.7         | 60.2                      | 26.0                | 68.0                 | 224.1                       | 96.4                 | 126.2                | 111.6                    |
| BOULGOU    | 46.2         | 102.6        | 87.8                      | 63.7                | 97.6                 | 181.7                       | 95.1                 | 215.8                | 111.3                    |
| BULKIEMDE  | 47.8         | 80.2         | 68.1                      | 76.6                | 86.1                 | 111.3                       | 106.0                | 178.1                | 124.9                    |
| COMOE      | 77.2         | 81.9         | 71.6                      | 76.8                | 77.7                 | 102.6                       | 94.8                 | 100.7                | 108.6                    |
| GANZOURGOU | 20.6         | 46.6         | 21.8                      | 23.7                | 23.7                 | 100.0                       | 60.8                 | 116.6                | 108.6                    |
| GNAONA     | 7.4          | 67.2         | 66.0                      | 63.0                | 77.3                 | 122.8                       | 136.2                | 1051.2               | 119.1                    |
| GOURMA     | 34.3         | 61.1         | 120.0                     | 88.6                | 98.4                 | 111.1                       | 192.7                | 237.1                | 82.0                     |
| HOUET      | 87.9         | 140.9        | 138.6                     | 143.8               | 147.6                | 102.6                       | 104.7                | 167.8                | 108.0                    |
| KADIOGO    | 21.4         | 6.3          | 7.7                       | 9.9                 | 9.9                  | 100.0                       | 186.7                | 46.2                 | 128.3                    |
| KENEDOUGOU | 38.7         | 40.7         | 46.3                      | 46.2                | 49.2                 | 105.9                       | 121.0                | 127.3                | 109.7                    |
| KOSSI      | 63.8         | 86.0         | 92.7                      | 71.3                | 84.3                 | 119.9                       | 98.1                 | 132.3                | 90.9                     |
| KOURITENGA | 26.6         | 35.3         | 8.4                       | 8.2                 | 9.8                  | 116.7                       | 27.7                 | 38.2                 | 116.8                    |
| MOU HOUR   | 68.2         | 78.2         | 83.0                      | 77.2                | 77.9                 | 100.9                       | 99.6                 | 114.2                | 93.9                     |
| NAOURI     | 16.8         | 18.2         | 38.8                      | 32.3                | 34.3                 | 106.1                       | 128.9                | 216.9                | 62.5                     |
| NAWENTENGA | 26.3         | 16.6         | 14.2                      | 16.7                | 16.7                 | 100.0                       | 100.6                | 69.6                 | 110.0                    |
| OUBRITENGA | 37.0         | 71.7         | 64.9                      | 76.2                | 76.2                 | 100.0                       | 196.0                | 203.6                | 137.0                    |
| OU DALAN   | 0.9          | 12.2         | 9.6                       | 9.4                 | 9.0                  | 96.4                        | 73.9                 | 999.7                | 94.9                     |
| PASSORE    | 42.7         | 66.3         | 31.2                      | 26.3                | 30.4                 | 120.2                       | 64.0                 | 71.1                 | 97.4                     |
| PONI       | 46.6         | 63.3         | 64.4                      | 26.4                | 62.4                 | 236.2                       | 117.1                | 133.9                | 114.6                    |
| SANGUIE    | 24.6         | 46.6         | 43.9                      | 46.6                | 63.7                 | 116.4                       | 116.4                | 219.2                | 122.6                    |
| SANWATENGA | 63.3         | 67.8         | 72.6                      | 67.2                | 71.6                 | 106.6                       | 106.6                | 122.8                | 96.7                     |
| SENO       | 11.4         | 37.1         | 32.1                      | 32.0                | 26.8                 | 83.8                        | 72.1                 | 234.9                | 83.4                     |
| SISSILI    | 27.1         | 39.7         | 32.8                      | 31.4                | 32.6                 | 103.6                       | 81.9                 | 120.0                | 99.1                     |
| SOLU       | 17.7         | 10.6         | 17.6                      | 22.4                | 20.9                 | 93.0                        | 106.6                | 117.9                | 118.8                    |
| SOUROU     | 36.4         | 68.6         | 66.0                      | 71.6                | 74.6                 | 104.7                       | 127.9                | 206.8                | 113.6                    |
| TAPOA      | 30.4         | 33.7         | 27.6                      | 28.2                | 26.8                 | 102.6                       | 79.5                 | 88.2                 | 97.1                     |
| YATENGA    | 29.4         | 60.7         | 69.6                      | 97.9                | 83.0                 | 84.7                        | 136.7                | 282.6                | 119.6                    |
| ZOUNDWEGGO | 36.6         | 31.6         | 28.4                      | 24.6                | 24.6                 | 100.0                       | 77.9                 | 67.2                 | 36.1                     |
| BURKINA    | 1,098.4      | 1,692.7      | 1,667.3                   | 1,493.3             | 1,663.6              | 111.4                       | 104.6                | 161.6                | 106.1                    |

