



Food Aid and Food Security in the Short and Long Run: Country Experience from Asia and sub-Saharan Africa

Carlo del Ninno
Paul A. Dorosh
Kalanidhi Subbarao

November 2005

Social Safety Nets Primer Series

Food Aid and Food Security in the Short- and Long Run: Country Experience from Asia and sub-Saharan Africa

By Carlo del Ninno, Paul A. Dorosh and Kalanidhi Subbarao

November 2005

WORLD BANK INSTITUTE
Promoting knowledge and learning for a better world



The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations or to members of its Board of Executive Directors or the countries they represent.

Social Safety Net Primer Series

The World Bank Social Safety Nets Primer is intended to provide a practical resource for those engaged in the design and implementation of safety net programs around the world. Readers will find information on good practices for a variety of types of interventions, country contexts, themes and target groups, as well as current thinking of specialists and practitioners on the role of social safety nets in the broader development agenda. Primer papers are designed to reflect a high standard of quality as well as a degree of consensus among the World Bank safety nets team and general practitioners on good practice and policy. Primer topics are initially reviewed by a steering committee composed of both World Bank and outside specialists, and draft papers are subject to peer review for quality control. Yet the format of the series is flexible enough to reflect important developments in the field in a timely fashion.

The primer series contributes to the teaching materials covered in the annual Social Safety Nets course offered in Washington DC as well as various other Bank-sponsored courses. The Social Safety Nets Primer and the annual course are jointly supported by the Social Protection unit of the Human Development Network and by the World Bank Institute. The World Bank Institute also offers customized regional courses through Distance Learning on a regular basis.

For more information on the primer paper series and papers on other safety nets topics, please contact the Social Protection Advisory Service; telephone (202) 458-5267; fax (202) 614-0471; email: socialprotection@worldbank.org. Copies of related safety nets papers, including the Social Safety Nets Primer series, are available in electronic form at www.worldbank.org/safetynets. The website also contains translated versions of the papers as they become available. An ambitious translation plan is underway (especially for Spanish and French, some in Russian). For more information about WBI courses on social safety nets, please visit the website www.worldbank.org/wbi/socialsafetynets.

Papers in the Safety Nets Primer as of November 2005

<i>Theme</i>	<i>Author</i>
<i>Program Interventions</i>	
Cash Transfers	Tabor, Steve
Community-based Health Insurance	Tabor, Steve
Conditional Cash Transfers	Rawlings, Laura
Fee Waivers in Health	Bitran and Giedion
Fee Waivers in Housing	Katsura and Romanik
Food Related Programs	Rogers and Coates
Micro Credit and Informal Insurance	Sharma and Morduch
Mitigating Social Risks	Tesliuc, Emil
Price and Tax Subsidies	Alderman, Harold
Public Works	Subbarao, Kalanidhi
Transferring Cash Benefits	Lafaurie and Velasquez
<i>Themes</i>	
Evaluation	Blomquist, John
Gender	Ezemenari, Chaudhury and Owens
Institutions	de Neubourg, Chris
Political Economy Aspects of Targeting	Pritchett, Lant
Public Attitudes and Political Economy	Graham, Carol
Safety Nets for Poverty Reduction	Ravallion, Martin
Targeting	Coady, Grosh and Hoddinott
Targeting: Lessons from LAC – Overview	Lindert et all
Targeting in Brazil	Lindert and Briere
Targeting in Chile (Spanish)	Larrañaga, Osvaldo
Targeting in Colombia	Castañeda, Tarsicio
Targeting in Costa Rica (Portuguese)	Viquez, Roxana
Targeting in Mexico (Portuguese)	Orozco and Hubert
Targeting in the United States	Lindert, Kathy
Testing Vietnam's Public Safety Nets	van de Walle, Dominique
<i>Country Context</i>	
Poverty and Aging in Africa	Subbarao, Schwartz and Kakwani
Transition Economies	Fox, Louise
Very Low Income Countries	Smith and Subbarao
<i>Special Vulnerable Group</i>	
Disability	Mitra, Sophie

Acknowledgement

This paper was undertaken as part of an ESW under the rubric of the Social Protection family in Africa. The authors thank peer reviewers, Harold Alderman and Steven Haggblade, for detailed comments on an earlier draft of this paper. Helpful comments were also received from Margaret Grosh and participants at a July 2005 workshop at the World Bank. Research support by Mahfuzur Rahman and Alessandra Marini is also gratefully acknowledged. Financial support for this work was provided by the Africa Human Development (Social Protection) department of the World Bank. Nonetheless, the opinions expressed here are those of the authors and do not necessarily reflect those of the Government of the Republic of Zambia or the World Bank, its executive directors or the countries they represent. The usual disclaimers apply.

Abstract

The purpose of this paper is to compare and contrast the experiences from four major recipients of food aid (India, Bangladesh, Ethiopia and Zambia) in normal time and after a natural disaster and draw implications for the design of effective food aid and food security policies in Africa. The study summarizes the food and agricultural policies and medium-term outcomes regarding food production, trade, markets, consumption and safety nets, as well as the policy responses to food emergencies. The experiences of the study countries suggest that food aid that supports building of production and market enhancing infrastructure, is timed to avoid adverse price effects on producers, and is targeted to food insecure households can play a positive role in enhancing food security. However, food aid is not the only, or in many cases, the most efficient means of addressing food insecurity. In many cases private markets can more effectively address shortfalls in food availability and cash transfers may be a viable alternative to food transfers in-kind. Thus, most important is a balanced, mutually-reinforcing mix of policies and programs that address both the production and marketing constraints to food availability and that raises the real incomes of the poor and thereby increase their access to food.

Key Words: Food Aid, Food Security, Trade

JEL: Q18 - Agricultural Policy; Food Policy; I38 - Government Policy; Provision and Effects of Welfare Programs; F1 - Trade

Table of Contents

	Page
EXECUTIVE SUMMARY	i
1. INTRODUCTION	1
2. FOOD AID AND FOOD SECURITY IN INDIA	6
2.1 The Food Security Problem in India: A Historical Perspective.....	6
2.2 Foodgrain Production and Availability of Food	8
2.3 Consumption and Safety Nets.....	18
2.4 Response to Droughts and Fluctuations in Production	22
2.5 Summary and Conclusions	24
3. FOOD AID AND FOOD SECURITY IN BANGLADESH	27
3.1 Introduction.....	27
3.2 Production, Trade and Availability	28
3.3 Food Consumption and Safety Nets	37
3.4 Government Response to Production Shortfalls	41
3.5 Concluding Observations.....	49
4. FOOD AID AND FOOD SECURITY IN ETHIOPIA	51
4.1 Introduction.....	51
4.2 Food Availability and Access	52
4.3 Consumption and Safety Nets.....	61
4.4 Government Response to Droughts	64
4.5 Concluding Observations.....	68
5. FOOD AID AND FOOD SECURITY IN ZAMBIA	70
5.1 Introduction.....	70
5.2 Availability of Food.....	72
5.3 Food Consumption and Safety Nets	80
5.4 Government Response to Food Crises.....	83
5.5 Conclusions.....	85
6. SUMMARY AND CONCLUSIONS	87
6.1 Comparing Country Experiences.....	87
6.2 Food Policy Lessons	91
6.3 Conclusions.....	96
REFERENCES	98

Tables

Table 1.1: Economic Structure of Study Countries	4
Table 1.2: Food Economies of Study Countries, 2001	5
Table 2.1: India: Cereal Area, Yield and Production, 1950 - 2003	8
Table 2.2: India: Major Domestic Agricultural Policy and Trade Regulations, 1996 and 2003 .	14
Table 2.3: India: Imports and Exports of Rice and Wheat, 1950-51 to 2000-2001.....	16
Table 2.4: India: Net Availability of Foodgrains: 1951 to 2002 (kgs/person/year).....	17
Table 2.5: India: Changes in Consumption Patterns: 1972-73 to 1999-00.....	19
Table 3.1: Bangladesh: Area, Yield and Production of Rice and Wheat, 1973-2004	29
Table 3.2: Bangladesh Foodgrain Trade, 1980/81 - 2002/03	31
Table 3.3: Bangladesh: Per Capita Food Consumption by Expenditure Quintile, 2000 (Grams per person per day).....	39
Table 3.4: Bangladesh: Household Budget Shares by Expenditure Quintile, 2000	39
Table 3.5: Bangladesh: Structure of Rice Markets, 1960-2000.....	41
Table 3.6: Availability, Stocks and Market Prices in Major Flood Years in Bangladesh	46
Table 3.7: Bangladesh: Coping strategies, flood exposure and poverty in November 1998.....	48
Table 4.1: Ethiopia: Cereal Production, 1980-2003	55
Table 4.2: Ethiopia: Cereal Production, Imports and Food Aid, 1980-2003.....	60
Table 4.3: Ethiopia: Food Budget Shares for Urban and Rural Households by Deciles, 2000...	62
Table 4.4: Approximate Expenditures by Selected Programs	63
Table 5.1: Zambia: Crop Production, 1980-2004	73
Table 5.2: Regional Production of Maize and Cassava, 1998-99.....	75
Table 5.3: Zambia: Maize Production, Net Imports and Food Aid, 1980-2003.....	78
Table 5.4: Zambia: Household Food Budget Shares in Rural and Urban Areas, 1998.....	81
Table 6.1: Monthly Prices of Major Staples in Study Countries, 1996-2002 (\$/ton)	90
Table 6.2: Summary of Food Security and Food Aid Policies in Study Countries	92
Table 6.3: Expenditure and Coverage of Safety Nets Programs in Study Countries	94

Figures

Figure 2.1: India: Cereal Production: 1950-2003	9
Figure 2.2: India: Public Investments in Agriculture, 1970-71 to 2000-01	10
Figure 2.3: India: Central Pool Foodgrain Stocks, 1980-2005	15
Figure 2.4: India: Calories from Cereals and Other Sources	18
Figure 3.1: Bangladesh Foodgrain Production and Food Gap.....	30
Figure 3.2: Bangladesh Food Aid Flows, 1981-2003	33
Figure 3.3: Bangladesh: Real Prices of Rice and Wheat, 1980-2003.....	34
Figure 3.4: Wheat Prices and Private Imports in Bangladesh, 1997-2003	35
Figure 3.5: Bangladesh: Rice Imports and Prices, 1997-2003.....	43
Figure 4.1: Ethiopia: Total cereal production by commodity.....	54
Figure 4.2: Nominal and deflated cereal prices (Addis wholesale): 1996-2002.....	56
Figure 4.3: Ethiopia: Wheat, production, imports and prices – 1980-2002.....	57
Figure 4.4: Ethiopia: Import and Export Parity Prices (US white maize, via Djibouti)	58
Figure 4.5: Food Aid in Ethiopia – 1970-2002.....	59
Figure 4.6: Total production and imports of cereals – 1980-2002	60
Figure 4.7: Ethiopia: Calories from Cereals and Other Sources, 1980-2001	61
Figure 5.1: Zambia: Cereal and Cassava Production, 1980-2004	74
Figure 5.2: Maize Prices in Southern Africa: January 1998 – December 2002 (\$/ton).....	77
Figure 5.3: Zambia: Food Aid and Other Imports 1980-2002.....	79
Figure 5.4: Zambia: Domestic and Import Parity Prices of White Maize, 1995-2002.....	80
Figure 5.5: Zambia: Calories from Cereals and Other Sources, 1980-2001.....	81
Figure 6.1: Prices of Major Staples in Study Countries, 1996-2003	90

Food Aid and Food Security in the Short- and Long Run: Country Experience from Asia and sub-Saharan Africa

EXECUTIVE SUMMARY

Maintaining food security at the national and household level is a major priority for most developing countries, both for the welfare of the poor as well as for political stability. In order to help assure food security, developing country governments have adopted various strategies including efforts to increase production (often with an explicit goal of food self-sufficiency), government intervention in markets, public distribution of food and maintenance of national food security stocks. Food aid, both for short-term emergency relief and program food aid, that helps address medium-term food “deficits”, is often a major component of these food security strategies.

Numerous concerns have been raised, however, about the efficiency of food aid-supported programs in meeting their objectives, including lack of timeliness and high cost of delivery to the recipient country, high administrative costs within-country, and leakages in the distribution of food aid). Moreover, food aid may cause disincentives for domestic production through reductions in domestic prices and lead to reduced public and private investment in food production. To the extent that these disincentive effects are large, the benefits of food aid in addressing acute short-term food insecurity may be offset by the cost of reducing long-term food security.

Experiences of countries in South Asia and sub-Saharan Africa regarding food aid, and in addressing food security objectives in both the short and long-term, have varied widely, however. This study analyzes the experiences of four major recipients of food aid over the past four decades -- India, Bangladesh, Ethiopia and Zambia – countries that have been at the center of much of the food aid debate. Both India and Bangladesh dramatically increased food production and reduced the role of food aid in national food supply and in programs to reduce food insecurity at the household level. In contrast, food aid has been a major share of total food supplies in Ethiopia for more than thirty years, and in spite of some gains in grain production since the mid-1990s, emergency food aid appeals are an almost annual occurrence. In Zambia, maize production has declined steeply since the late 1980s, but food aid has been a major supplement to domestic supplies only in occasional drought years. The purpose of this paper is to compare and contrast these country experiences and their implications for the design of effective food aid and food security policies.

The wide range of food aid programs and food security outcomes in India, Bangladesh, Ethiopia and Zambia over the past several decades highlights the importance of country context (including geography, economic structure and policy and political factors) in determining the role of food aid and other public sector interventions in enhancing food security. The Asian countries in the sample, India and Bangladesh, have significant differences in terms of population, levels of incomes and economic structure, not only between them, but even more so with Ethiopia, Zambia and other countries of sub-Saharan Africa. India’s population in 2002

(1,050 million) is about 50 percent greater than that of sub-Saharan Africa as a whole. Bangladesh with a population of 144 million in 2002 and a population density of nearly 1,000 per square-kilometer has roughly twice the population of Ethiopia, in an area only 13 percent as large. Per capita GDP (2002 data) is also significantly higher in India (\$480/person) and Bangladesh (\$360/person) than in Ethiopia (only \$100/person), though the average for sub-Saharan Africa (\$450/person) is comparable to that of India, and per capita income of Zambia (\$330/person) is close to that of Bangladesh. Bangladesh and India also differ from Ethiopia and Zambia in terms of growth and poverty outcomes over time. The agricultural growth in the two South Asian countries has been labor-demanding; real wages have risen, and the incidence of poverty has been reduced.

Nonetheless the countries shared broadly similar food security concerns. At various times, all the countries considered here have had significant trade deficits in cereals, the major staples for their households. India and Bangladesh have achieved large gains in per capita food production over time, however, in contrast to SSA countries. None of the countries, though, has yet resolved problems of household-level food security, and overall per capita calorie consumption is still low in Bangladesh (2,173), Ethiopia (1,962) and Zambia (1,893). Even in India, close to one-fifth of India's population continue to be food insecure, and numerous programs to promote access of the poor to food have met with only marginal success even as foodgrain stocks mounted.

Consumption patterns differ in important ways, as well. Cereals account for a high percentage of calories in all countries, ranging from about 60 percent in India and Zambia, to 69 percent in Ethiopia to 81 percent in Bangladesh. Moreover, a single major staple dominates cereal (and total) calorie consumption in Bangladesh (rice) and Zambia (maize), making poor consumers in these countries especially vulnerable to changes in these prices.

Comparing Country Experiences

For India, food aid was a major source of total food availability from the mid-1950s to the late 1960s, but a desire to avoid the uncertainties and political conditions tied to food aid flows led the country to adopt a food self-sufficiency policy in the mid-1960s. Public investments in irrigation, agricultural research and extension, and subsidies to fertilizer and agricultural credit led to a rapid spread in green revolution technology. The government intervened heavily in rice and wheat markets by restricting private sector purchases, storage and grain movements, while providing support to producers (particularly in key producing states) through procurement at official minimum support prices. Together these agricultural technology and price policies succeeded in rapidly raising production of rice and wheat, enabling the country to raise availability of grain and reduce food aid and commercial imports to insignificant shares of total supply. By the mid-1990s, excess availability of food (as reflected in rising public stocks) had replaced food supply shortfalls as a major food policy issue.

Nonetheless, these major gains in food production and the security of supplies provided through large national food stocks have not guaranteed access to food for poor households. The public distribution system, designed to address these needs does not provide sufficient resources

to the poorest households, and in spite of better targeting since the late 1990s, it still entails large fiscal costs. An estimated 200 to 300 million people, 20-30 percent of the population, consume inadequate amounts of calories.

Bangladesh has achieved similar success in raising domestic production and reducing the role of food aid in domestic food supplies, but with a more market-oriented approach that has involved lower fiscal costs of government procurement of grains. As in India, expansion in irrigation (particularly private tube wells after relaxation of restrictions on imported pumps in the late 1980s), increased use of fertilizer and improved seeds enabled the country to reach its rice and wheat production targets by 2000. In contrast with India, however, stability in food supplies was provided mainly through food aid from the mid-1970s to the early 1990s, and since the early 1990s, private sector imports. Food aid continues at reduced levels in spite of the production gains, providing fiscal resources for public distribution, which is better targeted, though at a smaller scale in terms of percentage of population covered, than in India. Nonetheless, there remains substantial chronic food insecurity at the household level, with about half of the population living in poverty.

Ethiopia's gains in food production, unfortunately, have been much more modest than those of India or Bangladesh. A much drier climate, with relatively far fewer opportunities for irrigation and multiple-cropping, greatly reduces the potential for the massive gains in food production achieved in south Asia. Economic reforms and increased adoption of improved seeds and fertilizer have enabled grain production to keep pace with a rapid 2.7 percent population growth rate since 1994, but only after a major decline in per capita grain production over the previous two decades. Because high transport and marketing costs, and restrictive trade policies have prevented private sector imports from making a significant contribution to supplies, food aid continues to be a major source of grain supply in Ethiopia, even in years without major droughts. And in years with major droughts, the country is heavily dependent on food aid to provide emergency relief. Unlike in India or Bangladesh, most food aid distribution is provided for free; only a small share of food transfers involves food for work or cash sales despite state policy objectives to avoid free distribution.

In Zambia, overall food production has actually declined substantially since 1990, due largely to the withdrawal of government subsidies on inputs and an end to pricing policies that had favored maize production at the expense of other agricultural commodities. As in Ethiopia, high transport and marketing costs in Zambia raise prices of imported grain, though the Republic of South Africa and Zimbabwe are relatively close sources of potential import supply in most years. Private imports have also been inhibited by substantial uncertainty regarding government policy related to volumes, quantities and sales prices of government commercial imports, and domestic prices rose substantially above import parity levels during the 2001-02 drought. An effective early warning system (FEWSNET) has helped with planning of government commercial imports and food aid. Nonetheless, food availability has declined substantially during drought years. Although most food aid distribution is through food for work programs, the developmental impact of these programs is open to question.

Government Response to Major Production Shortfalls

Government response to major production shortfalls has varied both in instruments chosen and in the overall effectiveness of the interventions. India's negative experience in the mid-1960s with uncertain food aid flows that depended on donor political considerations was instrumental in creating the political will to support policies to increase domestic production and achieve national food self-sufficiency through investments in irrigation, agricultural research and extension. Having successfully increased domestic production of rice and wheat, by the mid-1970s India was able to rely mainly on drawdown of accumulated stocks for addressing production shortfalls, coupled with self-targeting emergency relief programs (mainly food-for-work), even following the 1987 "drought of the century."

Bangladesh suffered a major famine in 1975 following flood-induced production shortfalls in late 1974, as the country lacked foreign exchange for imports and government stocks for targeted distribution. After more than a decade of investments in irrigation (including major private sector investments in tube wells), agricultural technology and roads, rice and wheat production had increased substantially. Particularly important was the increase in winter season crops (boro rice and wheat) that enabled a major harvest following monsoon season production shortfalls, as experienced due to major floods in 1988. Large public stocks, government commercial imports and food aid inflows helped stabilize market prices and permitted large-scale public distribution of grains, as well. Following the 1998 floods, however, private sector imports of rice and wheat, made possible by the trade liberalization of the early 1990s, played the major role in stabilizing grain prices, even without large-scale public distribution of grain or food aid flows. Food aid-supported and other public distribution programs did, however, were used to target flood-affected and other poor households.

Ethiopia and Zambia have been far less successful in maintaining food security following major production shortfalls. Ethiopia has relied mainly on large, annual food aid flows to supplement domestic supplies of grain and supply targeted relief efforts, but delays in food aid shipments have often occurred. Likewise, Zambia has relied on food aid, supplemented by government commercial imports, to address major drought-related maize production declines. Unfortunately, lack of transparency of Zambian government policies on its commercial imports and sales have added to uncertainties for traders, and kept private sector imports from stabilizing market prices following major production shortfalls in 2001 and other years.

Food Policy Lessons

Production

Food aid is often criticized for its potential disincentive effects on domestic production because it may lead to reduced market prices for producers and because it reduces government incentives for production-enhancing investments and policy reforms. The experiences of the countries discussed here, however, show that these adverse effects may occur, but are not inevitable. The strongest evidence for the complementarity of food aid-supported programs without producer disincentives is the case of Bangladesh, where sustained food aid flows of

wheat over 25 years coincided with doubling of rice production and an even more rapid gain in wheat production. From 1979/80 to 1999/2000, Bangladesh more than doubled its wheat production (from 829 thousand tons to 1.84 million tons in 1999/2000), in spite of large food aid wheat flows that averaged 1.03 million tons per year. India also avoided these adverse effects of food aid after the late 1960s through a determined effort to achieve self-sufficiency and eliminate major food aid inflows. In Ethiopia, however, availability of food aid may have reduced government incentives to invest, and late arrivals of food aid in 2001 contributed to steep reductions in producer prices. Zambia's food aid imports have been large relative to domestic production only during drought years, and apart from some localized disincentive effects of distribution of late arrivals of food aid in the early 1990s, food aid inflows do not appear to be a major cause of agricultural stagnation or the government's insufficient investment in agriculture.

Three factors were keys in enabling India and Bangladesh to achieve these production gains. First, Bangladesh and India maintained a political will and had donor support for long-term investments in production, including agricultural research, extension, irrigation and rural roads. Achieving similar production gains in sub-Saharan Africa will require similar public investments in research and extension, but opportunities for irrigation and multiple-cropping may be significantly less than in South Asia. Second, food aid flows were small relative to the size of total consumption, even in Bangladesh where food aid flows averaged about 600 thousand tons per year in the late 1990s. In countries where the size of food aid shipments is large relative to the size of the markets, and especially where the food aid commodity is a close substitute for major domestically produced staples, the risk of adverse price effects on production incentives are especially great. Third, food aid inflows were channeled through a public distribution system, with adequate public storage and careful management of the timing of arrivals of food aid and the distribution of food. Food aid distributed mainly through emergency relief programs in Ethiopia has been less effectively managed, though apart from a market price crash in 2001, food aid flows may not have had major price disincentive effects since the early 1990s.

Markets and Price Stability

All four countries considered here have intervened in domestic food markets, but approaches to market stabilization and market development have varied substantially. Public interventions in markets (procurement at fixed support prices, movement restrictions, limits on private stocks, large national food stocks, and subsidized sales of food through ration shops) have played a major role in maintaining price stability in India. Large national food stocks and increased public distribution enabled both India and Bangladesh to successfully manage major production shortfalls in the late 1980s. Market-intervention policies, though successful in terms of price stability have entailed large financial and efficiency fiscal costs, particularly in India. There, political pressure for high producer support prices has been a root cause of massive increases in public stocks beginning in the mid-1990s. Bangladesh has achieved considerable price stability at much lower fiscal costs, however, through promotion of a competitive private marketing sector. Private commercial imports rather than government stocks have been the major stabilizing force since liberalization of grain import trade in the early 1990s.

The absence of well-functioning domestic markets prevents price and supply-stabilizing market flows and stock behavior in Ethiopia, Zambia and much of sub-Saharan Africa.

Extremely high transport costs due to poor road infrastructure and informal tolls greatly hinder domestic and international trade. Moreover, in Ethiopia, the large gap between normal domestic prices and the cost of imported grain, particularly in years of high world prices, may limit the role of international trade liberalization in enhancing food security, unless income support is also available to poor consumers to maintain their purchasing power in periods of high prices. Government restrictions have also hindered regional trade flows at various times, preventing flows from low- to higher- price areas that could reduce price spikes.

Government direct purchases and sales, apart from food aid in Ethiopia have been limited, however. Market interventions were significant in Zambia prior to the liberalization of the early 1990s and helped boost maize production, but costs proved fiscally unsustainable, largely because of subsidized sales to urban consumers. Ethiopia's experience suggests that local procurement of grain for food aid or other food programs can improve farmer incomes in the short-run, but coherent and transparent government policy regarding procurement prices, stocks, and timing and levels of distribution are crucial to avoid excessive costs and to maintain incentives for the development of private sector trade. Unfortunately, policies regarding trade, government imports and sales in recent years in Zambia have been neither consistent nor transparent, and have hindered market-stabilizing private sector imports.

Safety Nets

Safety net programs have differed substantially across countries, as well. India's experience with sales of subsidized grains (as well as vegetable oil and sugar), suggests the importance of targeting (implemented in 1995) to keep program costs down and to increase the value of transfers to clearly identified vulnerable groups. Where there is a substantial difference between ration sales prices and open market prices, leakages can be substantial, as evidenced by Bangladesh in the late 1980s and many other countries, (including Mozambique in the early 1990s). Zambia's urban maize flour subsidies in the 1980s were untargeted and involved unsustainably large fiscal subsidies. Zambia eliminated these urban maize flour subsidies in the early 1990s, but has not replaced them with large-scale safety net programs. In contrast, Bangladesh greatly reduced the role of subsidized ration sales by eliminating its major rationing channels in the early 1990s, but replaced these programs with targeted programs (food-for-work, food-for-education, programs targeted to poor rural women). The Bangladesh experience also suggests that size of transfers and the target group are important factors in determining the effectiveness of targeting. In particular, small transfers targeted towards rural women are more effective in raising food consumption (as in the Bangladesh Vulnerable Group Development program) than are food-for-work programs (which involve relatively large payments in-kind).

Moreover, well-designed safety nets can both effectively target transfers to poor households and help build human and physical capital. For example, food-for-work (FFW) programs in both India and Bangladesh, and cash for work employment guarantee scheme in the state of Maharashtra, India, have not only increased incomes and access to food of poor households, but have contributed to building infrastructure. However, specific design details such as the level of wage rates, degree of labor intensity of projects, provisions for non-labor costs and gender issues are crucial to the effectiveness of these programs. In contrast to FFW programs in Bangladesh and India, most food aid distribution in Ethiopia is in the form of free

transfers. Food for work programs there are limited both because of administrative constraints and, in emergency relief situations, by the poor health of recipients. Finally, safety nets programs, however, well-designed and implemented cannot by themselves guarantee food security unless accompanied by poverty-reduction strategies that increase real incomes of the poor in the medium-term, as well.

Price Stabilization, Government Stocks and Public Distribution

In both India and Bangladesh, domestic procurement, public distribution and government stocks have played a central role, not only in price stabilization, but in provision of food for chronic poverty alleviation and maintenance of stocks for emergency relief. In the absence of budget constraints, the government can both procure unlimited quantities of food in local or international markets and, if necessary, subsidize the sales or distribution of this food to consumers. However, budget constraints (and in the short-run, storage constraints), often limit government interventions.

In India in the mid-1990s, the government's willingness to procure unlimited quantities of rice and wheat at high support prices (though mainly in only a few states) led to sharp increases in quantities procured, a massive build-up of stocks and huge fiscal costs when the grain was ultimately distributed at subsidized prices. In Bangladesh, tighter budget constraints and a willingness to give a greater role to the private sector kept the size of government's interventions (and their impacts on market prices) relatively small. Thus, procurement decisions were largely driven on quantity targets for public distribution and stocks, and the procurement price is not meant to function as a floor price.

Government procurement of key food commodities (e.g. wheat and maize) to boost producer prices (and perhaps guarantee a price floor) could help maintain producer incentives in Ethiopia, as well. Government procured grain could be used for relief purposes and consumption smoothing, replacing imported food aid, particularly in the food deficit regions in northern Ethiopia. In other regions where market supplies of food are more plentiful, safety nets could rely more on income transfers rather than food transfers. Wholesale open market operations to supply high-priced markets are another option. To the extent that cash-based safety nets are in place, and marketing reforms and investments can bring transactions costs and import parity prices down, private sector imports could help stabilize markets in years of major production shortfalls and prevent large price spikes (particularly in years of low or medium world prices).

Zambia's negative experience with large-scale intervention in domestic food markets in the 1980s illustrates potential pitfalls with this strategy, however. Government intervention to a large extent crowded out private trade and led to high marketing costs. Political pressure for low consumer prices led to huge budget subsidies. Agricultural trade liberalization in the early 1990s has helped reduce marketing costs and eliminated consumer subsidies, though after input and output subsidies for maize production were removed, output declined sharply. Less costly and less trade-distorting means of government interventions to support domestic producers, including investments in market infrastructure and increased provision of agricultural extension services, may be more efficient alternatives to government direct market interventions.

Conclusions

The experience in South Asia suggests that food aid, properly utilized, can contribute to increased food security in both the short- and long-term, provided it is used effectively as part of an integrated program of development. Increasing production and raising rural incomes require sustained government public investments in agricultural technology and extension, irrigation (where feasible), and market infrastructure. The evidence also suggests that while government interventions in markets can be helpful for maintaining adequate price incentives for producers and protecting consumers from price spikes, facilitating the development of private markets and liberalizing trade can increase the effectiveness and lower costs of price stabilization. Because individual countries in SSA vary significantly from those in South Asia, these broad policy and program options to guarantee food availability need to be carefully adapted to specific local conditions.

Finally, it is worth emphasizing that food aid is not the only, or in many cases, the most efficient means of addressing food insecurity. The benefits of well-managed and timely food aid inflows in short-term emergency situations where markets are not functioning and household access to food is extremely limited are clear. In the medium to long run, however, market mechanisms are generally more efficient in addressing food availability constraints. Food security at the household level is then mainly constrained by access to food, which is closely linked to household incomes. Thus, sustained pro-poor growth is needed along with appropriate safety nets. None of the study countries have yet fully succeeded in satisfactorily solving this problem of access to food by the poor.

The Asian and SSA experiences suggest that food aid that supports building of production and market enhancing infrastructure, is timed to avoid adverse price effects on producers, and is targeted to food insecure households can play a positive role in enhancing food security. Most important, however, is a balanced, mutually-reinforcing mix of policies and programs that address both the production and marketing constraints to food availability and that raise the real incomes of the poor and thereby increase their access to food.

1. INTRODUCTION

Maintaining food security at the national and household level is a major priority for most developing countries, both for the welfare of the poor as well as for political stability. In order to help assure food security, developing country governments have adopted various strategies including efforts to increase production (often with an explicit goal of food self-sufficiency), government intervention in markets, public distribution of food and maintenance of national food security stocks. Food aid, both for short-term emergency relief and program food aid that helps address medium-term food “deficits”, is often a major component of these food security strategies (Haddad and Frankenberger, 2003).

Numerous concerns have been raised, however, about the efficiency of food aid-supported programs in meeting their objectives (Hoddinot, Cohen and Bos, 2004). Food aid is often criticized for lack of timeliness and high cost of delivery to the recipient country (Barrett and Maxwell, 2004)¹. Moreover, along with food-assisted programs in general, food aid resourced programs often involve high administrative costs within-country (due in part to leakages), (Subbarao and Smith, 2004). Perhaps most important for long-term security, food aid can, in principle, reduce domestic prices and producer incomes, as well the incentives for public and private investment in food production. To the extent that these disincentive effects are large, the benefits of food aid in addressing acute short-term food insecurity may be offset by the cost of reducing long-term food security.

Experiences of countries in South Asia and sub-Saharan Africa regarding food aid, and in addressing food security objectives in both the short and long-term, have differed sharply. This study analyzes the experiences of four major recipients of food aid over the past four decades -- India, Bangladesh, Ethiopia and Zambia -- that have been at the center of much of the food aid debate. Both India and Bangladesh have dramatically increased food production and reduced the role of food aid in national food supply and in programs to reduce food insecurity at the household level. In contrast, food aid has been a major share of total food supplies in Ethiopia for more than thirty years, and in spite of some gains in grain production since the mid-1990s, emergency food aid appeals are an almost annual occurrence. In Zambia, maize production has declined steeply since the late 1980s, but food aid has been a major supplement to domestic supplies only in occasional drought years. The purpose of this paper is to compare and contrast these country experiences and their implications for the design of effective food aid and food security policies.

Though both India and Bangladesh have reduced both increased both food production and food security, agricultural development and food policies in these two Asian countries have differed substantially. India achieved a large increase in domestic food production from the late 1960s to the early 1990s through substantial public investments, large-scale government interventions in grain markets, and controls on private sector foodgrain trade. Only in the mid-1990s did major market liberalizations in agriculture occur, and the government still plays a dominant role in food markets in major producing states. Bangladesh also rapidly increased its

¹ Barrett and Maxwell (2004) deals largely with issues on the side of donors, particularly the United States, and offers several significant policy and operational changes that could render food aid an effective tool to reduce hunger. In this paper, however, we focus on management of aid flows by recipient countries.

food production, using similar technologies to those adopted in India, but through a more market-oriented process with less government intervention in markets, reaping its largest gains in production and food security after liberalizations of internal and external markets for foodgrain and agricultural inputs beginning in the late 1980s.

Moreover, these Asian countries have significant differences in terms of population, levels of incomes and economic structure, not only between them, but even more so with Ethiopia, Zambia and other countries of sub-Saharan Africa (Table 1.1). India's population in 2002 (1,050 million) is about 50 percent greater than that of sub-Saharan Africa. Bangladesh with a population of 144 million in 2002 and a population density of nearly 1,000 per square-kilometer has roughly twice the population of Ethiopia, in an area only 13 percent as large. Zambia's population density of only 14 per square-kilometer, is only half the sub-Saharan African average, and less than 1/50th that of Bangladesh.

Per capita GDP (2002 data) is also significantly higher in India (\$480/person) and Bangladesh (\$360/person) than in Ethiopia (only \$100/person), though the average for sub-Saharan Africa (\$450/person) is comparable to that of India, and per capita income of Zambia (\$330/person) is close to that of Bangladesh. Excluding the Republic of South Africa (45 million people and a GNI/capita of \$2500), the GNI/capita of the SSA is only about \$300, about 85 percent of the figure for Bangladesh.

Because of their very large populations, the total volume of food consumption requirements in India and Bangladesh are substantially greater than in Ethiopia and those of most other countries in SSA. This suggests a greater possibility for gains from economies of scale in marketing and storage in South Asia. Moreover, lower per capita incomes, particularly in Ethiopia other very poor countries of SSA, suggest less market purchasing power among households.

Bangladesh and India also differ from Ethiopia in terms of growth and poverty outcomes over time. The agricultural growth in the two South Asian countries has been labor-demanding; real wages have risen, and the incidence of poverty has been reduced. For example, the head-count rural poverty in India prior to the Green Revolution was 55 percent; now it is about 30 percent, and in the agriculturally prosperous regions the incidence is now only around 20 percent (Deaton,2003). Both countries have also improved their human capital outcomes, Bangladesh leveraging food-based safety net (Food for Education program) to promote both food security and school enrollments. In Ethiopia, overall growth has been modest, and growth-induced poverty reduction has been minimal.

Nonetheless the countries broadly shared similar food security concerns. At various times, all the countries considered here have had significant trade deficits in cereals, the major staples for their households. India and Bangladesh have achieved large gains in per capita food production over time, however, in contrast to SSA countries. None of the countries, though, has yet resolved problems of household-level food security, and overall per capita calorie consumption is still low in Bangladesh (2,173), Ethiopia (1,962) and Zambia (1,893). Even in India, close to one-fifth of India's population continue to be food insecure, and numerous

programs to promote access of the poor to food have met with only marginal success even as foodgrain stocks mounted.

Consumption patterns differ in important ways, as well (Table 1.2). Cereals account for a high percentage of calories in all countries, ranging from about 60 percent in India and Zambia, to 69 percent in Ethiopia to 81 percent in Bangladesh. Moreover, a single major staple dominates cereal (and total) calorie consumption in Bangladesh (rice) and Zambia (maize), making poor consumers in these countries especially vulnerable to changes in these prices. To the extent that imports are a major share of supply of staples or that prices of these tradable staples are largely determined by import prices (as for maize and wheat in Ethiopia, maize in Zambia and wheat and to a lesser extent, rice in Bangladesh), changes in international markets can also have a large impact on food consumption and food security. In principle, the possibility of large-scale commercial imports of these major staples can help stabilize supplies, weakening the case for food aid and food-assisted programs as opposed to cash transfers, but viability of such trade varies across these countries according to infrastructure, private market development and government trade and pricing policies.

Food aid has been a major source of cereal availability in peak years, from 12 percent in Bangladesh in 1987/88, a year of major floods, to 28 percent in Zambia in the 1992 drought year. In recent years, though, food aid has not been a major source of cereal availability in the South Asian countries, essentially zero in India and only 1.9 percent in Bangladesh in 2001, but remains significant in Ethiopia and Zambia, 5.7 and 3.8 percent of cereal availability, respectively.

Plan of the paper

The next four chapters cover the country experiences of India, Bangladesh and Ethiopia in turn. Each of these chapters begins with a brief summary of the history of key political and economic developments in the country. Second, production and trade, the components of availability, are discussed, including evidence of any disincentive effects of food aid on production. Third, consumption trends and patterns and safety net programs are described, with a special focus on food aid and public food distribution programs. Country experiences in handling food shortages and a brief summary conclude each country chapter. The final chapter compares these country experiences, and draws out policy implications for increasing food security in both the short- and long- term.

Table 1.1: Economic Structure of Study Countries

	Bangladesh	India	Ethiopia	Zambia	SSA
Area ('000 sq. km)	144	3,287	1104	753	24,267.0
Population ('000,000)					
1980	85.0	688.9	38.1	6.0	381.7
1990	109.4	846.4	52.0	8.2	508.6
2000	138.0	1016.9	65.6	10.4	658.2
2002	143.8	1049.5	69.0	10.7	688.0
Growth rate: 1980-2000	2.5%	2.0%	2.8%	2.8%	2.8%
Population density (2002)	999	319	62	14	28
GDP/capita \$ (Atlas method)					
1980	210	270	140	630	660
1990	280	390	170	450	550
2000	380	450	100	310	480
2002	360	480	100	330	450
Growth rate: 1980-2000	3.0%	2.6%	-2.0%	-3.5%	-1.6%
Growth rate: 1990-2000	3.1%	1.4%	-5.2%	-3.7%	-1.4%
Urbanization (percent)					
1980	14.88	23.06	10.48	39.81	23.08
1990	19.77	25.54	12.72	39.41	27.95
2000	23.19	27.66	14.90	35.12	34.21
2002	23.91	28.09	15.40	35.67	35.45
Agriculture/GDP					
1980	31.55	38.86		15.07	13.26
1990	30.25	31.27	49.27	20.60	16.06
2000	25.51	24.62	47.62	22.31	16.36
2002	22.73	22.67	41.97	22.20	16.27
Growth rate: 1980-2000*	-19.14%	-36.66%	-3.34%	48.04%	23.35%
Poverty Rate (National)					
1990					
2000 (latest)	49.8	28.6	44.2	73.0	
Per Capita Calorie Consumption					
1980-82	1,961	2,067	1,895	2,214	2,086
1990-92	2,074	2,368	1,684	1,965	2,116
2000-01	2,173	2,488	1,962	1,893	2,197
Change: 1980-82 to 2000-01	212	421	67	(321)	111

Notes: Ethiopia GNI/cap 1980 and 1980-2000 growth rates are 1983 and 1983-2000 data.

*) 1990-2000 for Ethiopia

Source: World Bank SIMA data base.

