Preliminary Draft

MAKING SENSE OF FOOD SECURITY STATISTICS:

POINTERS FROM BURKINA

by

Steve Haggblade
Public Administration and Metropolitan Studies Program
Maxwell School, Syracuse University

paper prepared for the seminar on
"Agricultural Policy and African Food Security"
Center for African Studies and Office of International Agriculture
University of Illinois, Champaign
April 24-26, 1986

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

Preface

After struggling for some time to make sense of conflicting data on food availability in Burkina, I have learned a little about how the relevant data are collected by various responsible agencies and what the degrees of error and correspondence are among sources. In the course of this work, I have identified, the hard way, a number of pitfalls awaiting the unwary food policy analyst. And I would like to pass on what I have learned to others who may, at some stage, engage in similar pursuits.

In the course of this review and prior analytical work in Burkina, I have been consistently impressed with the dedication and resourcefulness of data collection agencies, both in Burkina and outside. The three organizations maintaining time series data on food availability in Burkina are the Food and Agriculture Organization (FAO), the Economic Research Service of the U.S. Department of Agriculture (USDA) and the Government of Burkina (GOB). It is important to recognize that these agencies serve different constituencies and have consequently different priorities set for them and different demands placed on them. They operate often with limited resources and, for the FAO and USDA, with many demands other than those related to Burkina. I wish to record, at the outset, my respect for the tremendous efforts they undertake to maintain a reasonable assessment of the food situation throughout the world, including Burkina. I hope by bringing the comparative Burkina data together in this paper, it will assist them in identifying discrepancies and in evaluating estimating procedures in comparison with other agencies.

In preparing this paper, I have benefitted greatly from discussions with Mary Burfisher, Margaret Missiaen and Peter Riley of the Economic Research Service at the USDA, with Arthur Mead of the FAO office in Washington, DC and with Cyrille Nyamyogo of the Burkinan Ministry of Health, currently enrolled in graduate studies at Cornell University. I am likewise grateful to Kwesi Amissah and Bill Duncombe for diligent and careful research assisstnace in gathring, inputting, checking and rechecking thousands of data entries from all reporting agencies. Bill Duncombe also provided professional data management and data processing services which greatly facilitated the comparative analysis. To all, I express my gratitude.

I. INTRODUCTION

Existing data on African food production, consumption and trade are fragile. Not only are existing data subject to wide ranges of error, but key interested decision makers do not have access to the same information sources. And data frequently vary among sources. So even if host country governments and donors maintain identical behavioral assumptions about motivations and responsiveness of consumers, producers and marketing agents, differences in data can lead to substantially diverging problem diagnoses and policy prescriptions. Hence, for example, the common divergences in estimates of food aid requirements in any given year.

Yet even in this uncertain environment, policy makers in government and donor agencies must make decisions. They must determine when to intervene in food markets, if at all. They must estimate the magnitude of food imports or food aid required. They must consider issues of food pricing, distribution, and much more, all on the basis of tenuous and often conflicting statistical assessments of their food security situation.

Using information from Burkina, this paper examines some of the practical difficulties faced by practitioners trying to evalutate food security requirements based on existing data sources. It aims to provide pointers for analysts who must make sensible assessments in the short run. For the medium to long run, it suggests priorities for improving essential operational data. While the study is based on material relating to Burkina, I believe it will provide practical insights for analysts working in other African countries as well.

II. DATA REQUIREMENTS FOR MEASURING FOOD SECURITY

Food security is defined here in its large sense, as the ability of a country or region to assure a nutritionally adequate food supply to all members of its population at all times. Conceptually, food security comprises two elements: chronic and transitory security. Chronic food security requires that a country maintain adequate food availability continuously over long periods of time; while achieving transitory food security requires the ability to dampen short-run downswings in food availability for vulnerable groups.[1]

The data required for measuring food security are demanding. One must confirm not only that aggregate national food supplies are adequate but also that food is distributed geographically, seasonally and across income groups to all members of the population.

Analysts normally attempt to measure food security, or the degree of food insecurity facing a given country or region, in one of three ways. Two of the three methods focus on measuring food consumption, while the third physically measures people to assess the impact of food consumption on human health. The three approaches include:

1. Consumption-based indicators of food security
   a. food balance sheets
   b. household consumption studies; and
2. Anthropometric studies.

Each approach illuminates different features of a country's food security status. The individual approaches have their own strengths and weaknesses, and each demands very different types of data.

Food balance sheets estimate, normally at the national level, the amount of food available to consumers by adding domestic food supply to net food imports. Data requirements for making such calculations include information on: a) domestic production of all foodstuffs with an estimate of losses, wastage, seed and other nonfood use; b) net drawdowns on food stocks from year to year; c) food imports and exports; and d) population. Because production and trade data are published and available for a wide range of countries, this approach to measuring aggregate per capita food availability has proven very popular, in Burkina as elsewhere. It is both inexpensive and offers prospects for cross country and time series comparisons. Since aggregate national food availability is a necessary condition for food security, this approach represents a good first cut at assessing food

---

1. This definition follows that adopted by many analysts (Reutlinger, 1986; Eicher and Staatz, 1985), although not all (Valdes and Siamwalla, 1981; Valdes, 1984).

security status.

But food balance sheets have several limitations. First, data may be unreliable or unavailable. In Burkina, food production data are thought to be accurate to within 15-20% (Haggblade, ,1984; Lecaillon and Morrisson, 1985), trade data are known to underestimate acutal flows by 18 to 70 percent, and information on privately held food stocks is largely unavailable.[2] Thus, there is considerable uncertainty about the exactness of final food availability estimates. In addition, wild gathered foods are difficult to include in such balance sheets; and particularly during certain seasons, these appear to provide non-negligible dietary supplements. Critics have also complained that minimum nutritional requirements against which food availability is measured may represent overestimates and thus lead to overly pessimistic estimates of nutritional status (Poleman, 1977). Finally, aggregate food balance sheets offer no insights into actual food distribution across regions or income profiles. Even so, because the basic production and trade data are widely available and other data are scarce, this approach has constituted the principal means of assessing food security status in Burkina.

Household consumption studies avoid some of the problems of aggregate food balance sheets, since household interviewing makes it possible to estimate variations in consumption both regionally and by income group. It also allows estimation of key policy parameters such as income and price elasticities of consumption and dietary profiles by income level. These data provide a crucial supplement to food balance sheet evaluations; because when food balance sheets indicate that aggregate food intake is substandard, only the more detailed household consumption profiles offer indications of who the vulnerable groups are and what policy levers might be most effective in reaching them. Data requirements, though, are severe. Such studies require very detailed and expensive household survey efforts with frequent visits (often weekly) over the course of a consumption year. Like the food balance sheets, this approach too can miss important food intake outside the home, and it also misses variations in intra-household food distribution.