## Sources:

- (1) 1984 and 1985 cereal production from GOB Ministry of Agriculture Reports, provided in FEWS/BURKINA September Reports.
- (2) 1988 estimated crop areas from "Report On The Situation of The 1986-1987 Agricultural Campaign", GOB Ministry of Agriculture, as provided in August FEWS/BURKINA Report and revised in September Report.
- (3) Crop yields for maize, millet, and sorghum from "Burkina Faso Yield Forecast", NOAA/NESDIS/AISC, Assessment No. 1 used for October Estimate and Assessment No. 2 used for November Estimate.
- (4) Estimated rice production calculated as an the average production for 1984/1985 and adjusted by the % increase or decrease in estimated NOAA yields for maize, millet, and sorghum equivalents. The % change in sorghum equivalents was applied to the 1984/1985 average rice production.
- (5) Sorghum equivalent calculated based on caloric content:

$$\begin{aligned} \text{Sorghum} & \text{ Csg}=3052 & \text{Maize} & \text{ Cmz}=3167 \\ \text{Millet} & \text{ CmI}=3052 & \text{Rice} & \text{ CrI}=3687 \\ \text{Tons Sorghum} & = \{ (Psg * Csg) + (PmI * CmI) + (Pmz * Cmz) + (PrI * CrI) \} / Csg \end{aligned}$$