Table 1.2: Food Economies of Study Countries, 2001

	Bangladesh	India	Ethiopia	Zambia	SSA
Production					
Total Cereals (mn tons)	25.95	196.84	9.64	0.74	72.28
Population (mns)	140.4	1024.9	64.5	10.6	636.9
Total Cereals per capita (kgs/year)	184.9	192.1	149.5	69.6	113.5
Shares of Cereal Production					
Rice	93.3%	47.3%	0.0%	1.0%	10.4%
Wheat	6.4%	35.4%	16.6%	10.1%	3.4%
Maize	0.3%	6.8%	34.2%	81.2%	36.0%
Other Cereals	0.0%	10.5%	49.2%	7.6%	50.2%
Total Cereals	100.0%	100.0%	100.0%	100.0%	100.0%
Total Cereal Imports (mn tons)					
Total Cereal Imports (mn tons)	2.06	0.06	1.11	0.13	19.49
Of which Food Aid (mn tons)	0.491	---	0.568	0.057	3.20
Cereal Consumption(mn tons)					
Cereal Consumption(mn tons)	25.39	166.35	10.04	1.49	76.11
Per capita (kgs/year)	180.9	162.3	155.8	139.8	119.5
Cereal Imports/Total Consumption					
Cereal Imports/Total Consumption	8.1%	0.0%	11.1%	8.7%	25.6%
Cereal Food aid/Total Consumption	1.9%	0.0%	5.7%	3.8%	4.2%
Peak Food Aid Year					
Peak Food Aid Year	1988	1966	2000	1992	1993
Food Aid Peak Year (mn tons)					
Food Aid Peak Year (mn tons)	1.79	10.60	1.21	0.51	4.88
Cereal Food aid/Total Consumption					
Cereal Food aid/Total Consumption	12.1%	14.9%	13.4%	27.7%	6.9%
Per Capita Calorie Consumption					
Cereals (%)	80.9	59.8	69.2	62.3	46.2
Starchy Roots (%)	2.0	1.9	11.3	14.3	19.5
Other Vegetable Products (%)	14.1	30.5	14.7	18.3	27.9
Animal Products (%)	3.0	7.8	4.7	5.0	6.3
Total Kcal person/day	2,186	2,487	2,037	1,885	2,208
Per Cap. Protein Cons. (grams)					
Per Cap. Protein Cons. (grams)	46.8	58.4	59.7	46.3	53.5
Of which: Animal Protein (grams)	6.0	10.4	6.4	8.8	10.3

Note: Peak food aid year: Ethiopia through 2001 (India food aid 1966 est. as total cereal imports).

Source: Calculated from FAO Food Balance Sheet data files.

2. FOOD AID AND FOOD SECURITY IN INDIA

2.1 The Food Security Problem in India: A Historical Perspective

The World Food Summit Plan of Action defined that “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” This definition has four dimensions: food availability, food access, use and utilization, and stability of food availability (over the seasons and across space). In the first couple of decades following Independence in 1947, India’s food insecurity problem centered around all four dimensions mentioned above: there was a serious absolute national shortage of food caused by national production limitations; access of the poor to food was limited due to low incomes and high grain prices of whatever staple food was produced; malnutrition due to low food intake was widespread; and both seasonal and spatial price differences of staple food were quite large (WFP, 2001; Subbarao, 1976 and 1996; Lele 1971).

In the 1950s, food imports, (mainly “food assistance” from the United States under Public Law 480) were used to meet the gap between food needs and domestic supplies. In order to reduce the country’s dependence on food aid (which was increasingly becoming politically unpopular) and to address the problems of food insecurity and chronic energy deficiency, the Government of India adopted a two-fold strategy combat the food insecurity and chronic energy deficiency.

First, to increase domestic production of rice and wheat (and ease the food supply constraint), the government combined massive public investments in agricultural technology (research and development on high yielding varieties of seeds), irrigation, extension services, and rural infrastructure (roads, markets) with price support policies and subsidies on fertilizer and rural credit. These policies proved highly successful in raising grain production. India attained self-sufficiency in foodgrains, and the production of rice and wheat alone reached 157 million tones in 1998-99, almost triple the level of early 1960s. Output growth of rice and wheat exceeded population growth, so that net per capita availability of rice and wheat increased from 280 grams per day in 1961 to 385 grams per day in 1997.

Second, to ensure access to food, the government strengthened the public food distribution system which sells food (rice and wheat) at subsidized prices, and maintains national buffer stocks. In order to increase the flow of grains to the PDS system and thus enhance the government’s capacity to directly affect food consumption, numerous policy changes were introduced in 1965 in the aftermath of an extensive drought, including movement restrictions between production zones on private account, levies on farmers, and monopoly procurement of grains by the government. In addition, two new institutions were created: the Agricultural Prices Commission, a government agency to determine the level of support prices for various crops, and several other administrative controls; and the Food Corporation of India (FCI), a parastatal responsible for purchase, storage, movement and distribution of food to PDS system at the national level, as well as acting as the main handling agent for imported grain and its distribution. This government intervention in markets through the FCI was intended to provide a countervailing force to speculative activities of traders, but since the mid-1990s, some market

restrictions have been relaxed, and the process of market liberalization is slowly moving forward.

While there have been impressive achievements in raising food production (resulting in a reduction of food aid) and also in reducing the incidence of poverty significantly, hunger and malnutrition continue to haunt large sections of the population in “modern” India as it entered the 21st century. Paradoxically, even as buffer stocks of food mounted, over 200 million people continue to be food insecure. Large famines and mortality have been averted, but the goal of food security for the whole population remained elusive. The PDS has recently been reformed and better targeted. Nonetheless the system continues to be hugely expensive with central subsidy alone reaching a level of US \$ 4.3 billion in 2002-03 or 0.8% of GDP, which amounted to 5 percent of total public expenditure, or 9% of total government developmental expenditure).² The policy framework that evolved in the wake of critical shortages of the 1950s has outlived its purpose, and has probably become a shackle to future growth and may not even serve as a good instrument to provide food security for the millions who are still currently food insecure.

Box 2.1: Chronology of Key Events related to India’s Food Security

1943	Great Bengal famine
1947	Independence from Britain
1955-57	Series of poor harvests and beginning of large scale food aid imports through US PL480
1965	Major food policy shift involving public investment in Green Revolution technology and interventions in markets, including establishment of Food Corporation of India and Agricultural Prices Commission
1976	Food production self-sufficiency targets met for first time
1987	Massive drought, but production shortfall is met by domestic stock drawdown
1991	Economic liberalization begins
1997	Agricultural market liberalization, including scrapping of rice levies and foodgrain movement restrictions
2001	FCI food stocks reach 61.7 million tons in July
2004	Employment Guarantee Act passed guaranteeing 100 days of employment

² See Umali-Deininger and Deininger (2001) for an analysis of costs of the PDS and benefits to households.

2.2 Foodgrain Production and Availability of Food

Analysis of foodgrain production trends in India must take account of the size and diversity of a country that is sub-continental in scale and has a federal system of government and administration covering 27 states and 7 union territories. Foodgrain production, however, is concentrated in a few states. Three-fourths of the wheat and pulse production comes from six states in northern India. The biggest rice producing states are also found in the northern part of the country. The south, especially Kerala, Tamil Nadu and Maharashtra (a state with a high percentage of arid zone, subjected to periodic droughts) have historically been considered to be “food deficit” states that rely on supplies from the surplus producing states. During the 1950s and 1960s (prior to market liberalization and large increases in government stocks), these deficits suffered serious food shortages in years in which production in the surplus states fell and public sector shipments of grain to deficit states declined.

India’s agricultural growth in the post-independence period is characterized by three distinct phases: the pre-green revolution phase (1950-67), the green revolution phase (1968-90) and the post-liberalization phase (1991-present).

Phase I: Pre-green revolution (1950-67). During the pre-green revolution phase, cereal production increased by an average of 2.9 percent per year, due to increases in both area (1.1 percent per year) and yields (1.8 percent per year). Rice production, which accounted for nearly half of all cereal production, grew at a rapid annual rate of 2.3 percent; rice area harvested increased at 1.3 percent per year (Table 2.1).

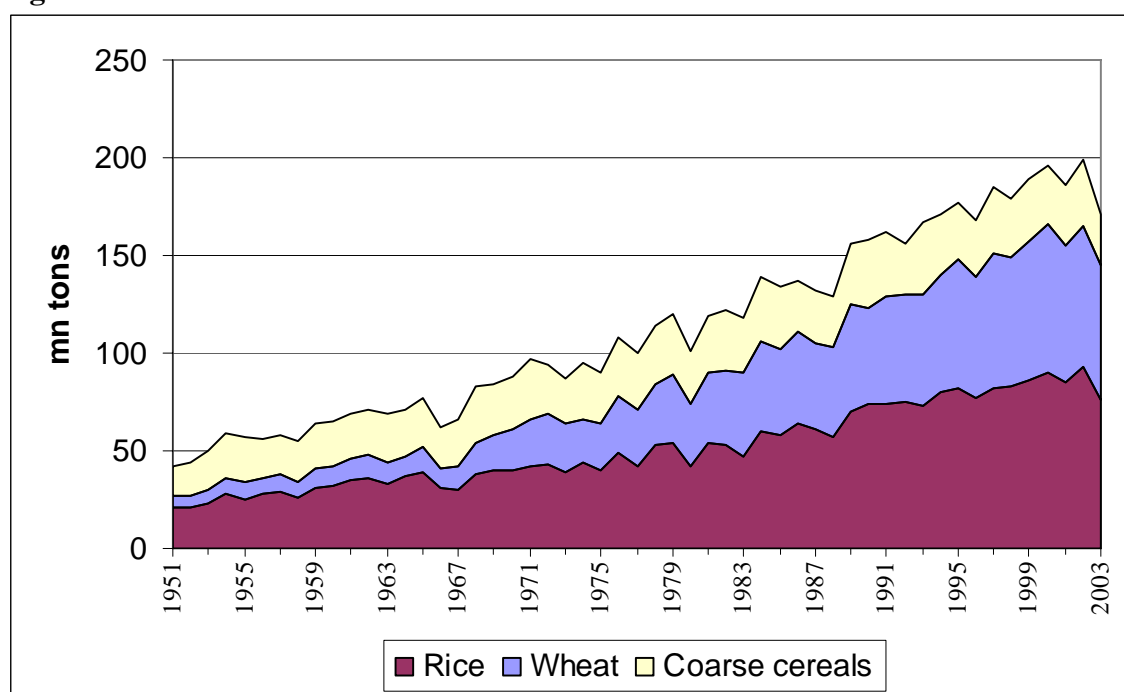
Table 2.1: India: Cereal Area, Yield and Production, 1950 - 2003

	Annual Average			Growth Rates		
	1950-67	1968-90	1991-2003	1950-1967	1968-90	1991-2003
Rice						
Production ('000 tons)	29.6	50.6	81.1	3.2	2.9	1.3
Area ('000 ha)	33.1	39.3	43.2	1.3	0.6	0.3
Yield (tons/ha)	0.89	1.29	1.88	1.9	2.3	1.0
Wheat						
Production ('000 tons)	9.5	33.9	65.4	3.6	5.5	2.7
Area ('000 ha)	12.2	20.9	25.6	2.1	2.2	0.9
Yield (tons/ha)	0.78	1.62	2.56	1.5	3.3	1.8
Coarse Grains						
Production ('000 MT)*	21.7	28.7	31.0	2.1	0.7	-0.6
Area ('000 ha)	43.3	42.2	31.4	0.7	-0.9	-2.1
Yield (tons/ha)*	0.50	0.68	0.99	1.3	1.6	1.5
Total Cereals						
Production ('000 tons)*	60.9	113.2	177.5	2.9	3.0	1.5
Area ('000 ha)	88.7	102.5	100.2	1.1	0.3	-0.3
Yield (tons/ha)*	0.69	1.10	1.77	1.8	2.7	1.8

Source: Calculated from Government of India, Bulletin of Agricultural Statistics data.

The years 1965-66 and 1966-67, however, witnessed serious drought and near-famine conditions. Cereal production fell to only 62.4 million tons in 1966 and 65.9 million tons in 1967, compared to an average of about 73 million tons in the previous two years (Figure 2.1). As a result, there was a significant food gap at the *national level* necessitating imports on a large scale. There was also a sharp increase in the price of food staples in the immediate short run which further accentuated the problem inasmuch as many rural households were not able to buy grains even when they were available. The magnitude of the crisis created by the drought both on the supply side (food gap) and on the demand side (inflationary conditions) was so serious that it brought about major re-thinking of the priorities of development policy in the mid-1960s.

Figure 2.1: India: Cereal Production: 1950-2003



Source: Calculated from Government of India, Bulletin of Agricultural Statistics data..

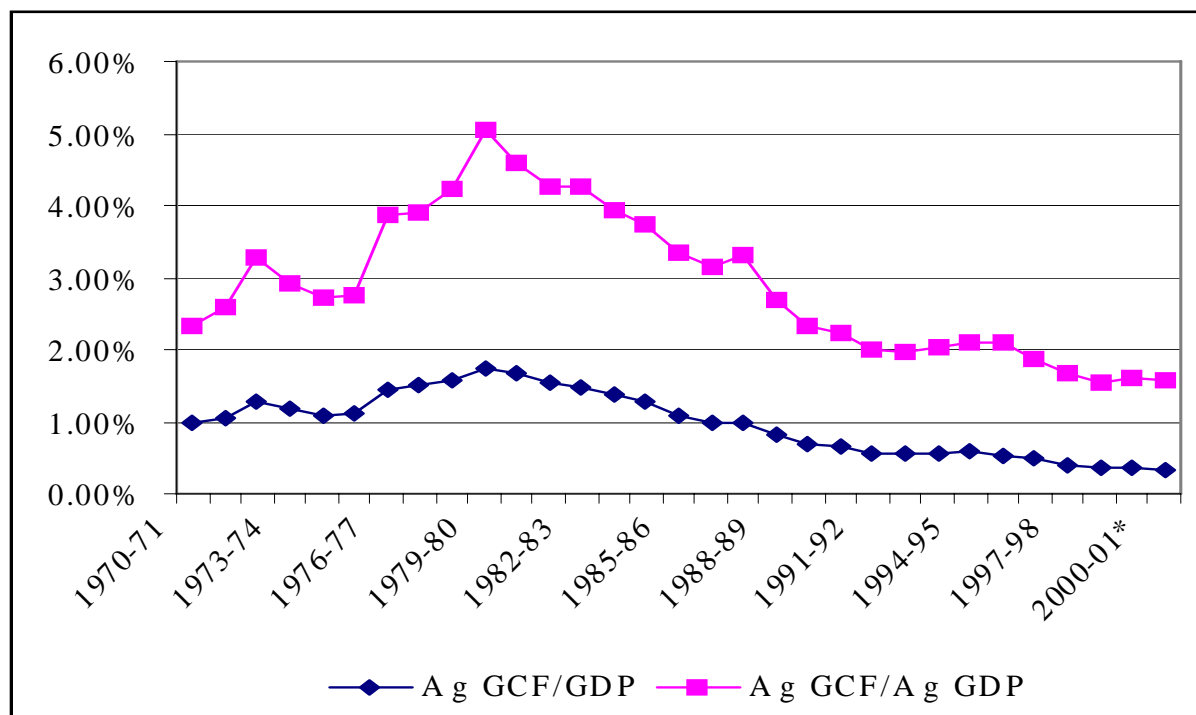
The *immediate* policy responses to the crisis during the pre-green revolution period comprised of, on the supply side, heavy imports of foodgrains under the P.L. 480. To guarantee access to the population in deficit states and in urban areas, major efforts were taken to strengthen the Public Distribution System (PDS) – a nation-wide intervention of rationing and fair price shops that had its origins during the inter-war years (pre-Independence era). To ensure smooth flow of grains to the PDS, the government also undertook certain ancillary measures to control and regulate the private trade in grains, including movement restrictions and levies on producers and millers.

Phase II: The green revolution (1968-1990). The *medium term policy* response to the food crisis was a change in strategy (called the “package program”) that was aimed at achieving national-level self-sufficiency in foodgrains via improvements in farm productivity and extending the area under irrigation. One key component of the package program was substantial

investment in agricultural R&D, encouraging private agricultural universities to lead the task of developing high-yielding and short maturation seed varieties. The government also invested heavily in irrigation. As a result, total public and private investment in agriculture rose from about 2 percent of GDP in 1970 to 4-5 percent of GDP in the later 1970s and early 1980s, before declining again to about 2 percent of GDP by 1990 (Figure 2.2).³

In addition, the government set up the Agricultural Prices Commission to set appropriate guaranteed incentive prices for farmers, enhanced the role of Food Corporation of India (FCI) to stabilize food prices through purchase and distribution of grains, and maintenance of a national grain buffer stock. Incentives for production were also supported through subsidies on fertilizer and revamping of the rural credit system.

Figure 2.2: India: Public Investments in Agriculture, 1970-71 to 2000-01



Source: World Bank (2004).

The emphasis of productivity-augmenting measures had the desired impacts as productivity of cereals increased at an overall average rate of 2.7 percent per year. Cereal production doubled between 1966-67 and 1983-84 from 66 million to nearly 140 million tons, and reached 158 million tons in 1989-90, an increase of 112 percent relative to 1966-67. Total area cultivated with cereals changed little over this period, though there area planted to coarse cereals declined slightly and area cultivated with wheat increased by an average of 2.2 percent per year.

³ See C.H.H. Rao, 1994.

Rice production increased at an average rate of 2.9 per cent per year over the 1968-1990 period in spite of little growth in area (only 0.6 percent per year), due to a substantial increases in yields (2.3 percent per year). Though rice production had increased prior to the green revolution period, especially during the period 1950-51 to 1962-63, the real spurt in growth occurred during the 1970s. However, during the 1970s and 1980s there were several years of poor harvests due mainly to droughts. In these years immediately following the start of the green revolution, instability of both area and especially yield increased (C.H.H.Rao, S.K. Ray and K. Subbarao, 1988). Growth in production became more stable during the 1990s, in large part because of a steady increase in the percentage of area irrigated by groundwater sources and the introduction of a second short-duration rice crop in the eastern districts of India. Nonetheless, in spite of these stabilizing factors, rice production fell sharply by 17 million tons (19 percent) in 2002-03 due mainly to severe drought.

Both price (incentive) and non-price (technology) factors played significant roles in expanding rice production, with their relative importance changing over time. Although there was considerable interplay between these two main factors, in broad terms, technology factors were the dominant source of increases in rice production in the early years of the green revolution, while incentive factors have played a larger role in the later years (C.H.H.Rao, S.K. Ray and K. Subbarao, 1988). Moreover, the production incentive structures have also changed. In the early years of the green revolution, incentive prices to farmers were driven by support prices and fertilizer subsidies. In the latter period, liberalizing domestic and international trade and markets began to play a larger role (World Bank, 2004).

Wheat production increased even faster than rice production in the green revolution period. Over the 1968-1990 period, wheat production grew at 5.5 percent per year, significantly faster than rice (2.9 percent per year). As a result, wheat production in 1983-84 (45.5 million tons) was four times its 1953-54 level (8.0 million tons); (and reached six times the 1953-54 level by 2002-03). About two-thirds of this increase in production was due to increases in productivity. Wheat yields rose impressively at an average rate of 3.3 per cent per year from 1968 to 1990, double the productivity growth in the 1950-67 period. Area cultivated with wheat also increased by 2.2 percent per year from 1968 to 1990.

Coarse cereals, grown and consumed mainly in dry regions of India, however, did not register growth in productivity comparable to what was achieved in rice and wheat cultivation. Trend productivity growth of coarse cereals (mainly maize, sorghum, and millet) averaged only 1.6 percent per year over the 1968 to 1990 period. In part because of lower agricultural productivity in the arid zone of India where coarse cereals predominate, producers and consumers of coarse cereals tend have lower incomes than those living in other regions and the incidence of poverty is higher. This disparity in land productivity, incomes and employment between dry lands and irrigated lands has widened since the onset of the green revolution, since rice and wheat productivity gains have tended to raise incomes in regions with more irrigated land. Moreover, because of erratic rainfall in arid regions, production of coarse cereals and household incomes in these regions are more unstable than rice and wheat production.

Raising yields in arid regions of India has proven very difficult, however. Because the basic constraint in dry land farming is the general deficiency and uncertainty in the availability

of moisture, dry land crop research has focused on the evolution of genetic varieties capable of withstanding moisture stress, with only limited success. One promising alternative is to ease the constraint of low and highly variable soil moisture conditions by focusing research on cost-effective water harvesting technologies. Greater expenditures on R&D on dry land farming research are needed -- the share of these expenditures in the total R&D budget is much lower than the share of dry land crops to gross cropped area. (C.H.H. Rao, S.K. Ray and K. Subbarao, 1988; Jodha, 1983 and Rangaswamy, 1986).

Phase III: The post-liberalization phase (1991-present). Beginning in 1991, the government of India undertook a series of broad economic reforms that included reduction of tariffs and elimination of most quotas, exchange rate depreciation, allowing foreign investment and reduced government regulation of domestic agricultural and non-agricultural product markets. Having achieved domestic self-sufficiency in cereals, there was little perceived need for further rapid increases in cereal production at the national level, though there remained substantial pressure from farmers in key producing states for increases in government procurement prices (Tyagi, 1990).

Overall, for the 1991-2003 period, rice and wheat production continued to increase, but at substantially slower growth rates: only 1.3 percent per year for rice and 2.7 percent per year for wheat. These production gains were due almost entirely to increases in yields: 1.0 percent per year for rice and 1.8 percent per year for wheat. Production of coarse cereals actually declined by 0.6 percent per year due to a steep 2.1 percent per year decline in area cultivated. As a result, total cereal production increased by only 1.5 percent per year, slightly less than the rate of population growth (1.9 percent).

Analysis of state-level data on growth and poverty in India (Datt and Ravallion, 1998) shows that agricultural productivity growth from 1958-1994 played a major role in reducing poverty. During this period, agricultural output per acre of net sown area grew by 2.91 percent per year, contributing to higher real wages for agricultural laborers (which grew by 2.84 percent per year). Higher farm yields for small producers contributed directly to their incomes, both through increased value of output and increased employment. Productivity growth also led to a decline in the real price of food, which increased the purchasing power of the poor. The price of food relative to agricultural laborers' consumer price index fell by 0.15 percent per year from 1976-94, after having increased by 0.62 percent per year from 1958-75. Regression estimates suggest that this decline in the real price of food explained about 20 percent of the change in poverty and 15 percent of the change in the squared poverty gap in this period.

Domestic Food Markets

Up until the early 1990s, Indian governments at the federal and state level placed significant restrictions on domestic food markets in an effort to protect small producers from unscrupulous traders, provide adequate producer incentives to raise production, procure grain for subsidized distribution to consumers and stabilize prices. These included restrictions in bulk handling and storage by private investors, licensing requirements, stocking limits, movement restrictions on wheat, paddy/rice, coarse grains, edible oilseeds and edible oils, and levies on rice millers, and also, for some years, compulsory levies on rice producers forcing them to sell grain

to the government at a price lower than the market price. There was also an unsuccessful attempt to nationalize foodgrain trade in 1973-74 but very quickly that move was reversed as it proved totally ineffective.

Of all the restrictions, movement restrictions and the imposition of levies on millers and in some years on producers attracted much attention largely because of their significant negative fall outs. Sustained research pioneered by (late) Raj Krishna (1965, 1967) has shown that movement restrictions has had dramatic negative effects on integrating food markets often raising market prices of food staples in deficit states beyond what would have prevailed in the absence of such restrictions. The compulsory levies on (middle and large) producers were defended on the ground that the weighted average price received by producers by selling a part of their grain to the government at the lower (levy) price, and the remainder in the open market price, would not be lower than the equilibrium open market price in the absence of such levies, and so would not constitute a disincentive. Research by Hayami, Subbarao and Otsuka (1983) has shown that such policies, notwithstanding its theoretical appeal, should be avoided for the political economy reasons: most large farmers managed to evade the levies whereas small medium farmers, who had no political clout, actually paid the levies thus opening up potential for the unintended adverse redistributive impacts.

Recognizing the deleterious impacts of market regulations, and in view of the mounting foodgrain buffer stocks, the GOI has undertaken several policy reforms related to domestic trade deregulation since the early 1990s. Movement restrictions were removed. The private sector was allowed to **do bulk handling** and storage. Licensing requirements, stocking limits, and movement restrictions on wheat and rice, on the private sector were removed. Several restrictions on the access to credit to the private sector have also been eliminated. Reform of the Agricultural Produce (Regulated) Markets is currently under way to give virtual freedom to farmers to sell outside of regulated markets. External trade regime has also been reformed: quantitative import restrictions were removed, minimum export prices were abolished, and credit to exporters rapidly expanded (Table 2.2). However, a large domestic market reform agenda remains to be completed. Higher growth is likely to be hampered unless further progress is made towards removing the remaining regulations coming under the purview of the Essential Commodities Act – a legislation that was passed during the years of shortage in 1955, and which has outlived its purpose.

In spite of these marketing reforms in the early 1990s, the government continued large-scale interventions in food markets to support producer prices and supply the Public Distribution System. Political pressures to rapidly raise minimum support prices and then procure the high volumes of rice and wheat offered for sale at these prices had a major impact on policy. Procurement levels of rice and wheat rose rapidly, increasing from 22 million tons in 1990-01 (or 13 percent of foodgrain production) to 37.41 million tons in 2001-02 or 18 percent of foodgrain production. Because procurement is highly concentrated in only a few states, (Punjab, Haryana and Uttar Pradesh for wheat, and Punjab, Haryana and Andhra Pradesh for rice), most of the benefits of these policies accrue to farmers in these states (World Bank, 2004).

Table 2.2: India: Major Domestic Agricultural Policy and Trade Regulations, 1996 and 2003

<i>Regulation</i>		<i>Rice</i>	<i>Wheat</i>	<i>Sugar</i>	<i>Oilseeds/ Edible oils</i>	<i>Cotton</i>	<i>Livestock/ products</i>
Central Government							
Movement control	2003 1996	lifted*	lifted* Lifted*	lifted*	lifted*	lifted*	
Storage control	2003 1996	lifted*	lifted*	lifted*	lifted*	lifted*	
Processing control	2003 1996	(levy)		Reduced (levy)		Removed (ginning fees)	removed (milk)
Small scale reservation	2003 1996	removed			(grndnut, mustard)		removed (ice cream mfg)
Selective credit control	2003 1996	lifted*	lifted*	lifted*	lifted*	lifted*	
Minimum Price support	2003 1996						
Consumer price subsidy	2003 1996	targeted	targeted	Reduced			
Export/Import	2003 1996						
Futures banned	2003 1996	removed	removed	Removed	removed	Removed	
State Governments							
Wholesale mktng control	2003 1996	#	#	#	#	#	
Storage control	2003 1996	lifted*	lifted*	lifted*	lifted*	lifted*	
Producer price support	2003 1996					(Maharashtra)	

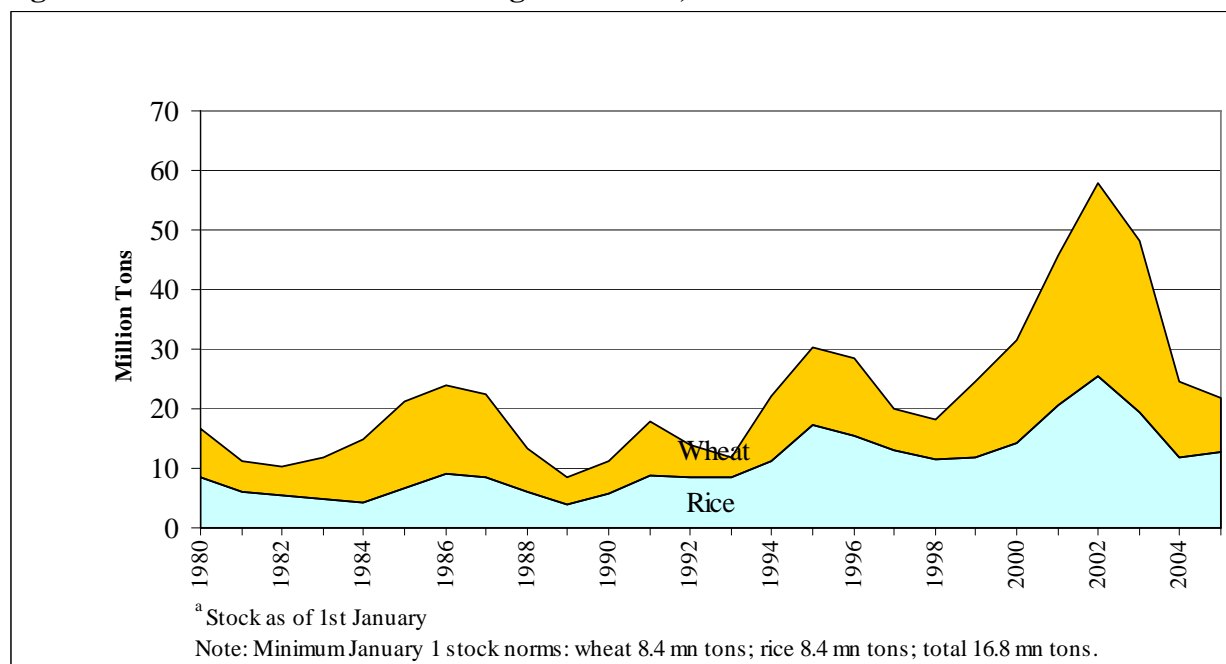
Notes: Shaded cells = commodity regulation exists. Lifted = commodity regulation temporarily not enforced. # =wholesale marketing controls relaxed in some states for contract growing arrangements. These commodities account for approximately two-thirds of agricultural GDP. Source: World Bank (2004): India Re-energizing the Agricultural Sector to Sustain Growth and Reduce Poverty. 2004.

Stock levels rose rapidly along with procurement levels, since the volumes of grain distribution did not increase. Government stocks increased from 15.8 million tones in 1990-01 to 58.0 million tons in January 2002 2001-02, far in excess of the (1999-2000) target stock norm of 18.8 million tons (Figure 2.3). Consequently, there was a significant increase in the subsidy on buffer stocks as a percent of total food subsidy from 16 percent in the early 1990s to 41.5 percent in 2001-02. These mounting buffer stocks (of both rice and wheat) became a source of embarrassment to the government in the wake of reports of deaths due to hunger in some states. FCI stocks were subsequently reduced to 21.7 million tons in January 2005, in large part through subsidized exports of 31 million tons of rice and wheat from 2000-01 through 2003-04.

Government intervention in food markets produced substantial price stability in India, particularly since the mid-1990s. From 1994/95 to 2000/01, the coefficient of variation of the market rice price in India was only 0.123, compared to 0.227 for Thai rice (15 percent broken, fob Bangkok, expressed in U.S. dollars).⁴ In real terms, annual rice prices in India were even more stable, with a coefficient of variation of 0.045 compared with 0.206 for Thai rice (Dorosh and Shahabuddin, 2004).

⁴ The India rice price used for this calculation is an estimated export parity price (Rs/kg) in West Bengal, derived from a wholesale Delhi price.

Figure 2.3: India: Central Pool Foodgrain Stocks, 1980-2005



Source: Calculated from GOI, India Economic Survey (various years).

Food Aid, Total Imports and Availability

As a result of sustained increases in domestic production over several decades, India moved from major cereal deficits in the 1950s and 1960s to approximate self-sufficiency from the mid-1970s to the early 1990s, and even significant exports from the mid-1990s onward.

India's rice and wheat imports exceeded several million tons during the 1950s, most of which was on concessional terms as aid from the United States. (Table 2.3) These imports of food under P.L. 480 created an uneasy atmosphere in the country inasmuch as the sale proceeds, called "counter part funds", were in the beginning owned by the Government of United States until the late 1950s. The counterpart funds became an embarrassment to both the Indian and the US governments. The counterpart funds accumulated to over 30 billion rupees opened up the potential for unleashing inflation should these funds be off-loaded. In later years, however, the issue of counterpart funds was resolved amicably: The funds were released mostly for agricultural development including research and education, minor irrigation, animal husbandry and dairy development, soil conservation and land development, financing some education projects including scholarships, and to health and nutrition projects. About 80 percent of counterpart funds were given away to the government of India as grants and loans, the former supporting farm research and the latter agricultural and rural projects (Sundaram, 1968). Also, there was recognition of the merit of releasing imported food into regular market channels via sale rather than as "free food" inasmuch as the policy did not supplant the development of grain markets.

During the 1960s, the Government was under serious political pressure to get rid of imports, as the policy of feeding the population was derisively characterized as “from ship to mouth”. There was also much concern with the potential distortionary and disincentive effects on the domestic market of large quantities of food aid. Research undertaken at the Delhi School of Economics during 1965-70 has shown that the disincentive effects were minimal. (Sundaram, 1968). Overall, the food import regime, including the counterpart funds, was managed well.

Table 2.3: India: Imports and Exports of Rice and Wheat, 1950-51 to 2000-2001

	Rice Exports	Basmati Exports	Rice Imports	Rice Net Imp Share	Wheat Exports	Wheat Imports	Wheat Net Imp Share
1951-60	26	n.a.	471	1.8%	414	1,941	15.7%
1961-70	3	n.a.	556	1.6%	196	4,899	26.3%
1971-80	67	n.a.	107	0.1%	857	1,964	3.4%
1981-90	413	330	209	-0.4%	87	919	1.8%
1991-2000	2,010	452	31	-2.3%	388	695	0.3%
1951-67	13	n.a.	522	1.8%	320	3188	21.2%
1968-90	210	330	198	0.0%	437	1871	0.3%

Notes: The data for imports and exports of rice and wheat up to 1979 are for calendar years; from 1980, data corresponds to financial years.

The import data from 1950 to 1973 are only available for trade on Government of India account; it is not clear whether export data in this period include private trade or not.

Rice import data after 1980 include basmati rice; prior to 1980, it is not clear whether the rice import figure includes basmati rice or not.

Rice export figures include both basmati and non-basmati rice exports. Separate figures for basmati rice exports are available from 1980-81 on. Exports of non-basmati rice were allowed for the first time during 1991.

Net import shares are calculated as net imports divided by domestic production plus gross imports.

Sources: Agricultural Statistical Compendium- Foodgrains, Volume I and II by P.C.Bansil, Published by Techno-Economic Research Institute, New Delhi; India Database by H.L.Chandhok; Reports of Commission for Agricultural Costs and Prices, New Delhi.

That said, the program food aid, as long as it existed, had significant benefits. First, it filled a food gap during years when many Indians faced hunger and malnutrition. Second, it saved precious foreign exchange which would otherwise have been spent on important food commercially. Third, PDS was sustained during the period of acute food shortages.

As gross production of foodgrains increased from 74.2 million tons in 1967-68 to 121 million tons in 1976, imports of foodgrains fell from 10.3 million tons in 1966-67 to 2.0 million tons in 1971; program food aid under P.L. 480 nearly ended by 1971; no provisions under P.L. 480 were made for 1972, 1973 and 1974. At the same time, the government of India was able to significantly increase its food stocks. By 1976-77, large scale imports of food under aid programs was virtually a thing of the past, except for supplemental feeding under government-run nutrition support programs.

External trade played little role in the Indian cereal economy throughout the 1980s, but the scenario vastly changed during the 1990s. Given the rapid production increases over the previous two decades, accumulating stocks and rising costs of the PDS, the government began to permit commercial exports of both rice and wheat at a significant scale (66 thousand tons of rice

and wheat in 1990-91). Exports increased rapidly during the 1990s (in part due to subsidies provided by the government), though with substantial fluctuations.⁵

From the early 1990s until 1996-97, the returns to rice cultivation were substantially enhanced following the gradual liberalization of international trade and the depreciation of the rupee, and steady increases in minimum support prices for rice. During the latter half of the 1990s, however, due to continuous increase in minimum support prices, domestic prices rose as world market price for rice hit its historic low, rendering Indian exports non-competitive. By 2000, the nominal protection coefficient (NPC) for rice was 1.39 (World Bank, 2004). To increase exports in order to offload the mounting domestic stocks of rice, the Government resorted to subsidizing internal marketing and freight charges. As a result, rice exports reached a peak level of 2.6 million tones in 2001, and continue to remain high at that level.⁶ For wheat, the nominal protection coefficient for wheat rose from 1 in 1998 to 1.75 in 2000, and wheat exports of wheat increased sharply by 2002.

The observed trends in production, imports and exports can best be summarized in terms of trends in per capita net availability. Notwithstanding impressive gains in productivity and production of both rice and wheat, no significant trend (either increasing or declining) can be found in per capita net availability of rice, wheat and total cereals, (Table 2.4) because production growth rates were only slightly higher than the population growth rates.

Table 2.4: India: Net Availability of Foodgrains: 1951 to 2002 (kgs/person/year)

Year	Rice	Wheat	Other Cereals	All Cereals	Gram	Pulses	Total
2000	74.3	58.4	21.5	154.3	3.9	11.6	165.9
2001	69.5	49.6	20.5	141	2.9	10.9	151.9
2002	83.1	59.9	23.6	166.6	3.9	12.7	179.3
1951-67	66.6	27.3	42.7	136.6	9.4	22.7	159.3
1968-90	67.2	45.7	34.7	149.9	5.8	15.7	165.5
1991-2002	67.8	58.5	24.3	159.4	4.3	12.9	172.2
Growth rates:							
1952-67	0.51	3.29	-0.41	0.79	-1.46	-1.82	0.44
1968-90	0.64	2.18	-1.91	0.49	-2.41	-1.04	0.34
1991-2002	-0.36	0.40	-2.45	-0.44	-0.77	-1.75	-0.54

Note : For calculation of per capita net availability the figures of net imports from 1981 to 1994 are based on imports and exports on Government of India account only. Net imports from 1995 onwards are the total exports and imports (on Government as well as private accounts).

Source: Government of India, Agricultural Statistics, various years.

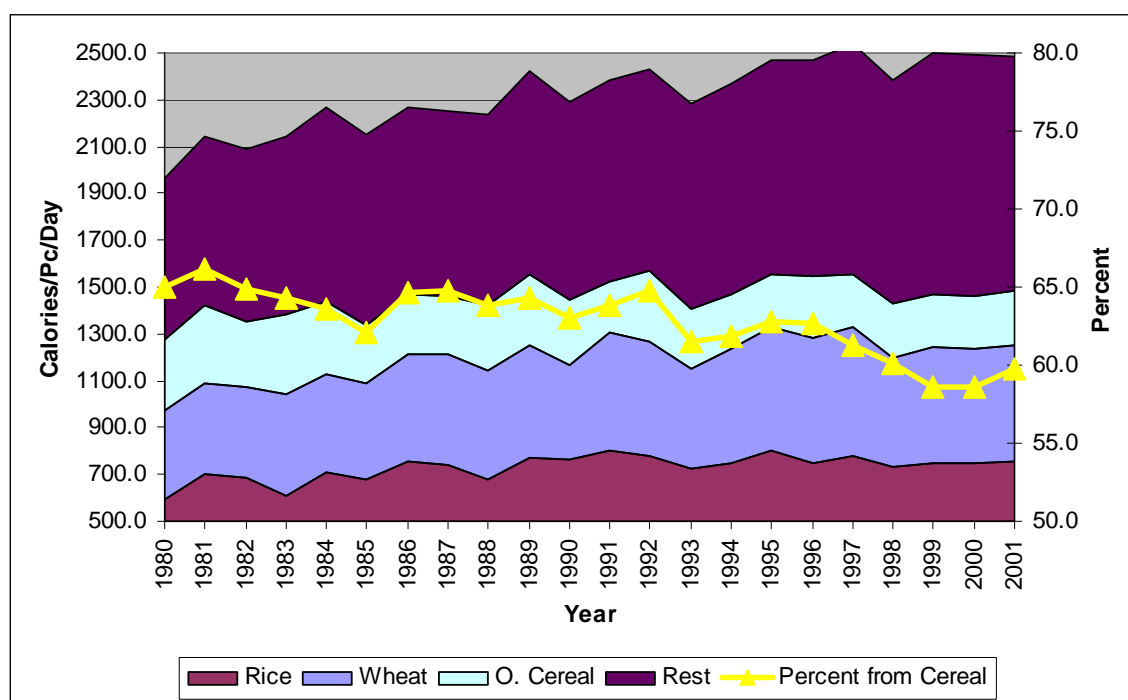
⁵ Small volumes of commercial imports of rice, nonetheless continued through 2002-03 (only 870 tons, equivalent to about 1/100,000th of production and wheat imports were nil).

⁶ Unfortunately the data on the fiscal cost of subsidizing marketing and freight charges is not readily available.

2.3 Consumption and Safety Nets

Increases in rice and wheat production enabled total consumption and calories derived from these grains to rise from 1,277 in 1980 to 1,487 in 2001 (Figure 2.4). The biggest gains in total consumption of calories, however, have come from a variety of other vegetable sources and animal sources, however, which almost doubled from 687 in 1980 to 1,000 in 2001. Total caloric consumption thus rose from about 1,966 to 2,487 in this period, an annual increase of 3 percent, and the share of calories derived from cereals fell from 65 to 60 percent.

Figure 2.4: India: Calories from Cereals and Other Sources



Source: Calculated from data from FAOSTAT.

Data from NSS surveys for various years also confirms these trends. At the all India level, cereal consumption declined from 15.3 kilograms per capita per month in 1972-73 to 12.7 kilograms per capita per month in 1999-00 in rural areas.⁷ Cereal shares have seen a dramatic decline of more than 10 percentage points between 1972-73 and 1993-94 in most regions in both rural and urban India. Similarly, the share of meat and milk products, and vegetables and fruits has increased over time (Table 2.5).

Changes in patterns of food consumption vary somewhat according to levels of household expenditures, though. Although total cereal consumption has declined for all expenditure groups, for the poorest 30 percent of households, rice consumption has increased

⁷ For more details on changing consumption patterns, see Rao, CHH (2000)

and wheat consumption has remained at approximately its level of the mid-1980s. Coarse cereal consumption, by contrast, has declined for all expenditure groups. At the same time, the budget share of non-cereal food and non-food has increased for all classes, and the consumption of non-cereal food increased in constant prices even for the bottom 30 percent.