Several recent consumption studies are currently filling a major gap in Burkinan food security understanding. Until last year, the most recent comprehensive consumption study had taken place in 1964. Fortunately Sawadogo (1985) has recently presented the results of an urban consumption study in Ouagadougou, and a consortium of the International Food Policy Research Institute (IFPRI), Centre de Recherches Economiques and Sociales (CEDRES) at the University of Ouagadougou and the International Center for Research in the Semi-Arid Tropics (ICRISAT) is currently analyzing extensive consumption data from both rural and urban areas of the country. This work will fill a

---

2. Current work by Purdue University and the Farming Systems Unit/Semi-Arid Food Grain Research and Development project (FSU/SAFGRAD) as well as by the Center for Research in Economic Development (CRED) at the University of Michigan in conjunction with the University of Wisconsin and the International Center for Research in the Semi-Arid Tropics (ICRISAT) is starting to provide interesting insights into the magnitudes of on-farm storage and changes in stock holdings over time.

critical data gap in our understanding of the nature of food insecurity in Burkina:

The third approach to measuring food security involves taking direct anthropometric measurements to assess health status: This takes food security assessment one step farther than household consumption studies, because it allows assessment of individual nutrititional status not just average household consumption levels. This is important because it locates vulnerable groups not identified by consumption or aggregate food balance approaches:

Although it enhances our understanding of food security by highlighting interpersonal differences food distribution, anthropometry also complicates such assessments: Physical measurements of height, weight, age, arm band circumference do measure health status. But health status is affected not only by food consumption but also by the health environment, including factors such as access to safe drinking water, the prevalence of disease and parasitic infestation. While household consumption studies may show adequate nutritional intake, an inhospitable health environment - for example parasites - may prevent the body from making full use of the food it consumes. Thus anthropometric data can document the existence of substandard health, but it cannot, without collateral investigation, separate out the influence of the health environemnt from the issues of food consumption:

Burkina currently collects anthropometric data regularly at hundreds of Ministry of Health clinics and maternity facilities nationwide and also at clinics and food distribution centers run by private voluntary organizations, particularly Catholic Relief Services (CRS): While CRS has made some attempts to evaluate their data (see Haggblade 1984), these efforts have been sporadic. And the much more extensive Ministry of Health data base has not been analyzed on an ongoing or systematic basis: Thus, although anthropometric data are being collected regularly throughout the country, they are not being analyzed: While they do not currently contribute to our understanding of key features of food security in Burkina, they could provide potentially important insights into regional, seasonal and interpersonal differences in nutritional status:

In sum, the bulk of data on which we can evaluate food security in Burkina really boil down to estimates of aggregate food availability based on production and trade statistics: In short order, nationwide household consumption profiles will be available to supplement the urban study of Sawadogo (1985); but for the present, evaluation of food security status rests squarely on the production and trade data generated by the Ministry of Rural Development in Burkina, by the FAO and by the USDA:

III: ASSESSING DIVERGENCIES IN PRODUCTION AND TRADE DATA

Three principal agencies collect historical agricultural production data for Burkina: the Ministry of Rural Development of Burkina (MRD), FAO and the Economic Research service of the USDA: FAO publishes its statistics in annual production and trade yearbooks, designated henceforth as FAO (B); and they also maintain an updated computer tape designated here as FAO (T): USDA publishes annually their World Indices of Agricultural and Food Production which will be labeled as USDA (B); and they too maintain updated versions of their statistics on computer spreadsheets which will be identified here as USDA (S).

Figures 1 through 7 provide a visual indication of the degree of correspondence among data sources; while the actual data, correlation coefficients and indexes of all estimates in relation to MRD figures are provide in annex tables.

Since cereals account for about 75% of caloric intake in Burkina, it is particularly important to review the degree of variation among the cereal production estimates of the various data sources. As is evident from Figure 1, the disparity among the various agency estimates was enormous during the 1960's and had diminished greatly since the early 1970's: In spite of their extremely high cereal estimates for the mid-1960's, MRD's figures, overall, are 2 to 4% lower than FAO (B) and USDA: This difference is potentially important when it comes to estimating current food needs or shortfalls.

Tables 1 and 2, in addition to illustrating how some of the cereal production divergences came about, identifies one of the principal pitfalls facing unsuspecting food policy analysts: It demonstrates the importance of the golden rule of food policy research - that the analyst must "Beware of the diagonal": The problem of the diagonal arises because in each annual publication, FAO and USDA can only provide retrospective data for a limited number of years, for the FAO normally three years at a time: Thus in their 1984 yearbook, FAO provides estimates for 1982, 1983 and 1984: The 1982 figure represents their latest published estimate for that year and supersedes 1982 estimates that appeared in the 1983 and 1982 yearbooks: To obtain the most current estimate, one must go through each yearbook in succession, prepare a diagonal such as that shown in Table 1 and take the most easterly estimate for each given year. Notice, as an example, that in estimating 1964 cereal production, FAO carried a 1427 estimate in five successive yearbooks. Then in 1972, a review of some sort took place and they revised the series back through time, reducing cereal production for 1964 by about 15%:

Unfortunately, even an analyst who is scrupulous about using only statistics on the diagonal can get caught, because revisions made more than three years back will appear in data tapes but not in published yearbooks: Thus we see in Table 1 how the 1964 cereal figures were adjusted downward a second time in the late 1980's, this time by an additional 20%: On the other hand, Table 2 shows that in recent years the FAO is increasingly inclined to align their cereal estimates with the MRD.