## APPENDIX II

## BURKINA FASO ESTIMATED CEREAL PRODUCTION

| PROVINCE    | SORGHUM            |                |                     | MILLET             |                |                     | MAIZE              |                |                     | RICE               |                |                     |
|-------------|--------------------|----------------|---------------------|--------------------|----------------|---------------------|--------------------|----------------|---------------------|--------------------|----------------|---------------------|
|             | Est. Yield (kg/ha) | Est. Area (ha) | Est. Prod. (000 mt) | Est. Yield (kg/ha) | Est. Area (ha) | Est. Prod. (000 mt) | Est. Yield (kg/ha) | Est. Area (ha) | Est. Prod. (000 mt) | Est. Yield (kg/ha) | Est. Area (ha) | Est. Prod. (000 mt) |
| BAM         | 600                | 37,779         | 18.9                | 450                | 34,319         | 15.4                | 600                | 2,427          | 1.2                 | 713                | 462            | 0.3                 |
| BAZEGA      | 710                | 66,652         | 47.3                | 660                | 62,221         | 41.1                | 650                | 4,266          | 2.8                 | 690                | 317            | 0.2                 |
| BOUGOURIBA  | 780                | 38,171         | 29.8                | 650                | 30,222         | 19.6                | 820                | 6,631          | 5.4                 | 737                | 1,035          | 0.8                 |
| BOULGOU     | 710                | 50,815         | 36.1                | 650                | 80,486         | 52.3                | 760                | 6,938          | 5.2                 | 963                | 3,208          | 3.1                 |
| BULKIEMDE   | 700                | 79,469         | 55.6                | 600                | 43,480         | 26.1                | 700                | 4,134          | 2.9                 | 746                | 380            | 0.3                 |
| COMOE       | 1050               | 20,068         | 21.1                | 1000               | 13,460         | 13.5                | 1350               | 26,612         | 35.9                | 835                | 5,841          | 4.9                 |
| GANZOURGOU  | 710                | 18,532         | 13.2                | 660                | 14,480         | 9.6                 | 650                | 1,332          | 0.9                 | 481                | 67             | 0.0                 |
| GNAGNA      | 650                | 64,670         | 35.7                | 650                | 67,680         | 37.6                | 930                | 4,190          | 3.9                 | 963                | 120            | 0.1                 |
| GOURMA      | 650                | 70,610         | 45.9                | 650                | 69,930         | 45.6                | 930                | 6,860          | 6.4                 | 665                | 683            | 0.4                 |
| HOUET       | 1080               | 68,920         | 74.4                | 750                | 23,730         | 17.8                | 1200               | 22,670         | 27.2                | 2230               | 10,060         | 22.4                |
| KADIAGO     | 710                | 8,421          | 5.0                 | 660                | 5,610          | 3.7                 | 650                | 222            | 0.1                 | 1089               | 30             | 0.0                 |
| KENEDOUGOU  | 1080               | 21,630         | 23.4                | 750                | 7,070          | 5.3                 | 1200               | 15,670         | 18.7                | 911                | 1,065          | 1.0                 |
| KOSSI       | 800                | 62,090         | 41.6                | 700                | 49,200         | 34.4                | 930                | 8,100          | 7.5                 | 1116               | 355            | 0.4                 |
| KOURITENGA  | 710                | 6,726          | 4.8                 | 650                | 5,674          | 3.7                 | 760                | 1,461          | 1.1                 | 1453               | 71             | 0.1                 |
| KOUHON      | 800                | 65,100         | 52.1                | 700                | 29,500         | 20.7                | 930                | 5,000          | 4.7                 | 896                | 360            | 0.3                 |
| NAWENTENGA  | 600                | 36,515         | 18.3                | 450                | 32,548         | 14.3                | 600                | 2,387          | 1.2                 | 790                | 173            | 0.1                 |
| NAOURI      | 710                | 9,398          | 6.7                 | 660                | 12,079         | 8.0                 | 650                | 1,168          | 0.8                 | 864                | 233            | 0.2                 |
| OUBRITENGA  | 710                | 62,931         | 37.6                | 660                | 54,584         | 36.0                | 650                | 2,095          | 1.4                 | 740                | 238            | 0.2                 |
| OUDALAN     | 300                | 2,170          | 0.7                 | 260                | 32,100         | 8.3                 | 0                  | 0              | 0.0                 | 0                  | 0              | 0.0                 |
| PASSORE     | 700                | 21,990         | 15.4                | 600                | 22,059         | 13.2                | 700                | 2,380          | 1.7                 | 613                | 35             | 0.0                 |
| FOHI        | 780                | 41,497         | 32.4                | 650                | 27,461         | 17.9                | 820                | 13,246         | 10.9                | 862                | 847            | 0.7                 |
| SANGUIE     | 700                | 61,088         | 35.6                | 600                | 27,033         | 16.2                | 700                | 1,965          | 1.4                 | 898                | 303            | 0.3                 |
| SANMATENGA  | 600                | 82,649         | 41.3                | 450                | 56,312         | 25.3                | 600                | 4,016          | 2.0                 | 2339               | 999            | 2.3                 |
| SENO        | 300                | 25,880         | 7.8                 | 260                | 73,130         | 19.0                | 233                | 360            | 0.1                 | 335                | 5              | 0.0                 |
| SISSILI     | 700                | 28,817         | 20.2                | 600                | 15,315         | 9.2                 | 700                | 3,994          | 2.8                 | 670                | 331            | 0.2                 |
| SOUM        | 99                 | 24,150         | 2.4                 | 260                | 71,010         | 18.5                | 29                 | 350            | 0.0                 | 104                | 65             | 0.0                 |
| SOUROU      | 800                | 49,900         | 39.9                | 700                | 48,800         | 34.2                | 930                | 700            | 0.7                 | 840                | 105            | 0.1                 |
| TAPOA       | 650                | 26,360         | 17.1                | 650                | 12,710         | 8.3                 | 930                | 610            | 0.8                 | 1370               | 340            | 0.6                 |
| YATENGA     | 610                | 64,600         | 32.9                | 600                | 94,100         | 47.1                | 440                | 4,000          | 1.8                 | 1179               | 850            | 1.0                 |
| ZOUND WEGOU | 710                | 20,722         | 14.7                | 660                | 13,246         | 9.7                 | 650                | 981            | 0.6                 | 825                | 379            | 0.3                 |
| Totals      | 692                | 1,198,390      | 828.7               | 663                | 1,119,572      | 630.6               | 967                | 154,987        | 149.9               | 1,397              | 28,867         | 40.3                |