Table 2.5: India: Changes in Consumption Patterns: 1972-73 to 1999-00

Rice (Kg/month)						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	4.82	5.17	4.44	5.74	6.10	6.60
Middle 40%	6.91	7.57	7.01	7.42	7.54	7.02
Top 30%	7.93	8.48	8.32	7.83	7.28	6.64
All	6.59	7.12	6.63	7.04	7.02	6.78
Wheat (kg/month)						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	2.09	2.33	3.40	3.71	3.38	3.44
Middle 40%	3.58	3.73	4.18	4.70	4.17	4.47
Top 30%	6.08	6.20	5.90	6.49	5.73	5.76
All	3.88	4.05	4.46	4.94	4.40	4.55
Other Cereals (kg/month)						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	4.45	3.92	4.11	2.82	2.28	1.41
Middle 40%	4.83	3.94	3.61	2.44	1.90	1.45
Top 30%	5.07	4.41	3.43	2.23	1.76	1.30
All	4.79	4.08	3.71	2.49	1.98	1.39
Total Cereals (kg/month)						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	11.36	11.42	11.95	12.27	11.76	11.44
Middle 40%	15.32	15.24	14.80	14.56	13.61	12.95
Top 30%	19.08	19.09	17.65	16.55	14.77	13.69
All	15.26	15.25	14.80	14.47	13.40	12.72
Budget Share of Food						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	81.22	79.50	75.94	74.21	69.76	62.71
Middle 40%	78.36	76.01	72.27	70.74	66.82	60.14
Top 30%	66.61	57.38	59.37	57.32	53.86	51.92
All	72.76	66.38	66.29	64.38	60.77	56.60
Expenditure on Non-cereal food (Rs. 0.00) /month 1990-91 prices						
Decile Group	1972-73	1977-78	1983	1987-88	1993-94	1999-00
Lowest 30%	29.64	30.30	32.58	34.77	36.20	34.74
Middle 40%	35.41	35.55	37.33	39.45	40.40	40.16
Top 30%	38.74	34.86	38.38	39.41	38.76	41.60
All	36.26	34.43	37.16	38.71	38.91	39.95

Source: NSS Consumer Expenditure Surveys; Dev (2003).

Food-based Safety Nets

The Public Distribution System (PDS) in India has been a mainstay to ensure access of food to millions of poor people. The PDS has been much researched in India. Its performance until 1996 (evaluated by Radhakrishna and Subbarao, 1997) has proven to be both inadequate to needs and hugely expensive. Large (regional) pockets of poverty and hunger continued to persist. The debate over Indian agricultural and rural development policy has clearly and strongly been influenced by the issue of regionally-differentiated poverty and hunger situation. This is because, despite rapid strides in agriculture, mounting foodgrain stocks, and the opening up of the economy, poverty, hunger and malnutrition is heavily concentrated in certain regions of eastern India and the arid zone. It is in this context that serious consideration is now being given to policy options both within the agricultural sector, (largely in the area of trade noted above), and in the area of safety nets.

The main plank of reform in ensuring food security is the implementation of Targeted Public Distribution System (TPDS). Under the TPDS, access to food at subsidized prices at the ration shops is restricted to the population below the poverty line (BPL families); those above the poverty line (APL families) could also gain access to food but only at market prices. Until 2000, a BPL family was entitled to 10 kg. Per month of subsidized grain (or 2 kg per month per person for a 5-member family). In response to inadequacy of this level of allocation and faced with the problem of mounting food stocks, the Government of India increased the BPL allocation from 10 to 20 kg per month in April 2000, to be priced at 50% of FCI's economic cost. From now on, the policy was geared not only to enhance allocations to the poor but also to reduce excess stocks. In July 2001, the BPL allocation was further increased to 25 kg per month per family, priced at 48% of FCI's economic cost. The Government also allowed APL families also to purchase foodgrains at 70% of the economic cost of FCI. Again in April 2002, the allocation to all classes of families was increased to 35 kg per family per month.

The various shifts in policy in the management of TPDS have definitely contributed to an increase in allocations and off-take in states with higher incidence of poverty (Uttar Pradesh, Orissa and Madhya Pradesh). As buffer stocks mounted, there was a downward pressure on market prices so that the difference between ration (subsidized) price and the market price narrowed, and as a result, the APL families began to limit their access to ration shops and avoid the transaction costs associated with such purchases. Analysis of household survey data show that the targeting of benefits via TPDS have been substantial inasmuch as participation rates increased from 22.6 per cent to 31.6 per cent between 1993-94 and 2001-02.

Despite the improvement in the access of the food, there remain large segments of the population still hungry and inadequately served. Results of household survey questionnaires showed that the main reason for their inability to access subsidized food was non-availability of the item they wanted at the time they needed it, and poor quality of grain supplied.

In addition to the PDS, the government also used the stocks to launch other welfare programs, including especially workfare programs. A new employment program called Sampoor Grameen Rozgar Yojana (SGRY) was launched, to be implemented by the states, and provided them with an allocation of 5 million tons to each state. Other programs supported by foodgrain

stocks include mid-day meals, nutrition program, food for works, and Antyodaya (destitute feeding program). Numerous safety net programs are now in operation, some financed entirely by the GOI, some partially with cost-sharing by states. Few rigorous evaluations of these various programs are available (with the exception of PDS), though several ad hoc evaluations did point out to several deficiencies of implementation of work fare programs. Clearly more research needs to be done to assess the cost and targeting efficiency of a multitude of safety net programs currently in operation in various states (R. Radhakrishna, K.H. Rao and K. Subbarao, 2004), some food-based and others cash-based.

The Right to Food Controversy

India is a signatory to many international treaties that include the right to food as one of the covenants. There are indirect references to the right to food in the Indian Constitution. In the recent period, there has been considerable interest among academics and non-governmental agencies on this matter. The main reason that even as the Government of India accumulated over 50 million tones of rice and wheat in public ware houses – probably the largest ever stocks of grain in world history in a developing country – close to 50% of India's children under age five are underweight (in 1998-99); 88 percent of pregnant women suffer from anemia, and over 200 million persons in India are food insecure. These numbers signify some of the worst failures of access to food in India. (Dev, 2003). Should this situation be allowed to prevail – that is the question most analysts in India are currently raising.

The rights based approach is gaining ground largely because of the growing realization that the impressive growth that India accomplished during the post-liberalization period do not seem to have trickled down to some of the poorest segments of the society. Nor did the safety net programs – food-based and others including the public distribution system and workfare programs – seem to be working in a way that can make a dent to the food insecurity problem. At the analytical level Sen's (1989) capability approach provides a link between poverty and rights-based approach to food security. According to Sen, these rights relate to certain fundamental freedoms, especially the freedom from hunger, disease, malnutrition and illiteracy. As Gaiha (2003) points out, in practical terms the right to food translates into food entitlements, that is, enforceable claims on the delivery of food. If food entitlements do become a policy plank, the implementation responsibilities will fall squarely on state governments. Implementation of the food entitlements is certainly a major concern, given that so many other programs in the past (such as guaranteed employment of 100 days – the EAS) have remained only paper and could not be implemented by states.

So far, no legislation has been enacted enforcing the right to food. Surely, future work will focus on the empirical (quantitative) translation of the nature of food entitlements, obligations of various agencies including states and non-governmental agencies, and enforcement modalities. But the very fact that the issue is being seriously debated and analyzed (see Dev 2003, Gaiha 2003 for recent contributions) is a clear recognition of the failure of the access to food in a country that has accomplished so much on the production front.

A recent development has been that the Supreme Court, in response to a public interest petition, directed the government to introduce a noon meal program for school children utilizing the accumulated food stocks. The Supreme Court opined that children have a “right to food”, and it was the responsibility of the government to see that no child goes hungry especially when the nation was awash with stocks of grains. The Government immediately introduced a national school lunch program.

2.4 Response to Droughts and Fluctuations in Production

While the overall supply position has improved, and foodgrain stocks accumulated, it did not prevent the occurrence of weather-induced shocks in production. Notwithstanding the green revolution, drought and floods continued to plague throughout early 1980s, culminating in a very serious drought in 1987 undermining the country’s VII Plan. The failure of the 1987 monsoon was the fourth in a row, and provoked the most serious drought (known as the “drought of the century”). Though foodgrain output (rice, wheat, pulses, coarse grains and pulses) dropped by about 10 percent, the losses were fewer than in earlier droughts mainly because of increased area under irrigation. Unlike in previous drought years, there was a strong recovery in 1988 with output returning to above normal.

What is interesting in the post-green revolution period is that notwithstanding several disappointing agricultural years in a row, it did not undermine India’s overall economic growth rate, though some declines in agriculture-dependent industries did occur. The major impacts of 1987 drought have been (a) inflation which increased by more than 10 percent in 1987-88; (b) aggravation of the budget deficit which had risen by more than 8 percent of GDP; and (c) balance of payments deficits leading to a drop in foreign exchange reserves in 1987-88 for the first time since 1980-81.

A significant difference in the causes of drought and consequences of drought in the pre- and post-green revolution periods is worth stressing. In the pre-green revolution period was the result of “pure weather” effect, output fluctuating almost proportionately to deficits in rainfall. By contrast, the instability in agricultural production in the post-green revolution period *has increased* on account of rise in the sensitivity of output to variations in rainfall. “This rising vulnerability of agricultural output, especially foodgrains output, to droughts is traceable to the high complementarity of new seed-fertilizer technology with water and the inadequate expansion of irrigation facilities.” (Rao, Subbarao, and Ray, 1988) Although the area under irrigation increased from about 17 percent of cultivated area in early 1950s to around 30 per cent by late 1980s, a good part of this irrigation is itself dependent on rainfall. In this sense the uncertainty in irrigation has been increasing in the post-1980 period.

Moreover, the severity of successive droughts in the post-1980 period has increased also due to deforestation. This is largely because of the rural-urban divide and inequity: While the country was in a good position to meet the growing requirements of urban areas even in years of serious droughts, the minimum requirements of the rural poor especially in the less-developed and less-endowed regions could not be met. The rural poor in these regions typically resort to coping strategies that eventually lead to over-grazing and deforestation. Serious shortages of

fuel wood and fodder caused great hardship to rural women and children the green revolution notwithstanding.

Large regional disparities in access to food and in the incidence of poverty seem to suggest that sometimes the goal of national food security could come in conflict the poverty and hunger alleviation. Some analysts felt that shifting emphasis to rainfed agriculture, for example, might help the poorest regions (and households). But such efforts may be less effective than strengthening irrigated agriculture in improving overall national food security.

The Government of India is also piloting a crop insurance scheme in 100 districts in 16 states. The idea is to manage both price and yield risks due to weather shocks and pests. The scheme will be first restricted to rice and wheat farmers, and will be compulsory for farmers who have availed of crop-loans. This is probably the first major attempt to implement income insurance for poor farmers. If implemented well, this safety net will be first major attempt at ex-ante social protection, in sharp contrast to most policies until now which provided ex-post protection after an adverse weather shock had occurred.

Hazell and Skees (2004) note that to be successful, the policy of insurance should have the following characteristics:

- be affordable and accessible to all kinds of rural people, including the poor;
- protect consumption and debt repayment capacity through compensation for catastrophic income losses;
- be practical to implement, given the limited kinds of data available in most developing countries;
- have a core market-orientation with little or no government subsidies; and
- avoid moral hazard and adverse selection problems that have bedeviled most agricultural insurance programs.

To embody the above features, they propose an area-based index contracts (rather than crop-yield-based contracts) such as regional rainfall insurance that could meet all the above requirements. The essential principle of area-based index insurance is that “contracts are written against specific perils or events (e.g., yield loss, drought, or flood) defined and recorded at a regional level (e.g., at a county or district level in the case of yields, or at a local weather station in the case of insured weather events). In its simplest form, insurance is sold based on the value of protection desired. The insured should be able to select any value of insurance. The premium rate can be quoted as dollars per one hundred dollars of protection. Buyers in the same region would pay the same premium rate. Likewise, once an event has triggered a payment, all buyers in the region would receive the same rate of payment. That rate would be multiplied by the value insured.” (Hazell and Skees, 2004, p.3)

Given that rainfall is accurately measured at the rainfall stations, it would be relatively easy to monitor and quickly decide on who would be eligible for payment and payouts for insurance can be structured in a number of ways. Area-based yield insurance is difficult because such disaggregated yield data are unavailable in most countries, but area-based rainfall index based insurance can be implemented since rainfall information is more widely available at

dispersed locations. Hazell and Skees (2004) note that the attractive features of such an area-based rainfall index based insurance are: less scope for adverse selection, less administrative costs, the potential for a secondary market, potential for sales of contracts to non-farmers, and possibilities of linking insurance to micro finance. Rainfall index based private insurance is now being piloted in Andhra Pradesh, India. Though there is now some documented experience that individuals located in high risk zones do purchase these contracts, future evaluations will show the challenges faced in the implementation of rainfall index based insurance.

2.5 Summary and Conclusions

India has moved a long way from the critical food shortages of the 1950s that triggered massive food aid imports under P.L. 480. Beginning in 1965, which can be considered a watershed in the evolution of public policy towards food security in India, concerted efforts were made to ease the production (supply) side of the food security problem. The new policy mix comprising massive public investments in agro-technology and irrigation, minimum support prices and the setting up of the Agricultural Prices Commission, and subsidies on inputs (fertilizer in particular) ushered in the green revolution and proved hugely successful in terms of raising production by the early 1970s.

At the same time, access question was not forgotten. To ensure access of the poor to food via the public distribution system (PDS), the 1965 public policies included price and market regulations such as compulsory levies and movement restrictions. With the increases in cereal production, the incidence of rural poverty fell. However, millions remained food insecure, and success on the access front was at best partial and disappointing. Indian agricultural sector did show resilience in the face of droughts. The 1987 “drought of the century” did not lead to food imports; instead, the food gap was met entirely from drawdown of government stocks procured domestically in earlier years.

Efforts towards ensuring food security to millions of poor households intensified during the 1990s. Significant progress has been made towards effective targeting of the public distribution system. Workfare programs, including Employment Assurance Program that was intended to guarantee 100 days of work for poor households in rural India, were launched but numerous difficulties were encountered in the administering of these programs including timely financial flows. Food security remained an elusive goal.

In the meantime, the policy mix that brought about a green revolution has increasingly becoming a shackle for future growth of output. India is saddled with the problem, not one of shortage, but one of mounting stocks of foodgrains. The need to off load them has become more of an immediate concern than poverty relief, and off-loading stocks has a fiscal cost.

Thus, the green revolution policy package (restrictions on trade and markets, subsidies, etc) has probably outlived itself. There is an urgent need for moves towards to an alternative more efficient policy mix freeing prices and markets and reducing subsidies (Gulati and Rao) but such moves are proving extremely difficult largely because of entrenched lobbies and political economy. Second, given significant moves towards decentralization, there are bound to be

significant differences across states for the willingness and speed in the moves towards efficiency. Future progress will depend on the boldness and creativity of state-driven reforms in major fiscal, regulatory and institutional aspects of both agricultural policy and social protection.

In all likelihood the liberalized market environment will continue, alongside a regulatory framework that fosters competition between various actors. However, there is no doubt that moving forward on the reform of foodgrain policies with respect to minimum support prices, buffer stocks, subsidies on power and fertilizer, and public distribution system is complicated by complex economic, social and political concerns. The major reform hurdle relates to rationalizing input subsidies on fertilizer, irrigation and power. Investments in these inputs are critical for further improvements in farm productivity. However, rationalizing their pricing structures and the institutions of delivery is also critical from the viewpoint of fiscal sustainability of reforms.

Finally, the failure to provide for food security for millions of households despite the availability of foodgrain stocks exceeding 50 million has renewed much debate on the role of “Right to Food” as a human right. A new law, Employment Guarantee Act, has been passed to provide guaranteed employment for 100 days at minimum wage for persons below the poverty line; implementation modalities are being worked out. Other initiatives such as pensions for the elderly and widows are already in place. Thus, efforts for guaranteeing food security are largely being floated via safety net programs.

While the emphasis on reformed, better targeted and expanded safety net is welcome, efforts at enhancing opportunities for the poor to participate in the growth process needs to be strengthened. That would require a serious re-thinking of the outmoded policy framework. For example, the employment elasticity has been steeply declining in the irrigated green-revolution belt in the recent period suggesting that heavy input subsidies have led to the substitution of capital for labor. While input subsidies have undoubtedly contributed to the widespread use of new technology since the 1970s and facilitated the ushering of the Green Revolution, and also benefited the consumers by bringing down the relative price of staple food, “the subsidies have reached a point where their beneficial effects seem to be outweighed by the adverse effects in terms of macroeconomic imbalances, slowing down of investment in agriculture, inefficiency use of resources at the farm level and degradation of the environment, and reduction in employment.” (Rao (1994), p.235)

Likewise India’s trade policy has been slow in adjusting to the new realities. Restrictions on exports have been imposed from time to time to protect the interests of domestic industry as well as consumers. Government intervention in trade does seem to have led to inefficiencies. There is indeed a case for lowering the protection currently offered to edible oils encouraging greater quantities of imports. Part of the problem is created by the spill-over effects of pervasive input subsidies. As argued by Rao (1994), if input subsidies are brought down, there would be some diversion of resources from water-intensive and fertilizer-intensive crops to semi-irrigated crops with a consequent change in the relative prices of crops. This would narrow down the difference between the international and domestic prices of cereals as well as oilseeds. Thus a good part of the “distortions” attributed to restrictions on trade are indeed the result of domestic distortions in the allocation of resources arising from heavy subsidies on inputs. That also

explains the “food mountain” problem: heavy input subsidies and technological change coupled with farm price support policies have led to heavy accumulation of foodgrain stocks with the government, and the internal carry-over costs have increased, while at the same time the hard core poor continued to suffer from food insecurity.

Thus, resolving India’s current food insecurity problem would entail significant policy changes not just on the safety net policy front, but on the broader arena of input subsidies and trade policy, in combination with policies to promote labor-demanding rural farm and non-farm growth.

3. FOOD AID AND FOOD SECURITY IN BANGLADESH

3.1 Introduction

For Bangladesh, which experienced widespread food shortages at independence in 1971, food security assumes such importance that the government's commitment to food security is enshrined in the constitution. Central to its efforts to achieve food security at a national level, Bangladesh adopted policies designed to increase rice production with the objective of reaching rice self-sufficiency. The government has actively promoted adoption of invested in agricultural research and development, irrigation and rural road infrastructure, liberalized private sector imports of pumps for tubewell irrigation in the late 1980s, and managed food aid inflows and government commercial imports so as to avoid price disincentive effects on domestic production. These policies have proven successful in raising production, and Bangladesh net foodgrain production exceeded the target level of 454 grams/person/day for the first time in 1999/2000 and then again in 2000/2001, with only small volumes of rice imports.

However, food insecurity at the household level remains widespread in rural areas, with about half of the population with incomes below a calorie-based poverty line. A central part of the safety net for these poor households is the Bangladesh Public Foodgrain Distribution System (PFDS), which accounted for 5-10 percent of total rice and wheat consumption in the country throughout most of the 1980 to 2000 period. Food aid (mainly wheat) has been a major source of grain for the PFDS, accounting for about 600 thousand tons per year from the mid-1990s to 2000, about one-third of total distribution. More recently, food aid flows have declined sharply, as Bangladesh domestic production has increased and donors have shifted food aid resources to other countries.

In spite of the large gains in production and decline in food aid inflows, though, foodgrain imports continue to play an important role in stabilizing market supplies, particularly following major production shortfalls, typically caused by massive floods that struck the country in 1988, 1998, and to a lesser extent, in 2004. From the 1970s to the late 1990s, food aid and government commercial imports helped meet chronic shortages in availability. Rice and wheat imports, largely by the private sector, now contribute to food security mainly by stabilizing prices after major production shortfalls.

This chapter examines the policies and programs Bangladesh adopted to achieve its success in raising production, even while receiving significant amounts of food aid. It also describes how the country improved its targeting of food aid and other government foodgrain distribution to poor households. Finally, the chapter chronicles how Bangladesh successfully handled a major production shortfall following the massive 1998 floods through a combination of market-stabilizing private import flows, well-targeted government distribution and private sector coping strategies (including substantial borrowing through the informal sector).

Box 3.1: Chronology of Key Events related to Bangladesh Food Security

1943	Great Bengal famine
1947	Pakistan independence from Britain
1971	Civil war and independence from Pakistan
1974	Production shortfall and famine leading to estimated 30,000 to 100,000 deaths ⁸
1988	Liberalization of imports of pumps contributing to large increase in dry (boro) season rice cultivation
1988	Massive floods; production shortfall met with government imports and stock drawdown
1991-93	Liberalization of private sector imports of foodgrains; elimination of ration shop public distribution channels
1998	“Flood of the Century”; rice markets stabilized through large scale private sector imports from India
2000-01	Foodgrain production self-sufficiency targets met for first time; food aid imports reduced

3.2 Production, Trade and Availability

Bangladesh has achieved considerable success in increasing rice and wheat production since independence in 1971. Most of the country (apart from hill areas along the northern, northeastern and southeastern borders, and occasional small terraces) is a flat alluvial plain well-suited to cultivating rice (Hossain, 1991). Traditionally, the main rice crop in Bangladesh was the *aman* monsoon season (August-December) crop⁹, which depended almost entirely on rainfall and regular seasonal flooding of rivers and streams. Substantial increases in rice production in the 1980s and 1990s, however, were mainly due to increases in production of the winter season (January-May) rice crop (*boro*).

Prior to the mid-1980s the boro harvest in Bangladesh was relatively small, only about 15 percent of rice production over the 1973-80 period (Table 3.1). Following the liberalization of imports of diesel engines and pumps for tubewell irrigation in 1988 and expansion in fertilizer and planting of high yielding varieties of rice (HYV's), though, area planted to boro increased sharply (Ahmed 2000). Over the 1981-90 period, boro area increased by an average of 7.5 percent per year, replacing the lower yielding *aus* rice crop (April-August) in many areas.

⁸ See del Ninno et. al, 2001, IFPRI research report, p.37.

⁹ The dates of planting and harvest of the *aman* and other rice crops given in this section are indicative; actual dates vary slightly across Bangladesh.

Wheat production also increased rapidly from an average of about 100 thousand tons per year from 1969/70 to 1974/75, to an average of more than 1.8 million tons per year from 1997/98 through 1999/2000, due to a seven-fold expansion in area and a doubling of wheat yields.¹⁰ Wheat production growth was especially rapid in the 1970s, increasing by an average of 37 percent per year, as area increased by 19 percent per year and yields rose by 15 percent per year.

Table 3.1: Bangladesh: Area, Yield and Production of Rice and Wheat, 1973-2004

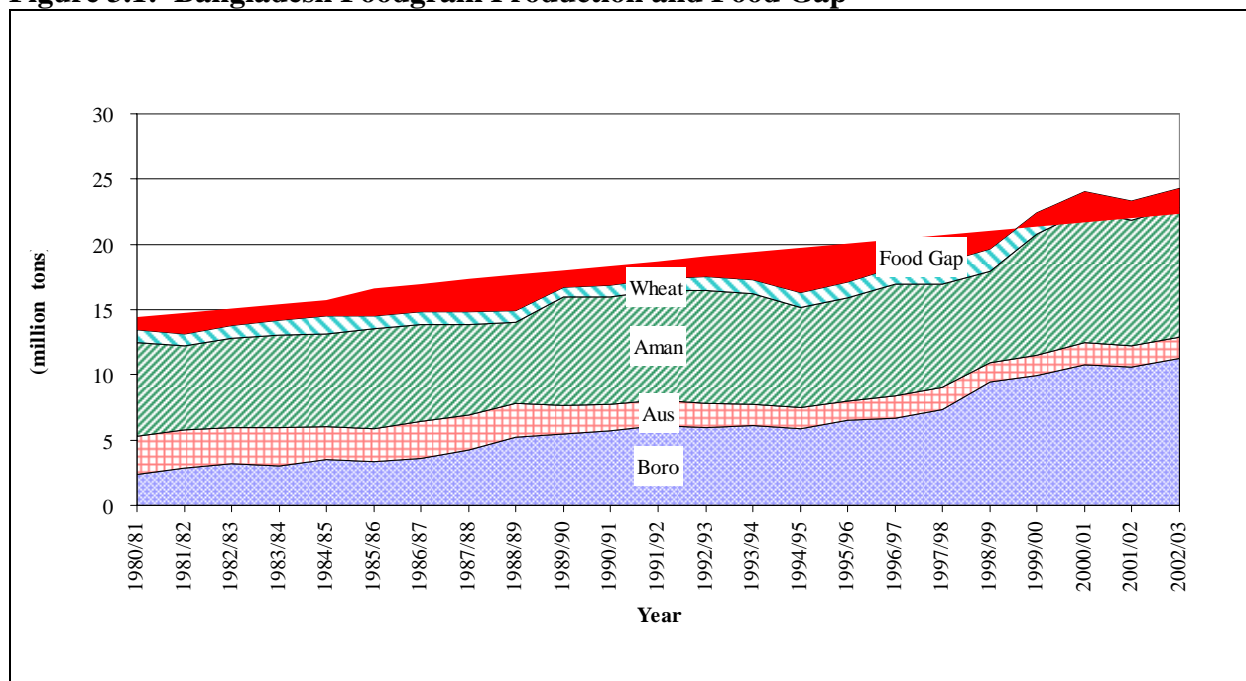
	Annual Average			Growth Rates			
	1973-80	1981-90	1991-2004	1973-80	1981-90	1991-2004	1981-2004
Aman							
Production	7113	7920	9706	2.99	1.03	1.69	1.64
Area	6305	6437	6229	0.68	-0.67	-0.19	-0.29
Yield	1.13	1.23	1.56	2.30	1.71	1.88	1.93
Aus							
Production	3049	2992	1886	2.88	-1.33	-1.35	-3.01
Area	3466	3186	1692	0.44	-2.34	-3.77	-4.59
Yield	0.88	0.94	1.12	2.42	1.03	2.51	1.66
Boro							
Production	2163	4100	9028	-0.02	8.81	6.53	6.96
Area	1167	1826	3434	0.84	7.51	4.00	5.46
Yield	1.85	2.25	2.63	-0.85	1.21	2.43	1.43
Total Rice							
Production	12325	15011	20620	2.44	2.63	3.44	2.78
Area	10937	11450	11355	0.62	0.18	0.51	0.07
Yield	1.13	1.31	1.82	1.81	2.44	2.91	2.71
Wheat							
Production	310	1092	1431	36.99	0.15	3.44	2.30
Area	213	627	777	19.18	1.78	2.12	1.92
Yield	1.45	1.74	1.84	14.95	-1.60	1.30	0.38
Total							
Production	12635	16103	22051	3.16	2.48	3.45	2.75
Area	11150	12077	12132	0.98	0.26	0.61	0.17
Yield	1.13	1.33	1.82	2.15	2.22	2.82	2.57

Source: Authors' calculations from BBS data.

¹⁰ These changes in cropping patterns resulting from an increase in minor irrigation and availability of modern varieties have reduced the susceptibility of Bangladesh agriculture to floods by 1) leading to a reduction in deepwater (broadcast) aman rice, grown on flood-prone land during the monsoon season; and 2) greatly increased the quantity of rice produced within five to six months of any damaged monsoon season rice harvest (Hossain, Bose and Chowdhury, 2001; del Ninno, Dorosh, Smith and Roy, 2001; Chowdhury and Haggblade, 2000).

Over the 1981-2004 period, rice and wheat production increased by an average of 2.8 and 2.3 percent per year, respectively, outpacing population growth of about 1.9 percent per year. By 1999/2000, these increases in production per capita eliminated the so-called “food gap”, calculated as the difference between the amount of foodgrain required to meet the consumption target of 454 grams of foodgrain per person per day and net domestic production, weakening the case for large food aid flows (Figure 3.1).

Figure 3.1: Bangladesh Foodgrain Production and Food Gap



Source: Dorosh, del Ninno and Shahabuddin (2004).

International Trade in Rice and Wheat

Prior to trade liberalization in the early 1990s, the Government of Bangladesh maintained a monopoly on food imports. Rice imports derived almost solely through government commercial imports; food aid accounted for most of wheat imports. Since the liberalization of trade in the early 1990s, private sector imports of rice have varied depending on domestic and international market conditions, while private sector wheat imports have grown steadily over the past decade due to continuing increases in domestic demand for wheat products.

Until 1999/2000, Bangladesh had been a consistent net importer of rice since independence, though substantial increases in rice production reduced net imports over time. In the 1980s, rice imports, (exclusively by the public sector) averaged 267 thousand tons per year (Table 3.2). During the 1990s, rice imports by the public sector were less than half this total (only 131 thousand tons per year), though total rice imports (including private sector imports) rose to 672 thousand tons per year in the 1990s and 748 thousand tons per year from 2000/01 to 2002/03. Wheat imports, have been significantly larger, averaging 1.6 million tons per year in the 1980s and 1.4 million tons per year in the 1990s and the early 21st century.

Table 3.2: Bangladesh Foodgrain Trade, 1980/81 - 2002/03

Year	Food Aid			Public Commercial			Total Public			Private Imports			Total Imports		
	Rice	Wheat	Total	Rice	Wheat	Total	Rice	Wheat	Total	Rice	Wheat	Total	Rice	Wheat	Total
1990/91	11	1530	1541	0	37	37	11	1566	1577	0	0	0	11	1566	1577
1991/92	39	1374	1414	0	150	150	39	1524	1564	0	0	0	39	1524	1564
1992/93	20	717	736	0	93	93	20	810	830	0	355	355	20	1165	1185
1993/94	0	654	654	0	0	0	0	654	654	74	238	312	74	892	966
1994/95	0	935	935	230	390	620	230	1325	1555	584	430	1014	814	1754	2569
1995/96	1	743	743	490	351	841	491	1093	1584	650	200	850	1141	1293	2434
1996/97	10	608	618	9	103	112	19	712	730	15	222	237	34	934	967
1997/98	0	549	549	92	156	249	92	706	798	993	142	1135	1085	848	1933
1998/99	60	1175	1236	348	429	777	408	1604	2013	2660	820	3480	3068	2424	5492
1999/00	5	865	870	0	0	0	5	865	870	428	806	1234	433	1671	2104
2000/01	32	447	479	0	0	0	32	447	479	529	534	1063	561	981	1542
2001/02	8	501	509	0	0	0	8	501	509	118	1171	1289	126	1672	1798
2002/03	4	238	242	0	0	0	4	238	242	1553	1414	2967	1557	1652	3209
Averages:															
1980/81- 89/90	83	1145	1228	184	427	610	267	1571	1838	0	0	0	267	1571	1838
1990/91-99/2000	15	915	930	117	171	288	131	1086	1217	540	321	862	672	1407	2079
2000/01-02/03	15	395	410	0	0	0	15	395	410	733	1040	1773	748	1435	2183

Source: Food Planning and Monitoring Unit, Bangladesh Ministry of Food.

Throughout the 1980s and early 1990s, Thailand was the major source of Bangladesh rice imports. However, the 1994 liberalization that permitted private sector imports coincided with India's rice trade liberalization and build-up of public rice stocks, dramatically changing the rice import trade. India, which enjoys the advantages of lower transport costs, reduced time of delivery (for private sector imports) and the possibility of smaller import contracts delivered by truck, quickly replaced Thailand as the major source of imports of Bangladesh. Over 90 percent of Bangladesh rice imports have come from India in most recent years. For example, in 1996/97 and 1997/98, 91.6 percent of Bangladesh rice imports came from India, with the next largest import sources, Pakistan, Vietnam and Thailand, each accounting for only 1-3 percent of the trade (BBS, various years).¹¹

Food Aid

Food aid imports from the US, Australia, Canada, the EU and other donors averaged 1.2 million tons per year in the 1980s, accounting for 73 percent of wheat imports in the decade. (The remainder of wheat import trade came through commercial channels, mainly from the same countries.) These food aid flows were large in macro-economic terms, as well. During the first five years of the decade, food aid averaged 18.3 billion (2000) taka in real terms, equal to 22.1 percent of total aid, 11.6 percent of government expenditures, and 10.9 percent of total imports.

Food aid flows declined in the 1990s as total domestic production of rice and wheat increased. Normal food aid flows during the late 1990s were only about 600,000 tons per year. Food aid flows declined even further in 2002/03 to 242 thousand tons due mainly to the European Union's decision to phase out food aid to Bangladesh and reduction in US food aid. (Figure 3.2). Moreover, the decline in food aid volumes and the growth in Bangladesh import trade (made possible by increases in textile exports and workers' remittances) and the overall economy, reduced the share of food aid in government expenditures and total imports to only 1.7 and 1.3 percent, respectively.

In the peak years of food distribution and food aid, from 1986/87 through 1991/92, food aid averaged 1.4 million tons per year and accounted for nearly 60 percent of average total public distribution of 2.4 million tons. By the late 1990s, food aid accounted for only about one-third of total PFDS distribution of about 1.8 million tons per year. Distribution of grain from non-food aid resources (government of Bangladesh-own resources) rose to about 1.2 million tons per year, up by about 200,000 tons from the late 1980s. In 2002/03, food aid shrunk to only 242 thousand tons, only 17 percent of total distribution of 1.423 million tons.

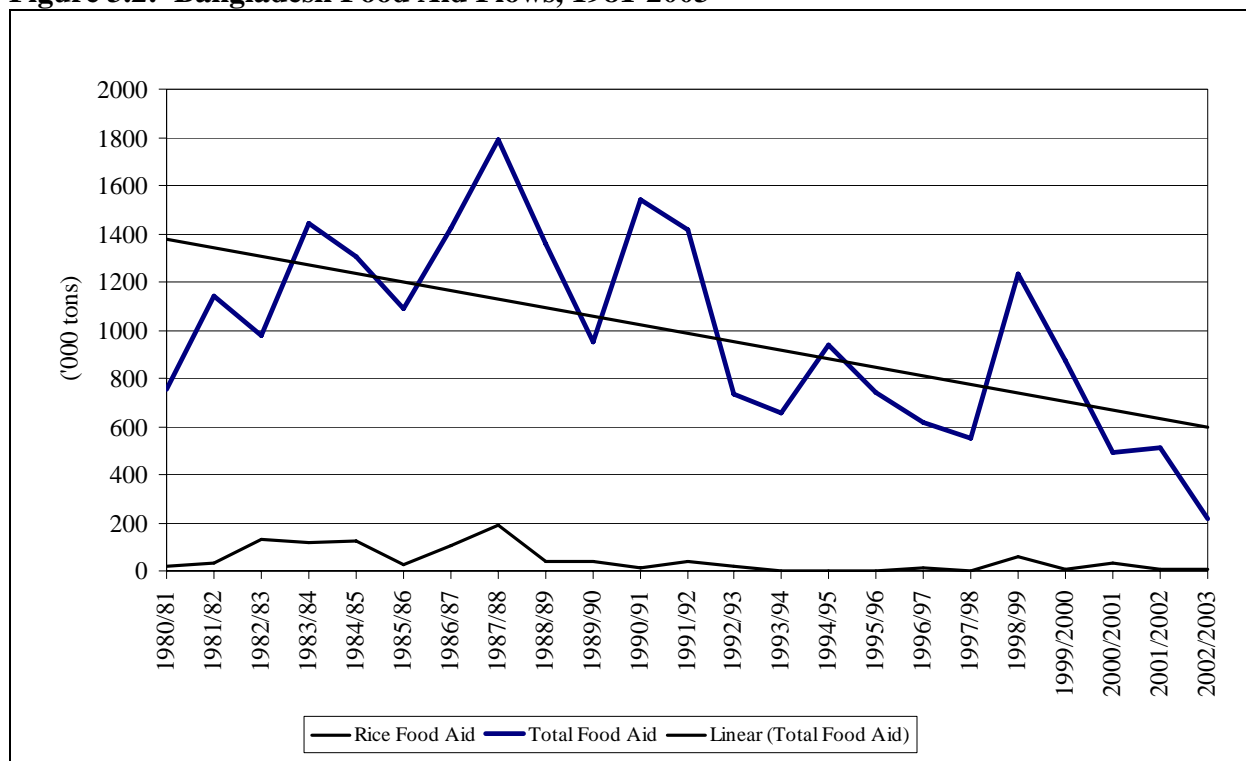
The new technology that permitted increased rice (and wheat) production benefited farmers who increased their foodgrain production significantly. Consumers also benefited, as increased domestic production contributed to a long-term decline in real rice prices (i.e. rice prices adjusted for overall inflation) from the late 1970s to the early 1990s.¹² Since that time,

¹¹ Other factors contributed to India's increase in rice exports, including a 27 depreciation of the rupee in real terms. See Dorosh, (2001).

¹² Farmers unable to adopt the new technology because of lack of irrigation, appropriate drainage or other constraints, particularly in southern and northeast Bangladesh, however, may have experienced declines in real incomes as real rice prices fell. See Ahmed (2001).

real rice prices on average remained approximately at a constant level since the early 1990s, though with substantial fluctuations (Figure 3.3).

Figure 3.2: Bangladesh Food Aid Flows, 1981-2003



Source: Bangladesh Food Planning and Monitoring Unit (FPUM); Dorosh (2004).

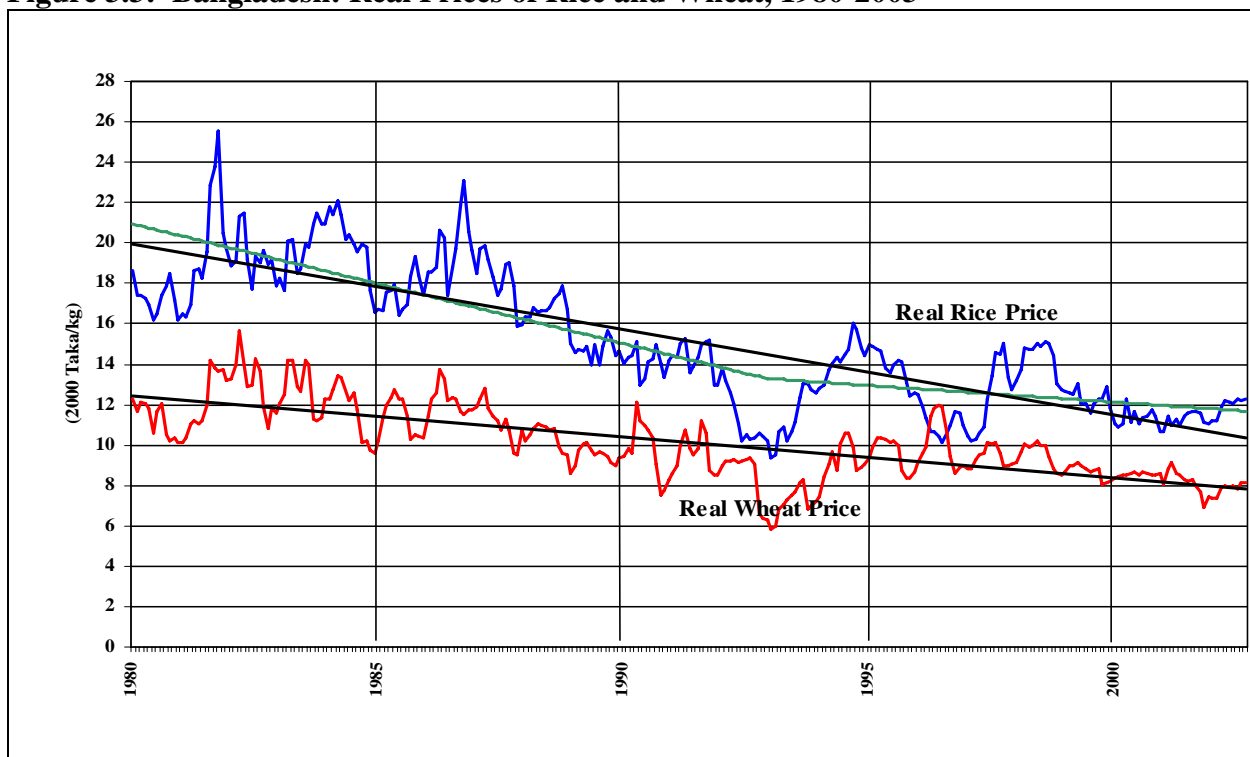
Disincentive Effects of Food Aid

Imports enhance national food security by adding to total supply, benefiting consumers by helping to lowering consumer prices. These benefits to consumers come at a cost to producers in terms of lower farmgate prices and reduced incomes, however. In years of major production shortfalls, the benefits to consumers of avoiding an excessive price increase may outweigh lost incomes to farmers in terms of overall welfare of the society. However, low-cost imports (either food aid or commercial imports) in years of normal harvests diminish incentives for domestic production, resulting in lower farmer incomes and potentially, slower economic growth.

