

Report No. 26275-ET

Ethiopia Risk and Vulnerability Assessment

August 2005

Human Development Group III
Africa Region



Document of the World Bank

Acronyms

DPPC	Disaster Prevention and Preparedness Commission
EGS	Employment Generation Program
EGTE	Ethiopia Grain Trading Enterprise
EU	European Union
FFW	Food for Work Program
GDP	Gross Domestic Product
GOE	Government of Ethiopia
GR	Gratuitous Relief
HICES	Household, income, consumption and expenditure survey
HICES/WMS	Household, income, consumption and expenditure survey/Welfare Monitoring Survey
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ITN	Insecticide treated bednets
NGOs	Non-governmental Association
PER	Public Expenditure Review
PRSC	Poverty Reduction Strategy Credits
PRSP	Poverty Reduction Strategy Papers
SDPRP	Sustainable Development and Poverty Reduction Program
SFP	School Feeding Program
SNNPR	Southern Nations, Nationalities and Peoples Region
SRM	Social Risk Management
UNAIDS	Joint United Nations Program on HIV/AIDS
USAID	United States Agency International Development
WFP	World Food Program
WMS	Welfare Monitoring Surveys
WHO/UNICEF	World Health Organization/United Nations Children's Fund

Ethiopia: Risk and Vulnerability Assessment

Table of Contents

ACKNOWLEDGEMENTS	1
1. EXECUTIVE SUMMARY	1
Promising beginning	1
But high vulnerability remains.	2
Reasons for high vulnerability	2
Effectiveness of risk management strategies.....	4
Growth and Welfare costs of ineffective risk management	5
Role for social risk management.....	6
2. SOCIAL PROTECTION FRAMEWORK	9
3. COUNTRY CONTEXT	13
Output Growth Trends.....	13
Poverty trends.....	14
Risks, growth and poverty traps	20
Identifying the vulnerable	21
The distribution of the vulnerable	24
4. IDENTIFYING SOURCES OF RISKS IN ETHIOPIA.....	25
Covariate Risks In Ethiopia	25
Low and unpredictable rainfall (or frequent droughts).....	25
Crop and livestock diseases.	29
Domestic and international price volatility.....	29
Unpredictable policy changes.....	33
Environmental degradation.....	34
Idiosyncratic risks	34
HIV/AIDS	34
Malaria	34
Ill-health, disability and mortality	35
Structural and life-cycle factors	36

5. ASSESSING EFFECTIVENESS OF RISK MANAGEMENT STRATEGIES **39**

Risk management Strategies by households	39
Risk mitigation strategies	39
Risk coping strategies.....	40
Effectiveness of household strategies.....	42
Markets for risk sharing.....	43
Public Risk management strategies	47
Risk-reducing programs.	47
Public programs for coping with risk	51
Effectiveness of public risk management Programs	58
Welfare cost of shocks.....	60

6. HELPING HOUSEHOLDS MANAGE RISKS BETTER: BUILDING BLOCKS OF A SOCIAL PROTECTION STRATEGY 66

Sustaining Growth.....	66
Reversing or halting environmental degradation.....	68
Special focus on covariate health risks.....	69
Making existing safety nets more effective and complementary.....	69