FIGURE 1

BURKINA FASO

COMPARISON OF CEREAL PRODUCTION ESTIMATES
MADE BY THE MDR, FAO AND USDA
THOUSANDS OF METRIC TONS

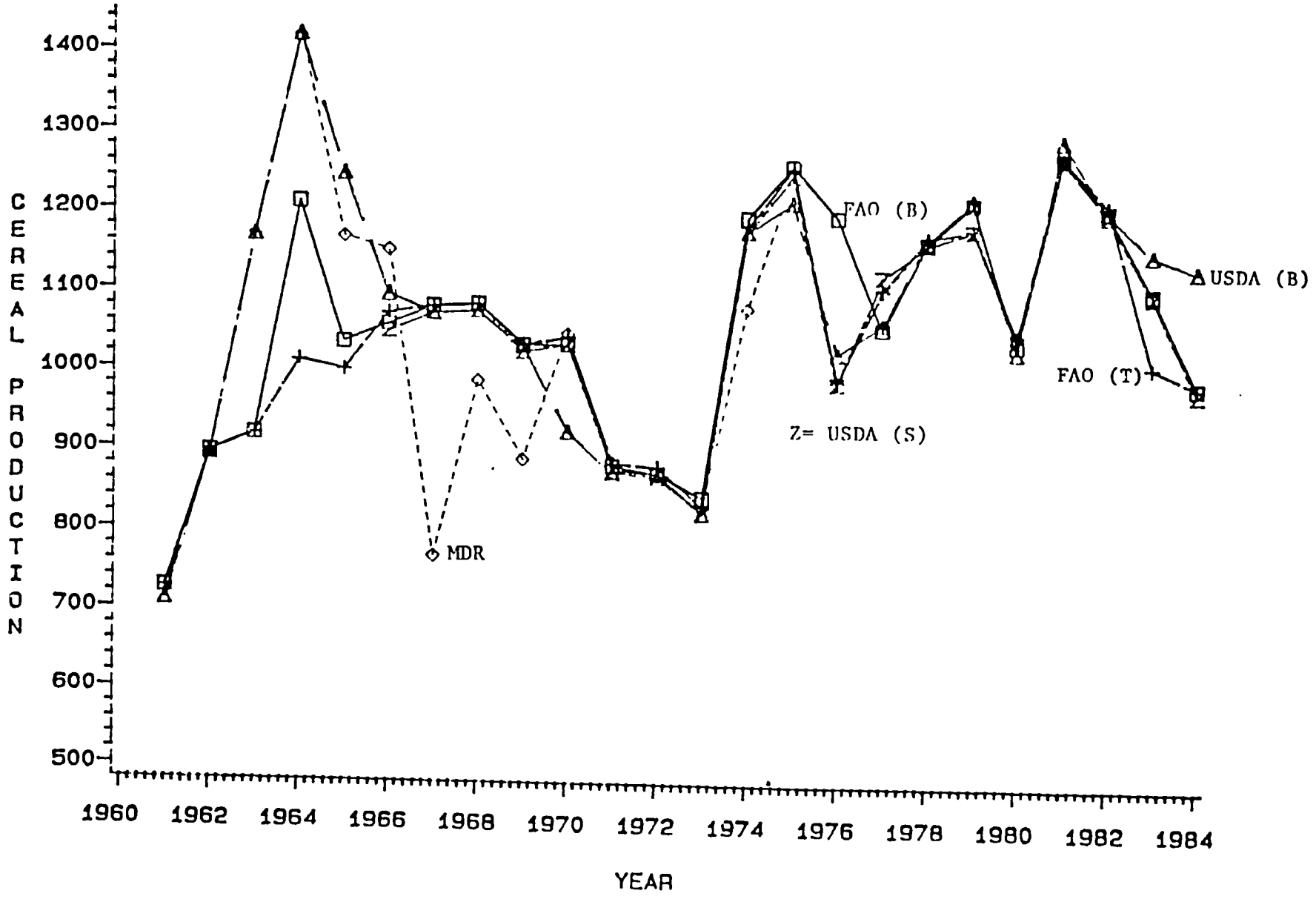


FIGURE 2

BURKINA FASO