Until 2001, the evidence suggests that food aid did not have significant price disincentive effects for domestic producers in Bangladesh in almost all years. Effects on rice production were minimal, since food aid was mainly in the form of wheat, not a traditional staple in Bangladesh and volumes of food aid wheat imports were small relative to total rice availability (generally on the order of about 5 percent). Moreover, even adverse effects of food aid on domestic wheat

production were minimized.¹³ Comparisons of domestic prices with import parity prices show that Bangladesh domestic prices for wheat closely tracked import parity prices (estimated costs of imported grain, including transport and trade margins to domestic markets) in the late 1990s, a period of large-scale private sector imports (Figure 3.4). For example, in 1999/2000, the private sector imported 806 thousand tons of wheat. In addition, public net distribution (total distribution less domestic procurement) added 813 thousand tons of wheat to domestic supplies. Thus, a total of 1.619 million tons of wheat were supplied to domestic markets through private imports and the PFDS in that year. Given that domestic prices remained close to estimated import parity prices for most of the year, and perhaps more important, that large amounts of wheat were imported by the private sector, it appears that food aid did not lead to price disincentive effects for Bangladesh wheat farmers in 1999/2000. By late 2000, private market imports slowed considerably, suggesting that private imports of non-milling wheat may not have been profitable.

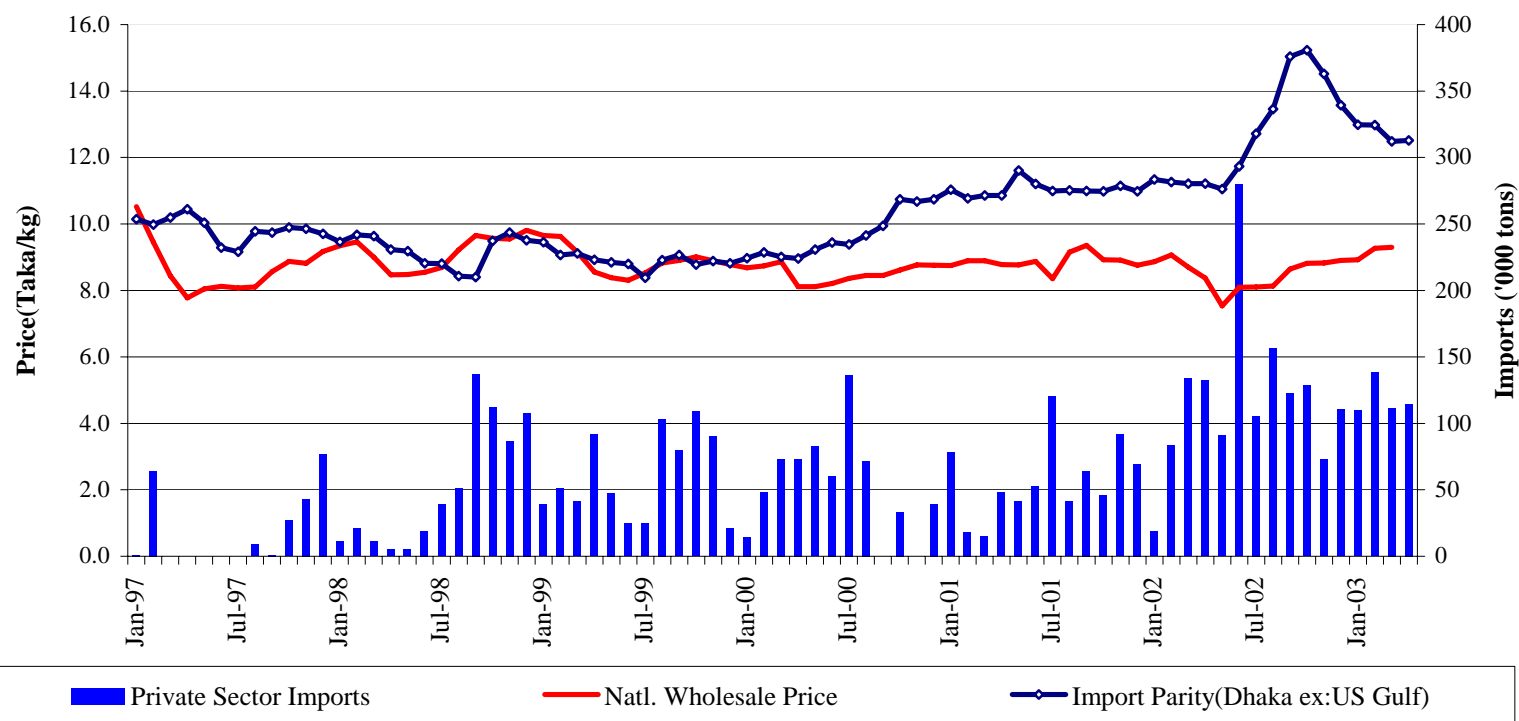
Figure 3.3: Bangladesh: Real Prices of Rice and Wheat, 1980-2003



Note: Prices are deflated using the non-food Dhaka middle-income Cost of Living Index (and the national CPI after June 1998).
Source: FPMU data and author's calculation.

¹³ After liberalization of wheat trade in the early 1990s, food aid did in effect, substitute for commercial imports of wheat, though donors (e.g. in the Bellmann analysis conducted by the U.S. Agency for International Development) and the government argued the case for food aid on the basis of inadequate domestic production of foodgrains to meet notional food available targets (i.e. to help fill the “food gap”) and widespread poverty in Bangladesh.

Figure 3.4: Wheat Prices and Private Imports in Bangladesh, 1997-2003



Note : . Private import quantity data is smoothed to adjust for reporting problems in April 1998, June 1999, and March 2000.

Source : Food Planning and Monitoring Unit, Bangladesh Ministry of Food; Dorosh (2000).

Analysis of the effects of food aid flows using a simple model of Bangladesh wheat markets indicates that food aid flows of the magnitudes of the mid-1990s would likely cause price disincentive effects on domestic wheat production in years of good rice harvests (del Ninno and Dorosh, 2003). This disincentive effect of food aid depends critically on the level of world prices of wheat, and the size of rice harvests (which influence domestic rice prices and both rice and wheat demand). Wheat food aid in 2001/02 (502 thousand tons) was close to the level at which price disincentive effects would occur if international wheat prices returned to medium-term levels of \$194/ton.¹⁴ Food aid was cut back substantially in 2002/03, however, to only 238 thousand tons, easing concerns about disincentive effects. Nonetheless, the analysis shows that price disincentive effects on domestic wheat production on the order of 10 to 20 percent may occur in the future if food aid flows return to their earlier levels in years of normal rice harvests.

Implications of Low Import Prices in International Markets

Reductions in food aid in 2002/03 have helped avoid adverse effects on producer prices of wheat in Bangladesh. However, low prices in world markets, in particular, low prices of subsidized rice and wheat exports by India, also pose a threat to farm incomes in Bangladesh. In spite of good harvests and low prices in Bangladesh, imports of Indian foodgrain from their national stocks were potentially profitable, provided the quality of the foodgrain was approximately equivalent to Bangladesh market standards.¹⁵ Thus, the same private sector import trade that so greatly benefited consumers in 1998/99 posed a threat to medium term food security in 2001 by potentially reducing already low producer prices in a year of good rice harvests. In order to protect Bangladesh producers, the government of Bangladesh raised import tariffs on rice from 5 percent to 37.5 percent (43 percent, including advanced income taxes and license fees) in August 2001. This policy was successful in that private sector rice imports since the import tariff increase essentially ceased for the rest of 2001, and were only 118 thousand tons in 2001/02. Rice imports again increased sharply in 2002/03 to 1.553 million tons, in part due to lower transport costs in Bangladesh that reduced the cost of imported rice in Dhaka.¹⁶

Export promotion efforts by India also had a large effect on the private sector wheat trade in Bangladesh, as India replaced traditional suppliers of imported wheat. None of the 534 thousand tons of wheat imported by the private sector in Bangladesh came across land borders with India in 2000/01. In the two subsequent years, however, wheat imports from India across land borders surged to 927 thousand tons in 2001/02 and over 1 million tons in 2002/03, equivalent to 80 percent of total wheat imports.

As a least developed country, Bangladesh is not prevented under the WTO from increasing tariff rates in order to protect domestic producers in periods of low international prices or in the face of subsidized exports. Nonetheless, there is a danger that this temporary measure could become a permanent policy leading to major distortions in Bangladesh agriculture even

¹⁴ Note that by June 2003, international wheat prices were only \$180 c&f Chittagong.

¹⁵ India was thus, in effect, dumping its aging rice and wheat stocks, a policy that would have benefited Bangladesh consumers to the detriment of Bangladesh producers.

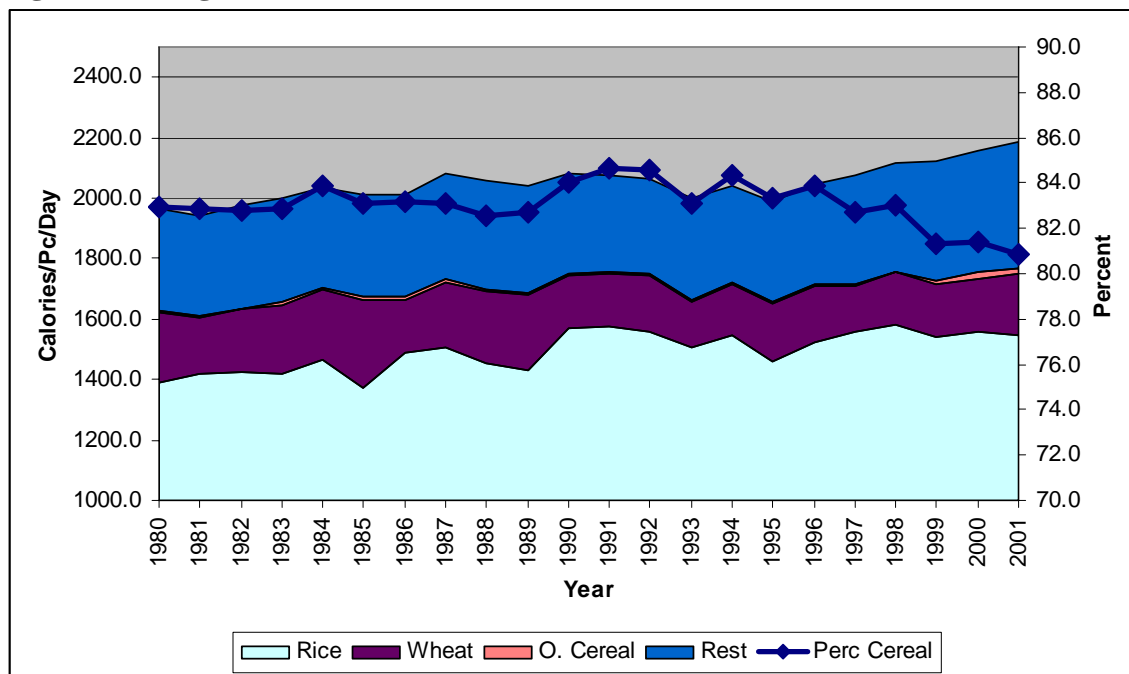
¹⁶ The large scale of rice imports in 2002/03 are somewhat of a puzzle, since despite anecdotal reports of a production shortfall, official estimates of the aman season rice crop of 11.12 million tons were 390 thousand tons greater than in 2001/02. As in 1998/99, it is possible that production and import trade have been overstated.

after rice import prices return to more normal levels. Continued increases in rice productivity in Bangladesh could avoid this scenario of a protected and inefficient rice sector, however, and even enable the country to compete on export markets. Small-scale private sector exports of coarse rice would have been profitable in recent years of good harvests if marketing channels were established and import barriers were removed.¹⁷

3.3 Food Consumption and Safety Nets

The sustained increase in rice production and the expansion of rice markets have enabled Bangladesh to maintain and even increase per capita consumption despite continued population growth and minimal external trade in years of normal harvests. Total caloric consumption thus increased from 1,965 to 2,187 calories per person per day between 1980 and 2001. This increase has been mostly due to the increase in consumption of rice from 1980 to 1990 and thereafter due to increased consumption of non-cereals. Overall, the total percentage of calories from cereals declined from 84 percent in 1996 to 81 percent in 2001.¹⁸

Figure 3: Bangladesh: Calories from Cereals and Other Sources, 1970-2001



Source: Calculated from FAOSTAT data.

¹⁷ Simulations of rice productivity gains using a computable general equilibrium model suggest that a rice export outlet could prevent a large decline in real prices and incomes of small farmers (Arndt et. al., 2002).

¹⁸ Estimates of national rice consumption of foodgrain over time as derived from production estimates were generally about 15 percent below consumption reported in national household surveys from the mid-1980s to the mid-1990s. By contrast, wheat consumption appears to be under-reported in the 2000 national household survey by about 50 due mainly to consumption wheat in the form of processed baked goods. See Dorosh et. al. (2004b) (book chapter 2).

Rice dominates the diet of both urban and rural households, though there are important differences with respect to expenditure patterns (Tables 3.3 and 3.4). Consumption of rice is higher in rural areas than in urban areas (482 and 384 grams per capita, respectively). Similarly, rice accounts for 42 percent of total food expenditure in rural areas and only 29 percent in urban areas (and only 17 percent for the richest 20 percent of urban households).

Wheat and other cereals account for 6 percent of cereal consumption. It has long been argued that wheat is an inferior commodity in Bangladesh, while other grains (such as bread, biscuits, and pasta) may well be considered normal or luxury commodities. Unfortunately, detailed data on wheat is not available, and the aggregate data on other cereals shows that consumption increases with the level of income in urban areas from 21 to 74 grams per capita per day and from 11 to 46 in rural areas.

Given the low levels of total calorie consumption and often poor sanitary conditions, particularly for the poor, the level of malnutrition in Bangladesh is quite high: 49 percent of all children are stunted (low height for age) and 12 percent are wasted (low weight for height) (World Bank 2002). Poor nutrition takes a devastating toll on children and women—through hunger, sickness, and loss of life (for instance, the under-five mortality rate is 102 and the maternal mortality rate is 4.3 per 1,000 live births). Low birth-weight incidence is estimated at 30–50 percent and micronutrient deficiencies are rampant (more than 70 percent of pregnant women are anemic). About 75 percent of a child's life is spent ill due to infections. Low birth weight and poorly nourished children have reduced resistance to common infections. They find it difficult to recover from even common illnesses because of deficient immune systems. Roughly two-third of deaths among children under five are attributed to malnutrition. About one-fourth of maternal deaths are associated with anemia and hemorrhage (World Bank 1998).

In addition to loss of lives, a heavy loss in work output is associated with malnutrition. The economic consequences of Bangladesh's malnutrition problem are profound, resulting in loss of productivity and reduced intellectual and learning capacity. These losses are difficult to quantify, though the most visible cost is in the drain on health service budgets.

High consumption of cereals but low consumption levels of edible oils, vegetables, and fish result in a low level of absorption of micronutrients and a high level of anemia and other deficiencies (Yusuf 1997). In the case of anemia, for example, an average woman of 55 kilograms has 50 percent probability of developing iron deficiency if she consumes less than 25 milligrams, and 25 percent probability if she consumes less than 32 milligrams per day (Bouis et al. 1998). Since the average intake is between 24 and 30 milligrams per day, it is not surprising that between 31 and 62 percent of all non-pregnant women are anemic.

**Table 3.3: Bangladesh: Per Capita Food Consumption by Expenditure Quintile, 2000
(Grams per person per day)**

	Expenditure Quintile					Total
	1	2	3	4	5	
Rice						
Urban	364.02	411.03	403.43	384.10	355.79	383.68
Rural	392.03	462.83	487.29	519.34	546.65	481.63
Total	386.36	452.31	470.29	491.96	507.93	461.78
Other Cereals						
Urban	21.22	32.45	44.03	54.47	74.41	45.33
Rural	11.38	13.99	21.02	28.88	45.73	24.20
Total	13.37	17.74	25.69	34.06	51.55	28.48

Source: Calculated from BBS, Household Income and Expenditure Survey 2000 data.

**Table 3.4: Bangladesh: Household Budget Shares by Expenditure Quintile, 2000
(percent)**

	Expenditure Quintile					Total
	1	2	3	4	5	
Rice						
Urban	43.27	34.66	27.68	22.45	16.89	28.98
Rural	53.25	47.49	42.14	37.54	28.95	41.87
Total	51.23	44.89	39.21	34.49	26.50	39.26
Other Grains						
Urban	2.95	3.64	4.36	4.41	4.51	3.98
Rural	1.98	2.07	2.54	3.05	3.88	2.71
Total	2.18	2.39	2.91	3.32	4.01	2.96
All Grains						
Urban	46.22	38.30	32.04	26.86	21.40	32.96
Rural	55.23	49.56	44.68	40.59	32.83	44.58
Total	53.41	47.28	42.12	37.81	30.51	42.22
All Food						
Urban	64.06	60.22	55.83	49.12	36.45	53.13
Rural	69.05	67.53	64.88	61.56	53.93	63.39
Total	68.04	66.04	63.04	59.04	50.38	61.31
Per Capita Expenditure						
Urban	504.13	767.85	1069.85	1525.76	3174.33	1408.96
Rural	376.86	516.96	647.38	832.93	1453.14	765.49
Total	402.62	567.88	733.01	973.21	1802.32	895.90

Source: Calculated from BBS, Household Income and Expenditure Survey 2000 data.

Government Food Policy Interventions

In addition to investments in research and extension, input subsidies and credit programs, through the Ministry of Agriculture, Government of Bangladesh food policy has also included market interventions and distribution programs related to the Public Food Distribution System (PFDS), administered by the Ministry of Food. PFDS operations involving producer price support through government domestic procurement, consumer subsidies through public distribution, market price stabilization, and emergency relief all affect producer incentives and trade flows.

Foodgrain for the public food distribution system in Bangladesh is procured either through domestic purchases at a fixed procurement price, international commercial tenders or through food aid.¹⁹ Unlike in India before its reforms in the mid-1990s where state governments or the Food Corporation of India operated through monopoly procurement and levies on rice millers, domestic procurement in Bangladesh consists of voluntary sales by producers and millers.²⁰ Moreover, the procurement price is not a floor price or minimum support price, since the government is not committed to procure all grain offered for sale at that price. Rather, the volume of domestic procurement is effectively quantity, not price, considerations: the distribution and stock needs for the PFDS, which in turn are influenced by budget constraints and storage capacity. As production gains have led to greater marketed surplus, (from about 3 million tons in the 1970s to 14 million tons in 2000), the share of government distribution in total rice marketed in total marketed foodgrain has declined, 15 percent in the 1970s to only 5 percent in 2000 (Table 3.5).

Since major reforms in the early 1990s, almost all grain distributed through the PFDS has been through non-sales channels (targeted programs such as Food For Work or Food For Education²¹ instead of through subsidized sales of grain. Prior to these reforms, an average of 612 thousand tons of rice and wheat were sold per year through the Rural Rationing and the urban Statutory Rationing channels, 26.7 percent of total foodgrain distribution (which averaged 2.294 million tons).²² Total sales channels, including open market sales and other programs, accounted for 63.5 percent of distribution, with relief and food-for-work channels accounting for the other 36.5 percent of distribution in these years (Dorosh, 2001).

Reforms in 1991/92 and 1992/93 closed the Rural Rationing and Statutory Rationing channels, in an effort to improve the targeting of foodgrain distribution, as well as to reduce fiscal costs (Ahmed, Haggblade and Chowdhury, 2000).²³ As a result, both the percentage and total amount of foodgrain distributed through targeted and relief channels increased in the mid-to late-1990s, averaging 1.166 million tons per year from 1995/96 to 1997/98, 72.8 percent of the 1.603 million ton total annual average distribution during these three years.

¹⁹ Local tenders have also been used in recent years, particularly when fixed-price procurement has failed to meet government targets.

²⁰ All domestic procurement has been voluntary from the 1980s onward.

²¹ Food for Education was discontinued in 2002 and replaced by a school meals program.

²² Ration sales data are for 1988/89 - 1990/91.

²³ For an analysis of political economy issues related to the food subsidy reforms, see Chowdhury and Haggblade, (2000).

3.4 Government Response to Production Shortfalls

Price stabilization through private sector imports²⁴

Since trade liberalization in the early 1990s, private sector rice and wheat imports have enhanced national food security by quickly adding to total market supplies (at no cost to the government) following domestic production shortfalls. Moreover, because of the competitive nature of the import and wholesale foodgrain trade in Bangladesh, these imports stabilized prices at levels approximating the export price of foodgrain plus transport and normal marketing costs.

Table 3.5: Bangladesh: Structure of Rice Markets, 1960-2000

	1960's	1970's	1980's	1990's	2000
Production					
Total (million tons)	10	12	15	18	23
Boro Share	7%	18%	26%	38%	48%
HYV Share	1%	23%	36%	63%	77%
Marketed Surplus					
As Share of Production	12%	27%	34%	49%	60% ^a
Total (million tons)	1	3	5	9	14
Per capita (kg)	20	41	51	76	107
Distribution					
Public Share of Rice					
Marketed	30%	15%	11%	7%	5%
Number of marketing agents					
Itinerant traders	4,000	na	na	48,000	na
Millers					
Automatic	0	3	66	88	na
Major	106	152	251	480	na
Husking Mill	6,049	11,437	43,374	50,300	na
Total	6,155	11,592	43,691	50,868	na
Private rice stocks					
Number of months					
Consumption Requirements	1	na	na	3	na
Average storage time for trader					
stocks(months)	4	na	na	1	na

Source: Chowdhury and Haggblade (2000). Dorosh et. al. (2004).
Calculated from 1995/96 Household Expenditure Survey data.

²⁴ This section draws heavily from Dorosh (2001).

Soon after the liberalization of international trade of rice in 1994 that allowed the private sector to freely import rice with no tariff,²⁵ Bangladesh imported substantial quantities of rice from India during a period of three successive poor Bangladesh rice harvests beginning in December 1994. These private sector imports were particularly important following a production shortfall in late 1997 and again in 1998 following massive floods. In both situations, the Government of Bangladesh took deliberate steps to encourage private sector imports of rice to stabilize domestic rice prices. In early 1998, a 2.5 percent import surcharge on rice imports was removed (signaling support for private sector rice imports), government open market rice sales were minimized, instructions were given to expedite clearance of rice imports through customs and, despite pressure from some groups for more direct market interventions, anti-hoarding laws were not re-imposed. These policies were also in place following the floods that occurred later that year from July to September.

Through its policy of encouraging private sector imports, the government enabled the private sector to import substantial quantities of rice and keep the domestic market price from rising above import parity levels. The close correlation between estimated import parity prices and domestic wholesale prices shows that average profit margins for rice imports were in line with normal expected margins (Figure 3.6). Letters of credit data provide further evidence of the competitive nature of the rice import trade. From January through mid-September 1998, 793 traders opened letters of credit for rice imports, with the import market share of the ten largest traders equal to only 142,369 tons, 16 percent of the total (Dorosh, 2001).

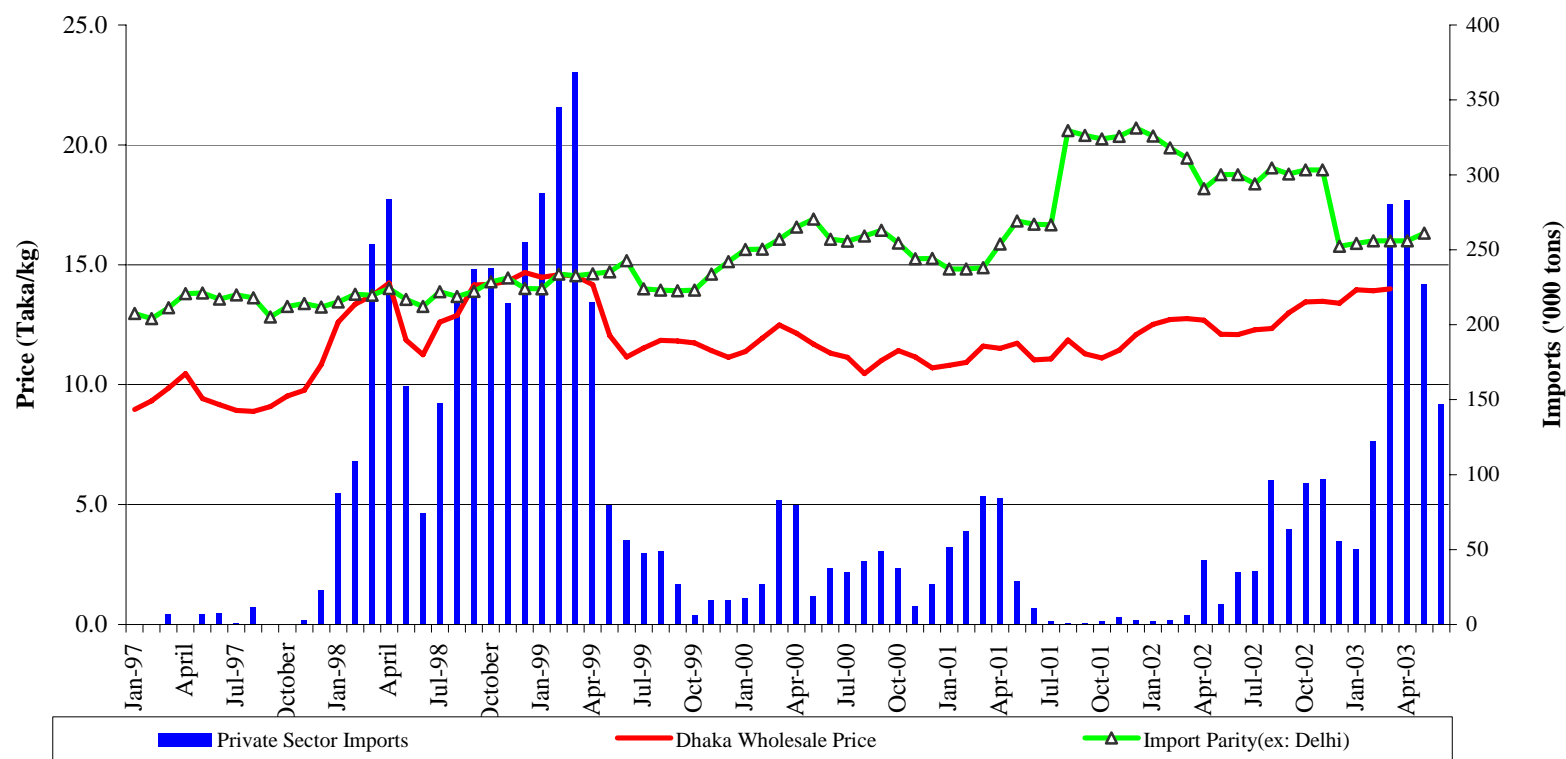
In comparison with private sector rice imports, government interventions in the domestic rice market were small, only 399 thousand tons from July 1998 through April 1999. Private sector rice imports, equal to 2.42 million tons in this period, were thus 6.1 times larger than government rice distribution.²⁶ 57.7 percent of rice distribution was targeted to flood-affected households through Vulnerable Group Feeding (41.5 percent) and Gratuitous Relief (16.2 percent). Total rice distribution during these months, however was only slightly above the original target, in part because the Ministry of Food faced substantial difficulties in procuring rice either through domestic or international tenders.²⁷

²⁵ The tariff on rice imports was 0 percent from April 1994 (the first month of private sector rice imports) through December 2000, and 5 percent from January 2000 through July 2001. The tariff on wheat imports was 0 percent from September 1992 (the first month of private sector wheat imports) through November 1993, 7.5 percent from December 1994 through July 1996; and 10 percent thereafter. Import surcharges, licensing fees and advanced income taxes generally applied to both commodities, however.

²⁶ The extremely high figures for recorded rice imports in early 1999 may overstate actual rice imports. Other commodities may have been imported in place of rice using false documents to avoid import tariffs and other surcharges. Government of India data and analysis of rice demand in Bangladesh suggest that actual level of imports may have been only about two-thirds the official figures. A lower import figure does not alter the main conclusion that private sector trade stabilized domestic rice prices at import parity levels, (see Dorosh, 2001).

²⁷ Relatively low rice stocks limited rice distribution, as problems related to the instability of prices and unreliability of suppliers constrained actual procurement of rice through commercial local and international tenders, (del Ninno et. al, 2001).

Figure 3.5: Bangladesh: Rice Imports and Prices, 1997-2003



Note : Import parity price is based on Bongaon (West Bengal) price from through November 1997, and Delhi wholesale price thereafter.

Source : Dorosh (2000); Food Planning and Monitoring Unit (FPMU), Bangladesh Ministry of Food.

The private sector also imported substantial volumes of wheat following the 1998 flood, even though large amounts of wheat food aid flowed into Bangladesh and distribution through VGF and Food for Work was expanded. Private sector wheat imports from July 1998 through February 1999 reached 624 thousand tons, 435 thousand tons more than in the same period in 1997/98. Given the large private sector imports, it appears that food aid inflows did not provide a disincentive for domestic wheat producers.²⁸

Market Prices in the Absence of Private Sector Imports

Though the exact quantity of private sector imports from India is not known, it is clear that this trade substantially augmented Bangladesh rice supplies in 1997/98 and 1998/99. One measure of the impact of this trade on national food security in Bangladesh is to compare actual prices and imports with estimates of prices and imports in the absence of private sector imports from India. Given the average wholesale price of coarse rice in Dhaka of 13.3 Taka/kg in 1998/99, rice imports from December 1997 through November 1998 were 2.043 million tons, (according to the Bangladesh customs data). Had rice imports from India not been available, the next lowest cost source for private importers would have been Thailand, for which the import parity price of 15 percent broken rice in Dhaka in the same period was 16.1 Taka/kg. Given the 20.9 percent increase in import parity price, estimated rice demand would fall by between 4.2 and 6.3 percent, assuming an own-price elasticity of rice demand of -0.2 to -0.3 . In this case, rice imports would decline by approximately 700 thousand to 1 million tons.²⁹

Such an increase in rice prices would have had a major impact on rice consumption of poor households. Average daily per capita calorie consumption of a sample of poor flood-exposed households in rural Bangladesh in December 1998 was only 1638 calories/day. Based on econometric estimates of calorie demand equations, with rice prices 21 percent higher, per capita consumption of the rural poor in 1998/99 could have been 44 to 109 calories/day less than this very low consumption level. Total direct transfers (mainly through the VGF program) added an estimated 20-25 calories/day to consumption of recipients, roughly one-fourth to one-half the positive impact of rice price stabilization for these recipients. To counteract the effect of a counterfactual 21 percent rice price increase would have required for all 60 million poor individuals of Bangladesh would have required a six- to twelve-fold expansion of the VGF program (del Ninno, Dorosh and Smith, 2003).

If private sector imports were unavailable (or banned) from any source, then, with no change in government imports, total supply would have been 12.1 percent less (apart from private stock changes) and rice prices could have risen by 40 to 60 percent, to an average of between 18.7 Taka/kg and 21.3 Taka/kg.³⁰ Such an increase in the rice price level would likely

²⁸ Domestic prices in this period were slightly below import parity of U.S. Hard Red Winter wheat, but most wheat imported by the private sector in this period came from lower-cost suppliers. See del Ninno et. al. (2001).

²⁹ This calculation assumes no problems with supply of imports from Thailand and a competitive import market involving fewer importers and larger shipments. See Dorosh (2001) for a discussion of implications of importing rice from Thailand.

³⁰ In the absence of private sector imports, domestic supply would have been 14.839 million tons, a 12.1 percent reduction in per capita supplies relative to the actual estimated levels. Assuming an elasticity of demand of -0.2 to $-$

have been unacceptable to the Government of Bangladesh and public sector imports would have been increased. But public sector imports of a magnitude equal to private sector flows would not have been feasible.

During the 1998 calendar year alone, private sector imports, mainly from India, reached 2.26 million tons. Had the government of Bangladesh imported this grain itself, the average cost of the imported rice delivered to local delivery points would have been approximately 14.9-15.9 Taka/kg, 1.0 to 2.0 Taka/kg above the private sector import costs, due to the higher costs of public sector handling and transport totaling 50 to 100 million dollars. And, if the government received a net price of 11.5 Taka/kg (equal to the Open Market Sales price of 12.0 Taka/kg less 0.5 Taka/kg OMS dealer's commission), the total unit subsidy would have been 3.4 to 4.4 Taka/kg, and the total fiscal cost would have been 160 to 210 million dollars.

The potential for price stabilization through import trade in times of rice shortages does not depend on imports from India. Alternative sources of rice imports are possible, as well, though imports by sea might involve fewer importers given economies of scale in shipping. Moreover, international market prices vary over time and other sources of supply can be less expensive than India, in spite of India's transport cost advantage. For example, export prices from Thailand and Vietnam were lower than those for similar grades of rice from India in 1999/2000 and 2000/01.³¹

Implications for Government Food Security Stocks

Following the 1974 famine in Bangladesh, a key part of the national food security policy of the country has been maintenance of a large food security stock to provide additional foodgrain supplies in times of major production shortfalls or natural disasters. Comparisons of government policy interventions at the time of the 1974 famine, the 1988 floods and the 1998 floods suggests, however, that it is possible for a small country with access to international markets to avoid a major food crisis even without large government food security stocks.

In 1974, floods caused an 8.1 percent reduction in the aman rice harvest relative to trend (a 600 thousand ton reduction in rice production for the calendar year, equal to 5.0 percent of production in the previous calendar year), and led to a 58.2 percent increase in prices between the May-July 1974 and August-November 1974 (Table 3.6).³²

Low public stocks (208 thousand tons, only 2.7 kilograms/person) and the inability to rapidly acquire more grain in international market during the critical August-November period heavily constrained public distribution options and the government's ability to calm food markets.

0.3, prices would need to rise by 12.1/0.3 (40 percent) to 12.1/0.2 (60 percent) to equilibrate market supply and demand.

³¹ Bangladesh and India rice production are not highly correlated, (the correlation coefficient of the error terms of linear time-trend regressions of rice production is 0.30 for Bangladesh and India total annual rice production), suggesting that India may be a fairly reliable source of rice supply. See Dorosh (2001).

³² International prices also rose dramatically in this period, but the Bangladesh government was unable to obtain significant amounts of commercial imports because of a lack of foreign exchange. Domestic prices in Bangladesh were thus largely determined by domestic supply and demand conditions, not by world market prices.

Table 3.6: Availability, Stocks and Market Prices in Major Flood Years in Bangladesh

	1974/75	1984/85	1988/89	1998/99
Foodgrain production				
Aman (mn tons)	6.29	7.93	6.86	7.74
% below trend	-8.5%	-0.1%	-18.1%	-18.0%
Total rice shortfall (calendar year, mn tons)	-0.608	-0.641	-0.241	-0.701
Per capita production (kgs/person)				
Rice (calendar year)	149.1	144.9	136.6	138.8
Wheat (calendar year)	1.2	12.5	9.9	14.3
Total foodgrain (calendar year)	150.3	157.4	146.6	153.1
Total foodgrain (fiscal year)	149.5	164.2	155.1	171.7
Aus and Aman/ total CY production (percent)	79.6%		62.8%	48.2%
PFDS distribution (July - June)				
	131	399	690	530
Total wheat (thousand tons)	1597	2163	2251	1603
Targeted rice (thousand tons)	4	6	167	386
Targeted wheat (thousand tons)	157	905	1259	1488
Foodgrain imports (July - June)				
Private rice imports ('000 tons)	0	0	0	2663
Public rice imports ('000 tons)	267	695	61	393
Private wheat imports ('000 tons)	0	0	0	805
Public wheat imports ('000 tons)	2030	1898	2075	1603
Per capita availability (fiscal year)				
Rice (kgs/person)	133.26	136.99	134.07	162.31
Wheat (kgs/person)	21.76	33.32	29.19	30.46
Total foodgrain (kgs/person)	155.03	170.31	163.26	192.77
National wholesale prices				
Rice: percent change ^a	58.2%	3.7%	7.0%	12.4%
Wheat: percent change ^a	61.2%	12.8%	15.3%	10.7%
Public foodgrain closing stocks				
Average (August - November)				
Rice ('000 tons)	21	223	621	359
Wheat ('000 tons)	187	413	546	310
Total ('000 tons)	208	636	1167	669
Total (kgs/person)	2.7	6.5	10.9	5.3

Notes: ^a Percentage change from May-July average to August-November average.

^b C+F price of rice times rice shortfall (calendar year) divided by foreign exchange reserves.

Source: del Ninno, Dorosh and Islam (2002).

In 1988/89, at the time of another major flood that caused an 18.1 percent reduction in the aman harvest relative to trend, public stocks averaged 1.167 million tons from August to

November, nearly 4 times larger in per capita terms than in 1974 (10.9 kilograms/person). These stocks combined with public sector imports enabled the government to use public distribution channels and stabilize markets and reach flood-affected households.

Average public stocks in August-November 1998, (669 thousand tons, 5.5 kilograms/person), however, were only half the per capita levels of ten years earlier, though double those of 1974. Nonetheless, private sector imports rather than public distribution provided the main source of additional market supplies to compensate for the 2.04 million ton crop loss (equal to 10.45 percent of target production for the entire 1998/99 fiscal year). For the nine month period from July 1998 through April 1999, public distribution of rice was only 399 thousand tons; private sector imports (banned in 1974 and 1988) were 6.1 times larger (2.42 million tons).

Other factors, in addition to the large inflow of private sector imports, were also important in enabling Bangladesh to avert a famine in 1998 even without substantial public foodgrain stocks, and suggest that only moderate levels of stocks are needed. The large expansion in the winter season boro rice and wheat harvests over more than two decades has reduced the relative importance of the monsoon (aman) rice crop in total domestic production, and helped stabilize total supply and prices: a record boro harvest followed just five months after the flood-damaged aman harvest. Rice and wheat markets in Bangladesh are also much better developed, enabling grain to flow across regions more easily and efficiently, thus avoiding regional shortages. Foreign exchange constraints, which hampered government efforts to procure rice in 1974, have been greatly eased through expansion in foreign exchange earnings. Finally, international markets for rice and wheat have grown in volume and price stability, reducing the probabilities and risks of extremely high prices.

Government Intervention after the 1998 Flood with Food and Cash Transfers

In response to the flood, the government of Bangladesh used two main direct transfer relief programs. In the initial flood period, immediate relief through the Gratuitous Relief program went mainly to seriously flood-exposed households; 35.7 percent of severely flood exposed households received the transfer compared to 9.7 percent of non flood exposed households. Vulnerable Group Feeding transfers started in late October and were targeted administratively through union-level committees. They were better targeted to the poor than to the flood exposed households. 38.8 percent of the households in the bottom quintile received grain transfers compared to 17.2 percent and 11.2 percent in the top two quintiles. However, almost 20 percent of the non-flood exposed households received transfers, as well. Yet, government transfers were small relative to the needs of households, as indicated by the share of the transfers compared to the monthly expenditure (del Ninno and Dorosh, 2001).

Small amounts of cash transfers were part of the initial flood relief efforts, but larger cash transfers or credit programs were not part of the medium-term relief to households two-four months after the floods, even though foodgrain stock constraints limited the expansion of the Vulnerable Group Feeding program during this period.

Household Coping Mechanisms. Households adjusted to the shock of the flood in several major ways: reducing expenditures, selling assets and borrowing. Borrowing to purchase food and to fund other expenses (such as education and health, farming, business, repayment of loans, marriage and dowry, purchases and mortgage of land/agricultural equipment purchases, etc.) has been the most important coping strategy employed by households in Bangladesh after the flood both in terms of the value of the resources and the number of households who borrowed.

More than 60 percent of poor, flood-exposed households in the sample borrowed money in the months immediately following the flood, and of these more than half borrowed money for food. Household debts rose to an average of 1.5 months of typical consumption compared with only a small percentage of monthly consumption in January 1998, about 8 months before the floods (Table 3.7). This borrowing was sufficient to maintain household levels of expenditures in value terms vis a vis pre-flood level, but because of higher prices, the purchasing power of poor flood-affected households declined.

Table 3.7: Bangladesh: Coping strategies, flood exposure and poverty in November 1998

	Flood Exposed			All	Not exposed	All households
	Bot 40%	Mid 40%	Top 20%			
Monthly households expenditure (Tk)	2,414	3,974	7,721	4,064	3,844	4,001
Share of food expenditures (percent)	72.4	69.5	62.2	67.4	68.4	67.7
Households in debt (percent)	68.2	58.9	62.6	63.5	53.5	60.6
Share of monthly expenditure (percent)	186.1	138.7	131.3	144.4	140.2	143.6
Household purchasing food on credit (percent)	56.7	54.1	50.5	54.4	29.5	47.3
Share of monthly expenditure (percent)	37.6	27.2	17.3	25.8	20.0	25.0
Households receiving government transfers (percent)	60.7	54.1	32.7	52.6	33.6	47.2
Share of monthly transfer on expenditure (percent)	3.4	2.4	0.8	2.0	2.1	2.0
Households selling assets (percent)	25.2	21.3	15.9	21.9	20.3	21.4
Share of monthly expenditure (percent)	45.5	51.3	75.3	51.9	44.2	49.9
Number of households	226	207	107	540	217	757

Source: FMRS-IFPRI Households Survey 1998-9 (del Ninno, Dorosh, Smith, 2003 WD)

As a result poor flood-exposed households consumed only 1,602 calories per capita per day, suggesting that targeted cash transfers and credit programs could have been an effective complement to direct food distribution. Households borrowed mostly from non-institutional sources such as friends and neighbors rather than from NGOs and banks. Interest rates on the loans ranged from 21 percent from institutional sources to a maximum of 67 percent.