7. CONCLUSION AND NEXT STEPS 72

Lessons learned.....	72
Next steps	73

ANNEXES..... 75

List of Tables

TABLE 3-1: ETHIOPIAN GROWTH BY SECTOR IN THE 1990S	14
TABLE 3-2: TRENDS IN NON-CONSUMPTION POVERTY IN ETHIOPIA, 1995-2000	19
TABLE 3-3: VULNERABILITY TO CONSUMPTION POVERTY LINE DUE TO RAINFALL AND INCOME SHOCKS, 1995/96-1999/2000	22
TABLE 3-4: TRANSITION IN AND OUT OF POVERTY BASED ON ACTUAL AND PREDICTED EXPENDITURE, ETHIOPIA, 1995/96-1999/2000	23
TABLE 4-1: PERCENTAGE OF HOUSEHOLDS REPORTING THAT PARTICULAR TYPE OF EVENT HAS CAUSED CONSIDERABLE HARDSHIP (LOSS OF INCOME OR WEALTH) DURING THE LAST 20 YEARS	28
TABLE 4-2: SOURCES OF RISK IN ETHIOPIA SUMMARIZED BY SUBJECTIVE RISK INDEX OF INCIDENCE AND SEVERITY OF RISKS.....	29
TABLE 4-3: PRICE OF COFFEE RECEIVED BY THE FARMER (IN BIRR PER KG).	33
TABLE 5-1: TYPES OF ACTIONS TO MANAGE RISK BY INDIVIDUALS AND HOUSEHOLDS. ...	39
TABLE 5-2: OFF-FARM WORK PARTICIPATION IN TWO WOREDAS, TIGRAY REGION.....	40
TABLE 5-3: SOURCES TO GET 100 BIRR FOR UNFORESEEN CIRCUMSTANCES IN A WEEK. ...	41

TABLE 5-4: PROPORTION OF HOUSEHOLDS WHO CAN GET 100 BIRR IN A WEEK FOR UNFORESEEN PROBLEMS.	43
TABLE 5-5: RISK MITIGATING OR RISK-PREVENTION ACTIVITIES.	48
TABLE 5-6: INDICATIVE CATEGORY OF FOOD INSECURE HOUSEHOLDS IN ETHIOPIA.	52
TABLE 5-7: PROGRAMS, ESTIMATED COSTS AND SIZE OF BENEFICIARIES, ETHIOPIA.	54
TABLE 5-8: ESTIMATED EFFECTS OF RAINFALL AND TRANSITORY INCOME ON CONSUMPTION (1995/96-1999/2000).	63

List of Figures

FIGURE 3.1: CONSUMPTION GROWTH BY DECILE, ETHIOPIA, 1995-2000.	16
FIGURE 3.2: CONSUMPTION GROWTH IN RURAL AND URBAN ETHIOPIA, 1995-2000.	16
FIGURE 4.1: AVERAGE ANNUAL RAINFALL, ETHIOPIA (1967-2000).	26
FIGURE 4.2: AVERAGE STANDARD DEVIATION OF ANNUAL RAINFALL, ETHIOPIA (1967-2000).	26
FIGURE 4.3: AVERAGE ZONAL RAINFALL AND COEFFICIENT OF VARIATION, ETHIOPIA, 1967-2000.	27
FIGURE 4.4: CEREAL AND FOOD PRICE INDEXES, ETHIOPIA, JULY 1997-APRIL 2000.	30
FIGURE 4.5: CEREAL PRICES IN ADDIS ABABA WHOLESALE MARKET, ETHIOPIA, 1996-2002.	31
FIGURE 4.6: PERCENT OF HEADS OF HOUSEHOLDS REPORTING HEALTH PROBLEMS TWO MONTHS PRIOR TO START OF SURVEY.	35
FIGURE 4.7: PROBABILITY FUNCTIONS OF BECOMING DESTITUTE BY SEX OF HOUSEHOLD HEAD.	37
FIGURE 5.1: TOTAL SPENDING ON RISK-COPING PROGRAMS (MILLION USD).	55
FIGURE 5.2: PER CAPITA FREE AID AND GIFTS, 1995/96 AND 1999/00.	57
FIGURE 5.3: REAL PER CAPITA AID FROM GOVERNMENT AND NON-GOVERNMENTAL ORGANIZATIONS.	57
FIGURE 5.4: THE EFFECT OF DROUGHT ON AGRICULTURAL GROWTH, ETHIOPIA, 1981/82-1999/2000.	61
FIGURE 5.5: IMPACT OF 1984 DROUGHT ON CEREAL PRODUCTION AND YIELD.	62