COMPARISON OF GROUNDNUT PRODUCTION ESTIMATES
MADE BY THE MDR, FAO AND USDA
THOUSANDS OF METRIC TONS

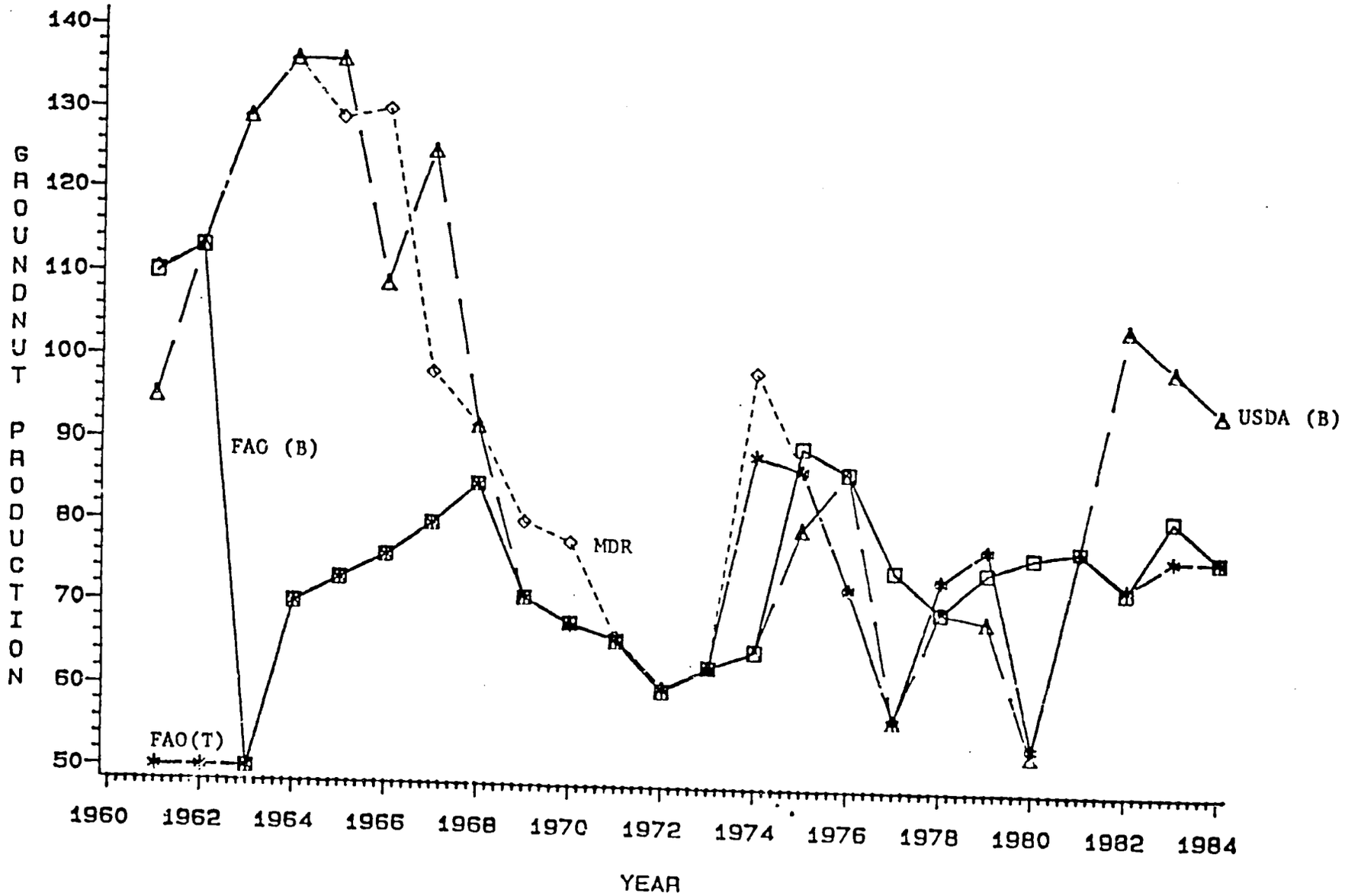
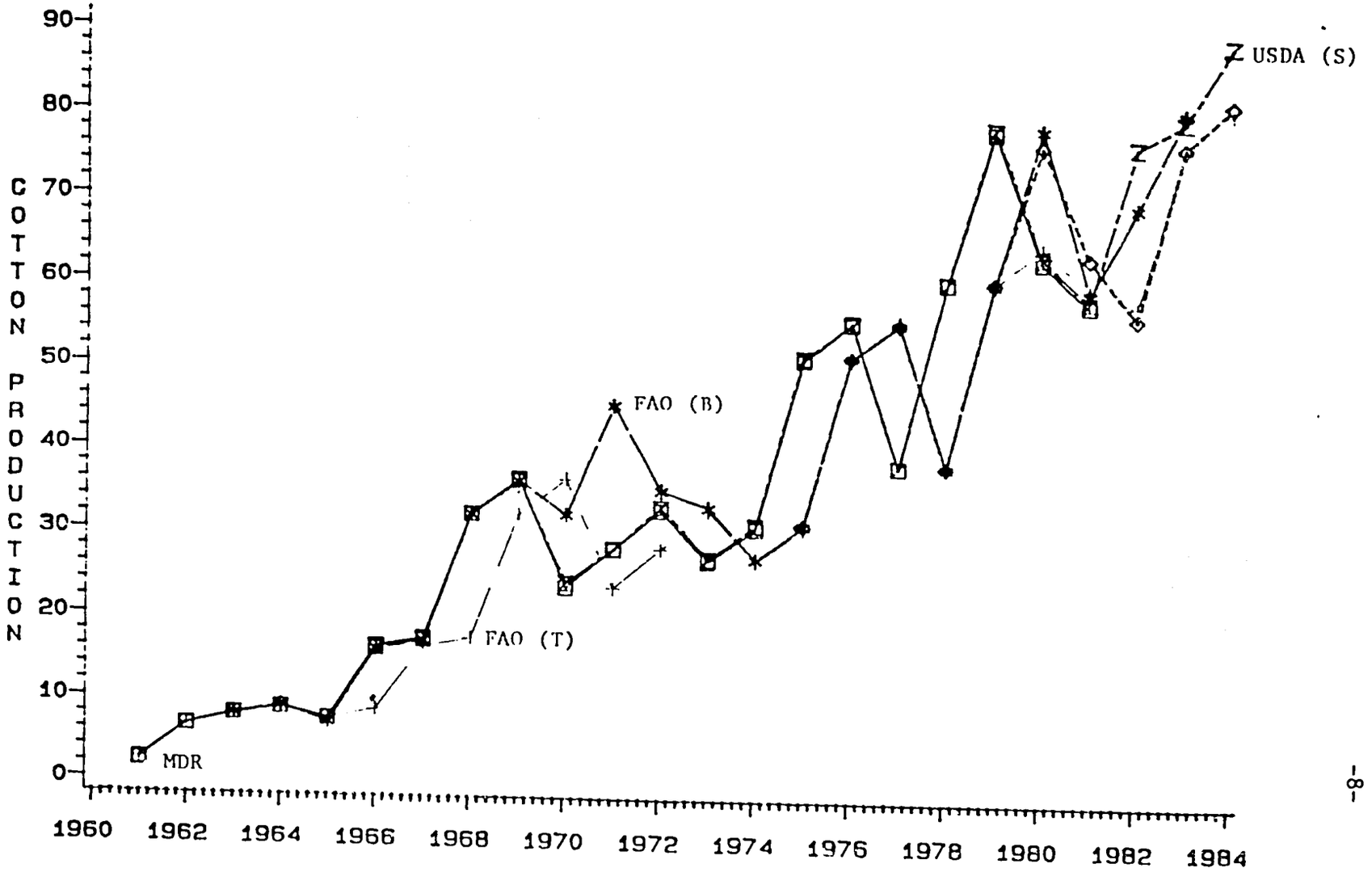