The percentage of households with outstanding debt one year after the flood decreased progressively from November 1998, when it was at the highest with 66 percent of the households holding an average of 7,937 Taka in outstanding debt, to 54 percent in November, 1999 for 6,497 Taka. Nevertheless, even though there has been an improvement in the number of households in debt and the amount of debt, it still constitutes a large share of the total expenditure and leaves those households vulnerable another shock.

3.5 Concluding Observations

Bangladesh has enjoyed considerable success in increasing rice and wheat production, more than doubling rice production since its independence in 1971 and achieving its target levels of domestic production (454 grams per person per day) for the first time in 1999/2000. This gain in production has been important, not only for reducing the country's dependence on imported foodgrain, but for raising rural incomes and contributing to an increase in supply that led to a 30 percent decline in the real price of rice from the early 1980s to the late 1990s that benefited poor consumers throughout the country.

Bangladesh achieved these production gains while receiving substantial flows of food aid over almost three decades. Food aid did not cause disincentive effects on rice production in large part because most food aid was in the form of wheat, not a close substitute for rice, and volumes of food aid wheat imports were small relative to total rice availability (generally on the order of about 5 percent). Even for wheat production, however, disincentive effects on production were minimal because of well-designed government policies and increases in domestic demand for wheat.

The strong commitment by the Government of Bangladesh to increase rice (and wheat) production to achieve national self-sufficiency was a major factor. This commitment translated into substantial investments in infrastructure, research and extension, and efforts to maintain price incentives for producers. US PL480 food aid actually re-inforced these efforts since support for rice and wheat agronomic research programs in Bangladesh was consistently funded along with US PL480 aid programs as part of an overall food security strategy. Food aid programs also funded Food for Work³³ programs that built substantial amounts of infrastructure.³⁴

Careful management of food aid flows generally avoided excessive increases in total supply that could depress market prices. Since food aid flowed through the Public Food Distribution System, the government was able to store food aid shipments and plan orderly distribution. Management of these food aid resources was also strengthened through donor-supported technical assistance designed in part to ensure that food aid did not cause disincentive effects and hinder efforts at long-term food security.

³³ Beginning in the mid-1990s, PL480 food aid also funded sizeable Cash for Work programs through the sales of food aid to Government of Bangladesh.

³⁴ Critics of the program in the early 1990s argued, however, that many of these roads were poorly constructed and without culverts, and that they posed drainage problems and sometimes cut off much cheaper river transport routes. Subsequent reforms may have improved the quality of roads. See Ahmed, Haggblade and Chowdhury, (2001).

Moreover, by the mid-1990s, demand for wheat, which had grown because of increased incomes, greater urbanization and a change in consumer tastes, resulted in substantial private sector imports for the domestic milling industry. Over time, these private sector imports exceeded food aid flows, which were linked loosely to the notional food gap that had gradually decreased as domestic production increased. Thus, to a large extent, food aid simply replaced a portion of private sector imports and did not reduced domestic prices below import parity levels.

Finally, following continued increases in domestic production that eliminated the “food gap” in the late 1990s, donors have reduced their volume of food aid flows to Bangladesh so that by 2003, food aid accounted for only about 1 percent of total rice and wheat availability. Without this policy change, large-scale food aid inflows would likely have reduced domestic prices and incentives for domestic wheat production.

In addition to a steady flow of food aid to supply programs that address chronic food insecurity, food aid has also played a major role in addressing short-term fluctuations in production following major floods. Survey evidence suggests that major food distribution programs were well-targeted to poor households following the 1998 flood. However, in terms of volumes and timeliness, large scale private imports of rice wheat that were enabled by the trade liberalization of the early 1990s have played a large role than additional food aid flows following major production shortfalls, however. In late 1997 and again in the second half of 1998, when Bangladesh domestic rice prices rose rapidly to levels equal to import parity with India, the private sector imported several million tons of rice. By encouraging this trade, the Government of Bangladesh was able to augment domestic rice supplies quickly and stabilize market prices, benefiting millions of poor consumers. Nonetheless, there remains a need for a flexible trade policy in which tariff structures can be adjusted to protect producer interests and long-term food security, particularly in the face of unusually low import prices.

4. FOOD AID AND FOOD SECURITY IN ETHIOPIA

4.1 Introduction

Ethiopia, one of the poorest countries in the world, faces severe food insecurity problems due to widespread poverty, rapid population growth, and recurrent droughts. The country has been an independent nation for centuries, with the exception of the Italian occupation between 1936 and 1941. However, in recent decades Ethiopia has suffered from severe political instability in the form of civil wars and military coups, and a series of drought-related food crises.

In the midst of a severe famine that resulted in about one quarter million deaths, the Derg Marxist government took power in 1974, which imposed numerous controls on markets and investment. Economic output stagnated over the next fifteen years, during which a drought-related famine in 1984-85 caused one million deaths. The civil war from 1974 to 1991, which ultimately led to the independence of Eritrea, strained public finances, reduced international support and constrained agricultural production (Von Braun, Teku and Webb, 1998).

Then, following the overthrow of the government and the adoption of a broad spectrum of reform measures for economic recovery and reconstruction in 1991, agricultural and overall economic growth increased. However, the war with Eritrea from May 1998 to December 2000, reduced donor support and undermined investor confidence. At the same time, drought and late arrivals of food aid contributed to another food crisis in 1999-2000. Finally, in spite of the end to armed conflicts, the country experienced yet another drought and food crisis in 2002-03.

Gains in cereal production since the early 1990s notwithstanding, the situation thus remains critical at present. Almost half of the population has incomes below the poverty line and 20% of Ethiopian households (13 million people) are food insecure (i.e. these households do not consume adequate amounts of food in drought years). Moreover, 6-7 million people are *chronically* food insecure, lacking sufficient resources to consume enough food even in good years.³⁵ Malnutrition (stunting) among Ethiopian children is over 60 percent in some regions (Tigray, Amhara) reflecting long term impact of food insecurity (Subbarao and Smith, 2003). In addition, a large number of poor households face the risk of transitory food insecurity: the majority of the population is rural and highly dependent on agriculture (only 15% living in towns) and the small holder, pastoralist and laborers are constantly vulnerable to droughts.

Food aid has played a crucial role in increasing food supply and averting major famines since the 1990's. Nonetheless, even though food aid imports have been necessary to address short-term food shortages, there remain several questions about the effectiveness of food aid in both the short- and long- term. First, have food aid imports had a negative impact on producer prices and incentives to increase production, thereby increasing the dependence on future food aid? Second, have the quantities and timing of food aid flows been efficiently managed? Lastly,

³⁵ Households are defined poor if the food expenditure per adult equivalent is less than the food poverty line. The food poverty line used in Ethiopia is based on a basket providing 2200 kcal per adult equivalent per day. In 1995/96 prices, this basket cost Birr 647.8 per year. The same "basket" and poverty line is used in 1999/00 to maintain comparability between the two survey years.

have the resources of food aid available been used effectively to help poor food insecure households?

Box 4.1: Chronology of Key Events related to Ethiopia’s Food Security

1971-75	Drought and famine caused by a sequence of rain failures; estimated 250,000 people dead; 50 percent of livestock lost in Tigray and Wollo.
1974	Emperor Haile Selassie, who had ruled since 1930, overthrown by the Derg military and Marxist regime installed. Government policy shifts to a controlled economy model.
1974-1991	Civil War with Eritrea and Tigray. The war ended in May 1991 with the overthrow of the Derg Marxist regime, resolution of the dispute with Tigray, and a provisional Eritrean government (and eventual Eritrean independence in 1993).
1984-85	Drought leads to famine and one million deaths. 8 million people affected;
1991	Marxist regime overthrown. Transitional Government of Ethiopia (TGE) initiates a broad spectrum of reform measures for economic recovery and reconstruction.
1993	Set up of the National Policy on Disaster Prevention and Management (NPDPM) composed of the Early Warning System (EWS), the Emergency Food Security Reserve (EFSR), and the National Disaster Prevention and Preparedness Fund (NDPPF).
1994-1997	Large increase in cereal production (mainly maize) due to adoption of improved seeds and increased fertilizer use.
1998-2000	War with Eritrea (May 1998 to December 2000). The conflict strained public finances, reduced donor support and undermined investor confidence.
1999-2000	Food crisis caused by drought in earlier year and late arrival of food aid subsequent to production recovery.
2001	Food market prices collapse following bumper harvests and late arrival of food aid.
2002-03	Drought leads to declaration of food emergency

4.2 Food Availability and Access

Food production in Ethiopia is heavily dependent on scarce and often erratic rainfall. Agriculture in the country is almost entirely rain-fed: only about 190 thousand hectares out of

11.3 million hectares of area cultivated (about 0.2 percent³⁶ of total agricultural land is irrigated), and production is greatly influenced by large fluctuations in the timing and volume of rainfall. About 95 percent of cereal production takes place during the main rainy season (called *meher* or *kiremt*) which runs from June-July to September-October. A minor season (*belg*) accounts for only about 5 percent of cereal production.³⁷ Cereals (mainly maize, wheat, teff,³⁸ sorghum) account for about 70 percent of area cultivated, as well as 70 percent of calorie consumption.

Most of Ethiopia has a sub-humid or semi-arid climate with average annual rainfall of 1200 millimeters or less. Most of the population lives in the temperate, cool sub-humid highlands (*weina dega*) at elevations between 1500 and 2500 meters with average annual rainfall from 800 to 1200 millimeters. A wide variety of crops are cultivated here, including teff, a drought-resistant grain and the traditional staple of Ethiopia. In the cool humid highlands (*dega*) with elevations of 2500 to 3000 meters and the cold high highlands (*wurch*) with elevations of 3000 meters and above, barley and wheat are the dominant crops.

Agriculture in the driest regions of the country, the warm semi-arid lowlands (*kola*) and the hot and hyper-arid desert areas (*bereha*) consists mainly of agro-pastoral and pastoral production systems dominated by livestock.³⁹ Those areas have the lowest population density but are highly vulnerable because of lack of rainfall and poverty of soils. Another element contributes to the southern regions' vulnerability to droughts: their dependency on the short "Belg" rains (secondary rains from March through May) for their total annual production. It is estimated that the eastern and southern regions receive between 40 and 50% of their annual rainfall from the short rains, whereas in the central and northern highlands the percentage ranges from 20 to 30 percent (Webb, von Braun and Johannes, 1992).⁴⁰

Data on cereal production of uneven quality and difference sources provide conflicting numbers,⁴¹ but the broad trends suggest a sharp increase in cereal production after 1994 (Figure 4.1). Average annual growth in cereal production was -0.8 percent per year from 1980-89 and -4.0 percent per year from 1990-94 due to periodic droughts, soil erosion, military conflict and the absence of significant technical change. Favorable weather, an increase in fertilizer use and grain market liberalization, however contributed to a 50 percent increase in grain production between 1990-94 and 1995-99 (see Amha et al., 1997).⁴²

³⁶ FAO/WFP (2002), p.6

³⁷ FAO/WFP (2002), p. 6.

³⁸ Teff is a drought-resistant grain and a traditional food staple in much of Ethiopia.

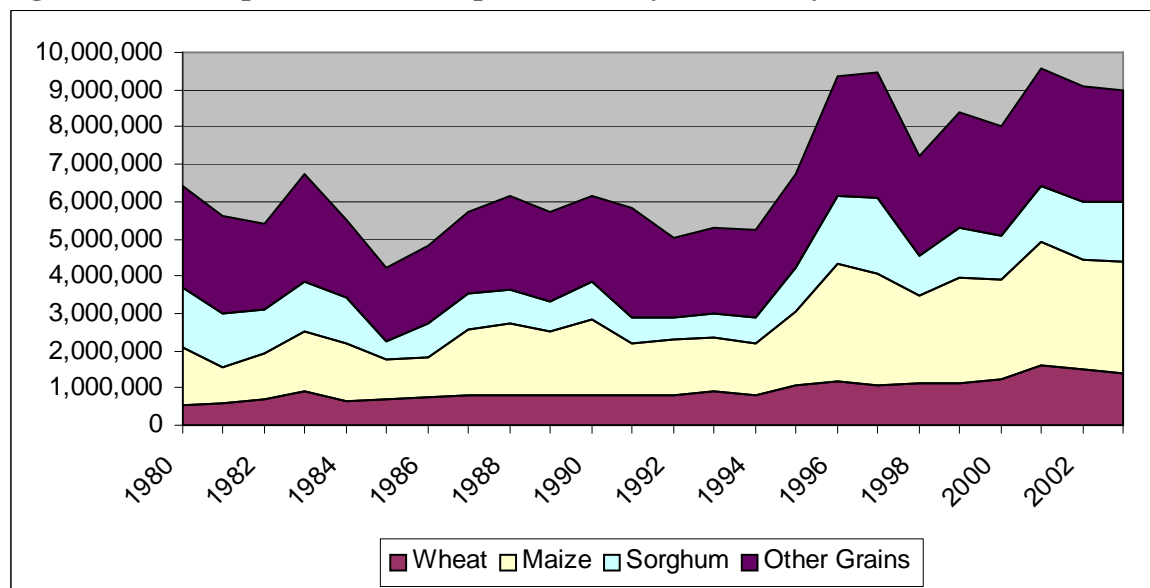
³⁹ This description of agro-climatic zones is based on US Department of Agriculture, Foreign Agricultural Service website (http://www.fas.usda.gov/pecad2/highlights/2002/10/ethiopia/baseline/Eth_Agroeco_Zone).

⁴⁰ Although the harvest in the belg season accounts for only about 5 percent of annual production, rainfall in this season, *belg* rains offer the opportunity for land preparation and improve pasture and browse after the dry season. (FAO/WFP 2005, p.7.).

⁴¹ There are marked discrepancies between FAO/Ministry of Agriculture production data and data reported by the Central Statistical Agency (CSA). In general the estimates of total production of CSA (reported on the basis of the Ethiopian calendar) are lower than those of FAO/MOA (reported on the basis of the western calendar). Note that FAO does not even report area cultivated by crop for years prior to 1993.

⁴² Markets were deregulated in 1991, increasing competition between buyers and sellers that led to increased farmgate prices, and the removal of barriers to labor mobility resulted in significant seasonal migration of farm workers.

Figure 4.1: Ethiopia: Total cereal production by commodity



Source: FAOSTAT.

Much of this increase (40 percent of the total gain) is due to a 70 percent increase in maize production (mainly in the southern plateau regions), (Table 4.1). Increased sorghum production accounted for 28 percent of the total gain in production, more than doubling between the two periods. Wheat and other grain production also rose by 38 and 23 percent, respectively.

Since 1995, maize and wheat production have increased steadily while production of sorghum, teff and other cereals cereal production has more or less stagnated. From 1995-2003, annual average growth in maize and wheat production was 3.0 and 4.4 percent, respectively. Average annual growth of sorghum and other cereals was only 0.4 percent per year. Thus, total growth in cereal production over this period was only 2.0 percent per year, less than population growth of 2.65 percent.

With little expansion in irrigation, total area cultivated with cereals has remained almost constant. The 3.0 percent per year expansion of maize production from 1995 to 2003 was mainly due to a 2.3 percent per year increase in yields. By contrast, most of the 4.4 percent per year growth in wheat production was due to a 3.4 percent per year growth rate in area; wheat yields increased by an average of only 1.0 percent per year. In all average wheat area cultivated in the 2001-2003 period increased by 210 thousand hectares (24 percent) relative to the 1995-1997 period. During this same period, average teff and barley area declined by 230 thousand (22 percent) and 110 thousand hectares (5 percent), respectively.

Table 4.1: Ethiopia: Cereal Production, 1980-2003

Years	Wheat	Maize	Sorghum	Other Grains	Total
Production (thousand tons)					
1980-1989	725	1,435	1,096	2,373	5,628
1990-1994	816	1,569	713	2,407	5,505
1995-1999	1,126	2,663	1,481	2,963	8,234
2000-2003	1,427	2,987	1,474	3,027	8,915
Growth rates (percent)					
1980-1989	3.2	3.9	-7.1	-1.6	-0.8
1990-2003	5.6	6.4	7.3	2.3	4.7
1990-1994	1.4	-7.1	-7.2	-2.0	-4.0
1995-2003	4.4	3.0	0.8	0.8	2.0
Production increase					
1990-94 to 1995-99					
(thousand tons)	310	1,095	769	556	2,729
(percentage of 1990-94)	38%	70%	108%	23%	50%
(as % of total cereal change)	11%	40%	28%	20%	100%

Source: FAOSTAT; authors' calculations.

Highly variable rainfall often results in local or regional production shortfalls that have a large impact on food security in various regions, largely because of infrastructural bottlenecks and poorly developed markets. Transportation costs are high (in part because of informal tolls), market information is often difficult to obtain,⁴³ and marketable surpluses and market demand are often small. For example, because of high transactions costs, prices of white maize in the northern region of Tigre were on average 70 percent higher than markets in southern provinces during the last five years.⁴⁴ Nonetheless, in surplus areas, the evidence suggests that grain markets are competitive and that trade margins are quite tight, reflecting real marketing costs (Gabre-Madhin, 2001). Moreover, monthly price movements of maize and wheat (and to a lesser extent, teff) in Addis are correlated, suggesting the influence of common weather-related supply shocks and substitution in consumption (Figure 4.2).⁴⁵

Weak market links between producer and consumer regions within the country also contribute to period market gluts and steep price declines. As shown in Figure 4.3, wheat prices have fluctuated considerably over time, rising during periods of production shortfalls and falling sharply in years of good harvests.⁴⁶ Wheat prices in nominal dollar terms generally increased steadily from 1983 to 1999, with the largest price increases during droughts in 1984 crises and

⁴³ The government's unwillingness to open up cell phone markets is a major impediment to information flows and private sector response to regional price disparities.

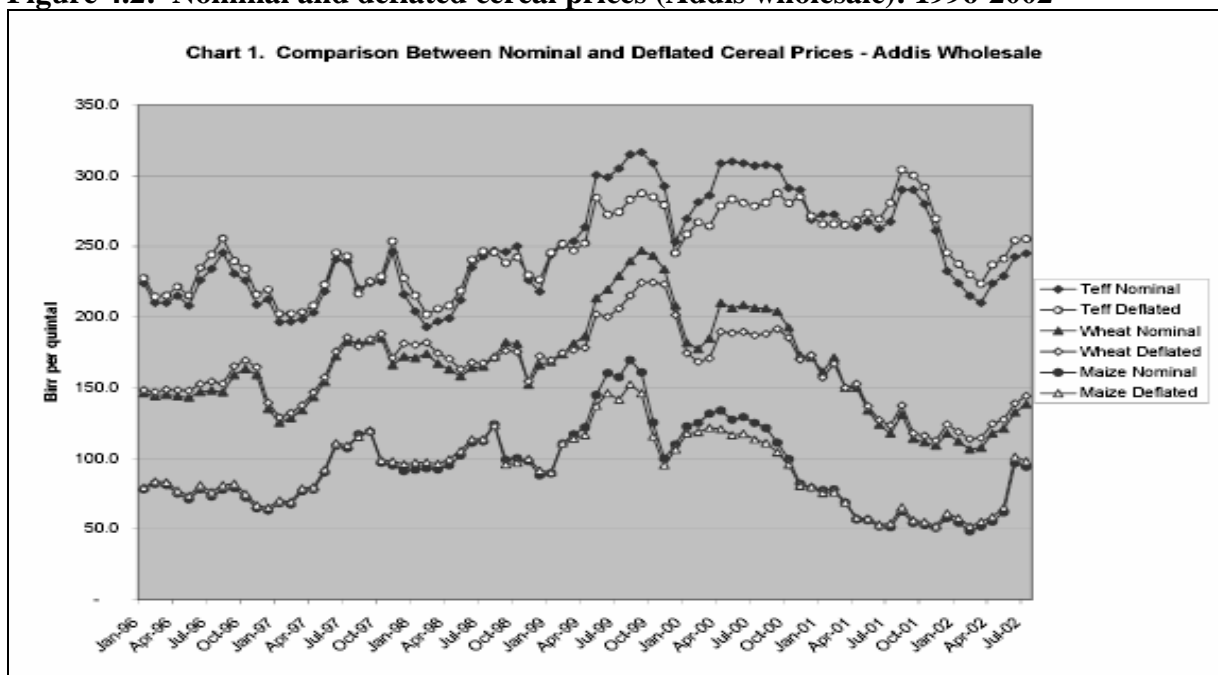
⁴⁴ Calculated from FEWSNET data.

⁴⁵ Alderman (1993) demonstrates similar co-movement of prices of major food commodities in Ghana, suggesting that measures that help stabilize prices of one commodity may help stabilize prices of other food commodities, as well. Barrett (1997) finds similar results for Madagascar.

⁴⁶ Steep price declines also followed bumper white maize harvests in 2001 (Gabre-Madhin, Barrett and Dorosh, 2003).

1999. Following good harvests, however, prices collapsed (1988, 1994 and 2001). The steep price decline in 2001 was exacerbated by large volumes of food aid imports, which remained at high levels well after the initial crisis.⁴⁷

Figure 4.2: Nominal and deflated cereal prices (Addis wholesale): 1996-2002

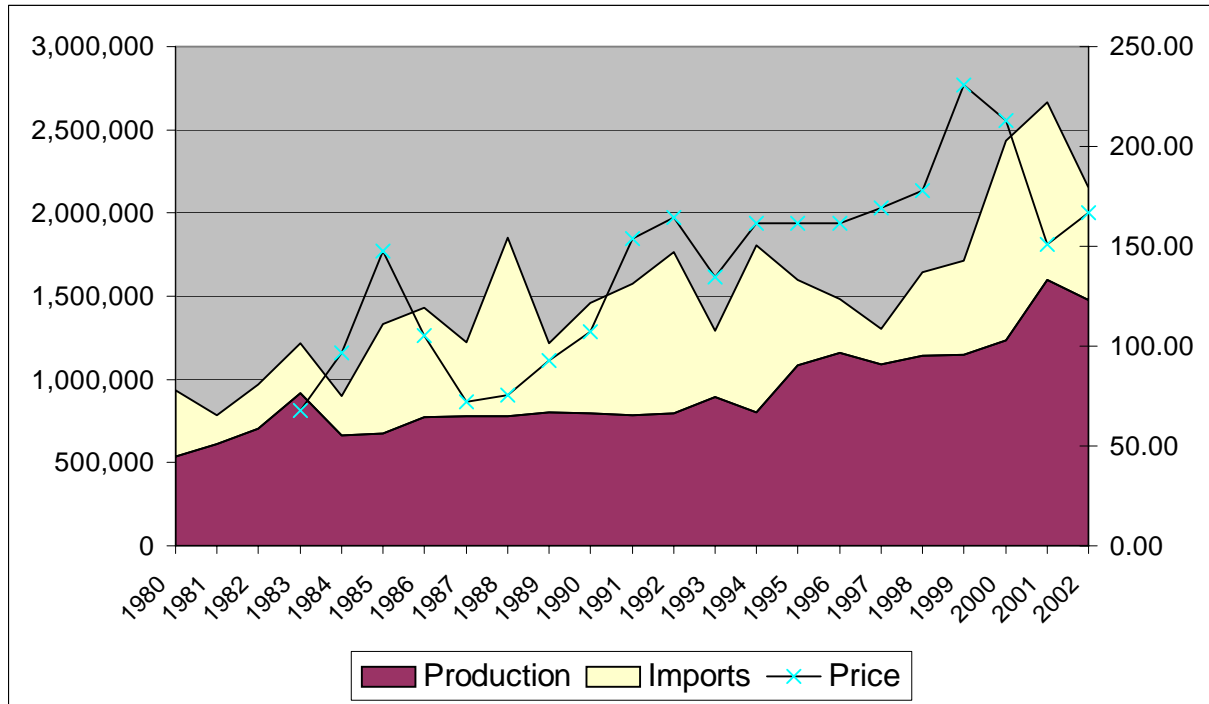


Source: Harrison (2002).

Because of high transport and other marketing costs, private sector international trade (which was not liberalized until the 1990s) is not a major stabilizing factor in Ethiopia's grain markets. What is the volume in recent years? Estimated transport and other marketing costs of \$50/ton from the port in Djibouti to Addis are approximately 40 percent of the average wholesale market price in Addis (\$130), so that unless domestic prices rise substantially above world market prices, there is little incentive for private sector imports. Likewise, the high transport and marketing costs make exports prohibitively expensive unless prices in surplus areas of Ethiopia are at least about \$65/ton (\$50/ton domestic marketing costs plus \$15/ton international shipping costs) below import (cif) prices in nearby international markets.

⁴⁷ In this case the most important market failure was therefore considered the inability of smoothing out temporal (rather than spatial) supply and demand inequalities (Harrison, 2002).

Figure 4.3: Ethiopia: Wheat, production, imports and prices – 1980-2002



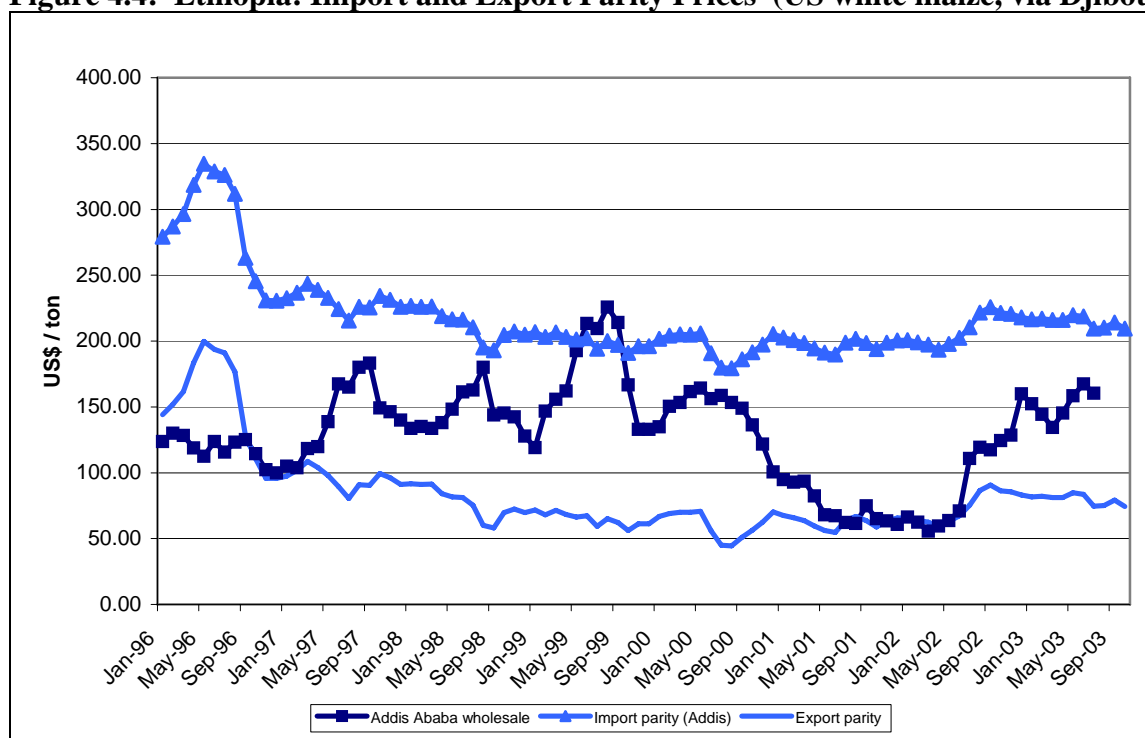
Source: FAO FAOSTAT & Food aid: WFP EU Units, Prices: FEWS – White wheat Addis retail

For most of the 1998-2003 period, for example, wholesale prices of white maize in Addis Ababa were in between import and export parity, suggesting there was no opportunity for private sector imports or exports at these times. Only for a few months in late 1999 did white maize prices rise to estimated import parity levels and beyond. Similarly, white maize prices in Addis from July 2002 to July 2003 fell sharply to export parity levels, but without established trading contacts, there was little if any export.⁴⁸

High costs of transport and marketing to Kenya also prevent market stabilizing trade flows with Kenya and Uganda. Export of maize surpluses to Kenya represents a clear opportunity for Ethiopian maize farmers in years of bumper harvests. Similarly, imports of maize from Uganda through Kenya could help stabilize Ethiopian market prices in years of poor harvests.

⁴⁸ See RATES (2003) and Magnay (2004).

Figure 4.4: Ethiopia: Import and Export Parity Prices (US white maize, via Djibouti)



Note: Import and export parity calculations assume transaction costs of \$60 for imports and \$75 for exports.
 Source: International Grain Council; Detlev Puetz (International Food Policy Research Institute).

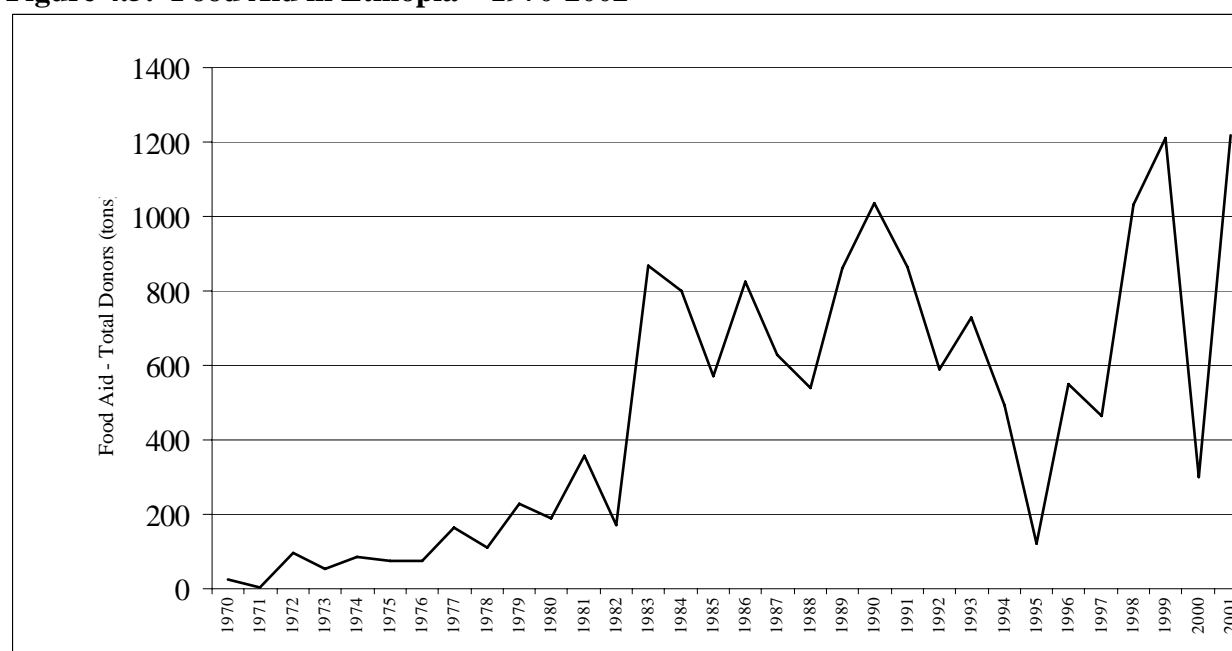
International Trade and Food Aid

Given the high transport and marketing costs (and until the 1990s, official government policies) that discourage private sector imports, food aid has accounted most grain imports in Ethiopia over the last few decades.⁴⁹ Food aid flows to Ethiopia (including local procurement) averaged 728 thousand tons since 1990 and have ranged from 120 thousand tons in 1996 to 1.22 million tons (ten times the 1996 total) in 2002 (Figure 4.5). Most of this food aid was in the form of cereal (almost all wheat) imports, which accounted for almost 10 percent of total cereal availability.⁵⁰

⁴⁹ Data on food aid flows to Ethiopia is highly uncertain, however, and there are major discrepancies between data from various sources.

⁵⁰ From 1995 to 2001, about 80 percent of food aid wheat was imported (an average of 534 thousand tons per year); the remainder (an average of 143 thousand tons per year) was procured locally. (Data from WFP EU Units, as reported in Harrison, 2002.)

Figure 4.5: Food Aid in Ethiopia – 1970-2002



Source: FAOSTAT.

Imports (mainly food aid) have tended to stabilize availability of cereals somewhat, although total supply in drought years has still been substantially less than in years of good harvests (Figure 4.6). As measured by the coefficient of variation, total supply (production plus imports) was slightly more stable than production of cereals in the 1980-95 period (Table 4.3). From 1996 to 2002, however, the coefficient of variation for production is essentially the same as that for total supply of cereals, (0.095).

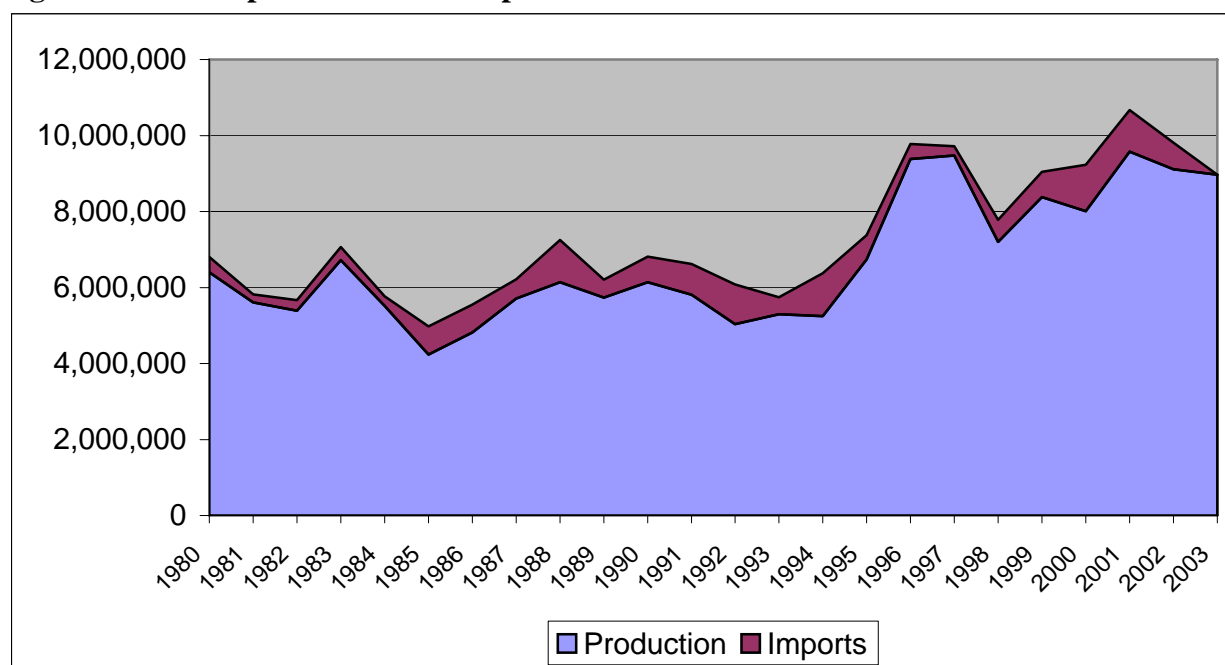
Local procurement of grain has increasingly been used to supply foodgrain programs. In 1995, following the increase in local production of cereals and a growing concern for negative impacts of food aid on local prices,⁵¹ the government procured grain for relief purposes in the local market for the first time in order to reduce costs and stabilize market prices. The experience of the 1995 local purchase program proved successful (Amha et al., 1997) in meeting its primary goal of building up the EFSRA emergency food reserve in a cost-effective manner. In subsequent years, the EU and WFP have increasingly purchased food aid locally. Local purchases averaged 178 thousand tons per year between 2000 and 2004, ranging from 97 thousand in 2002 (when many private suppliers failed to fulfill contracts after prices rose sharply) and 234 thousand in 2001.

Detailed analysis of available statistical data on household incomes and expenditures suggest that food aid has not had significant disincentive effects on food production. Simple test

⁵¹ Harrison (2002) argues that that imported food aid had a major effect in further depressing Ethiopian grain prices, especially in years of high production, and that food aid had a strong negative impact on farmers' income. Unpredictable government and food aid imports also add to market uncertainty for domestic grain traders (Demeke and Ferede, 2004).

statistics, such as a comparison of means, or simple regressions, suggest that the disincentive effects of food aid on household behaviors are many, large in magnitude and statistically significant. However, when targeting-related placement effects are taken into account,⁵² no empirical support remains for the hypothesis that food aid created disincentive effects. In fact, there is some suggestion in these data that food aid leads to increases in labor supply to agriculture, wage work and own business (Abdulai, Barrett and Hoddinott, 2004).

Figure 4.6: Total production and imports of cereals – 1980-2002



Source: FAOSTAT

Table 4.2: Ethiopia: Cereal Production, Imports and Food Aid, 1980-2003

	Production	Imports	Food Aid	Supply	Imps/Supply
Average Quantity (thousand tons)					
1980-1989	5,628	504	517	6,132	8.4%
1990-1994	5,505	823	816	6,328	12.9%
1995-1999	8,234	506	531	8,740	6.1%
2000-2002	8,898	1,005	910	9,903	9.2%
Coefficient of variation					
1980-2002	0.246	0.488	0.511	0.229	----
1980-1995	0.119	0.492	0.439	0.108	----
1996-2002	0.095	0.501	0.644	0.095	----

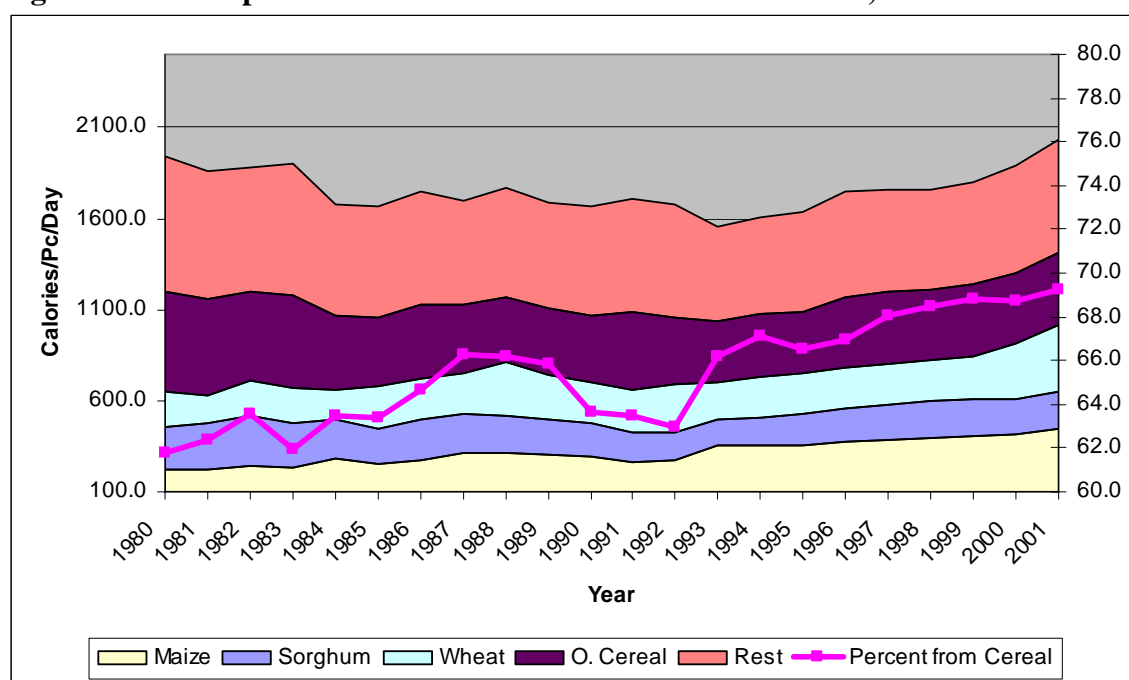
Source: FAOSTAT, WFP and authors' calculations.

⁵² Since food aid often is targeted to areas facing most severe production shortfalls, a simple comparison of production levels will tend to find that areas receiving food aid have less production with those not receiving food aid.

4.3 Consumption and Safety Nets

Cereals form a major component of average diets in Ethiopia and the share of cereals in total calories has steadily increased from 63 percent in 1992 up to almost 70 percent in 2001, along with the increase in domestic production. This increase in cereal production since 1992 enabled total caloric consumption to increase from less than 1,677 calories/person/day in 1992 to 2,037 in 2001, reversing the downward trend after 1980 (when consumption was 1944 calories/person/day (Figure 4.7). In spite of a huge apparent increase in calorie availability, hunger has not declined substantially. Seasonal shortages, regional imbalances, high concentrations of poverty in remote areas, and inefficient markets may explain this anomaly, but further work is needed.

Figure 4.7: Ethiopia: Calories from Cereals and Other Sources, 1980-2001



Source: Calculated from FAOSTAT data.