## Sources:

- (1) 1986 Crop Areas from "Report on the Situation of the 1986-1987 Agricultural Campaign as of August 31", GOB Ministry of Agriculture
- (2) Estimated Yields from "Burkina Faso Crop Yield Forecast", NOAA/HESDIS/AISC Assessment No. 2, 1986
- (3) Rice yields calculated as the average 1984/1985 rice yields adjusted by the percent increase or decrease in production for sorghum, maize, and millet in sorghum equivalents between 1984/1985 average and 1986 yield forecasts by NOAA.

APPENDIX III  
ESTIMATED CEREAL REQUIREMENTS  
BURKINA, 1986/1987

| Province    | Estimated<br>Population<br>Dec. 1986 | Cereal<br>Needs<br>(192 kg) |
|-------------|--------------------------------------|-----------------------------|
| BAM         | 169,405                              | 32.5                        |
| BAZEGA      | 320,255                              | 61.5                        |
| BOUGOURIBA  | 230,962                              | 44.3                        |
| BOULGOU     | 419,293                              | 80.5                        |
| BULKIEMDE   | 374,177                              | 71.8                        |
| COMOE       | 261,251                              | 50.2                        |
| GANZOURGOU  | 204,895                              | 39.3                        |
| GNAGNA      | 239,629                              | 46.0                        |
| GOURMA      | 307,995                              | 59.1                        |
| HOUET       | 621,137                              | 119.3                       |
| KADIOGO     | 498,600                              | 95.7                        |
| KENEDOUGOU  | 145,309                              | 27.9                        |
| KOSSI       | 347,364                              | 66.7                        |
| KOURITENGA  | 204,698                              | 39.3                        |
| MOU HOUN    | 303,317                              | 58.2                        |
| NAMENTENGA  | 204,733                              | 39.3                        |
| NAOURI      | 109,469                              | 21.0                        |
| OUBRITENGA  | 312,376                              | 60.0                        |
| OU DALAN    | 111,261                              | 21.4                        |
| PASSORE     | 230,768                              | 44.3                        |
| PONI        | 242,466                              | 46.6                        |
| SANGUIE     | 224,060                              | 43.0                        |
| SANMATENGA  | 382,381                              | 73.4                        |
| SENO        | 242,961                              | 46.6                        |
| SISSILI     | 260,881                              | 50.1                        |
| SOU M       | 202,666                              | 38.9                        |
| SOUROU      | 281,221                              | 54.0                        |
| TAPOA       | 166,470                              | 32.0                        |
| YATENGA     | 551,932                              | 106.0                       |
| ZOUND WEOGO | 162,274                              | 31.2                        |
| Totals      | 8,334,207                            | 1,600.2                     |

Source and Notes:

(1) Estimated Population, and Per Capita Consumption from FEWS/BURKINA September, 1986 Report.

(2) Per Capita Ration of 192 kg/person/year.

(3) The FEWS October Report for Burkina, according to the FEWS team in Burkina, incorrectly adjusted the December 1986 province populations by province growth rates. The population figures in this appendix are December 1985 census figures which have adjusted by provincial growth rates to estimate the December 1986 population for each province.