FIGURE 3

BURKINA FASO

COMPARISON OF TOTAL COTTON PRODUCTION ESTIMATES
MADE BY THE MDR, FAO AND USDA
THOUSANDS OF METRIC TONS



* REFERRED TO AS COTTON (MDR) AND COTTONSEED (FAO, AND USDA).

FIGURE 4

BURKINA FASO

COMPARISON OF TUBER PRODUCTION ESTIMATES
MADE BY THE FAO, AND USDA
THOUSANDS OF METRIC TONS

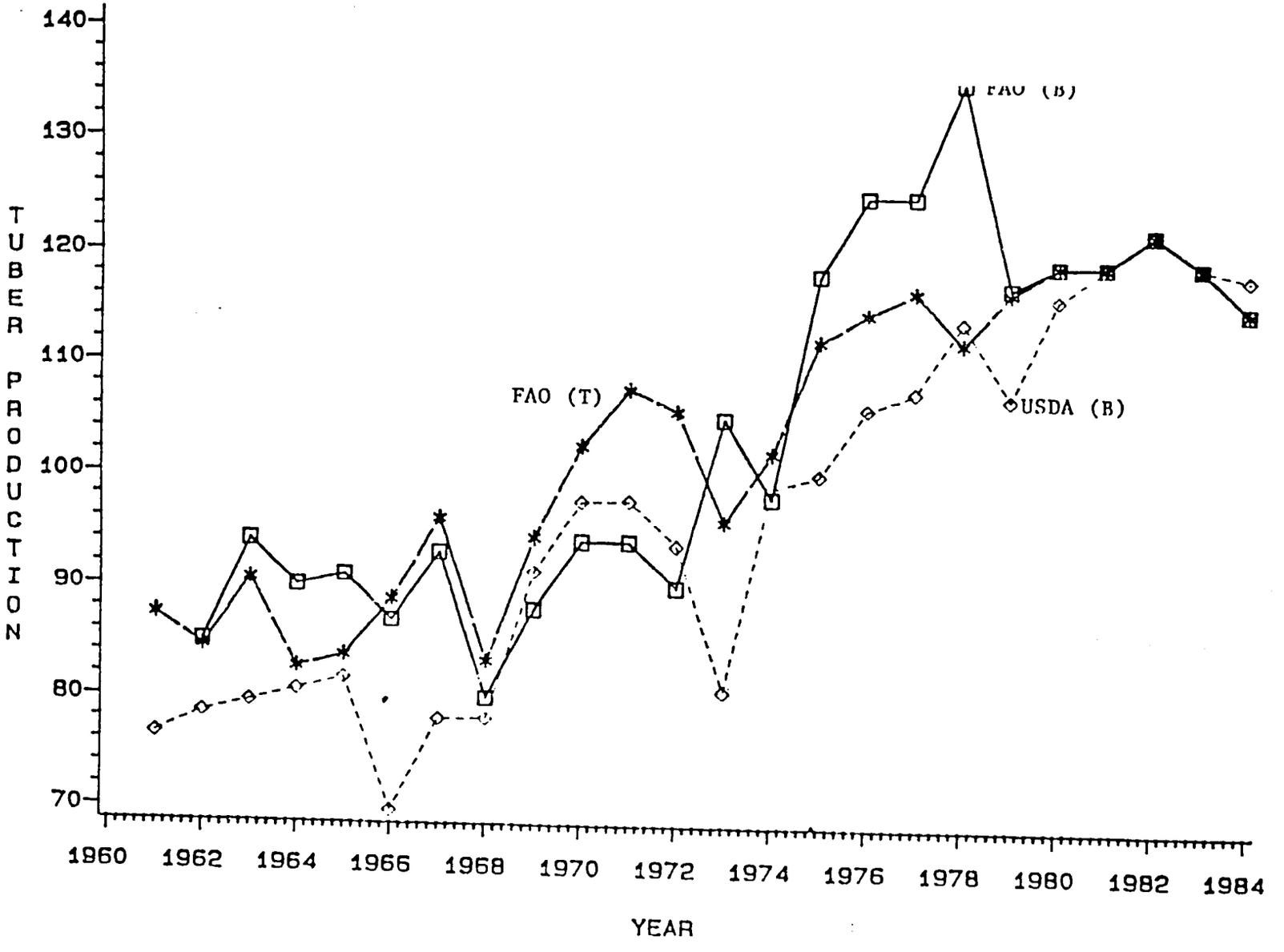


FIGURE 5

BURKINA FASO

COMPARISON OF MEAT PRODUCTION ESTIMATES
MADE BY THE FAO, AND USDA
THOUSANDS OF METRIC TONS

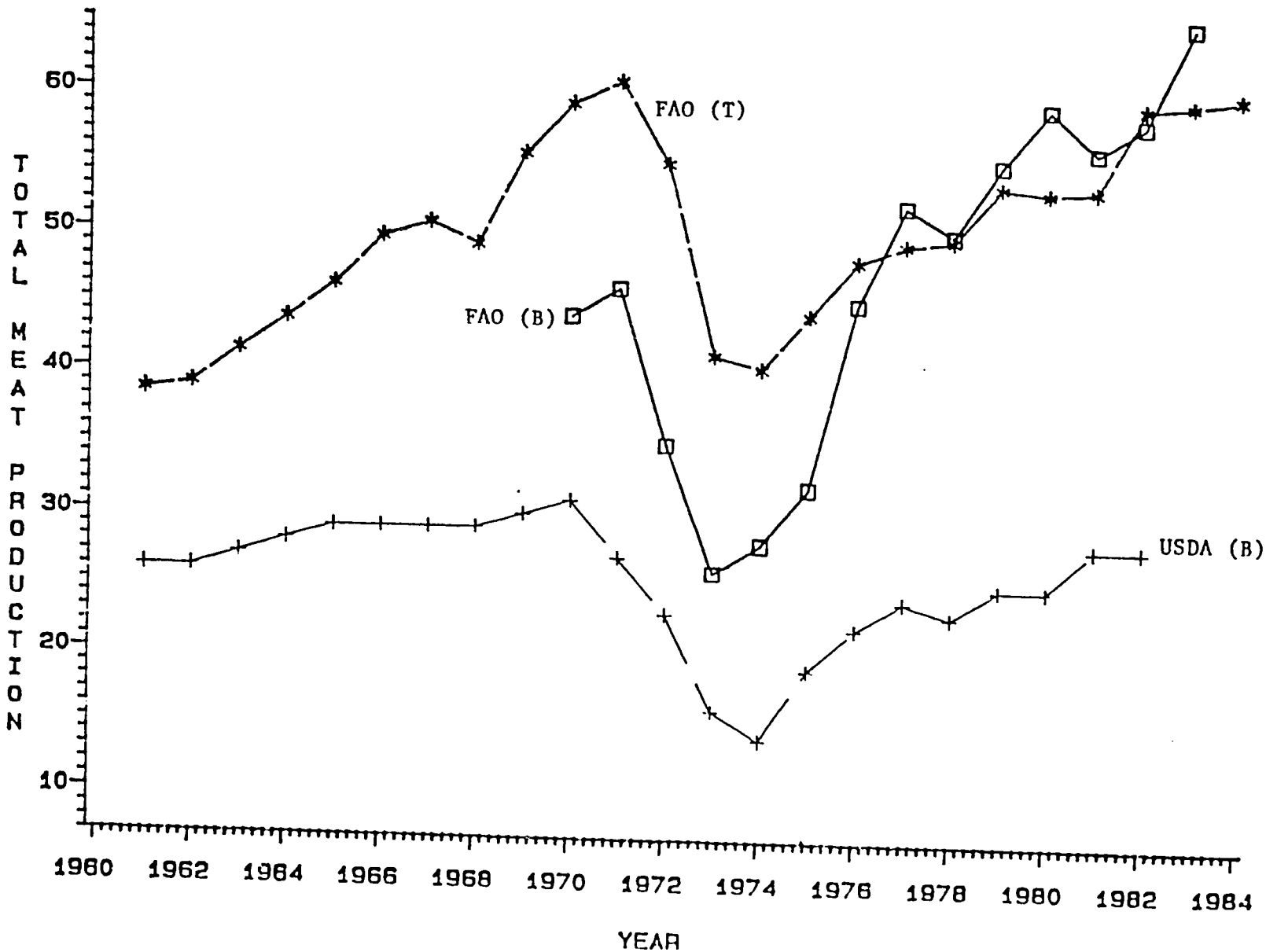


FIGURE 6

BURKINA FASO

COMPARATIVE ESTIMATES OF TOTAL IMPORT VALUE
GOB AND UN
MILLIONS OF CFAF

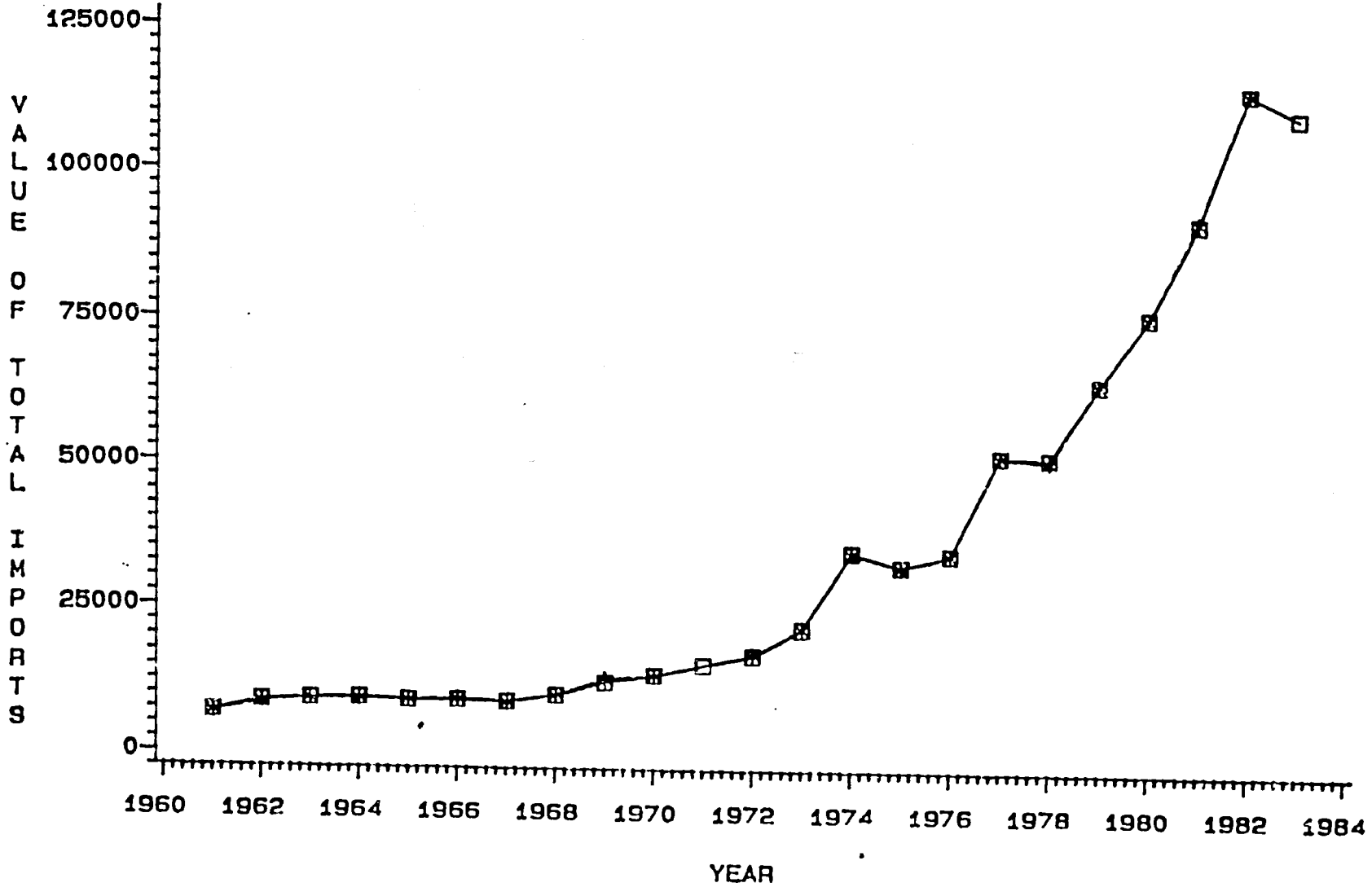


FIGURE 7

BURKINA FASO, COMPARATIVE ESTIMATES OF

TOTAL CEREAL IMPORT QUANTITIES
GOB, FAO, AND USDA
METRIC TONS

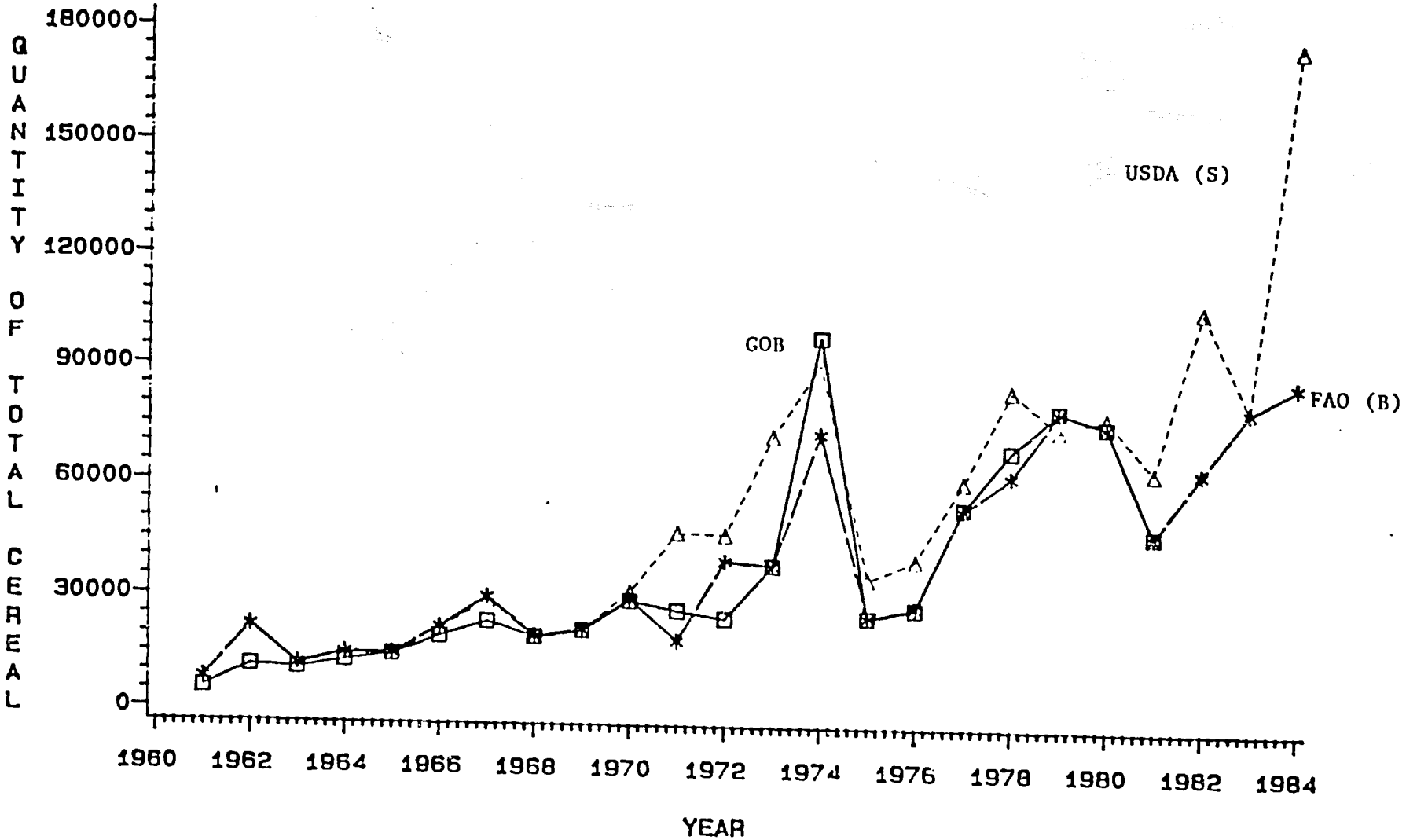


Table 1

BURKINA FASO
VARIATIONS IN FAO PRODUCTION YEARBOOK ESTIMATES OF TOTAL CEREAL PRODUCTION
(Thousands of Metric Tons)

Year	Yearbook Issue													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	
1961			675	726		726							726	
1962			-	895	894	894	894	894					895	
1963					1177	1183	1183	1183	1183				918	
1964						1427	1427	1427	1427	1427			1209	
1965							1436	1254	1254	1271			1034	
1966								1304	1184	1119	1119		1058	
1967									1246	1090	1082	1082	1081	
1968										1380	1094	1084	1084	
1969											1255	1033	1032	
1970											1055	1041	1032	
1971												1052	1065	
1972													1060	

Year	Yearbook Issue													
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	FAO (B)	FAO (T)
1961													726	726
1962													895	895
1963													918	918
1964													1209	1011
1965													1034	999
1966													1058	1072
1967													1081	1081
1968													1084	1084
1969													1032	1032
1970													1032	1042
1971	881												841	884
1972	887	871											871	880
1973	831	829	843										843	831
1974		699	1185	1193									1193	1182
1975			1122	1250	1257								1257	1254
1976				1193	1107	1194							1194	988
1977					1018	1051	1055						1055	1105
1978						1178	1208	1163					1163	1170
1979							1145	1185	1212				1212	1181
1980								1150	1036	1036			1036	1048
1981									1299	1299	1270		1270	1270
1982										1282	1211	1205	1205	1211
1983											1008	1103	1103	1010
1984												985	985	985