Data from the 1999/2000 Household Income, Consumption and Expenditure Survey (HICES) indicate significant differences in food consumption patterns by location and by level of incomes (expenditures), (Table 4.3). The share of food in total consumption expenditures in rural areas is significantly higher in rural areas (71 percent) than in urban areas (46 percent), with the food expenditure share exceeding 80 percent for the poorest ten percent of rural households. Likewise, the share of total cereal consumption in expenditures is much larger in rural areas (34 percent) than in urban (20 percent).

Maize and other cereals (mainly sorghum and millet) are major staples only in rural areas (with budget shares of 10 percent and 9 percent, respectively); in urban areas maize accounts for only 2 percent of expenditures and other cereals account for only 1 percent of expenditures. Budget shares for teff have the opposite pattern with larger expenditure shares for urban

households (12 percent) than for rural households (12 percent). These differences are even more pronounced for the poorest 30 percent of households in each region: 15-17 percent for the urban poor and 7 to 9 percent for the rural poor. Only for wheat are budget shares in urban and rural areas roughly similar (6 and 7 percent, respectively). Thus, cereal diets are much more diversified in Ethiopia than in south Asia.⁵³

Table 4.3: Ethiopia: Food Budget Shares for Urban and Rural Households by Deciles, 2000

Rural Decile	Maize	Wheat	Teff	O. Cereal	All Cereals	All Food
1	13.9	9.1	8.9	14.8	46.7	87.7
2	13.3	9.1	8.4	12.8	43.6	85.9
3	11.1	8.1	7.3	12.6	39.1	81.4
4	11.2	8.1	7.3	11.5	38.1	79.1
5	9.8	7.3	8.8	11.7	37.6	77.4
6	9.8	7.5	8.0	9.9	35.2	75.4
7	10.3	6.6	8.7	10.8	36.4	73.9
8	10.2	7.4	7.9	8.6	34.1	71.5
9	10.3	6.2	7.9	7.8	32.2	70.5
10	6.2	5.0	7.8	5.6	24.6	54.5
National average	9.7	6.9	8.0	9.4	34.0	71.4
Urban Decile						
Urban Decile	Maize	Wheat	Teff	O. Cereal	All Cereals	All Food
1	5.7	10.8	15.2	4.8	36.5	67.8
2	3.7	8.2	17.0	3.2	32.1	63.5
3	3.6	8.0	16.9	2.6	31.1	63.2
4	2.7	7.4	16.1	2.3	28.5	60.4
5	2.9	7.3	16.1	1.8	28.1	59.1
6	2.4	7.0	15.3	1.6	26.3	56.5
7	1.7	6.9	13.5	1.2	23.3	53.6
8	1.4	5.8	12.2	1.1	20.5	49.8
9	0.9	5.1	11.7	0.7	18.4	44.4
10	0.3	3.2	6.5	0.4	10.4	28.7
National average	1.6	5.6	11.6	1.2	20.0	46.0

Source: Calculated from *Household Income, Consumption and Expenditure Survey* (HICES), 1999/2000 (Federal Democratic Republic of Ethiopia, Central Statistics Authority); (Diao et. al, 2004).

Use of food aid and distribution programs

Food aid in Ethiopia has been traditionally allocated in the form of food for work programs⁵⁴ (or Employment Generation Programs, EGS, and food for work, FFW, that distribute about 80% of all food aid) and of free distribution of food⁵⁵ (or Gratuitous Relief, GR, and

⁵³ In addition, there are also important differences in grain consumption patterns across regions in Ethiopia.

⁵⁴ Ethiopia's official food aid policy states that no able-bodied person should receive food aid without working on a community project in return.

⁵⁵ Free distribution programs distribute cereals like wheat, maize and sorghum.

School Feeding Programs, SFP, which jointly use approximately about 20% of all food aid) (Table 4.4).⁵⁶

Table 4.4: Approximate Expenditures by Selected Programs

Program	Average Expenditure
WFP Food-for-Work	15
Gratuitous Relief Distribution	150
Employment Generation Scheme	100
School Feeding	3
DPPC Operations	40
Emergency Food Security Administration	2

Source: Subbarao and Smith, 2003

Note: Most Recent Periods –Average US\$ millions p.a. equivalent

There is some evidence that food aid programs have been effective in reducing household vulnerability in Ethiopia (Dercon and Krishnan, 2000 and Quisumbing, 2004) and had a positive impact on child nutritional status (Quisumbing, 2003 and Yamano, Christiaensen and Alderman, 2005) and that they have been allocated mostly to the poorest households⁵⁷.

Several studies question the effectiveness of the targeting mechanisms used in the allocation of food aid transfers, however. Two targeting issues are worth differentiating here: targeting efficiency of regional allocations and targeting efficiency within a region. While 41 percent of the rural population was food poor in 1999/2000, six million people are at risk of starvation every year in the drought prone areas in Tigray, Amhara and pastoral regions identified by the annual food assessment of the government. The annual appeal of food aid that depends largely on the crop assessment is mainly concerned with those people that are at risk of starvation in those areas that are affected by the drought. While interventions in those areas are necessary, it is also possible that food aid programs might not reach the poorest households that do not live in drought prone areas (Clay et al., 1999; Subbarao and Smith, 2003).⁵⁸ In other words, the government faced a hard choice: whether to allocate the resources to poor households throughout the country and increase their level of consumption, or concentrate the resources to those poor households that are vulnerable to extremely low consumption level and hunger in drought-affected regions of the country. Within each region though, the evidence provided above confirms that resources were well targeted.

The allocation within drought affected areas might also not be optimal. According to Salama et al. (2001) the humanitarian response of food aid and selective feeding programs at a few central locations translates in low coverage for remote and less accessible areas and may

⁵⁶ In reality a large proportion of the EGS was distributed under free food because of capacity constraints and lack of non-wage (cash) components for materials (Subbarao and Smith, 2004).

⁵⁷ Gilligan and Hoddinot (2004) provide evidence GR resources were better to the poor than EGS program, which were allocated largely to people able to work. Levinsohn and McMillan (2005) also found that households at all levels of income benefit from food aid and that – somewhat surprisingly – the benefits go disproportionately to the poorest households.

⁵⁸ Jayne et al., 2002 identify in inertia one of the possible causes of actual allocation of resources to the same areas, though the findings are disputed by the government.

have also contributed to increased communicable disease transmission and mortality by attracting non-immune, malnourished people to central locations. This is again a regional allocation issue. Similarly, Lentz and Barrett (2004 – cite with author’s permission) found that in the pastoralist areas, food aid flows tend to respond to readily observable rainfall measure. Data on transfers received indicate that self-targeting or other indicator-based targeting mechanism appear to better target the poor than does community based targeting. Moreover, the analysis suggests that food aid does not crowd out other transfers.

Given regional allocations, the second issue is how effective the targeting has been in the regions receiving food aid. Subbarao and Smith (2003) argue that in rural areas, targeting is generally very effective since extremely vulnerable households are selected in participating in the programs. However, the programs also benefited people from all income deciles in urban areas because the wage rate offered is not necessarily lower than the market wage.⁵⁹ In this case the possibility of attracting the non poor may have been avoided by the selection criteria, which was largely determined by the communities

There is also an increasing concern that “national policy-makers and the international community have adopted a ‘crisis management’ strategy that has resulted in dependence on food aid, rather than addressing the underlying problems of poverty and livelihood insecurity” (Devereux, Sharp and Amare, 2004). In their study Sharp, Devereux and Amare (2003) stress the need to utilize the additional international assistance resources to invest to address the underlying causes of chronic food insecurity instead of covering the emergency appeals and annual food deficits. They also suggest to move away from acute or transitory food insecurity towards the needs of a large (and possibly growing) group of people living permanently in extreme poverty, or ‘destitution’ – a highly vulnerable group which has been neglected in current policy discourses around poverty reduction.

A major change in the government’s approach to safety nets has been introduced in 2005, involving greater use of cash transfers and a longer term program focus. The new Productive Safety Net Programme (PSNP) is designed to address the longer term food security needs of 5 million chronically food-insecure people through cash and food transfers. Emergency food assistance programs will also continue, but at a lower level – only 2.2 million people in 2005 (compared with six to seven million people in previous recent years).⁶⁰

4.4 Government Response to Droughts

Given the absence of irrigation and major fluctuation in rainfall, food crop production is highly susceptible to droughts. Major droughts in Ethiopia occurred in 1971-75, 1984-85, 1999-00 and 2002-03, but nearly every year since 1980 at least some parts of the country have been

⁵⁹ CARE started a pilot food-for-work project in urban areas in 1993, and has targeted this program to extremely poor areas where at least 75 percent of the households earned less than the stipulated maximum income (500 birr/month in 1999-2000). See Garrett (2001).

⁶⁰ FAO/WFP (2005) and various government project papers.

affected by drought⁶¹. Some have been more severe than others, like the 1984, which led to a famine and the 1999-00 and 2002-03 crises.

The 1984-85 famine

A major famine occurred in the 1984-85 following an extended period of poor rains beginning in 1977. Almost eight million people were affected by food shortage during the crisis and at least one million people are estimated to have died.

The total production of cereal in 1984-85 was only 70 percent of the mean production of the previous three years. Moreover, variability in production was extremely high; some areas actually production surpluses.⁶² Both nominal and real prices of cereals increased dramatically in response to the production failure. The national price index for cereals is estimated to have increased from 89 in 1983 to over 220 in 1985 (Webb, von Braun and Yohannes, 1992). However, there were great disparities in the price increase: the cereal price in Dessie (in the food-deficit Wollo area) was three times as high as the price in Debre Markos (in Gojjam).

The severity of the production crises was exacerbated by the fact that Marxist military regime of that time had firmly refused to allow foreign aid into the country meanwhile concentrating most of its budget on a massive military buildup to finance the 20-year civil war in the Northern provinces of Eritrea and Tigre⁶³ (BBC, 2000b). At the same time Western governments were slow and reluctant to get involved – fearing to bear the cost of drought aid whilst the local government spent money buying weapons and building up its army.

Aftermath of the 1984-85 Crisis

The lessons from 1984 famine, which caused the death of almost one million people, prompted the new government, which took office in 1991, and the donor community to implement a series of reforms to minimize the impact of possible droughts the occurrence of another widespread famine.

In 1993 the GOE adopted the National Policy on Disaster Prevention and Management (NPDPM), to tackle disasters and reducing people's vulnerability to disasters. The National Disaster Prevention and Preparedness Committee (NDPPC) has the overall decision making responsibilities at national level for all matters regarding disaster prevention and management. The Disaster Prevention and Preparedness Commission (DPPC), formerly known as the Relief and Rehabilitation Commission (RRC), which was re-establishment in August 1995, is the secretariat of the National Committee co-ordinates the day-to-day activities pertaining to disaster prevention and preparedness.

⁶¹ Most droughts have been concentrated geographically in the central and northeastern highlands and in the southern lowlands.

⁶² See de Waal (1997) *Famine Crimes* for a good discussion of the regional disparities in this famine.

⁶³ Von Braun, Teku and Webb (1998) point out to the huge costs that the war had on Ethiopia population, financial resources and agriculture production.

The other main elements of the system of Preparedness include the Early Warning System (EWS), the Emergency Food Security Reserve (EFSR) and the National Disaster Prevention and Preparedness Fund (NDPPF). The objective of the EFSR is to provide adequate capacity to prevent disasters through provision of loans of food and non-food emergency items to agencies that are engaged in relief activities. Repayments and projected loans are expected to keep the physical stock above the minimum operational level, (100,000 tons in March, out of a total physical capacity of Food Reserve warehouses of 315,500 tons and an additional rented warehouse capacity of 30,000 tons.

In recent years, the DPPC has also taken the lead in the joint multi-agency seasonal assessments based on the analysis of major food security indicators, such as climate and weather, agricultural activities and crop production statistics, livestock conditions and other income sources. The assessment approach is mainly qualitative and it is based on information provided by Zones and woreda officials and it is supplemented by rapid rural assessment techniques. The assessment is then used to estimate the number of vulnerable population and the amount of resources need to avoid a crises situation⁶⁴. In addition, WFP prepares a Vulnerability Assessment Map (VAM) and other agencies conduct their own priority assessment.

Ethiopia has now one of the most advanced systems in Africa for monitoring weather changes and analyzing data on food harvests and social indicators. Nevertheless, the system has limitations and areas of concern. Notably, there are some reservations regarding the flow and reliability of data from local to national level and the fact that the system of monthly data collection is most established in crop-dependent areas. The system is weak in pastoral areas and in areas either not traditionally prone to famine or those historically marginalized (Lautze et al. 2003). Some report that the previous years estimates are a major determinant of current year's figures (Clay et al., 1999a, Lautze et al. 2003).

The 1999-2000 Crisis

The 1999-2000 crisis was the results of a series of events including repeated smaller weather shocks, lack of market access and the negative impact and the restrictions of movements due to the conflict with Eritrea. Even though a major famine was averted especially in the chronically vulnerable high lands, an estimated 10 million people needed food assistance at the height of the crises (Hammond and Maxwell, 2003; Maxwell 2002).

The overall drop in production in 1990-2000 with respect to the previous years was less than in 1985. This was the reflection of the fact that the 1998 harvest was worse than predicted and the 1999 harvest was not great either. Prices of grain and wheat (Figure 4.3) rose sharply in 1999 after being stable for the previous 5 years.

By that time the accumulated effect had been evaluated it was evident that the crises had a devastating impact on household consumption in the period before the following harvest and on household assets, especially in pastoral areas. DPPC estimated that the number of people in need of food rose from about 2 million in early 1999 to 10 million in July 2000 before declining to 3 million in December 2000 (Hammond and Maxwell, 2003).

⁶⁴ The various early warning and information system existing in Ethiopia is well described in Lautze et al. 2003.

The situation was exacerbated by the fact that the government was unable to intervene quickly because the stock reserves had not been replenished and new appeals have been slow due to the conflict with Eritrea⁶⁵. Eventually, by late 2000 interventions by the government and the international community brought the situation under control and averted a crisis of larger proportion.

The slow response of the government and international community caused the late arrival of food aid well into the following season. The large amount of food aid then might have caused a negative impact on the level of prices (Hammond and Maxwell, 2002)

The 2002-2003 Emergency

In 2003 Ethiopia experienced one of the worse drought in many years. Failure of the 2002 “Belg” rains (secondary rains from March through May) combined with delayed and sporadic 2002 “Meher” rains (main rains from May through September) were at the origin of the severe drought conditions and food insecurity in 2003.

Supplies of maize and teff tightened substantially and prices rapidly picked upward in 2002. It is estimated for example that at the end of July 2002 the Addis Ababa wholesale maize price was 70 percent higher than three months before. In Nakempte (Oromyia region), a surplus area, which is also one of the major supplies to the Addis market, the price was up 150 percent higher than in the previous harvest season (Harrison, 2002).

The drought also caused livestock to die at an increasing rate. Those animals, which remained alive, had significantly lowered body weight, which translated into poorer traction, reduced milk production, which again meant higher food insecurity. The crisis was further exacerbated by a decline in the world coffee prices, decrease in labor wages and market instability.

The annual multi-agency pre harvest assessment teams lead by DPPC, determined that 11.3 million people would require food aid in mid-2003 and almost 3 million would need close monitoring. As a result, about 13 million people (most of them children) needed food assistance (USAID, 2004). In December 2002 in addition to the appeal for food aid, the GOE also appealed for \$75 million in emergency non food assistance. While the food aid response has been adequate the non food assistance has been inadequate, reflecting a bias in the food aid response is due in part also to the nature of the early warning systems focused on food production (Lautze et al. 2003).

⁶⁵ Between 1998 and 2000 the war with Eritrea killed tens of thousands of people, forced about 350,000 people to leave their homes, damaged the country’s infrastructures and encouraged many foreign donors to freeze foreign aid to the country.

4.5 Concluding Observations

Lessons learned from the 1984 famine, which caused the death of almost one million people, helped to save lives in the following periodic droughts and avert a major humanitarian disaster in two larger crises that occurred since then (Subbarao and Smith, 2003). Even though the more recent crises, which were the results of cumulative failure of early (*belg*) and main (*meher*) rains, put many more people at risk because of population growth and the separation of farmland into much smaller parcels, major disasters were still avoided thanks to the changes that occurred in the past ten years. First of all, food production has increased and improvements in the road network have allowed better transport of food supplies. Second, Ethiopia set up one of the most advanced systems in Africa for monitoring weather changes and analyzing data on food harvests and social indicators. Third, the GOE set up of a reserve system, which holds about 350,000 metric tons of food in order to respond rapidly to food shortage.⁶⁶ Finally, the GOE has relied on the international community for receiving food aid imports to increase the amount of food available in the country and address production shortfalls. Food aid local purchases have also increased grain for targeted distribution.⁶⁷

However, even though the GOE has been able to avert a major famine in the last 20 years and per capita food production has increased in the last decade, there are still several issues that need to be addressed. First, local food availability needs to be increased and stabilized through increases in production and development of markets. This will require significant public investments in agricultural research and extension, irrigation, roads and other market infrastructure. Over the last three decades, much of this infrastructure has been damaged or destroyed during military conflicts, and defense expenditures crowded out these important public investments in agriculture and market infrastructure. Second, there is still the need for a coherent food and safety net policy to deal with recurrent shortfalls and chronic food insecurity to protect the most vulnerable population. In particular, repeated droughts have caused impoverishment of rural households that have exhausted their traditional coping mechanisms. Most farmers and pastoralists sold their last few livestock to purchase grains in order to smooth consumption and were forced to leave their farms for nearby towns; moreover many pastoralists shifted from herding camels to cattle which is more profitable when it comes to sell but is also more vulnerable to drought. Lastly, the response mechanisms to emergencies needs to make sure that the early warning system is linked and followed up with actions and the available level of stocks is sufficient to deal with seasonal and regional shortfalls (Hammond and Maxwell, 2002)

Still, some questions remain about the need and the utilization of food aid. Without very substantial investments in road and market infrastructure in Ethiopia (and in neighboring countries), private market development, and more transparent and pro-market government policies, international private sector trade flows cannot play a major role in stabilizing markets. In the absence of these market developments, imported food aid will continue to be an important instrument to maintain overall availability of food, particularly in drought years. Moreover, in

⁶⁶ However, the reserves have dropped significantly during the most recent crises, even though they were supposed to be replenished.

⁶⁷ Supplies of grain through local procurement are not guaranteed even when cash resources are available, however, as evidenced by the failure of the local procurement in 2002.

the absence of well-functioning internal domestic markets, some form of public distribution of food to households in deficit areas may be needed to stabilize local prices and maintain food availability.

In addition, more efforts are clearly needed to design programs that combine the “protective” role of food aid with a “productive” role, by including activities that promote farm productivity and increase human capital. As argued by Subbarao and Smith (2001), in low income countries such as Ethiopia large direct free transfer programs, either in cash or in-kind are not fiscally sustainable.

Finally, in a very poor country like Ethiopia, the use of programs that make use of geographical targeting will ensure the distribution of additional food aid resources to chronic poor in the drought affected areas. At the same time, however, it might exclude those chronic poor in the other parts of the country, who are still vulnerable to poverty, but are less likely to die of hunger.

5. FOOD AID AND FOOD SECURITY IN ZAMBIA

5.1 Introduction

Zambia has historically been the most urbanized country in SSA outside of the Republic of South Africa, though its urbanization rate (35 percent) is now equal to the sub-Saharan African average. The country reaps substantial foreign exchange earnings from copper mining (\$571 million in 2003, equal to \$55/capita). Nonetheless, a steadily declining per capita income over more than two decades due in large measure to a long-term decline in its copper mining industry, widespread poverty and severe droughts have led to severe chronic and transitory food insecurity in the country.

A former British colony, Zambia has been independent since 1964, following the dissolution of the Federation between Northern Rhodesia (Zambia), Southern Rhodesia (Zimbabwe) and Nyasaland (Malawi) in 1963. It inherited an economy based on mining and characterized by a dual agricultural production system of European settlers who cultivated maize on large farms near railway lines in the Central and Eastern regions of the country, and subsistence African farmers in the rest of the country.

Food policy in both 20th-century colonial Northern Rhodesia and in independent Zambia has been designed to achieve self-sufficiency in maize, the major staple, and to keep costs of food down for urban consumers. To achieve these objectives, various governments controlled prices and trade of maize and other agricultural products. Colonial governments set producer prices for European farmers at levels designed to cover their costs of production, taxed African producers, and subsidized sales to urban markets to keep wage costs down. Post-independence governments, up until the early 1990s, administratively set producer prices (equal for all farmers within a region) to keep production approximately at self-sufficiency levels, and continued to subsidize urban consumers.⁶⁸

In an effort to reduce fiscal deficits, maize subsidies were eliminated in 1986, but were soon restored because of riots in which 86 people died. In 1991, Kenneth Kaunda, the country's president since independence, was succeeded by Frederick Chiluba. The new government accelerated economic reforms, including liberalization of agricultural product markets and reduction of food subsidies and the eventual elimination of subsidized sales of maize flour in urban ration shops in 1993-94.

Production and income instability due to droughts remain serious threats to food security in Zambia, however. Along with much of the rest of southern Africa, the country suffered a severe drought in 1991 and 1992. Zambia was also hit by more localized droughts in its southern and western regions in 1994 and 1995, as well droughts in 1998 and 2001. Moreover, poverty remains widespread in both rural and urban areas. Child malnutrition is pervasive, affecting on average 22 percent of the households (47 percent of children and almost 60 percent of the poorest children). In addition, Zambia's population suffers from a high level of AIDS prevalence (close to 20 percent⁶⁹).

⁶⁸ See Jansen, (1988), especially pp. 60, 65, 66.

⁶⁹ World Bank (2003).

Box 5.1: Chronology of Key Events related to Zambia's Food Security

1924	The British colonial office takes control of Zambia (Northern Rhodesia). Large scale copper mining starts. Land is expropriated by European settlers who set up large commercial farms.
1953	Federation of Rhodesia and Nyasaland established encompassing Northern Rhodesia (Zambia), Southern Rhodesia (Zimbabwe) and Nyasaland (Malawi).
1964	Following the break up of the Federation in 1963, Zambia gains independent, with Kenneth Kaunda as the first president.
1970s	Civil wars and turmoil in neighboring countries have an adverse impact on Zambia's economy.
1980s	Economic declines due to a fall in the world price of copper and related crises in the mining sector.
1986	Maize subsidies are eliminated, but quickly restored after riots result in 86 deaths.
1989	Decontrol of most agricultural prices (not including maize).
1990	Riots in Lusaka and the Copper Belt after more than 100 percent increase in the controlled price of maize meal.
1991	Frederick Chiluba replaces Kenneth Kaunda as president. Liberalization of agricultural markets continues at a more rapid pace.
1991-92	Severe drought affects all of Southern Africa.
1993-94	Consumer subsidies on maize meal abolished; liberalization of import and export trade (export ban re-imposed in 1995).
1994-95	Drought affects southern and western parts of Zambia.
2001	After a few years of political turmoil and attempted coups, Patrick Levy Wanawasa becomes the new president in December 2001.
2001-02	Following a poor harvest in 2001, a combination of drought and flood causes large losses in cereal production in 2002.
2002	Zambia rejects food aid shipments of Genetically Modified (GM) maize.

In this context, food aid has added to food availability and increased the income of the poor in periods of crises and declining production, though government policies may have, at the same time, discouraged private sector imports. This chapter explores the role of food aid in

enhancing food security in Zambia in this context of widespread poverty, massive production instability and partially liberalized markets.

5.2 Availability of Food

Production

Crop production in Zambia, as in most of sub-Saharan Africa, is almost entirely dependent on rainfall, and is highly susceptible to droughts. Only 53 thousand hectares out of 1.2 million hectares of area cultivated (about 5 percent of total agricultural land is irrigated). Most crops are cultivated from November to April, with very little off-season production, except in the northern part of the country and irrigated areas.

There are three broad agro-ecological zones in Zambia: the western and southern valleys, the central zone, and the humid north. The valleys areas in the extreme western and southern areas receive little rainfall (800 mms per year) and have a short growing season; maize is grown here at subsistence level. The central zone of Zambia is the most productive agricultural area for both food and cash crops, in part because of its access to transport infrastructure, but also because of more rainfall (800-1000 mms/year) and a longer growing season (100-140 days). This area includes two sub-zones: the highly productive plateau areas of Lusaka, Central, Eastern and Southern provinces and the less productive Kalahari sand plateau and Zambezi river flood plain. Rainfall (1000-1200 mms/year) and the growing season (120-150 days) are longest in the north, but the region has limited agricultural production potential because of higher soil acidity. Cassava is a major crop here in terms of both production and consumption. (FEWSNET, 2004).

Maize dominates cereal production in Zambia, accounting for about 85 percent of both area cultivated and production of cereals in 2000-04 (Table 5.1 and Figure 5.1). Production systems vary markedly across the country, however. Farms along the rail line in southern and central Zambia, cultivated by European settlers before independence, on average are larger, use more fertilizer per hectare, cultivate more hybrid maize, and have higher yields than do farms in the rest of the country.

The distribution of farm size is highly skewed, to a large extent due to the country's colonial legacy. Half of the "native reserve" land, formerly allocated to European settlers and which later became "state land", was granted to individuals after Independence, mostly for farming. Much of this land is now cultivated by medium- and large-scale commercial farmers (about 1 percent of farm households) with farm sizes of 20-40 hectares and about 700 large-scale, high-input mechanized farmers cultivating up to 600 hectares. The majority of farmers (70 to 80 percent of farm households), however, are traditional farmers, with average landholdings of about 2 hectares per household, using mainly family labor and producing for own consumption. Small-scale commercial farmers (about 10-20 percent of households), cultivating from 5-20 hectares per farm, account for the remainder of the farms.⁷⁰ Only about five percent of cultivated area is irrigated (only 53 thousand hectares); the commercial sector and large-scale irrigation accounted for 58 and 38 percent of this total; small holder and medium scale irrigation accounted for the

⁷⁰ Figures on distribution of land are from Jansen (1988).

remaining 4 percent.⁷¹ Most of these commercial farms produce irrigated wheat in the winter season.

Table 5.1: Zambia: Crop Production, 1980-2004

	Annual Average			Growth Rates		
	1980-1989	1990-1999	2000-2004	1980-1989	1990-1999	2000-2004
Agriculture, Total						
Area ('000 ha)	982	1215	1187	6.9	0.4	4.7
Cereals						
Production ('000 tons)	1,243	1,137	1,041	8.8	-1.0	11.0
Area ('000 ha)	687	774	691	6.7	-0.7	8.9
Yield (tons/ha)	1.79	1.47	1.50	2.0	-0.2	1.9
Maize						
Production ('000 tons)	1,171	986	881	8.5	-1.7	12.8
Area ('000 ha)	608	633	586	6.2	-1.7	11.5
Yield (tons/ha)	1.91	1.55	1.49	2.2	0.0	1.2
Cassava						
Production ('000 MT)*	97	187	231	5.8	3.1	3.1
Area ('000 ha)	63	122	165	5.8	3.7	0.0
Yield (tons/ha)*	1.55	1.54	1.40	0.0	-0.5	3.1
Cereals plus Cassava						
Production ('000 tons)*	1,340	1,324	1,271	8.6	-0.4	9.5
Area ('000 ha)	749	896	856	6.6	-0.1	7.1
Yield (tons/ha)*	1.77	1.48	1.48	1.8	-0.3	2.2

Source: FAOSTAT, authors' calculations.

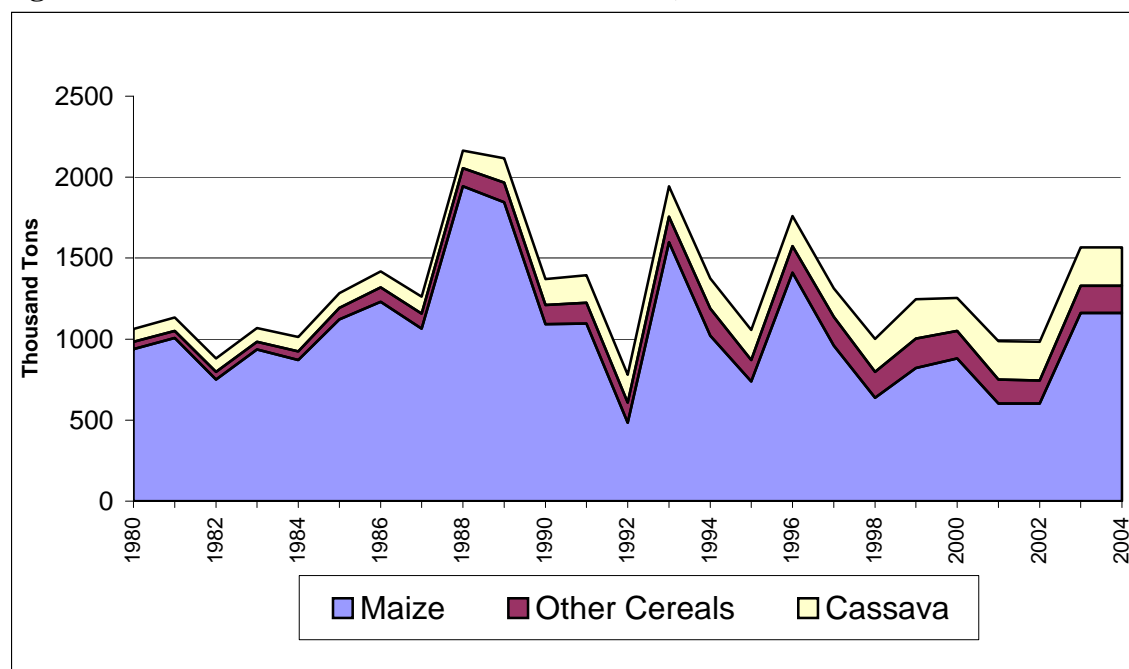
Note: Cassava production and yields expressed in grain equivalents, calculated as weight of root times 0.25.

Production of maize hovered around 1.0 million tons per year from 1980 through 1987, but then jumped to 1.9 million tons in 1988 due to a sharp increase in yields due to good weather and increased use of hybrid seeds and fertilizer. Production also reached 1.8 million tons the following year, as area cultivated increased sharply to offset a return to normal average yields. During the 1990s, however, production fluctuated sharply, between 0.5 million tons in 1992 (a year of severe drought) and 1.6 million tons in 1993, with average annual growth in maize production for the decade of -1.7 percent per year. A major reason for this decline in maize production was the abandonment of the policy of pan-territorial prices and large-scale government procurement, which reduced price incentives for maize cultivation, particularly in more remote areas (described in more detail below). Area planted to maize, use of hybrid seeds and use of fertilizer all declined (fertilizer use declined from 80.4 thousand tons in 1985-89 to 68.2 in 1990-95). (Jayne and Jones, 1997; Zulu et al., 2000; VAC, 2003).

Maize sales are highly concentrated amongst the larger farms. Commercial farms account for well over half of marketed maize. Half of smallholder maize sales derive from the top 0.5 percent of maize selling households. And almost two-thirds of rural households did not sell any maize. Relatively few households in Zambia sell maize at harvest and then purchase maize later in the season (Jayne, Tembo and Nijhoff, 2005).

⁷¹ Water Right Survey (1994); Kalinda, Maimbo and Mushimba (2003), p. 47.

Figure 5.1: Zambia: Cereal and Cassava Production, 1980-2004



Source: FAOSTAT.

Note: Cassava production expressed in grain equivalents, calculated as weight of root times 0.25.

As production incentives for maize diminished, incentives for production of other crops, for which producer prices had generally been set far below border price levels (Jansen, 1988), rose both in relative and absolute terms. In particular, following market liberalization, groundnut area cultivated more than doubled between 1990/91 and 1996/97 and cotton area increased by 50 percent.⁷²

Production of cassava, the second most important food staple in Zambia, has increased steadily. With growth rates of 5.8 percent per year in the 1980s and 3.1 percent per year in the 1990s, cassava production tripled between 1980 and 2001. Over 60 percent of production takes place in Northern and Luapula provinces, where per capita rural production is about three times per capita rural maize production (Table 5.2). (Zulu et al., 2000)

Production of other grains has also increased. Wheat production, grown exclusively on irrigated land in the winter season, increased ten-fold from 10 thousand tons in 1980 to 100 thousand tons in 2003. Production of millet and sorghum, cultivating mainly in the drier northern regions, increased from a total of 35 thousand tons in 1980 to 54 thousand tons in 2003.

⁷² See McCulloch, Baulch and Cherel-Robson, 2000.

Table 5.2: Regional Production of Maize and Cassava, 1998-99

Province	Maize					Cassava				
	Rural	Urban	Total	Share	Per Cap*	Rural	Urban	Total	Share	Per Cap
Central	186.5	18.8	205.3	24.5%	182.8	11.8	0.0	11.8	5.8%	11.5
Copperbelt	36.5	28.0	64.5	7.7%	20.0	2.9	0.5	3.3	1.7%	1.6
Eastern	208.6	9.7	218.4	26.1%	161.0	1.6	0.1	1.7	0.9%	1.2
Luapula	11.8	4.6	16.4	2.0%	17.0	48.9	1.4	50.3	25.0%	70.5
Lusaka	31.9	17.3	49.3	5.9%	20.9	0.0	0.5	0.5	0.3%	0.0
Northern	34.9	5.9	40.8	4.9%	28.5	92.9	1.3	94.2	46.7%	75.9
North-Western	36.4	4.9	41.2	4.9%	66.0	22.9	1.0	23.9	11.8%	41.6
Southern	156.2	6.4	162.6	19.4%	121.5	1.3	0.0	1.3	0.6%	1.0
Western	35.2	2.7	37.9	4.5%	47.3	14.6	0.1	14.6	7.3%	19.6
Total	738.0	98.3	836.3	100.0%	72.6	196.8	4.9	201.7	100.0%	19.3

Source: Zambia National Household Income and Expenditure Survey, 1998-99.

Market Regulation and Liberalization

Prior to about 1920, there was relatively little farming by European settlers in British Rhodesia (including northern Rhodesia, i.e. Zambia). Most food produced in these areas derived from African farmers; these settlers had little involvement with farming, but were instead largely concerned with copper mining. During the 1920s, the number of European farmers expanded greatly, however, and when export prices of maize collapsed during the Great Depression of the 1930s, the colonial governments in Northern Rhodesia responded with the Maize Control Act and the Establishment of the Maize Control Board in 1936. State crop buying stations implemented a system of dual pricing with European farmers close to rail links receiving on average 41 percent higher prices than did Africans from 1936 to 1958. In order to prevent grain flows out of African areas to higher-priced crop buying centers, inter-district movement restrictions on maize flows were also imposed. These inter-district bans on maize movements also stifled the development of the milling sectors in maize-deficit rural areas by starving local small hammer mills of maize supply and guaranteeing a market for maize meal milled by large mills (using roller mill technology) in other parts of Zambia. (Jayne and Jones, 1997; pp. 1507-1509)

Expanding small holder production and achieving self-sufficiency in white maize were major policy objectives of Zambia and other east and southern African governments in the early 1960s. State crop buying stations were expanded into smallholder areas that had been earlier excluded from the colonial system, and direct state control over markets was maintained. As the scale of purchases increased, marketing board costs rose even more rapidly due to pan-territorial pricing (which entailed higher actual costs of grain procurement in remote areas), low prices (and implicit subsidies) for urban consumers, storage losses and corruption (Jayne and Jones, 1997; pp. 1510). Unlike the colonial system in which maize subsidies to large farmers and urban consumers were funded through implicit taxes on the grain sales of African smallholders, food subsidies in post-independence Zambia were largely paid directly from the treasury, and were a major cause of macro-economic instability (maize subsidies reached 13.7 percent of government

budget expenditures in 1990)⁷³. When the sales price of rationed maize meal was raised in 1986, food riots resulted, leaving 86 people dead, and the subsidy was quickly re-instated.⁷⁴ From 1989 to 1992, a maize meal coupon program replaced ration sales, but consumer subsidies were not finally abolished until 1993/94.

Similarly, market liberalization began in 1986, but remains incomplete even today. Inter-district trade was liberalized in 1986, but import and export trade were not liberalized until 1994 (and then the export ban was re-instated in 1995). In 1989, the National Agriculture Marketing Board (NAMBOARD) was eliminated, its function allocated to local cooperatives and prices of most agricultural commodities (not including maize) were liberalized. Fertilizer and other input subsidies were eliminated in 1992.

Nonetheless, liberalization of domestic maize markets benefited consumers in deficit rural areas since it enabled flows of maize grain (formerly banned) to these areas, where it could milled at low cost at small local hammer mills. Previously, these small mills lacked sufficient maize supplies for part of the year, leaving only higher cost maize flour derived from large mills near urban centers to supply these markets. (Sashemani, 1998; Jayne and Jones, 1997). Small farmers in remote areas suffered income losses due to the liberalization, however, not only because of the end of high-priced government procurement of maize, but also because of less access to inputs and credit (Sashemani, 1998).

In spite of the liberalization, the government continued to intervene in food markets. In 1995, the government established the Food Reserve Agency (FRA) to purchase and manage maize for the national food reserve and to collect and disseminate marketing and trade information. The FRA also attempted to stabilize market prices through sales of maize to selected mills at below market prices. The volume and total cost of government imports was excessive, however.⁷⁵ In addition, these public sector subsidized sales to mills had adverse effects on the private trade, particularly in late 1997 and early 1998 (Jayne et al., 1999).

The Crop Marketing Authority (CMA) replaced the FRA in 2003 with the mandate to promote markets (with the introduction of grades and standards) and to maintain strategic reserve stocks enough to ensure market supplies for three months, (100 thousand tons, according to the CMA Concept Note). Nijhoff et al., (2003) argue that since food emergencies in Zambia develop slowly and early warning systems are in place, a combination of food aid, government commercial imports and private sector imports is sufficient to supply markets. Thus, government stocks are redundant and may even destabilize markets by discouraging private stockholding and imports.

⁷³ McCulloch, Baulch and Cherel-Robson, 2000. According to Smale and Jane (2003) maize subsidies in the 80s reached 17 percent of government spending.

⁷⁴ In 1989, Zambia agreed to its second adjustment plan with the IMF, and removed all price controls on consumer goods, except for maize. Controlled prices of high grade maize meal were raised by over 100 percent in 1990, and when riots in Lusaka and the Copperbelt ensued, the Zambian government postponed further reduction of maize meal subsidies, ultimately leading to the end of international financial support to Zambia. See Litchfield and McCulloch, 2003 (p.7).

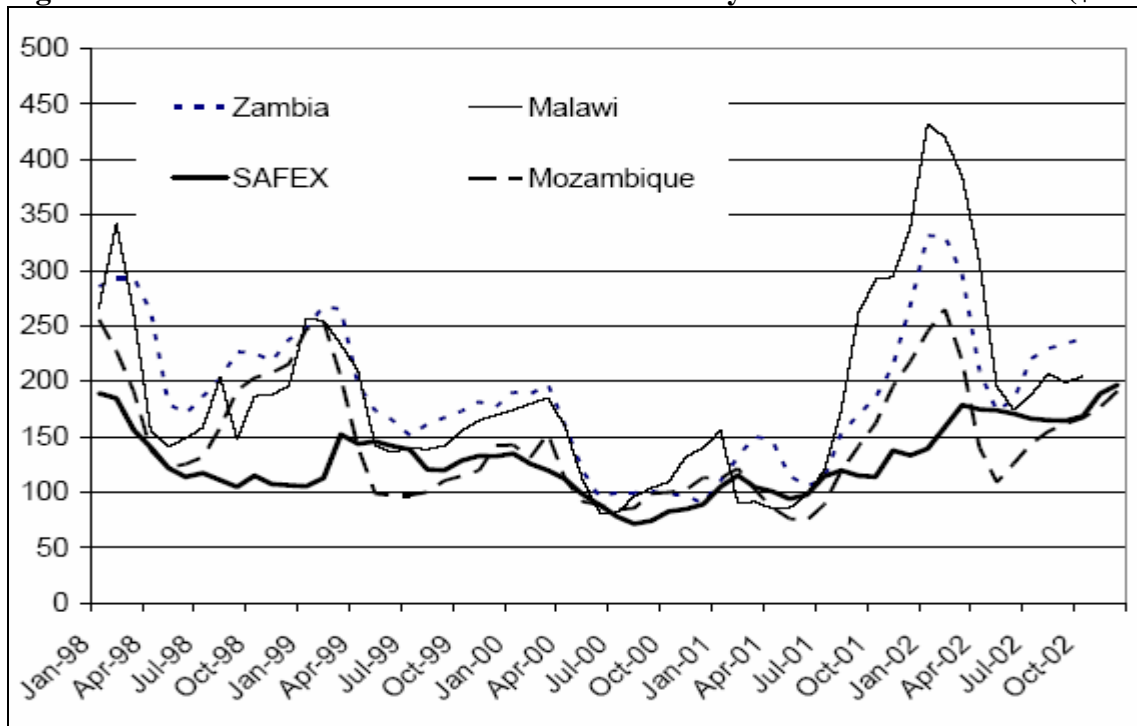
⁷⁵ FRA contracts from Zimbabwe and South Africa for 410 thousand tons at approximately US\$205/ton, estimated to be three times the amount needed to meet likely level of demand at import parity prices (Kalinda, Maimbo and Mushimba, 2003, p. 52).