List of Boxes

BOX 4.1: MULTIPLE RISKS (BUNCHING OF RISKS) WORSEN VULNERABILITY.	32
BOX 4.2: DECLINING COFFEE PRICES MAY DEEPEN POVERTY.	33
BOX 4.3: CHANGES IN POLICY HAVE A LONG LASTING EFFECT.	33
BOX 4.4: EFFECT OF HOUSEHOLD SIZE ON HOUSEHOLD VULNERABILITY IS AMBIGUOUS.	38
BOX 5.1: HOW LONG CAN THE AVERAGE SUBSISTENCE HOUSEHOLD RELY ON OWN HARVEST? AT MOST 7 MONTHS.	44

List of Annexes

ANNEX 1: METHODOLOGY AND DATA.	76
ANNEX 2: TABLES.	83
ANNEX 3: FIGURES AND GRAPHS.	100
ANNEX 4: REFERENCES.	120
TABLE A 1: TYPE AND TIME OF SURVEY.	77
TABLE A 2: SIZE OF AGE COHORTS AND AVERAGE SIZE OF CELLS, RURAL ETHIOPIA, 1995/96-1999/2000.	78
TABLE A 3: SUMMARY STATISTICS FOR 1995/96 AND 1999/2000.	83
TABLE A 4: SUMMARY STATISTICS OF RAINFALL VARIABLES (MM), ETHIOPIA, 1967-2000.	85

TABLE A 5: ESTIMATES OF HEAD COUNT RATIO, POVERTY GAP AND SQUARED POVERTY GAP INDEXES, ETHIOPIA, 1995 AND 2000 (%).	85
TABLE A 6: REGIONAL POVERTY COUNT, ETHIOPIA, 1995/96-1999/2000.	86
TABLE A 7: CONSUMPTION GROWTH RATES BY DECILE, ETHIOPIA, 1995/96-1999/2000.	86
TABLE A 8: CONSUMPTION INEQUALITY (GINI INDEX), ETHIOPIA, 1995/96 AND 1999/2000.	86
TABLE A 9: CHARACTERISTICS OF THE CHRONIC, TRANSIENT, AND NOT SO POOR (RURAL HOUSEHOLDS), ETHIOPIA, 1995/96-1999/2000.	87
TABLE A 10: DETERMINANTS OF CONSUMPTION, ETHIOPIA, 1995/96-1999/2000. (DEPENDENT VARIABLE = LOG OF CONSUMPTION).	90
TABLE A 11: DETERMINANTS OF INCOME, ETHIOPIA, 1995/96-1999/2000. (DEPENDENT VARIABLE = LOG OF TOTAL INCOME).	92
TABLE A 12: DETERMINANTS OF CONSUMPTION INCLUDING TRANSITORY INCOME, ETHIOPIA, 1995/96-1999/2000. (DEPENDENT VARIABLE = LOG OF CONSUMPTION)	94
TABLE A 13: PER CAPITA REAL AID AND GIFTS TO HOUSEHOLDS (IN BIRR), ETHIOPIA, 1995/96.	97
TABLE A 14: PER CAPITA REAL AID AND GIFTS TO HOUSEHOLDS (IN BIRR), ETHIOPIA, 1999/2000.	97
TABLE A 15: PER CAPITA REAL AID AND GIFTS TO HOUSEHOLDS (IN BIRR), RURAL ETHIOPIA, 1999/2000.	98
TABLE A 16: PER CAPITA REAL AID AND GIFTS TO HOUSEHOLDS (IN BIRR), URBAN ETHIOPIA, 1999/2000.	99
FIGURE A 1: CUMULATIVE DISTRIBUTION OF CONSUMPTION, ETHIOPIA, 1995/96 AND 1999/2000.	100
FIGURE A 2: CUMULATIVE DISTRIBUTION OF CONSUMPTION, ETHIOPIA REGIONS, 1995/96 AND 1999/2000.	101
FIGURE A 3: SHIFT IN CONSUMPTION DISTRIBUTION, ETHIOPIA, 1995/96 – 1999/2000.	102
FIGURE A 4: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, ETHIOPIA, 1995/96-1999/2000.	102
FIGURE A 5: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, ETHIOPIA, 1995/96-1999/2000.	103
FIGURE A 6: SHIFT IN CONSUMPTION DISTRIBUTION, RURAL ETHIOPIA, 1995/96 – 1999/2000.	103
FIGURE A 7. SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, RURAL ETHIOPIA, 1995/96-1999/2000.	104
FIGURE A 8: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, RURAL ETHIOPIA, 1995/96-1999/2000.	105
FIGURE A 9: SHIFT IN CONSUMPTION DISTRIBUTION, URBAN ETHIOPIA, 1995/96 – 1999/2000.	105
FIGURE A 10: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, URBAN ETHIOPIA, 1995/96-1999/2000.	106
FIGURE A 11: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, URBAN ETHIOPIA, 1995/96-1999/2000.	106
FIGURE A 12: SHIFT IN CONSUMPTION DISTRIBUTION, TIGRAY REGION, 1995/96 – 1999/2000.	107
FIGURE A 13: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, TIGRAY REGION, 1995/96-1999/2000.	107
FIGURE A 14: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, TIGRAY REGION, 1995/96-1999/2000.	108
FIGURE A 15: SHIFT IN CONSUMPTION DISTRIBUTION, AMHARA, 1995/96 – 1999/2000	108