Table 2

BURKINA FASO

VARIATION IN FAO PRODUCTION YEARBOOK ESTIMATES OF TOTAL CEREAL PRODUCTION

Index -- FAO Estimates as a Percent of MDR Estimates

Year	Yearbook Issue													
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	
1961			96.15	103.42	0.00	103.42							103.42	
1962				100.22	100.11	100.11	100.11	100.11					100.22	
1963					100.68	101.20	101.20	101.20	101.20	0.00			78.53	
1964						100.85	100.85	100.85	100.85	100.85			85.44	
1965							123.05	107.46	107.46	106.91			88.60	
1966								113.39	102.96	97.30	97.30		92.00	
1967									162.45	142.11	141.07	141.07	140.94	
1968										140.10	110.05	110.05	110.05	
1969											141.49	116.46	116.35	
1970											100.86	99.52	98.66	
1971												120.23	121.71	
1972													121.84	

Year	Yearbook Issue												FAO (B)	FAO (T)
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984		
1961													103.42	103.42
1962													100.22	100.22
1963													78.53	78.53
1964													85.44	71.45
1965													88.60	85.60
1966													92.00	93.22
1967													140.94	140.96
1968													110.05	110.05
1969													116.35	116.35
1970													98.66	98.62
1971	100.69												100.69	101.03
1972	101.95	100.11											100.11	101.15
1973	76.94	76.76	78.06										78.06	78.54
1974		56.14	95.18	95.02									95.82	96.34
1975				100.40	100.96								100.96	100.72
1976				120.87	112.16	120.97							120.97	100.10
1977					92.46	95.46	95.82						95.82	100.36
1978						101.55	104.14	100.26					100.26	100.86
1979							97.28	100.68	102.97				102.97	100.34
1980								110.36	99.42	99.42			99.42	100.58
1981									102.69	102.69	100.40		100.40	100.40
1982										100.48	100.58	100.08	100.08	100.50

In general, as in the case of cereals, the FAO estimates seem to shave the data peaks and fill the troughs, making their estimates less prone to wide fluctuations. The coefficient of variation around FAO trend cereal production estimates is 12%, while that for the MRD is 20%. Lower FAO coefficients of variation were found for other commodities as well.

Table 3 furnishes an overview of some of the key features of various production and trade estimates and explains some of the divergences and close parallels among the different commodity series. First, as Table 3 points out, one must realize that some of Burkina's production and trade data are actually measured, however imperfectly, while others are merely armchair estimates based on reasonable assumptions about population, weather, offtake rates and so on. For production data, with the exception of cotton, MRD is the agency in Burkina which compiles initial estimates based on the observations provided to them by personnel in the Regional Development Organizations. In this way, the ministry tries to obtain direct measures of major crops such as cereals, groundnuts, cotton and sesame. But for minor crops such as tubers they do not produce estimates. Similarly for meat, because herders are so mobile and difficult to canvas, government does not try to estimate meat production. In a normal sequence, FAO begins with MRD data and apparently makes adjustments based on judgements passed on from FAO teams passing through Burkina. USDA normally collects information for Agricultural Attaches, but since the is none in Burkina, USDA must depend on various published sources, trade journals, FAO and occasional reports and cables coming out of Ouagadougou.

Not surprisingly, the degree of probable error in estimates is greater for the unmeasured commodities such as tubers than it is for cotton and cereals.[3] Perhaps more surprising, correlation among data sources is not related to the reliability of the original source estimates. Groundnut estimates vary considerably, as is seen in Figure 2, while tuber estimtes track very cloely. And among the guesstimated commodities some, such as tubers, show high correlation while others, such as meat, do not. Tubers track very well in spite of their shaky estimating foundation, apparaently because USDA normally accepts FAO guesses as to tuber production levels. But for meat production, USDA does not follow the FAO lead. The two sets of estimates differ by a factor of two. Either USDA includes fewer meats in its definition or makes more restrictive assumptions about offtake rates and herd size. Thus, guesstimated crops may track well, but this high correlation among reporting sources does not make any of the estimates reliable.

Before moving on to trade data, the cotton production estimates displayed in Figure 3 provide a good example of how one might improve correspondence among data sources. Because cotton is almost exclusively a cash crop and since all marketing is done through one agency, its production figures are thought to be extremely reliable. So all reporting agencies accept the

---

3. For original estimates of many of these probable error ranges, see Haggblade 1984 and Lecaillon and Morrisson 1985.

Table 3

BURKINA FASO
OVERVIEW OF STATISTICAL SOURCES AND DEGREE OF CORRESPONDENCE

	Based on Physical Measurement or Pure Estimate?	Probable Margin of Error MRD Estimates	Range of Correl. Coefficients Among Sources*
1. Production Data			
a) total cereals	measured	15 - 20%	.65 to .98
b) total groundnuts	measured	?	-.10 to .90
c) total cotton	measured	2%	.3 to .999
d) total tubers	estimated	100% +	.84 to .94
e) total meat	estimated	100% +	.46 to .76
2. Trade Data			
a) total import value	measured	20%	.999
b) total cereal import quantity	measured	20%	.84 to .96
c) quantity of coarse grain imports	measured	20%	.91 to .98
d) wheat and rice quantity imports	measured	20%	.73 to .84
e) total export value	measures	70%	.999

*Sources include MRD, FAO Yearbooks, FAO production tape, USDA "World Indices of Agricultural and Food Production", and USDA data spreadsheets. See appendices for raw data and individual correlation coefficients.

marketing company's figures as accurate:[4] But the FAO and USDA apparently have less respect for MRD original estimates of other crops. So they begin with the MRD numbers and adjust them apparently based on assessments from field mission visits: Not surprisingly, it seems that FAO confidence in official figures increases their tendency to accept them unaltered:

Trade data from various sources correspond far more closely than production data, probably because trade data are computed from the same basic sources, the customs records of importing and exporting countries: But even though all source estimate for total import and export values track almost identically, this once again does not mean the numbers are accurate: Balance of payments statisticians tell us that, because of Burkina's highly permeable borders and problems with export price delcarations, official trade statistics considerably underestimate the volume of both imports and exports:[5] Official import figures underestimate actual flows by about 20%, while export figures are thought to be off by 70%:

Estimates of trade quantities for individual commodities vary slightly more than do the total value figures: The USDA cereal import figures are normally higher than other sources, because they take information from export records of exporting countries, compare them with FAO import figures and then take the higher number: In examining the trade data, it is apparent that at least a portion of food aid imports often misses Burkina's inbound statistical net as do the clandestin grain flows that we know take place to and from neighboring countries:

4: There appears to be a data entry problem with the FAO tape estimates mistakenly inputting an extraneous figure for 1966, because from that time on their figures are identical with those of MRD but with a one year lag:

5: See Haggblade 1984 for details:

IV. POTENTIAL ANALYTICAL IMPLICATIONS OF DATA DIVERGENCES

Data divergences among sources can cause serious complications for food policy analysts and policy makers. Consider, for example, the case of groundnuts, a major source of lipids as well as a significant secondary source of calories in Burkina. Burkinan authorities have become concerned in recent years about what appears to be a serious erosion in groundnut production. Their concern is based on MRD production figures which show groundnut output declining at a rate of 3.6% annually between 1961 and 1981. Based on this serious dimunition of output, authorities raised the producer price of groundnuts by over 90% between 1979 and 1981.

But had the government had access to FAO or USDA data, they would have computed positive growth rates of about 2% per year over the same 1961 to 1981 period. Is there really a problem? Should they have doubled groundnut prices? Clearly policy action would vary dramatically depending on what data source is used. The numbers do matter.