Seasonal and Regional Prices

As in Ethiopia and many other countries of sub-Saharan Africa, seasonal and regional production patterns in Zambia combined with high marketing costs result in large seasonal and regional price variability. Monthly wholesale maize prices in major markets in Zambia indicate substantial price variability across space and time. Nominal prices (expressed in kwacha) from January 1996 to February 2003 in the highest price markets (Northern province) were on average 19 percent greater than prices in the lowest price markets (Southern province). In the same period, coefficients of variation ranged from 0.59 in the Northern region to 0.64 in Lusaka and 0.76 in the Southern region. Mean absolute percentage changes ranged from 10 to 13 percent across markets. There is also substantial seasonal movement in prices. Prices rise by on average almost 100 percent between the maize harvest in May and their peak in February/March. (Oygaard et. al, 2003, pp.4,7, etc).

Prices are highly variable in dollar terms, as well. Between January 1998 and December 2002, Zambia's prices ranged by over 300 percent, between about \$90/ton and \$330/ton. By comparison, prices of white maize in South Africa (SAFEX) ranged from \$75/ton in September 2001 to about \$200/ton in December 2002 (Figure 5.2).

Figure 5.2: Maize Prices in Southern Africa: January 1998 – December 2002 (\$/ton)



Source: Oygaard et. al. (2003), p. 10, using data from Safex, FEWS NET.

There is some evidence that liberalization led to reductions in marketing costs. Within-city marketing margins showed a downward trend over time from January 1995 through early 1997, as measured by the difference between wholesale and retail prices for maize in public markets. There is little evidence of declining margins (transactions costs) between cities over this same period, however. Survey evidence indicated a lack of effective competition among

traders who purchased from farmers, and very poor access to communications, transportation and market information by farmers (Kahkonen and Leathers, 1999).

International Trade and Food Aid

International trade (including food aid) constitutes a major share of total cereal availability in Zambia. Since 1980, net commercial imports (both government and private sector) and food aid have accounted for one fifth of total cereal availability.⁷⁶ The share of net imports in total availability has actually declined since liberalization, however, falling from an average of 23.4 percent of annual availability from 1980 to 1997 to only 16.5 percent of average availability from 1994 to 2003, despite a decline in overall average cereal production from 1.23 to 1.04 million tons over the two periods (Table 5.3). Overall, over the entire 1980-2003, average commercial imports have been twice the magnitude of food aid imports (214 thousand tons and 85 thousand tons, respectively). In the post-trade liberalization period (1994-2003), the share of food aid in total imports is even smaller (about 15 percent), as food aid flows have averaged only 30 thousand tons per year, compared with 175 thousand tons per year of commercial net imports. Thus, in this period, food aid has only been about 3 percent of total availability (compared to about 12 percent in the 1980-93 period).

Table 5.3: Zambia: Maize Production, Net Imports and Food Aid, 1980-2003

Year	Production	Net Imports	Food Aid	Avail.	Imps/Avail
Quantity (thousand tons)					
1980-2003	1,153.1	214.4	84.7	1,452.2	20.5%
1980-1993	1,230.9	242.7	123.7	1,597.3	23.4%
1994-2003	1,044.3	174.8	30.0	1,249.1	16.5%
Coefficient of Variation					
1980-2003	0.323	0.763	1.358	0.244	0.693
1980-1993	0.344	0.717	1.112	0.223	0.637
1994-2003	0.259	0.841	0.928	0.196	0.777

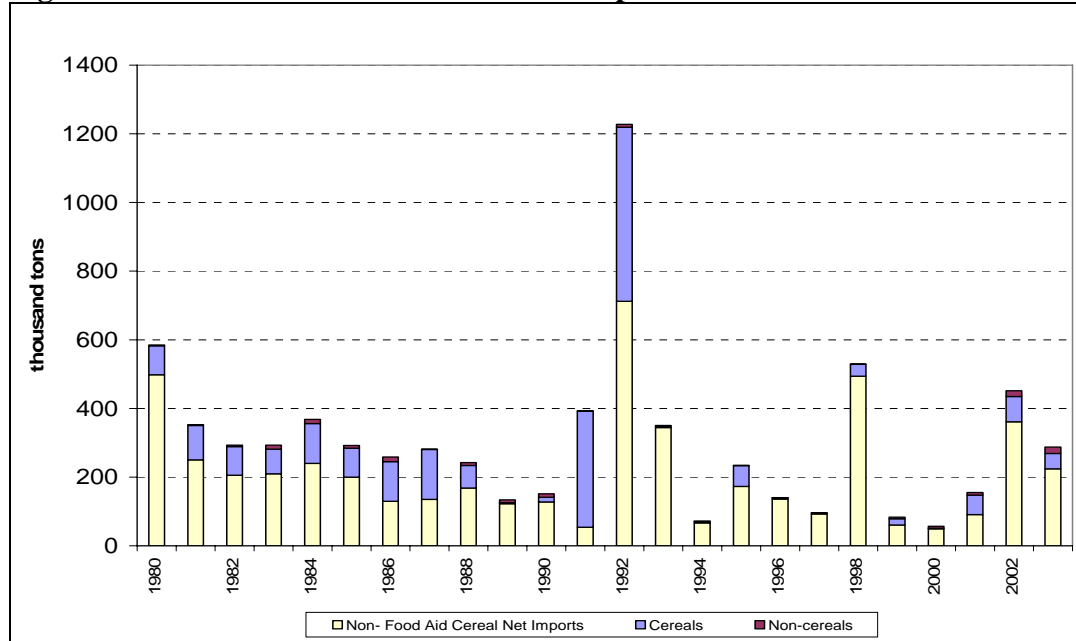
Note: Imports/Availability uses total net imports (including food aid).

Source: FAOSTAT, WFP and authors' calculations.

These period-average import totals mask substantial year-to-year fluctuations, however (Figure 5.3). Total net cereal imports exceeded 1.2 million tons in 1992 following severe droughts throughout southern Africa, but have exceeded 400 thousand tons in only three other years since 1980 (1980, 1998 and 2002). From 1994 to 2003, total net imports were less than 200 thousand tons per year in six out of ten years.

⁷⁶ Zambia has had small volumes of maize exports every year from 1985 to 2003, averaging seven thousand tons per year from 1994-2003, with the largest export volumes in 1986 (35 thousand tons) and 2000 (20 thousand tons). In no years since 1980, however, were there net exports.

Figure 5.3: Zambia: Food Aid and Other Imports 1980-2002



Source: FAOSTAT.

Although private sector international trade (which was not liberalized until the 1990s) has added to supplies, it has not effectively stabilized market prices. In part, this is because production shortfalls in Zambia due to droughts have coincided with shortfalls and high prices in neighboring countries. This was especially important in 1992 when drought affected the entire southern African region and most countries placed restrictions on cross-border grain movements. These restrictions have hindered Zambia's exports of maize, as well. In 2004, even though Zambia had a significant maize surplus, no restrictions on grain exports, and lower prices than neighboring Zimbabwe, trade flows from Zambia to Zimbabwe were very small until late 2004.

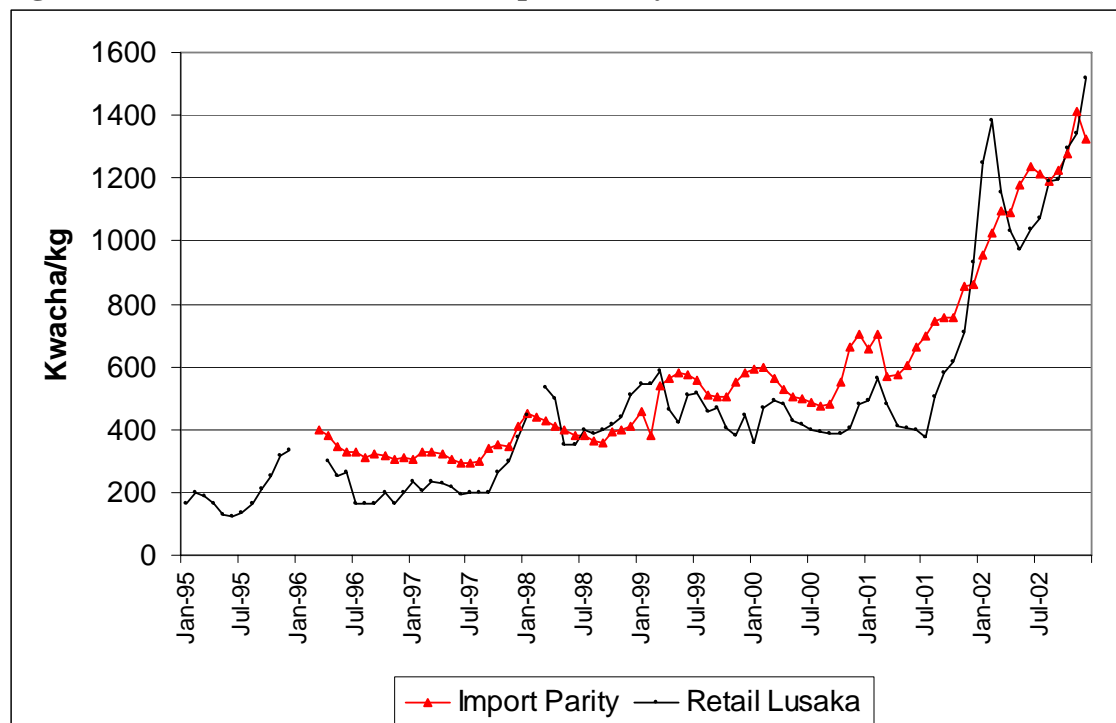
In addition, government interventions in markets have hampered the functioning of private sector international trade. Although private trade is legal, imports (and exports) of white maize still require permits. Thus, the government maintains controls on the volume of formal trade. Moreover, the possibility of government imports and sales (such as by FRA in the late 1990s) created uncertainty regarding future supplies and prices and thus discouraged private international trade.⁷⁷ Even when the government formally encouraged private sector imports, as it did following the poor harvest in early 2002, significant restrictions and uncertainties remained. At that time, the government waived the duty on imported maize grain, but set an import quota of 300 thousand tons. Imports restrictions on maize flour (mealie meal) also remained (Kalinda, Maimbo and Mushimba, 2003). As a result, the volume of private grain

⁷⁷ For example, in August 2001, the Government of Zambia made arrangements to import 200 thousand tons of maize to be sold at subsidized price to selected millers. (The landed cost of commercial maize imports was \$220-260/ton; government sponsored imports were to be sold to millers at \$160/ton for contracts signed before January 2002, and \$200/ton, thereafter.) As a result, private companies generally refrained from importing on their own account for several months. In the end the GOZ was able to procure only 130 thousand of the planned 200 thousand tons, leading to a significant increase in market prices beginning in December 2001 (Nijhoff et. al, 2002).

import flows were insufficient to prevent the retail price of maize from rising above the import parity price in Lusaka (Figure 5.4).

Similarly, private sector efforts to export maize in surplus years have been thwarted. Several multinational trading firms, including Cargill, Louis Dreyfus, Glencore and Exatrade attempted to operate from Zambia in the mid-1990s, but left shortly thereafter because of the uncertainties caused by export restrictions and financial losses (Nijhoff et. al., 2003; p.13).

Figure 5.4: Zambia: Domestic and Import Parity Prices of White Maize, 1995-2002



Note: Import parity calculations assume a \$40/ton transport and handling costs from South Africa to Lusaka, Zambia plus a 30 percent marketing margin.

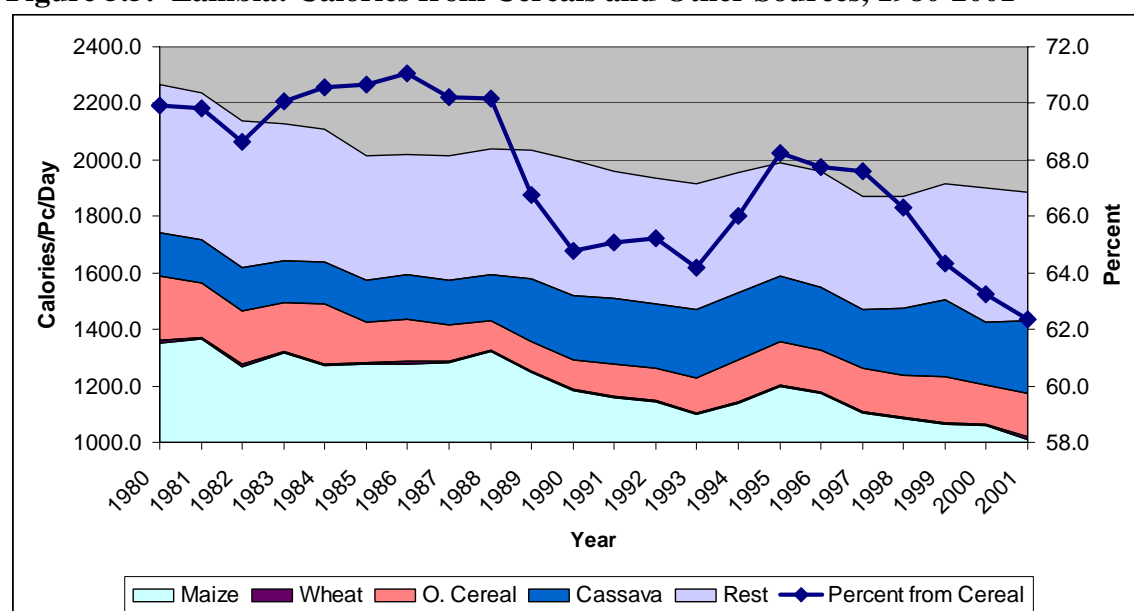
Source: FEWSNET and author's calculations.

5.3 Food Consumption and Safety Nets

Total calories consumption has been decreasing since 1980, largely because of the decline in domestic maize production and consumption (Figure 5.5). Total calorie consumption fell from about 2200 calories/person/day in the 1980s to less than 1900 calories/person/day in 2001. This decline would have been even greater if not for an increase in cassava production and consumption. Cassava accounted for only 5 percent of total availability of cereals and cassava (dry weight) combined in 1980, but this share rose to an average of 17 percent from 2000 to 2003, and reached 21 percent in the 2000-01 drought year.⁷⁸

⁷⁸ Production of other root crops remains small, though. According to FAO data, 53 thousand tons of sweet potatoes were produced in Zambia in 2001, accounting for 12 calories/capita/day, less than 5 percent of cassava consumption.

Figure 5.5: Zambia: Calories from Cereals and Other Sources, 1980-2001



Source: FAO

Household survey data from 1998 indicate that poor people allocate a large amount of their expenditure on cereal consumption and almost one third on maize (Table 5.4). The bottom 30 percent of the population in rural areas spend 77 percent on food, of which 44 percent on cereal and 27 percent on maize. In urban areas, the very poor, appear to be even more dependent on maize. They spend 70 percent on food and 33 percent on cereal, almost all of it (27 percent) on maize. In contrast non poor people in the urban areas spend only 54 percent on food and 17 percent on cereal and only 11 percent on maize.

Table 5.4: Zambia: Household Food Budget Shares in Rural and Urban Areas, 1998

	Maize	O Cereals	All Cereal	Tuberous	Fruits and Veg	Meat and Fish	Food Share
RURAL							
Non Poor	12.4	7.5	19.9	3.3	16.0	20.5	70.7
Poor	21.1	11.7	32.8	3.2	12.2	15.4	73.5
Bot 30%	27.4	16.6	44.0	2.5	9.7	12.1	77.2
Total	21.0	12.4	33.4	3.0	12.3	15.5	73.8
URBAN							
Non Poor	9.6	7.2	16.8	1.9	9.0	12.1	53.6
Poor	18.9	7.6	26.5	2.0	11.0	11.6	64.2
Bot 30%	27.7	5.8	33.5	2.2	13.9	9.2	69.3
Total	14.6	7.2	21.8	2.0	10.2	11.7	59.0
ALL							
Non Poor	10.8	7.3	18.1	2.5	12.0	15.7	60.9
Poor	20.3	10.3	30.6	2.8	11.8	14.1	70.5
Bot 30%	27.4	15.2	42.6	2.4	10.2	11.7	76.1
Total	18.7	10.4	29.1	2.6	11.6	14.1	68.4

Source: Zambia 1998 and Household Living Conditions Monitoring Surveys and authors' calculations.

Another important dimension of maize consumption to take into account in Zambia is the form in which maize is consumed. Consumers have the choice to bring the grain to the local hammer mills and receive *mugaiwa* or to purchase ready made packages of roller or breakfast meals produced by the larger mills, which have a smaller extraction rate⁷⁹ and are more expensive than *mugaiwa*. While *mugaiwa* is consumed mostly by 80 percent of rural households and low income consumers in urban areas, richer consumers prefer to purchase the ready made products. This means that when there is in case of shortage of maize in the market the larger mills are those that import the maize from abroad, facilitated by the government, then poor consumers are forced to pay higher prices for the maize. (Mwinga et al., 2002)

Vulnerable groups. Poor consumers are also more vulnerable to the negative impact of drought and other production shortfalls. A recent vulnerability survey, identified the Luangwa valley, Gwembe valley, Shangombo, Kazungula/Sesheke and Mambwe as most drought-vulnerable zones (maize growing districts that are often affected by droughts/floods) (VAC, 2003). It is estimated that the probability of suffering from drought is higher for widow and separated female headed households, households whose income comes mainly from agriculture and that have a large proportion of area under crop (del Ninno and Marini, 2005).

Safety Nets

Food aid programs have been the prominent safety net in Zambia and in Southern Africa region for much of the past 15 years. The lack of famine mortality, the lack of widespread social disruption, familiar relief foods, and distribution of food through market channels all made it easier for Southern Africa to recover from the disastrous agricultural conditions in 1991/92. Food relief has been distributed in 1990/91, 1995, 1997/8 and in 2001. In June 2002, after the last drought, 10.5 kg of food relief for each person per month was distributed 4-to 6 times over the course of the year to targeted households. Evidence shows that sometimes the resources were targeted by local committees to vulnerable population, other times they were distributed equally to all households in smaller quantities (VAC 2003). Other food aid activities included: food for assets, school feeding programs, supplementary feeding, and support to HIV/AIDS affected households.

Food for work and cash for work programs were implemented after the 1995 crises in the Western province between 1995 and 1997. In some cases, cash for work has been used instead of food for work to provide income, stimulate the economy and to build necessary infrastructure. A cash-for-work project implemented in Western Province was found to generate a range of benefits not normally associated with food-for-work, including income and employment multipliers, investment of cash-for-work earnings in farming and non-farm enterprises, stimulation of trade, and food price stabilization (Devereux, 2003, 2002b). The cash for work programs had limited effects on food prices, however, because the injection of cash attracted traders and an inflow of commodities. Unfortunately, at the end of the projects, these areas suffered massive economic recession. (Devereux, 2000)

⁷⁹ The extraction rate for *mugaiwa* is 99 percent compared to that of roller meal, which is 85 percent and of breakfast meal, which is 65 percent.

Impact of food aid. According to some accounts (Devereux, 2000), Zambia may have started to become dependent on food aid in the 1990's. Between 1990 and 1995, in response to several droughts, and the inertia associated to the establishment of the food aid pipeline and the need to address the food insecurity, the same areas in the western region received food aid 4 out of 5 years, possibly creating a food aid dependency mentality.

Food aid supplied about 5 percent of the annual caloric requirement on average, but in the Southern regions, it accounted for 10-15 percent of total annual caloric requirements, and was thus a major component of livelihoods in these regions. Even though limited targeting weakened the impact of food relief on the most vulnerable households, the vulnerability assessment (Zambia VAC, 2003) showed that most poor households were able to meet their basic annual caloric requirement of 2200kcal/pc/day through a combination of crops grown in their own farms (maize, cassava, pumpkins), market purchase⁸⁰ and exchange for food.

The drought recovery project implemented after the 2001 crises focused on the implementation of safety nets interventions, mostly public works and agricultural inputs subsidies. Some reports mention the existence of constraints in the implementation of public works shifted the focus on food handout and poor targeting (Kalinda et al, 2003).

Sometimes food aid resources have been used in a very useful way, like in the case of the cash for work projects in the Western province after the 1995 crises (Devereux, 2002a). Other time, like in the case of the 2001 crises, they have been criticized for poor implementation and targeting (Kalinda et al, 2003).

Other Coping mechanisms. The main coping mechanism used a time of crises include reducing consumption, skipping meals, selling and eating wild foods, selling livestock and assets, cutting expenditures on health and education – taking children out of school, migrating in search of work. Other coping strategies consisted on changes in food consumption. Affected individuals looked for food from other sources, moved away from more expensive foods and reduced the number of meals per day (Zambia VAC 2003??). Even though maize represents the most important staple food, cassava and other cereals represent an important form of mitigating and coping mechanisms and help reducing the food deficit.

5.4 Government Response to Food Crises

Highly variable rainfall and lack of irrigation make Zambia vulnerable to droughts. In the last fifteen years, the country suffered three major droughts: in 1991-92, 1994-95 and 2001-02. These droughts affected farmers who lost crops and livestock, and consumer who faced sharply higher prices. In an effort to protect food security during these droughts, Zambian governments have attempted to increase food supplies through a combination of government commercial imports, food aid and private sector imports (and bans on exports). Food and cash

⁸⁰ Income for purchase came mainly from sale of milk/livestock, casual labor, cross- border trade and other sources.

transfer programs have been implemented as well, in an effort to increase access to food by food-insecure households.⁸¹

The 1991-92 Drought. In 1992, a severe drought affected all of Southern Africa, reducing southern African cereal harvests by 11.4 million tons (compared to average production). These production shortfalls placed more than 17 million persons at risk, 15 million of these in Malawi, Zimbabwe, Mozambique, and Zambia. Maize production in Zambia in 1991/92 was only 600 thousand tons, half that of the previous year, and less than one-third of the record harvests in 1998 and 1999.

A massive and timely international response averted famine, prevented off-farm migration, and facilitated recovery. The United States, which had record amounts of yellow corn on hand at the time that Southern Africa needed it most, delivered about 12 million tons of grain to southern Africa in 1992. Good market infrastructure, coordination among donors and absence of a conflict and the use of NGO contributed to the success of the emergency relief operations (Callihan, Eriksen and Herrick, 1994). Food aid grain shipments to Zambia of 500 thousand tons were supplemented by 700 thousand tons of commercial imports, so that, ultimately, cereals availability per capita in 1991/92 (211 kgs/person) was greater than in the previous two years, and only slightly less than the average for 1980-93 (216 kgs/person) (Figure 5.4).

The 1994-95 Drought. In 1994-95, Zambia suffered a moderate drought that mainly affected the Southern and Western provinces. National cereal production fell by about 300 thousand tons (about 30 percent of 1994 cereal production of 1190 thousand tons). In July 1995, the government made an appeal for 85 thousand tons of food aid; ultimately 61 thousand tons of food aid were received, supplemented by 176 thousand tons of commercial imports. Cereal availability per capita food fell to 118 kgs/person, 56 percent of the per capital availability in 1991/92. Most of the food aid was distributed through food for work programs. Nonetheless, Devereaux (2000) argues that substantial sales of food aid (mainly in small towns along rail lines) that took place show that the quantities distributed were too large, arrived too late, and were poorly targeted. In addition, the government also distributed seeds and credit for drought rehabilitation.

The 2001-02 crisis. Poor rains over two consecutive crop years (2000-01) and (2001-02) caused severe production and supply shortfalls in Zambia and elsewhere in southern Africa that were not relieved until the 2002-03 crop was harvested in early 2003. In 2000-01, prolonged dry spells in Southern and Western Zambia, (in some areas the second or third consecutive year period of poor rains), combined with excessive rains and flooding that destroyed crops in other areas to cause a 29 percent (300 thousand ton) decline in cereal production relative to decline (WB, 2002).

Cereal production was equally poor in the following cropping season due to a more extended drought that affected larger parts of the country. Maize prices increased up to 5 times

⁸¹ Expansion of minor irrigation is one potential alternative response to recurring droughts to increase food availability.

the five-year average and in some southern provinces, maize was not available on the market. (*WFP 2003, WFP 2002*).⁸² At the peak of the crises, 2.9 million (26 percent of total population) were estimated to be in need of food assistance. The worst affected areas were in the south, where 60 percent of the population was deemed to be in need of relief food, and in valley districts.

In June 2002 the government of Zambia declared the southern region to be a disaster area and issued an appeal for humanitarian aid. Subsequently, the National Vulnerability Assessment Committee, a consortium of government, NGOs, and UN agencies, initiated a series of food security assessments in August and December 2002 and April 2003 in order to identify needs, inform food aid distribution priorities within the country. This was part of a regional initiative coordinated by the South African Development Community (SADC), Food Agriculture and Natural Resources (FANR) Vulnerability Assessment Committee (Tschirley et al. 2004). However, the government decision in 2002 to prohibit the distribution of GM maize as relief food, even if milled, resulted in a large amount of food stocks to be removed from the country and others that were in the pipeline to be diverted.

Moreover, the early warning system (FEWSNET) played a crucial role in the planning for the shipment of food aid to the southern African region in advance of the depletion of local stocks (USAID, 2003). Strategic reserves were very small and did not play a major role in the response to the crisis (Tschirley et al. 2004).

In total, Zambia received 176 thousand tons of food aid in 2000-01 to 2002-03 period. Nonetheless, per capita availability of cereals dropped to only 85 kgs/person in 2000-01, in spite of 106 thousand tons of commercial imports and 57 thousand tons of food aid. Commercial imports played a larger role in 2001-02 (367 thousand tons of commercial imports) and combined with 74 thousand tons of food aid helped to raise per capita cereal availability to 110 kgs/person in 2001-02, though still only about half of per capita cereal availability in the 1980-93 period.

WFP emergency responses (direct relief and FFW) through its NGO partners focused on the districts most affected by the drought. Distribution of food relief (mainly maize and beans) was an important component of people's access to food. In none of the districts, however, did WFP relief food plus own production reach the minimum SPHERE-recommended calories from carbohydrate sources (1470 Kcal/day).

5.5 Conclusions

Zambia has suffered a long term decline in cereal production and availability that, combined with the effects of severe droughts in some years, seriously threaten food security at the macro- and micro- levels. After achieving large gains in maize production in the late 1980s due to increased utilization of hybrid seeds, fertilizer subsidies, and a market controls that skewed

⁸² WFP estimated a cereal shortfall in 2001-02 of 340 thousand tons, on the basis of a staple cereal (excluding wheat) production of 670 thousand tons and consumption requirements of 1.16 million tons. Considering carry-over stocks from previous year of 23,000 MT, the total cereal deficit for the period reached 672 thousand tons.

incentives in favor of maize production relative to other crops, average annual cereal production in Zambia from 1994 to 2003 (1.04 million tons) was only half that of 1988 and 1989 (2.01 million tons). Cassava production, however, tripled between 1980 and 2003, partially offsetting the decline in cereals production, and accounted for as high as 21 percent of total availability of cereals and cassava in 2000-01 drought year, compared to only 5 percent in 1980.

External trade liberalization, begun in the late 1980s, remains incomplete in Zambia. Nonetheless, commercial trade and food aid have helped to stabilize Zambia's cereal availability, particularly in drought years. Volumes of imports have not been sufficient to prevent large increases in market prices, however, as evidenced by a tripling of maize prices (in US dollar terms) between July 2001 and February 2002. A major reason for this insufficiency of private imports has been the continued uncertainty regarding volumes, quantities and sales prices of government commercial imports. In addition, the major droughts in 1992 and 2001-02 affected not only Zambia, but other countries in southern Africa, (particularly Zimbabwe and the Republic of South Africa), who thus did not exportable surpluses in those years.⁸³ Moreover, high transport and market costs for cereal imports from outside of southern Africa make the landed cost of these imports high relative to typical domestic prices in years of normal harvest.

Government programs to increase household access to food have shrunk significantly since the untargeted and costly maize meal subsidies were ended in the early 1990s. Food aid alone accounted for 5 percent of total availability of cereals from 2001 through 2003, when emergency relief programs, including food for work, cash for work and direct food transfers played a major role in drought relief efforts. Effective donor coordination and the Famine Early Warning System network (FEWSNET) helped ensure that food aid and government commercial imports generally arrived on time.

Nonetheless, Zambia's poor remain extremely vulnerable to production shocks, not only because droughts reduced crop and livestock production and incomes, but also because market price increases greatly diminish the purchasing power of poor households. Since average household calorie consumption is very low (less than 1900 calories/person/day in 2001) and the poor allocate over 70 percent of their budget to food, real income growth of the poor is crucial to reducing household food insecurity in Zambia.

⁸³ In spite of a decline in domestic production, total grain exports by the RSA in 2002 were essentially unchanged from 2001 because of re-exports of grain. South Africa's grain imports increased by 1.6 million tons to 2.8 million tons, enabling exports to remain essentially constant at about 1.1 million tons. Regional trade flows from Northern Mozambique and Tanzania also added to supplies in Zambia and other deficit countries.

6. SUMMARY AND CONCLUSIONS

The wide variety of food aid programs and food security outcomes in India, Bangladesh, Ethiopia and Zambia over the past several decades highlights the importance of country context (geography, economic structure and policy, political factors, etc.) in determining the role of food aid and other public sector interventions in enhancing food security. Food aid has been an important component of food availability over extended periods of time in each of these countries, though this is no longer the case for India and Bangladesh. Similarly, food aid-supported programs have at various times been central to government efforts to enhance access to food, though public food transfers supplied with domestically procured grain and cash transfers have replaced or are being considered as alternatives to food aid transfers to households.

6.1 Comparing Country Experiences

For India, food aid was a major source of total food availability from the mid-1950s to the late 1960s, but a desire to avoid the uncertainties and political conditions tied to food aid flows led the country to adopt a food self-sufficiency policy in the mid-1960s. Public investments in irrigation, agricultural research and extension, and subsidies to fertilizer and agricultural credit led to a rapid spread in green revolution technology. The government intervened heavily in rice and wheat markets by restricting private sector purchases, storage and grain movements, while providing support to producers (particularly in key producing states) through procurement at official minimum support prices. Together these agricultural technology and price policies succeeded in rapidly raising production of rice and wheat, enabling the country to raise availability of grain and reduce food aid and commercial imports to insignificant shares of total supply. By the mid-1990s, excess availability of food (as reflected in rising public stocks) had replaced food supply shortfalls as a major food policy issue.

Nonetheless, these major gains in food production and the security of supplies provided through large national food stocks have not guaranteed access to food for poor households. The public distribution system, designed to address these needs does not provide sufficient resources to the poorest households, and in spite of better targeting since the late 1990s, it still entails large fiscal costs. An estimated 200 to 300 million people, 20-30 percent of the population, consume inadequate amounts of calories.

Bangladesh has achieved similar success in raising domestic production and reducing the role of food aid in domestic food supplies, but with a more market-oriented approach that has involved lower fiscal costs of government procurement of grains. As in India, expansion in irrigation (particularly private tubewells after relaxation of restrictions on imported pumps in the late 1980s), increased use of fertilizer and improved seeds enabled the country to reach its rice and wheat production targets by 2000. In contrast with India, however, stability in food supplies was provided mainly through food aid from the mid-1970s to the early 1990s, and since the early 1990s, private sector imports. Food aid continues at reduced levels in spite of the production gains, providing fiscal resources for public distribution, which is better targeted, though at a smaller scale in terms of percentage of population covered, than in India. Nonetheless, there

remains substantial chronic food insecurity at the household level, with about half of the population living in poverty.

Ethiopia's gains in food production, unfortunately, have been much more modest than those of India or Bangladesh. A much drier climate, with relatively far fewer opportunities for irrigation and multiple-cropping, greatly reduces the potential for the massive gains in food production achieved in south Asia. Economic reforms and increased adoption of improved seeds and fertilizer have enabled grain production to keep pace with a rapid 2.7 percent population growth rate since 1994, but only after a major decline in per capita grain production over the previous two decades. Because high transport and marketing costs, and restrictive trade policies have prevented private sector imports from making a significant contribution to supplies, food aid continues to be a major source of grain supply in Ethiopia, even in years without major droughts. And in years with major droughts, the country is heavily dependent on food aid to provide emergency relief. Unlike in India or Bangladesh, most food aid distribution is provided for free; only a small share of food transfers involves food for work or cash sales despite state policy objectives to avoid free distribution.

In Zambia, food production has actually declined substantially since 1990, due largely to the withdrawal of government subsidies on inputs and an end to pricing policies that had favored maize production at the expense of other agricultural commodities. As in Ethiopia, high transport and marketing costs in Zambia raise prices of imported grain, though the Republic of South Africa and Zimbabwe are relatively close sources of potential import supply in most years. Private imports have also been inhibited by substantial uncertainty regarding government policy related to volumes, quantities and sales prices of government commercial imports, and domestic prices rose substantially above import parity levels during the 2001-02 drought. An effective early warning system (FEWSNET) has helped with planning of government commercial imports and food aid. Nonetheless, food availability has declined substantially during drought years. Although most food aid distribution is through food for work programs, the developmental impact of these programs is open to question.

Government Response to Major Production Shortfalls

Government response to major production shortfalls has varied both in instruments chosen and in the overall effectiveness of the interventions. India's negative experience in the mid-1960s with uncertain food aid flows that depended on donor political considerations was instrumental in creating the political will to support policies to increase domestic production and achieve national food self-sufficiency through investments in irrigation, agricultural research and extension. Having successfully increased domestic production of rice and wheat, by the mid-1970s India was able to rely mainly on drawdown of accumulated stocks for addressing production shortfalls, coupled with self-targeting emergency relief programs (mainly food-for-work), even following the 1987 "drought of the century".

Bangladesh suffered a major famine in 1975 following flood-induced production shortfalls in late 1974, as the country lacked foreign exchange for imports and government stocks for targeted distribution. After more than a decade of investments in irrigation (including major private sector investments in tubewells), agricultural technology and roads, rice and wheat

production had increased substantially. Particularly important was the increase in winter season crops (boro rice and wheat) that enabled a major harvest following monsoon season production shortfalls, as experienced due to major floods in 1988. Large public stocks, government commercial imports and food aid inflows helped stabilize market prices and permitted large-scale public distribution of grains, as well. Following the 1998 floods, however, private sector imports of rice and wheat, made possible by the trade liberalization of the early 1990s, played the major role in stabilizing grain prices, even without large-scale public distribution of grain or food aid flows. Food aid-supported and other public distribution programs did, however, were used to target flood-affected and other poor households.

Ethiopia and Zambia have been far less successful in maintaining food security following major production shortfalls. Ethiopia has relied mainly on large, annual food aid flows to supplement domestic supplies of grain and supply targeted relief efforts, but delays in food aid shipments have often occurred. Likewise, Zambia has relied on food aid, supplemented by government commercial imports, to address major drought-related maize production declines. Unfortunately, lack of transparency of Zambian government policies on its commercial imports and sales have added to uncertainties for traders, and kept private sector imports from stabilizing market prices following major production shortfalls in 2001 and other years.

Market Price Stabilization Outcomes

Because food prices are a major determinant of food security of the poor net consumers, one of the primary objectives of food and agricultural policies in the study countries has been price stability. Avoiding price spikes is particularly important for poor households, since these price increases can severely reduce household access to food.

Both price levels and price stability vary markedly across the four countries considered in this study (Table 6.1). Large scale food market interventions and long term increases in production have resulted in long-term declines in the price of food in India to below import parity levels in most recent years. Moreover, prices of rice (expressed in U.S. dollars) in India are extremely stable. Bangladesh rice prices average about 10 percent higher than in India (in dollar terms at market exchange rates), and exports from India have helped to stabilize rice prices at the import parity level in Bangladesh in years of major production shortfalls.

Staple food prices in Zambia (white maize) have averaged about 10 percent lower than rice prices in India, though these prices are nearly 50 percent higher than average maize prices in Ethiopia over this period. These relatively high prices of maize in Zambia in part reflect supply shortages following major droughts.⁸⁴ Moreover, food prices are much more variable in Zambia and Ethiopia than in India and Bangladesh, with coefficients of variations roughly 3 times greater in the two sub-Saharan African countries than in Bangladesh and India.

⁸⁴ Price levels measured in foreign currency (as opposed to Zambian kwacha) are, of course, also influenced by nominal exchange rates.

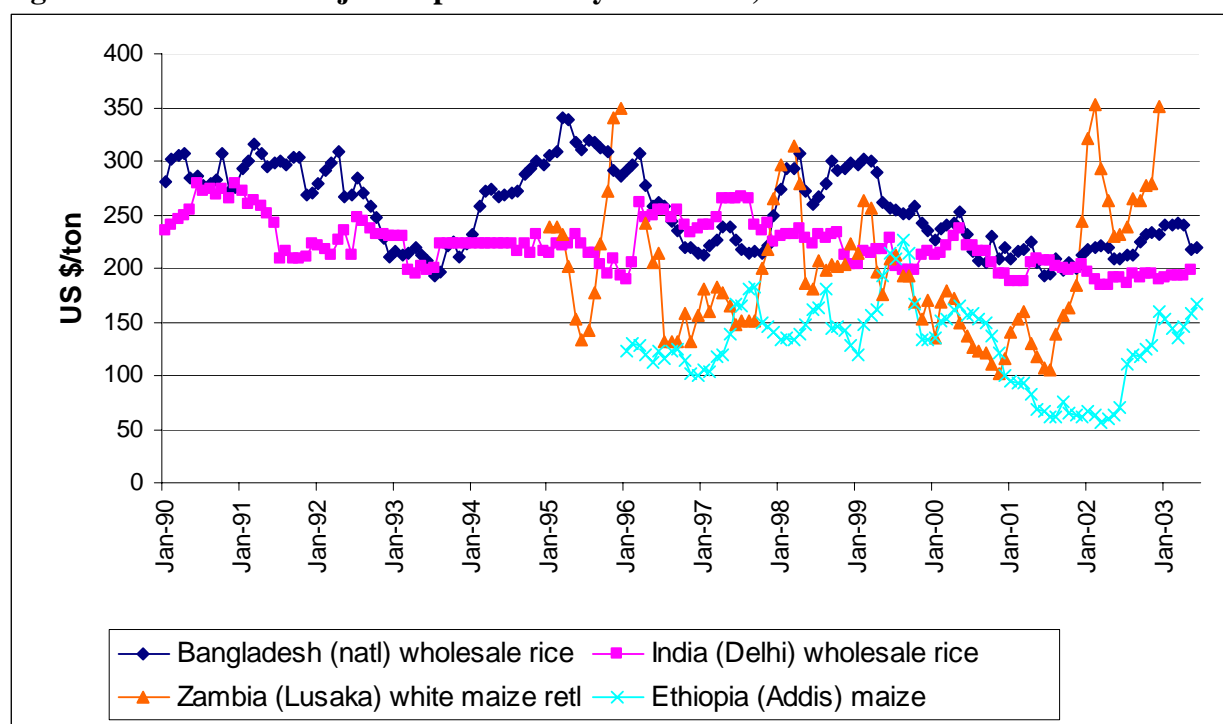
Table 6.1: Monthly Prices of Major Staples in Study Countries, 1996-2002 (\$/ton)

	Bangladesh National Ave. Wholesale Coarse Rice	India Delhi Wholesale Coarse Rice	Zambia Lusaka Retail White Maize	Ethiopia Addis Retail Maize
Average Price	240.9	218.7	191.8	127.7
Standard Deviation	32.0	23.0	59.4	39.6
Coef. of Variation	0.133	0.105	0.310	0.310
Maximum	307.1	266.0	352.1	225.7
Minimum	193.5	184.0	100.9	55.7
Maximum/Minimum	1.59	1.45	3.49	4.05
Maximum/Mean	1.27	1.22	1.84	1.77

Source: Authors' calculations.

As shown in Figure 6.1, Ethiopia has had substantial negative price swings in this period, reflecting the production surges and market gluts in 2001-02. The maximum price of maize was over four times the minimum price. In Zambia, price spikes have been the major source of price instability: the ratio of the maximum price to the mean price was 1.84, slightly higher than in Ethiopia (1.77) and considerably above Bangladesh (1.27) and India (1.22). Thus, price instability has continued to plague Zambia and Ethiopia, in spite of the sizeable food aid flows to these countries.

Figure 6.1: Prices of Major Staples in Study Countries, 1996-2003



Source: Authors' calculations.