FIGURE A 16: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, AMHARA, 1995/96-1999/2000.....	109
FIGURE A 17: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, AMHARA, 1995/96-1999/2000.....	110
FIGURE A 18: SHIFT IN CONSUMPTION DISTRIBUTION, OROMIYA REGION, 1995/96 – 1999/2000.....	110
FIGURE A 19: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, OROMIYA REGION, 1995/96-1999/2000.....	111
FIGURE A 20: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, OROMIYA REGION, 1995/96-1999/2000.....	111
FIGURE A 21: SHIFT IN CONSUMPTION DISTRIBUTION, SNNP REGION, 1995/96 – 1999/2000.....	112
FIGURE A 22: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, SNNP REGION, 1995/96-1999/2000.....	112
FIGURE A 23: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, SNNP REGION, 1995/96-1999/2000.....	113
FIGURE A 24: SHIFT IN CONSUMPTION DISTRIBUTION, ADDIS ABABA, 1995/96 – 1999/2000.....	114
FIGURE A 25: SIMULATED EFFECTS OF ASSETS, EDUCATION, DEMOGRAPHICS, SERVICES, AND SHOCKS (RAINFALL AND HEALTH) ON CHANGES IN CONSUMPTION, ADDIS ABABA, 1995/96-1999/2000.....	114
FIGURE A 26: VISUAL IMPACT OF VARIABLES ON CHANGES IN CONSUMPTION, ADDIS ABABA, 1995/96-1999/2000.....	115
FIGURE A 27. EMPIRICAL DISTRIBUTION OF AVERAGE ANNUAL RAINFALL, ETHIOPIA, 1967-2000.....	115
FIGURE A 28. EMPIRICAL DISTRIBUTION OF STANDARD DEVIATION OF RAINFALL, ETHIOPIA, 1967-2000.....	116
FIGURE A 29: AVERAGE ANNUAL RAINFALL, NATIONAL AND BY REGION, ETHIOPIA (1967-2000).....	116
FIGURE A 30: STANDARD DEVIATION OF ANNUAL RAINFALL, NATIONAL AND BY REGION, ETHIOPIA (1967-2000).....	118

Acknowledgements

This report has been prepared by a team comprised of Mmes/Messrs.: Nadine Poupart (AFTH3, Team Leader) and Andrew Dabalén (AFTH3, Economist, Co-Team Leader), Antoine Bommier (University of Toulouse), Pierre Dubois (University of Toulouse), Tassew Woldehanna (Addis Ababa University), Tewodros Negash Kahsay (Addis Ababa University), Patrick McGraw Kline (Michigan University), Jo-Anne Bour (JPA, MNSHD), and Diane Coury (Consultant).

The team would like to express its special appreciation and gratitude to Ato Getachew Adem, Head, Economic Policy and Planning Department, Ministry of Finance and Economic Development (MOFED) and his team; and Dr. Abdulahi Hassen, General Manager, Central Statistical Authority, MOFED and his team for facilitating this work.