APPENDIX IV  
ESTIMATED CEREAL BALANCE, BURKINA 1986/1987

| Province    | ESTIMATED NET PRODUCTION (000 mt) |       |                            |         | PRODUCTION BALANCE<br>(Deficit or Surplus) |               |                | G.O.B.<br>Cereal<br>Stocks<br>(000 mt) | BALANCE ADJUSTED<br>(G.O.B. Stocks Included) |               |                |
|-------------|-----------------------------------|-------|----------------------------|---------|--|---------------|----------------|--|--|---------------|----------------|
|             | Sorghum/<br>Millet                | Maize | Sorghum<br>Rice Equivalent |         | (000 t)<br>mt                              | kg/<br>person | % Of<br>192 kg |  | (000 t)<br>mt                                | kg/<br>person | % Of<br>192 kg |
| BAM         | 20.2                              | 1.0   | 0.2                        | 30.5    | -2.1                                       | -12.2         | -6.4%          | 0.0                                    | -2.1   | -12.2         | -6.4%          |
| BAZEGA      | 75.1                              | 2.4   | 0.1                        | 77.7    | 16.2                                       | 60.6          | 26.4%          | 0.0                                    | 16.2   | 60.6          | 26.4%          |
| BOUGOURIBA  | 42.0                              | 4.6   | 0.4                        | 47.3    | 2.9  | 12.8          | 6.6%           | 5.0                                    | 5.9  | 25.6          | 13.3%          |
| BOULGOU     | 75.1                              | 4.4   | 1.5                        | 81.0    | 1.1  | 2.6           | 1.3%           | 2.7                                    | 3.8  | 9.0           | 4.7%           |
| BULKIEMDE   | 69.5                              | 2.6   | 0.1                        | 72.2    | 0.3  | 0.9           | 0.5%           | 2.4                                    | 2.7  | 7.3           | 3.8%           |
| COMDE       | 29.4                              | 30.5  | 2.4                        | 64.0    | 13.8                                       | 52.9          | 27.6%          | 1.4                                    | 15.2   | 68.3          | 30.4%          |
| GANZOURGOU  | 19.3                              | 0.7   | 0.0                        | 20.1    | -19.2                                      | -93.9         | -48.9%         | 0.0                                    | -19.2  | -93.9         | -48.9%         |
| GNAGNA      | 62.2                              | 3.3   | 0.1                        | 65.7    | 19.7                                       | 82.1          | 42.6%          | 0.0                                    | 19.7   | 82.1          | 42.6%          |
| GOURMA      | 77.6                              | 5.4   | 0.2                        | 83.5    | 24.1                                       | 79.1          | 41.2%          | 6.1                                    | 30.5   | 98.9          | 51.5%          |
| HOUET       | 78.4                              | 23.1  | 11.2                       | 115.9   | -3.3                                       | -5.3          | -2.6%          | 12.6                                   | 9.2  | 14.8          | 7.7%           |
| KADIOGO     | 8.2                               | 0.1   | 0.0                        | 8.4     | -87.4                                      | -175.2        | -91.3%         | 32.4                                   | -65.0  | -110.2        | -67.4%         |
| KENEDOUGOU  | 24.4                              | 15.9  | 0.5                        | 41.4    | 13.5                                       | 83.2          | 48.5%          | 0.0                                    | 13.5   | 83.2          | 48.5%          |
| KOSSI       | 64.6                              | 6.4   | 0.2                        | 71.5    | 4.8  | 13.9          | 7.2%           | 0.0                                    | 4.8  | 13.9          | 7.2%           |
| KOURITENGA  | 7.2                               | 1.0   | 0.1                        | 8.3     | -31.0                                      | -151.6        | -78.9%         | 3.0                                    | -28.0  | -136.9        | -71.5%         |
| MOU HOUN    | 61.8                              | 4.0   | 0.2                        | 66.1    | 7.9  | 26.0          | 13.5%          | 12.1                                   | 20.0   | 65.9          | 34.3%          |