Consider also the common annual exercise of estimating cereal import requirements. Donors and government engage in such estimating in order to evaluate food aid needs. And the IMF requires estimates of imports around recent trends in order for countries to access its Export Earnings Compensatory Finance Facility. Using different data sources to estimate consumption shortfalls around trend levels results in close estimates in some years and substantial differences in others. Computing the 1977 cereal consumption gap based on four year moving averages of production and imports, FAO Yearbook data project a consumption gap of 150 thousand tons, while MRD data indicate a 74 thousand ton surplus! Clearly the selection of data sources can matter to policy makers who must make the hard decisions on food policy.

Compounding the problem of data divergence among sources is the fact that different actors have access to different sets of numbers. Analysts operating in Burkina have access only to MRD and FAO Yearbook data, while donors normally use FAO tape, USDA and FAO Yearbook data. Until data inconsistencies are resolved, various interested parties risk wasting time debating the numbers instead of debating key policy issues.

V: CONCLUSIONS

Several conclusions emerge from this analysis, some relating to Burkina and others which apply to food policy analysis more generally:

A. Implications for Measuring Food Security in Burkina

First, it is important to reiterate that key gaps exist in the data base required to accurately assess food security needs in Burkina: Much of this paper involved comparing and contrasting different production and trade estimates, but only because these are the only areas in which duplicate sources exist, differ and prompt debate: While production and trade data form the backbone of national food balance sheets, crucial collateral information is required for assessing food security needs: Most prominent are: a) anthropometric evidence that would provide regional and vulnerable group status reports; b) consumption studies in both rural and urban areas which will provide estimates of key income and price elasticity parameters as well as income distribution and seasonal consumption profiles; c) information on privately held grain stocks, especially on farm storage; and d) increased reliability of national production estimates of principle food staples: Sawadogo (1985), Purdue's current FSU/SAFGRAD anlayses, and the IFPRI/CEDRES/ICRISAT consumption analyses will go a long way to filling gaps b) and c): But gaps a) and d) remain unattended: In spite of a steady supply of anthropometric data collected at clinics throughout the country, no system is in place to analyze these statistics: And statistical, design and material support for the understaffed Agricultural Statistics Unit in the Ministry of Rural Development (MRD) is not in sight: Given the current work on household consumption and on-farm grain storage, I think priorities should be to begin systematic analysis of the anthropometric evidence from health clinics: This will require some though about sampling, data processing design, logistics and perhaps analytical training: In addition, support for MRD statistical staff would be particularly valuable:

Second, I think there is little to be gained from further national level assessments of food security: Sufficient macro analyses have been done (Haggblade 1984, Lecaillon and Morrisson 1985): Additional work in this vein will only degenerate into quarrels about data sources and estimating assumptions. Instead of further reworking of the fragile macro food statistics, donors should consider sending an agricultural statistician or microcomputer data base specialist to help upgrade the image and capability of MRD statistical staff: Or they could assist in a pilot effort to explore ways of effectively analyzing the Ministry of Health anthropometric evidence.

Next comes the question of which production and trade data sources to use for Burkina-focused analyses: Initially, I embarked on this study hoping to designate a key data source, and I still anguish trying to identify one: For production data, I have mixed feelings: MRD has much to recommend it: They collect the primary data; FAO has access to it as well as the visits of field mission staff, and USDA must largely depend on published sources and sporadic

reporting cables from the USAID/Burkina. MRD is the only agency which actually takes measurements first hand; and the FAO, which does benefit from the periodic input field teams who can advise them on judgemental adjustments, has in recent years been clearly moving to MRD cereal estimates. Except for the unbelievably high cereal estimates of 1964 and 1965, MRD data are probably reasonable figures. FAO has made what appear to be sensible downward estimates of those mid-60 cereal figures, but with groundnuts the FAO adjustments to MRD data seem less defensible. Without knowing more about how the FAO makes adjustments to official Burkinan statistics, I am reluctant to settle on a single source.

For trade data, it appears that USDA figures are the most complete. By using supplier country export sources, comparing them with FAO figures and taking the higher one, USDA has regularly produced the highest cereal import figures. Since balance of payments statisticians make us fairly certain that trade data are undercounted, this implies that the USDA figures are probably closer to the truth than are the other sources.

Finally, since the MRD statistics constitute the raw materials from which all other estimates are confectioned, it seems most important to improve their statistical capacity. Such recommendations are inexpensive and therefore frequently made:(Lele and Chandler 1981; Paulino 1981). But I do think some marginal improvements in statistical sampling, computer software and perhaps some transport funds could go a long way in improving both the stature and reliability of MRD crop production estimates. It appears from the experience with Burkinan cotton data that acknowledged reliable data will lead to greater consistency among data sources. I believe noticeable improvements could be made at relatively low cost.

B. General Implications

For analysts working outside of Burkina, four principal conclusions emerge from the preceeding review. First, when using FAO or USDA statistics "beware of the diagonal," as data revisions over time can result in considerable discrepancies in annual yearbook recordings of historical data. Obtain the USDA spreadsheets or FAO data tapes if at all possible, since they include all backward revisions. But if, as is frequently the case, the analyst only has access to published yearbooks, (s)he must be scrupulously careful to draw diagonals, as in the example in Section III, in order to obtain the latest published data updates. Several eminent analysts, who are best left unnamed, have been misled by not using FAO data diagonals in Burkinan analyses. Their reporting of non-diagonal data has, in several cases, been taken directly by later scholars who then repeat analysis on the uncorrected estimates. Undoubtedly the problem occurs elsewhere as well.

Second, in estimating long-term production trends it is probably safest to use a four or five year moving average rather than trend line regressions. Trend lines can be strongly influenced by a few very high or very low outliers in early periods. For groundnuts, sorghum, millet and maize this proved to be a significant problem in Burkina. Since the data for the early 1960's are questionable in these instances, and not easily verified, it seems more prudent not to allow them to influence trend lines. Moving averages of more recent data, probably more accurate and certainly

more closely scrutinized, will avoid this potential pitfall.

Third, after reviewing the major data sources in conjunction with the food security literature, I come away with the feeling that far too much analytical time and effort has been spent analyzing data on aggregate national food availability. Because adequate national food supply is a necessary but far from a sufficient condition for food security, I think we need to branch out into in-depth country studies which include not only reviews of food availability but also begin to address seasonal, regional, household and individual level food consumption needs and physical well being. These, along with an understanding of marketing and distribution systems, will be essential for targeting cost effective food policy interventions in countries where food security is not yet achieved. The recent country study series sponsored by OECD and by AID through Michigan State University represent welcome steps in this direction.

Finally, individual country analysts can help improve food production and trade data bases by supplying FAO and USDA with reports of their findings. I have found the statistical staff in these agencies eager to improve the quality of their data bases. Since country analysts in these agencies frequently cover many countries and have limted time and travel resources, they are particularly interested in information from smaller, less frequently visited countries from which they have fewer opportunities for obtaining information.

Food security is a pressing problem. Improving the data base on which critical decisions are made should lead to less debate over the numbers and more time to assess cost effective means of addressing food security needs.