6.2 Food Policy Lessons

Production

Food aid is often criticized for its potential disincentive effects on domestic production because it may lead to reduced market prices for producers and because it reduces government incentives for production-enhancing investments and policy reforms. The experiences of the countries discussed here, however, show that these adverse effects may occur, but are not inevitable. The strongest evidence for the complementarity of food aid-supported programs without producer disincentives is the case of Bangladesh, where sustained food aid flows of wheat over 25 years coincided with doubling of rice production and an even more rapid gain in wheat production. From 1979/80 to 1999/2000, Bangladesh more than doubled its wheat production (from 829 thousand tons to 1.84 million tons in 1999/2000), in spite of large food aid wheat flows that averaged 1.03 million tons per year. India also avoided adverse effects of food aid after the late 1960s through a determined effort to achieve self-sufficiency and eliminate major food aid inflows (Table 6.2). In contrast, in Ethiopia, availability of food aid may have reduced government incentives to invest, and late arrivals of food aid in 2001 contributed to steep reductions in producer prices. Zambia's food aid imports have been large relative to domestic production only during drought years, and apart from some localized disincentive effects of distribution of late arrivals of food aid in the early 1990s, food aid inflows do not appear to be a major cause of agricultural stagnation or the government's insufficient investment in agriculture.

Three factors were key in enabling India and Bangladesh to achieve these production gains. First, Bangladesh and India maintained a political will and had donor support for long-term investments in production, including agricultural research, extension, irrigation and rural roads. Achieving similar production gains in sub-Saharan Africa will require similar public investments in research and extension, but opportunities for irrigation and multiple-cropping may be significantly less than in South Asia. Second, food aid flows were small relative to the size of total consumption, even in Bangladesh where food aid flows averaged about 600 thousand tons per year in the late 1990s. In countries where the size of food aid shipments is large relative to the size of the markets, and especially where the food aid commodity is a close substitute for major domestically produced staples, the risk of adverse price effects on production incentives are especially great. Third, food aid inflows were channeled through a public distribution system, with adequate public storage and careful management of the timing of arrivals of food aid and the distribution of food. Food aid distributed mainly through emergency relief programs in Ethiopia has been less effectively managed, though apart from a market price crash in 2001, food aid flows may not have had major price disincentive effects since the early 1990s.

Table 6.2: Summary of Food Security and Food Aid Policies in Study Countries

	Production/Supply Policies/Programs	Production/Supply Role of Food Aid	Markets and Trade Policies/Programs	Consumption Policies/Programs	Consumption Role of Food Aid
India	<i>Highly Successful</i> Massive public investments in R&D and irrigation achieve grain self-sufficiency in 12 years	<i>Minor Role</i> Food aid a minor source of supply after 1970. Food for work used to build road and irrigation infrastructure	<i>Highly restrictive policies</i> Until 1990 GOI had severe trade restrictions in place, including movement restrictions, private stock limits and a ban on private imports	<i>Partially Successful</i> Large-scale Public Distribution System with ration sales, FFW; Targeting introduced 1995 due to increasing costs of PDS	<i>Minor Role</i> Well-targeted FFW programs, but small coverage
Bangladesh	<i>Highly Successful</i> Large public investments in R&D; private investments in tubewells and input trade reform lead to rice self-sufficiency in 2000	<i>Significant Role</i> Large food aid inflows until 2001 helped supply and provided financial support. Food for work used to build road infrastructure	<i>Liberalized policies</i> Relative small government interventions; major domestic and international trade liberalization in early 1990s	<i>Partially Successful</i> Major ration sales programs replaced by well-targeted food-based safety nets in early 1990s	<i>Significant Role</i> FFW and various well-targeted, food transfer programs, including Food for Education (from 1994 until 2002).
Ethiopia	<i>Not Successful</i> Little investment in R&D; few opportunities for irrigation; modest increase in production since 1994 (mainly maize)	<i>Major Role</i> Food aid flows are a major source of supply especially in drought years; little or no productive use of food aid	<i>Highly restrictive policies</i> Several restrictions towards private sector trade	<i>Partially Successful</i> Food aid-supported programs saved lives in emergencies	<i>Major Role</i> Large, untargeted programs, mainly through free food transfers
Zambia	<i>Not Successful</i> Steep decline in maize production after 1990 due to reduced market price incentives, problems with input supply and droughts.	<i>Significant Role</i> Food aid flows significant only in drought years; productive use of food aid not a major source of investment.	<i>Highly restrictive policies</i> Liberalized trade regime since early 1990s; gov't market interventions inhibit private internat'l trade.	<i>Partially Successful</i> Large urban maize flour subsidies eliminated in early 1990s; very limited programs remain.	<i>Significant Role</i> Food aid transfers an important, though limited, safety net in drought years.

Markets and Price Stability

All four countries considered here have intervened in domestic food markets, but approaches to market stabilization and market development have varied substantially. Public interventions in markets (procurement at fixed support prices, movement restrictions, limits on private stocks, large national food stocks, and subsidized sales of food through ration shops) have played a major role in maintaining price stability in India. Large national food stocks and increased public distribution enabled both India and Bangladesh to successfully manage major production shortfalls in the late 1980s. Market-intervention policies, though successful in terms of price stability have entailed large financial and efficiency fiscal costs, particularly in India. There, political pressure for high producer support prices has been a root cause of massive increases in public stocks beginning in the mid-1990s. Bangladesh has achieved considerable price stability at much lower fiscal costs, however, through promotion of a competitive private marketing sector. Private commercial imports rather than government stocks have been the major stabilizing force since liberalization of grain import trade in the early 1990s.

The absence of well-functioning domestic markets prevents price and supply-stabilizing market flows and stock behavior in Ethiopia, Zambia and much of sub-Saharan Africa. Extremely high transport costs due to poor road infrastructure and informal tolls greatly hinder domestic and international trade. Moreover, in Ethiopia, the large gap between normal domestic prices and the cost of imported grain, particularly in years of high world prices, may limit the role of international trade liberalization in enhancing food security, unless income support is also available to poor consumers to maintain their purchasing power in periods of high prices. Government restrictions have also hindered regional trade flows at various times, preventing flows from low- to higher- price areas that could reduce price spikes.

Government direct purchases and sales, apart from food aid in Ethiopia have been limited, however. Market interventions were significant in Zambia prior to the liberalization of the early 1990s and helped boost maize production, but costs proved fiscally unsustainable, largely because of subsidized sales to urban consumers. Ethiopia's experience suggests that local procurement of grain for food aid or other food programs can improve farmer incomes in the short-run, but coherent and transparent government policy regarding procurement prices, stocks, and timing and levels of distribution are crucial to avoid excessive costs and to maintain incentives for the development of private sector trade. Unfortunately, policies regarding trade, government imports and sales in recent years in Zambia have been neither consistent nor transparent, and have hindered market-stabilizing private sector imports.

Safety Nets

Safety net programs have differed substantially across countries, as well (see Table 6.3 for a summary of the level of expenditure and coverage of the main programs in the study countries). India's experience with sales of subsidized grains (as well as vegetable oil and sugar), suggests the importance of targeting (implemented in 1995) to keep program costs down and to increase the value of transfers to clearly identified vulnerable groups. Where there is a substantial difference between ration sales prices and open market prices, leakages can be

substantial, as evidenced by Bangladesh in the late 1980s and many other countries, (including Mozambique in the early 1990s⁸⁵).

Table 6.3: Expenditure and Coverage of Safety Nets Programs in Study Countries

Country and Program	Total Expenditure	Coverage
India	1.5% of GDP current, planned to increase to 2.8%	
<i>Food Based:</i> PDS	US\$ 700 million - about 1% of GDP or 36% of Central poverty alleviation and social sector programs	About 60% of households ^a
<i>Non Food Based:</i> workfare, elderly pensions, etc.	About US\$ 230 million or 0.3% of GDP	Outreach details are highly conflicting ^b
<i>Planned:</i> Employment Guarantee for 100 days for rural poor	US\$ 700 to 950 million – about 1 to 1.3% of GDP	200 districts (out of 365)
Bangladesh	Less than 1% of GPP and less than 20% of social expenditure	About 5 million at any given time – depending on occurrence of disasters
<i>Food Based:</i> FFW, VGD, VGF, others	US\$ 216 million year (2002-5)	FFW about 75 million hours; VDG: 480,000;
<i>Non Food Based:</i> PESP, FSSAP, Old Age, RMP	US\$ 164 million year (2002-5)	5 million children in PESP, 3 million elderly in old age
Ethiopia (1998-2002): (All programs food-based) ^c	Highly variable depending on donor financing – 1 to 6% of GDP	
Free Food (Gratuitous Relief)	US\$ 70 to 500 million in different years	2 to 5 million during a normal year, up to 10 million during a bad year
Employment Generation Scheme	US\$ 2.3 to 6.9 million	Average of 200,000 households per year, 600,000 in 2002
Food for Work	US\$ 20 million	357,000 households per year
School Feeding	US\$ 4.1 million	600 schools or 258,000 children
Zambia^d (2003-4)	US\$ 8.5 million (.2% of GDP) in 2003 to US\$ 27.7 million (.6% of GDP in 2004)	
<i>Food Based:</i> - Food security pack	US\$ 930 thousand in 2003 and US\$ 20 million in 2004	150,000 Farmers
- Public Welfare Assistance Scheme (PWAS)	US\$ 1 million	200,000 households
- WFP Programs (Before 2004 crop failure)	US\$ 6 million (at least 30Th Tons of food aid @ US\$ 200 per ton)	129,000 children and 60,000 Family Members
<i>Non food Based:</i> Peri- Urban Self Help (PUSH) (Workfare) and National Social Safety Net	US\$ 600 thousand	

Notes: a) Source NSS 58th round
b) NSS survey results show very low outreach; government program management data show very high coverage.
c) In Ethiopia, due to lack of systematic reporting and inconsistent data and the fact most programs are food based and donor funded and therefore off-budget, it is difficult to say with certainty the amounts spent (as % of GDP), characteristics of beneficiaries, and program costs. The numbers reported here are taken from Ethiopia PER (2003)
d) Source for Zambia is the PRSPII

Zambia's urban maize flour subsidies in the 1980s were untargeted and involved unsustainably large fiscal subsidies. Zambia eliminated these urban maize flour subsidies in the early 1990s, but has not replaced them with large-scale safety net programs. In contrast,

⁸⁵ Dorosh, del Ninno and Sahn (1995).

Bangladesh greatly reduced the role of subsidized ration sales by eliminating its major rationing channels in the early 1990s, but replaced these programs with targeted programs (food-for-work, food-for-education, programs targeted to poor rural women). The Bangladesh experience also suggests that size of transfers and the target group are important factors in determining the effectiveness of targeting. In particular, small transfers targeted towards rural women are more effective in raising food consumption (as in the Bangladesh Vulnerable Group Development program) than are food-for-work programs (which involve relatively large payments in-kind).

The use of safety nets programs and food aid resources following natural disasters has also differed across countries. Since the mid-1970s, India has relied almost exclusively on domestic cash and food resources for public employment and other relief programs following disasters. In Bangladesh, however, food aid has been used in combination with domestic resources for emergency relief programs. After the 1998 flood, the government was very effective in quickly scaling up existing programs to flood-affected households through cash transfers via the Gratuitous Relief (GR) and in-kind transfers to poor women via the Vulnerable Group Feeding (VGF) (del Ninno et. al, 2001). Yet, government transfers were small relative to the needs of households, as indicated by the share of the transfers compared to the monthly expenditure (del Ninno and Dorosh, 2001). In Ethiopia, there has been an increasing concern that “national policy-makers and the international community have adopted a ‘crisis management’ strategy that has resulted in dependence on food aid, rather than addressing the underlying problems of poverty and livelihood insecurity” (Devereux, Sharp and Amare, 2004). A major change in the government’s approach to safety nets was introduced in 2005, involving greater use of cash transfers and a longer term program focus, to address this concern. The new Productive Safety Net Programme (PSNP) is designed to address the longer term food security needs of 5 million chronically food-insecure people through cash and food transfers. Emergency food assistance programs will also continue, but at a lower level – only 2.2 million people in 2005 (compared with six to seven million people in previous recent years).⁸⁶ Finally, Zambia has relied on food aid inflows following several drought-related production shortfalls. This food aid made an important contribution to household food security in 2002 (VAC 2003) when it provided about 5 percent of the annual caloric requirements in most regions and up to 10-15 percent of total annual caloric requirements in the Southern region (VAC 2003).

Moreover, well-designed safety nets can both effectively target transfers to poor households and help build human and physical capital. For example, food-for-work (FFW) programs in both India and Bangladesh, including the employment guarantee in the state of Maharashtra, India, have not only increased incomes and access to food of poor households, but have contributed to building infrastructure. However, specific design details such as the level of wage rates, degree of labor intensity of projects, provisions for non-labor costs and gender issues are crucial to the effectiveness of these programs. In contrast to FFW programs in Bangladesh and India, most food aid distribution in Ethiopia is in the form of free transfers. Food for work programs there are limited both because of administrative constraints and, in emergency relief situations, by the poor health of recipients. Initially, safety nets programs, however, well-designed and implemented cannot by themselves guarantee food security unless accompanied by poverty-reduction strategies that increase real incomes of the poor in the medium-term, as well.

⁸⁶ FAO/WFP (2005) and various government project papers.

Price Stabilization, Government Stocks and Public Distribution

In both India and Bangladesh, domestic procurement, public distribution and government stocks have played a central role, not only in price stabilization, but in provision of food for chronic poverty alleviation and maintenance of stocks for emergency relief. In the absence of budget constraints, the government can both procure unlimited quantities of food in local or international markets and, if necessary, subsidize the sales or distribution of this food to consumers. However, budget constraints (and in the short-run, storage constraints), often limit government interventions.

In India in the mid-1990s, the government's willingness to procure unlimited quantities of rice and wheat at high support prices (though mainly in only a few states) led to sharp increases in quantities procured, a massive build-up of stocks and huge fiscal costs when the grain was ultimately distributed at subsidized prices. In Bangladesh, tighter budget constraints and a willingness to give a greater role to the private sector kept the size of government's interventions (and their impacts on market prices) relatively small. Thus, procurement decisions were largely driven on quantity targets for public distribution and stocks, and the procurement price is not meant to function as a floor price.

Government procurement of key food commodities (e.g. wheat and maize) to boost producer prices (and perhaps guarantee a price floor) could help maintain producer incentives in Ethiopia, as well. Government procured grain could be used for relief purposes and consumption smoothing, replacing imported food aid, particularly in the food deficit regions in northern Ethiopia. In other regions where market supplies of food are more plentiful, safety nets could rely more on income transfers rather than food transfers. Wholesale open market operations to supply high-priced markets are another option. To the extent that cash-based safety nets are in place, and marketing reforms and investments can bring transactions costs and import parity prices down, private sector imports could help stabilize markets in years of major production shortfalls and prevent large price spikes (particularly in years of low or medium world prices).

Zambia's negative experience with large-scale intervention in domestic food markets in the 1980s illustrates potential pitfalls with this strategy, however. Government intervention to a large extent crowded out private trade and led to high marketing costs. Political pressure for low consumer prices led to huge budget subsidies. Agricultural trade liberalization in the early 1990s has helped reduce marketing costs and eliminated consumer subsidies, though after input and output subsidies for maize production were removed, output declined sharply. Less costly and less trade-distorting means of government interventions to support domestic producers, including investments in market infrastructure and increased provision of agricultural extension services, may be more efficient alternatives to government direct market interventions.

6.3 Conclusions

The experience in South Asia suggests that food aid, properly utilized, can contribute to increased food security in both the short- and long-term, provided it is used effectively as part of an integrated program of development. Increasing production and raising rural incomes require sustained government public investments in agricultural technology and extension, irrigation

(where feasible), and market infrastructure. The evidence also suggests that while government interventions in markets can be helpful for maintaining adequate price incentives for producers and protecting consumers from price spikes, facilitating the development of private markets and liberalizing trade can increase the effectiveness and lower costs of price stabilization. Because individual countries in SSA vary significantly from those in South Asia, these broad policy and program options to guarantee food availability need to be carefully adapted to specific local conditions.

Finally, it is worth emphasizing that food aid is not the only, or in many cases, the most efficient means of addressing food insecurity. The benefits of well-managed and timely food aid inflows in short-term emergency situations where markets are not functioning and household access to food is extremely limited are clear. In the medium to long run, however, market mechanisms are generally more efficient in addressing food availability constraints. Food security at the household level is then mainly constrained by access to food, which is closely linked to household incomes. Thus, sustained pro-poor growth is needed along with appropriate safety nets. None of the study countries have yet fully succeeded in satisfactorily solving this problem of access to food by the poor.

The Asian and SSA experiences suggest that food aid that supports building of production and market enhancing infrastructure, is timed to avoid adverse price effects on producers, and is targeted to food insecure households can play a positive role in enhancing food security. Most important, however, is a balanced, mutually-reinforcing mix of policies and programs that address both the production and marketing constraints to food availability and raise the real incomes of the poor and thereby increase their access to food.

REFERENCES

- Abdulai, A., C. Barrett and J. Hoddinott, 2005, "Does food aid really have disincentive effects? New evidence from sub-Saharan Africa," *World Development*. (forthcoming)
- Ahmed, Raisuddin, Steven Haggblade, and Tawfiq Elahi Chowdhury, 2000, *Out of the Shadow of Famine: Evolving Food Markets and Food Policy in Bangladesh*, Baltimore, Maryland: Johns Hopkins University Press.
- Ahmed, Raisuddin, 2001, *Retrospects and prospects of the rice economy of Bangladesh*. Dhaka: University Press.
- Alderman, H., 1993, "Intercommodity Price Transmittal: Analysis of Food Markets in Ghana," *Oxford Bulletin of Economics and Statistics* 55(1):43-64. 1993.
- Amha, W., J. Stepanek, T.S. Jayne and A. Negassa, 1997, "Meeting Food Aid and Price Stabilization Objectives through Local Grain Purchase: A Review of the 1996 Experience, Grain Market Research Project," Working Paper 7, Ministry of Economic Development and Cooperation, Addis Ababa.
- Arndt, Channing, Paul Dorosh, Marzia Fontana and Sajjad Zohir, with Moataz El-Said and Christen Lungren, 2002, "Opportunities and Challenges in Agriculture and Garments: A General Equilibrium Analysis of the Bangladesh Economy, Trade and Macroeconomics," Division Discussion paper No. 107. Washington, D.C.: IFPRI.
- Barrett, C. and D. Maxwell, 2004, *Food Aid After Fifty Years: Recasting Its Role*. Rutledge.
- Barrett, C, 1997, "Food Marketing Liberalization and Trader Entry: Evidence from Madagascar," *World Development*. 25 (5): 763-777.
- BBC News, 2000A, "Why is Famine Back Again?," Friday, 31 March, 2000.
- BBC News, 2000B, "Flashback 1984: Portrait of a Famine," Thursday April 6, 2000.
- Bouis, H., de la Briere B, Guitierrez L., Hallman K., Hassan N, Hels O. Quabili W, Quisumbing A., Thilsed., Zihad Z., Zohir S.. 1998, *Commercial Vegetable and Polyculture Fish Production in Bangladesh: their Impacts on Income, Household Resources Allocation, and Nutrition*, International Food Policy Research., Washington, D. C.
- Braun J. Von, T. Teklu and P Webb, 1998, "Famine in Africa: Causes Responses and Prevention,". IFPRI and John Hopkins
- Callihan, D., J. Eriksen, and A. Herrick, 1994, "Famine Averted: The United States Government Response to the 1991/92 Southern Africa Drought," Management Systems International, Evaluation Synthesis Report Prepared for USAID/Bureau for Humanitarian Response. Washington, D.C.: Management Systems International.
- Chowdhury, Nuimuddin and Haggblade, Steven, 2000, "*Evolving Rice and Wheat Markets. In Out of the shadow of famine: Evolving food markets and food policy in Bangladesh*," ed. R. Ahmed, S. Haggblade, and T.E. Chowdhury. Baltimore Md., USA: Johns Hopkins University Press for the International Food Policy Research Institute.
- Clay D., Molla D. and Habtewold D. 1999, "Food Aid Targeting in Ethiopia: A Study of Who Needs It and Who Gets It," *Food Policy*. 24(4): 391-409.

- Dabalén, A., H. Alderman, K. Subbarao, M. Phillips and T. Haque, 2003, "Securing Consumption while Promoting Growth: the Role of a Productive Safety Net in Ethiopia," Issue Note, the World Bank.
- Datt, Gaurav and Martin Ravallion, 1998, "Farm Productivity and Rural Poverty in India," *Journal of Development Studies*, 34(4):62-85. (April).
- Deaton, Angus, 2003, "Adjusted Indian Poverty Estimates for 1999-2000" *Economic and Political Weekly*, January Vol.XXXVIII(4), pp.322-326)
- Deininger D.U. and K. Deininger, 2001, "Towards Greater Food Security for India's Poor: Balancing Government Intervention and Private Competition," *Agricultural Economics* 25: 321-35.
- del Ninno, C. and A. Marini, 2005, Households' Vulnerability to Shocks in Zambia, *Social Protection Discussion Paper No. 536*. The World Bank Social Protection Unit.
- del Ninno, C., P. Dorosh, L. Smith, 2003, "Public Policy, Markets and Household Coping Strategies in Bangladesh: Avoiding a Food Security Crisis Following the 1998 Flood," *World Development* 31(7):1221-1238
- del Ninno, Carlo and Paul Dorosh, 2001, "Averting a Food Crisis: Private Imports and Public Targeted Distribution in Bangladesh After the 1998 Flood," *Agricultural Economics*, vol. 25, pp. 337-346.
- _____. 2003. "Impacts of In-Kind Transfers on Household Food Consumption: Evidence from Targeted Food Programs in Bangladesh," *Journal of Development Studies*. 40(1): 48-78.
- del Ninno, Carlo, Paul Dorosh, Lisa C. Smith and Dilip K Roy, 2001, "The 1998 Floods in Bangladesh: Disaster Impacts, Household Coping Strategies, and Response," *International Food Policy Research Report 122*. Washington, D. C.
- Demeke, M. and T. Ferede, 2004, "The Performance of Grain Marketing in Ethiopia," Addis Ababa University)
- Dercon, S. and P. Krishnan, 2004, "Food Aid and Informal Insurance in S. Dercon," *Insurance against Poverty*, Oxford University Press.
- Dev, Mahendra 2003, "Right to Food in India," Center for Economic and Social Studies, Hyderabad.
- Devereux S., K. Sharp and Y. Amare, 2004, "Destitution in Wollo, Ethiopia," *IDS Research Reports – 55*
- Devereux, S., 2000, Social Highlights summary of Research Report for the Department for International Development (DFID), ESCOR Report R7017
- Devereux, S. 2003, "Policy Options for Increasing the Contribution of Social Protection to Food Security," *Forum for Food Security in Southern Africa*.
- Devereux, S., 2002a, "Social Protection for the Poor: Lessons from Recent Development Experience," *IDS Working Paper 142*.
- Devereux, S., 2002b, "Can Social Safety Nets Reduce Chronic Poverty?" *Development Policy Review*, 20(5): 657-675

- de Waal, A. 1997, *Famine Crimes, Politics and the Disaster Relief Industry in Africa*. James Currey.
- Diao, X, M. Gautam, J. Keough, D., J. Chamberlin, C. Rodgers, L.You, and B.Yu, 2004, “Growth Options and Investment Strategies in Ethiopian Agriculture: A Spatial, Economy-wide Model Analysis for 2004 – 2015,” International Food Policy Research Institute. Mimeo
- Donovan, C. M. Damaseke, J Govere and D. Simumba, 2002, “Framework and initial analyses of Fertilizer profitability in Maize and Cotton in Zambia,” Working paper no. 5. Food Security Research Project. Lusaka, Zambia
- Dorosh, Paul A., 2001, “Trade liberalization and national food security: rice trade between Bangladesh and India,” *World Development*, 29(4): 673–689.
- Dorosh, Paul A. and Quazi Shahabuddin, 2004, “Price Stabilization and Food Stock Policy,” in Dorosh et. al. 2004, *The 1998 Floods and Beyond: Towards Comprehensive Food Security in Bangladesh*. Dhaka, Bangladesh: IFPRI and UPL.
- Dorosh, Paul A., Carlo del Ninno and Quazi Shahabuddin (eds.), 2004, *The 1998 Floods and Beyond: Towards Comprehensive Food Security in Bangladesh*, Dhaka, Bangladesh: International Food Policy Research Institute (Washington, D.C.) and University Press, Ltd.
- Dorosh, Paul A., Raisuddin Ahmed, Carlo del Ninno and K.A.S. Murshid, 2004, “Overview of the Bangladesh Foodgrain Economy,” in Dorosh et. al. (2004) *The 1998 Floods and Beyond: Towards Comprehensive Food Security in Bangladesh*. Dhaka, Bangladesh: IFPRI and UPL.
- Dorosh, Paul, Carlo del Ninno and David E. Sahn, 1995, "Poverty Alleviation in Mozambique: A Multi-Market Analysis of the Role of Food Aid.," *Agricultural Economics*, 13 (1995): 89-99.
- FAO. FAOSTAT, several years
- FAO/WFP 2002. Crop and Food Supply Assessment Mission to Ethiopia
- FAO/WFP 2005. Crop and Food Supply Assessment Mission to Ethiopia
- FEWSNET, 2004. Zambia annual harvest assessment report October 2004
- Gabre-Madhin, E.Z., 2001, “Market Institutions, Transaction Costs, and Social Capital in the Ethiopian Grain Market,” IFPRI Research Report 124, Washington D.C.
- Gaiha 2003, “Does the Right to Food Matter,” *Economic and Political Weekly*, October, XXXVIII (40)
- Garrett, J., 2001, “Lessons from the urban food-for-work program CARE-Ethiopia,” International Food Policy Research Institute. Washington DC. Mimeo
- Gilligan, D and J. Hoddinott, 2004, “Using community targeting to provide drought relief: Evidence from Ethiopia,” Mimeo, International Food Policy Research Institute
- Goletti, F. 1994, *The Changing Public Role in a Rice Economy Approaching Self-sufficiency: The Case of Bangladesh*, International Food Policy Research Report 98. Washington, D. C.
- Government of India. 2001, Economic Survey.

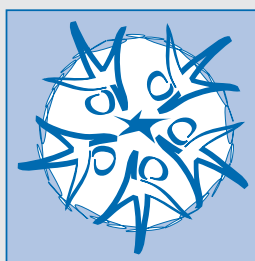
- Gulati, A. and C.H.H. Rao, 1994, "Indian Agriculture: Emerging Perspectives and Policy Issues," *Economic and Political Weekly*, 31: December, pp. A158-A169.
- Haddad, L; Frankenberger, T; 2003, "Integrating Relief and Development to Accelerate Reductions in Food Insecurity in Shock-Prone Areas," USAID Office of Food for Peace, *Occasional Paper No. 2*, Washington DC, USA.
- Hammond L. and D. Maxwell, 2002, "The Ethiopian Crisis of 1999-2000: Lessons Learned, Questions Unanswered, Disasters," vol.26(3), p.262.
- Harrison, P., 2002, Ethiopia: Grain Marketing - Review of Recent Trends, draft following mission to Ethiopia, 19 July-7 August 2002, the World Bank.
- Hayami, Yujiro, K. Subbarao and K. Otsuka, 1982, "Equity and Efficiency in the Producer Levy of India," *American Journal of Agricultural Economics*, vol. 64, No. 4, pp. 654-63.
- Hazell, P. and Jerry Skees, 2004, "Insurance against Bad Weather: Recent Thinking" Paper presented at the seminar in honor of Prof. C.H.H. Rao.
- Hoddinott, J.; M. Cohen, and S. Bos, 2004, "Re-Defining the Role of Food Aid," IFPRI. Mimeo.
- Hossain, Mahabub and Manik Lal Bose, 2000, "Growth and Structural Changes in Bangladesh Agriculture: Implications for Strategies and Policies for Sustainable Development" in M.A. Sattar Mandal (ed.) *Changing Rural Economy of Bangladesh*. Dhaka: Bangladesh Economic Association
- Household Expenditure Survey (HES) 1995-96, Bangladesh Bureau of Statistics (BBS), Dhaka, Bangladesh.
- Jansen, B. 1988. Trade, exchange rate and agricultural pricing policies in Zambia. World Bank comparative studies, cited in World Bank (1992).
- Jayne T, G. Tembo and Nijhoff, 2005, "Experiences of Food Market Reform and Price Stabilization in E.and S, Africa" presented at World Bank Workshop on Managing Price Instability and Risk. Washington, D.C.
- Jayne T., J. Strauss, T. Yamano, and D. Molla, 2001, "Giving to the Poor? Targeting of Food Aid in Rural Ethiopia ," with, *World Development*, vol. 29(5), pp.887-910.
- Jayne T., J. Strauss, T. Yamano, and D. Molla, 2002, "Targeting of Food Aid in Rural Ethiopia: Chronic Need or Inertia?" *Journal of Development Economics*, vol.68(2), pp. 247-288.
- Jayne, T. and S. Jones.,1997, "Food marketing and pricing policy in Eastern and Southern Africa: A survey," [World Development V 25\(9\)1505-1527](#)
- Jayne, T., M. Mukumbo, M. Chisvo, D. Tschirley, M. Weber, B. Zulu, R. Johansson, P. Sanots, D. Soroko, 1999, "Successes and challenges of food market reform: Experiences from Kenya, Mozambique, Zambia and Zimbabwe," Michigan State University. International Development Working paper No 72
- Jeffrey, P., 2000, Why another drought in Ethiopia?, ACT Dateline, Addis Ababa.
- Jodha N., 1989, "Dry Farming Research: Issues and Approaches," in N.S.Jodha (ed) 1989. *Technology Options and Economic Policy for Dryland Agriculture: Potential and Challenge*. The Indian Society of Agricultural Economics, Bombay: Concept Publishing Company, New Delhi.

- Kahkonen, Satu and Howard Leathers, 1999, "Transaction Costs Analysis of Maize and Cotton Marketing in Zambia and Tanzania," IRIS Center, University of Maryland. Technical Paper No. 105. June.
- Kalinda, T., F. Maimbo, and M. Mushimba, 2003, [Zambia Food Security Issues Paper](#). Forum for Food Security in Southern Africa. www.odi.org.uk/food-security-forum.
- Krishna, Raj, 1965, "Rice Zone Policy: A Note of Dissent" in Agricultural Prices Commission, Report on the Price Policy for Kharif Cereals, New Delhi, Government of India.
- Krishna, Raj 1967, "Government Operations in Foodgrains," *Economic and Political Weekly*, September 16.
- Lautze S., Y Aklilu, A. Raven-Roberts, H. Young. Girma Kebede and J Leaning, 2003, Risk and vulnerability in Ethiopia: Learning from the past, responding to the present preparing for the future," A report for the USAID.
- Lele U., 1972, "Foodgrain Marketing in India," Ithaca: Cornell University Press
- Lentz and Barrett, 2004, "Food Aid targeting, Shocks and private transfers among East Asia," African Pastoralist. Mimeo
- Litchfield, J. and N. McCulloch, 2003, "Poverty in Zambia: Assessing the Impacts of Trade Liberalization in the 1990s.," Mimeo, Poverty Research Unit, Sussex University.
- Levinsohn, J. and M. McMillan, 2005, Does Food Aid Harm The Poor?, Household Evidence from Ethiopia NBER Working Paper 11048
- Magnay. J., 2004, "The Ugandan Maize Industry," Paper presented at the NEPAD/IGAD regional conference, Agricultural Successes in the Greater Horn of Africa" Nairobi. November 22-25, 2004.
- Maxwell D., 2002, Why do famines persist? A brief review of Ethiopia 1999-2000, IDS Bulletin, 33(4), pp.48-54.
- McCulloch, N., B. Baulch, and M. Chereh-Robson, 2000, "Poverty, Inequality and Growth in Zambia During the 1990s," IDS Working Paper No. 114
- Mitchell, Donald and Tajlul Islam. 1998. "Growth Potential in Bangladesh Agriculture." World Bank
- Mwiinga B, J.J. Nijhoff, T.S. Jayne, G. Tembo and J. Shaffer, 2002, "The role of Mugaiwa in promoting household food security. Why it matters who gets access to government maize imports," *Policy Synthesis no. 5*. Food Security Research Project. Lusaka, Zambia
- Nijhoff J. J., G. Tembo, J. Shaffer, T. Jayne, J. Shawa, 2003, "How Will the Proposed Crop Marketing Authority Affect Food Market Performance in Zambia: An Ex Ante Assessment to Guide Government Deliberation," *Working paper no. 7*. Food Security Research Project. Lusaka, Zambia
- Øygard, R., R. Garcia, A. Guttormsen, R. Kachule, A. Mwanaumo, I. Mwanawina, E. Sjaastad, and M. Wik, 2003, "The Maze of Maize: Improving Input and Output Market Access for Poor Smallholders in Southern African Region, the Experience of Zambia and Malawi," Agricultural University of Norway Department of Economics and Resource Management Report No. 26, ISSN 0802-9210.

- Quisumbing A. R. and Y. Yohannes, 2004, How Fair is Workfare? Gender, Public Works and Employment in Rural Ethiopia, first draft. [NOT FOR CITATION]
- Quisumbing A. R., 2003, "Food Aid and Child Nutrition in Rural Ethiopia," World Development, 31(7), pp.1309-1324
- Radhakrishna, R. and K. Subbarao, 1997, "India's Public Distribution System: A National and International Perspective". The World Bank: Discussion Paper
- Radhakrishna, R. K.H. Rao and K. Subbarao, 2004, "Reducing Vulnerability and Enhancing Opportunity: Towards More Effective Use of India's Safety Net Programs," Draft.
- Rahman, Mahfoozur et. Al., 1994, "Cross-border trade and commodity prices of principal food items," Dhaka: International Food Policy Research Institute, Bangladesh Food Policy Project (unpublished project report).
- Rangaswamy P., 1986, "Dry Farming in India," Ph.D.Thesis, Delhi School of Economics.
- Rao C., 1994, "Agricultural Growth, Rural Poverty and Environmental Degradation in India," Oxford University Press. Delhi.
- Rao C., S.K. Ray and K. Subbarao, 1988, "Unstable Agriculture and Droughts: Implications for Policy," Delhi:Vikas Publications
- RATES Project, 2003, "Maize Market Assessment and Baseline Study for Ethiopia," The RATES Center. Nairobi, Kenya
- Salama, P. et al., 2001, "Malnutrition, Measles, Mortality and the Humanitarian Response During a Famine in Ethiopia," Journal of American Medical Association, Vol. 286(5), pp. 563-571.
- Sen, A.K., 1981, "Poverty and Famines". Oxford. Clarendon
- Seshamani V., 1998, "The impact of market liberalization on food security in Zambia," Food Policy Vol 23(6): 539-551
- Sharp K., S. Devereux & Y Amare, 2003 *Destitution in Ethiopia's Northeastern Highlands (Amhara National Regional State)* University of Sussex for Save the Children U
- Smale, M., and T. Jayne, 2003, "Maize in eastern and southern Africa: 'Seeds' of success in retrospect," EPT Discussion Paper #97. Washington DC: International Food Policy Research Institute.
- Subbarao, K. and W. James Smith, 2004, "Safety Nets versus Relief Nets: Towards a Medium Term Safety Nets Strategy for Ethiopia," Draft.
- Subbarao, K. and W.J. Smith, 2003, "What Role for Safety Net Transfers in Very Low Income Countries?," Paper, Social Safety Net Primer Series, World Bank, Washington D.C.
- Subbarao. K., 1976, "Rice Marketing System and Compulsory Levies," Allied Publishers: Delhi
- Subbarao. K., 1996, "An Analysis of Agricultural Marketing Systems in India: Presidential Address to the Indian Society of Agricultural Marketing," published by the Society, in Vistas in Agricultural Marketing.
- Sundaram K., 1968, "Some Economic Aspects of P.L. 480 Imports in Indian Economic Development," Delhi University: Delhi School of Economics. Ph.D. Dissertation.

- Tschirley, David , Jan J. Nijhoff, Pedro Arlindo, Billy Mwinga, Michael T. Weber, and T.S. Jayne, 2004, "Anticipating and Responding to Drought Emergencies in Southern Africa: Lessons from the 2002-2003 Experience," Michigan State University. Prepared for the NEPAD Regional Conference on Successes in African Agriculture, 22-25. November 2004, in Nairobi, Kenya.
- Tyagi, D.S., 1990, "Managing India's Food Economy," Sage Publications, New Delhi.
- USAID, 2004, Ethiopia: Complex Health/Food Insecurity Emergency Situation Report #2 (FY 2004), USAID.
- USAID, 2003, "Analysis Of Food Security, Health And Nutrition In Zambia," Prepared by: USAID/WDC/HA/FFP and AFR Bureau Team for USAID Zambia. Mimeo circumstances.
- Webb, P. and J. Von Braun, 1994, "Famine and Food Security in Ethiopia, Lessons for Africa," John Wiley. London.
- Webb, P., J. Von Braun and Y. Yohannes, 1992, "Famine in Ethiopia: Policy Implications of Coping Failure at National and Household Levels," IFPRI Research Report 92.
- WFP, 2002, Facts and Figures Following the Emergency Food Need Assessment Mission in Aug-Sept 2002, WFP, Rome.
- WFP, 2003, Grain Markets in Ethiopia.
- WFP, 2003, Special Report: FAO/WFP Crop and Food Supply Assessment Mission to Zambia, WFP, Rome.
- World Bank, 2004, "India: Re-energizing the Agricultural Sector to Sustain Growth and Reduce Poverty," Mimeo.
- World Bank, 2002, Technical Annex on a Proposed Credit in the Amount of SDR 22.8 Million and Grant in the Amount of SDR 15.2 Million to the Republic of Zambia for the Emergency Drought Recovery Project, Report No. T7559-ZA.
- World Bank, 2003, "Poverty and Social Conditions in Zambia," Incomplete Draft for Input into the CEM, SDV and AFTH1.
- World Bank, 1998, "Bangladesh: From counting the poor to making the poor count" Report No. 17534-BD. World Bank. April 29, Washington, D.C.
- World Bank, 2002, "Reducing Vulnerability: Public Social Safety Net Programs" in *Poverty in Bangladesh: Building on Progress" Bangladesh Poverty Assessment*. Draft, June 2002. World Bank, Washington, D.C.
- World Food Program, 2001, "Enabling Development: Food Assistance in South Asia," Oxford University Press.
- Yamano, T., H. Alderman and L. Christiaensen, 2005, "Child Growth, Shocks, and Food Aid in Rural Ethiopia," *American Journal of Agricultural Economics*. 87(2):273-288.
- Yusuf, Harun K. M., 1997, "Existing Nutrition Situation in Bangladesh," Dhaka: Bangladesh: World Food Programme (processed).
- Zambia Vulnerability Assessment Committee (VAC), 2003, "Zambia VAC April 2003 Livelihood and Vulnerability Assessment," Final Report, Lusaka.

Zulu B., J.J. Nijhoff, T.S. Jayne and A. Negassa, 2000, "Is the glass half-empty or half full? An analysis of agricultural Production trends in Zambia," *Working paper no. 3*. Food Security Research Project, Lusaka



The purpose of this paper is to compare and contrast the experiences from four major recipients of food aid (India, Bangladesh, Ethiopia and Zambia) in normal time and after a natural disaster and draw implications for the design of effective food aid and food security policies in Africa. The study summarizes the food and agricultural policies and medium-term outcomes regarding food production, trade, markets, consumption and safety nets, as well as the policy responses to food emergencies. The experiences of the study countries suggest that food aid that supports building of production and market enhancing infrastructure, is timed to avoid adverse price effects on producers, and is targeted to food insecure households can play a positive role in enhancing food security. However, food aid is not the only, or in many cases, the most efficient means of addressing food insecurity. In many cases private markets can more effectively address shortfalls in food availability and cash transfers may be a viable alternative to food transfers in-kind. Thus, most important is a balanced, mutually-reinforcing mix of policies and programs that address both the production and marketing constraints to food availability and that raises the real incomes of the poor and thereby increase their access to food.

HUMAN DEVELOPMENT NETWORK

About this series...

The World Bank Social Safety Nets Primer is intended to provide a practical resource for those engaged in the design and implementation of safety net programs around the world. Readers will find information on good practices for a variety of types of interventions, country contexts, themes and target groups, as well as current thinking of specialists and practitioners on the role of social safety nets in the broader development agenda. Primer papers are designed to reflect a high standard of quality as well as a degree of consensus among the World Bank safety nets team and general practitioners on good practice and policy. Primer topics are initially reviewed by a steering committee composed of both World Bank and outside specialists, and draft papers are subject to peer review for quality control. Yet the format of the series is flexible enough to reflect important developments in the field in a timely fashion.

The primer series contributes to the teaching materials covered in the annual Social Safety Nets course offered in Washington, DC, as well as various other Bank-sponsored courses. The Social Safety Nets Primer and the annual course are jointly supported by the Social Protection unit of the Human Development Network and by the World Bank Institute. The World Bank Institute also offers customized regional courses through Distance Learning on a regular basis.

For more information on the primer paper series and papers on other safety nets topics, please contact the Social Protection Advisory Service; telephone (202) 458-5267; fax (202) 614-0471; email: socialprotection@worldbank.org. Copies of related safety nets papers, including the Social Safety Nets Primer series, are available in electronic form at www.worldbank.org/safetynets. The website also contains translated versions of the papers as they become available. An ambitious translation plan is underway (especially for Spanish and French, some in Russian). For more information about WBI courses on social safety nets, please visit the website www.worldbank.org/wbi/socialsafetynets.