| NAMENTENGA  | 28.0                              | 1.0   | 0.1                        | 29.1    | -10.2                                      | -49.8         | -26.0%         | 0.0                                    | -10.2  | -49.8         | -26.0%         |
| NAOURI      | 12.4                              | 0.9   | 0.1                        | 13.2    | -7.8                                       | -71.1         | -37.0%         | 1.3                                    | -6.5   | -69.2         | -39.6%         |
| OUBRITENGA  | 62.6                              | 1.2   | 0.1                        | 63.9    | 3.9  | 12.5          | 6.5%           | 0.0                                    | 3.9  | 12.5          | 6.5%           |
| OULDALAN    | 7.8                               | 0.0   | 0.0                        | 7.8     | -13.7                                      | -123.3        | -64.2%         | 0.0                                    | -13.7  | -123.3        | -64.2%         |
| PASSORE     | 24.3                              | 1.4   | 0.0                        | 26.8    | -18.5                                      | -80.1         | -41.7%         | 0.0                                    | -18.5  | -80.1         | -41.7%         |
| PONI        | 42.7                              | 9.2   | 0.4                        | 52.7    | 6.2  | 25.4          | 13.2%          | 4.7                                    | 10.9   | 44.8          | 23.3%          |
| SANGUIE     | 44.2                              | 1.2   | 0.1                        | 45.8    | 2.5  | 11.3          | 5.8%           | 0.0                                    | 2.5  | 11.3          | 5.8%           |
| SANMATENGA  | 66.7                              | 1.7   | 1.2                        | 69.8    | -13.6                                      | -35.5         | -18.5%         | 3.4                                    | -10.2  | -20.6         | -13.9%         |
| SENO        | 22.8                              | 0.0   | 0.0                        | 22.8    | -23.9                                      | -98.3         | -61.2%         | 6.8                                    | -17.1  | -70.3         | -36.6%         |
| SISSILI     | 25.0                              | 2.4   | 0.1                        | 27.6    | -22.5                                      | -86.4         | -45.0%         | 0.0                                    | -22.5  | -86.4         | -45.0%         |
| BOUM        | 17.7                              | 0.0   | 0.0                        | 17.7    | -21.2                                      | -104.5        | -54.4%         | 0.0                                    | -21.2  | -104.5        | -54.4%         |
| SOUROU      | 63.0                              | 0.6   | 0.0                        | 63.6    | 9.6  | 34.1          | 17.6%          | 0.0                                    | 9.6  | 34.1          | 17.6%          |
| TAPOA       | 21.6                              | 0.7   | 0.2                        | 22.6    | -9.3                                       | -56.2         | -29.2%         | 0.0                                    | -9.3   | -56.2         | -29.2%         |
| YATENGA     | 68.0                              | 1.5   | 0.5                        | 70.1    | -35.9                                      | -85.0         | -33.8%         | 8.9                                    | -27.0  | -48.8         | -25.4%         |
| ZOUND WEOGO | 19.9                              | 0.5   | 0.2                        | 20.7    | -10.5                                      | -64.5         | -33.6%         | 0.0                                    | -10.5  | -64.5         | -33.6%         |
| Totals      | 1,240.5                           | 127.4 | 20.2                       | 1,387.0 | -203.2                                     | -24.4         | -12.7%         | 100.7                                  | -102.5                                       | -12.3         | -6.4%          |

NOTES AND SOURCES:

Sorghum  
Millet Maize Rice

Milling and Waste Loss Rates: 15% 15% 50%

(1) Government of Burkina (GOB) Stocks from FEWS/BURKINA September Report, reflect August 1986 estimates.

(2) Sorghum equivalent calculated based on caloric content:

Sorghum Csg=3052                      Maize    Omz=3167  
Millet    OmI=3052                      Rice     Cri=3687

$$\text{Total Sorghum} = [(Psd * Csg) + (Pml * OmI) + (Pmz * Omz) + (Pri * Cri)] / Csg$$