The report was prepared under the general guidance of Ms. Laura Frigenti (Sector Manager, AFTH3), Mr. Ishac Diwan (Country Director, AFC06), Mr. Arvil Van Adams (Lead Sector Specialist, AFTHD), and Mr. Kalanidi Subbarao (former Lead Sector Specialist for Social Protection, AFTHD). Peer reviewers were Ms. Margaret Grosh (Lead Economist, HDNSP), Ms. Giovanna Prennushi (Lead Economist, PRMPR), Ms. Gillette Hall, (Economist, LCSHS), and Mr. Lant Pritchett (Harvard University). Invaluable comments were received from Mr. Harold Alderman (Lead Economist, AFTHD) and Ms. Trina Haque (Senior Economist, AFTH3).

1. Executive Summary

1.1 This study is a review of risks and how they are currently managed, by individuals, households, communities and the public in Ethiopia. It starts with the hypothesis that risks are important determinants of poverty and understanding how they are managed permits us to assess the prospects and strategies for poverty reduction and sustainable development in the future. The review focuses on the most common risks that affect individuals or communities.

1.2 The approach proposed to undertake this assessment is the social risk management (SRM) framework. SRM refers to public interventions that help individuals, households, and communities to better manage the diverse risks they face. In this framework, risk-induced poverty traps lead to high vulnerability, itself defined as the inability to prevent falling into poverty or destitution in the future. Therefore, **all** direct and indirect public expenditures, which protect or prevent households from falling into poverty traps, are **investments** — not a drain on public coffers.

1.3 A risk and vulnerability assessment complements general poverty assessments in two ways. First, it takes a fluid and dynamic view of poverty and thereby expands the definition of the poor to include the current poor and those who are at risk of being poor in the future. Second, it accounts more explicitly for the impact of shocks on household welfare. This risk-focused perspective allows policy makers to devise a diversity of strategies and instruments to combat two sources of household poverty and vulnerability: one that is due to low income or lack of assets and typically the preoccupation of standard poverty analysis, and the other that is due to high variance of income. The welfare consequences of both situations can be made worse by inadequate and ineffective risk management instruments.

PROMISING BEGINNING

1.4 The review finds that the developments in the 1990s have provided a promising platform to reduce poverty and vulnerability in Ethiopia. The relative peace which was interrupted by a brief but tragic border war with Eritrea, significant public investment, and a period of historically favorable rains have led to high growth rates in GDP, improvements in broad measures of welfare, and even more dramatic improvements in non-consumption measures of welfare. Starting with consumption measures, we find that average consumption per adult held steady between 1995/96 and 1999/2000. We also find that the consumption of the poorest households edged up, but only slightly, compared to consumption of the richest households. As a result, poverty rates did not decline significantly between 1995/96 and 1999/2000. In contrast to slow movements in consumption, there was significant progress in non-consumption measures of poverty in areas such as malnutrition, literacy, and accessibility to health care, water and education. Moreover, all this was done without measurable increase in inequality.

BUT HIGH VULNERABILITY REMAINS.

1.5 These positive developments on welfare notwithstanding, many Ethiopians remain poor and highly vulnerable. About 45% of the population finds itself in conditions of mass poverty. In the same period that poverty rates came down, vulnerability to poverty, whether measured as the probability to fall into poverty in the future or movement in and out of poverty between periods, remained high. About 70% of cohorts, defined as groups of household heads of the same age group living in the same administrative zone, who were followed between 1995/96 and 1999/2000 were predicted to have more than a 50% chance to fall into poverty in the future. About two-fifth of this estimated vulnerability can be explained by the knowledge of rainfall shocks alone. When looking at the transitions in and out of poverty we find that about 10% of the rural population remained poor in both periods, while another 35% were predicted to move in and out of poverty between periods. These numbers and the recent drought of 2002/03, portray the fragility of recent gains in improving welfare. They suggest that in addition to the 45% of the population who remain poor, another 25% who are not poor now have a high probability of falling into poverty in the future with a single large scale shock.

1.6 Furthermore, despite impressive gains in non-consumption measures of poverty, major risks remain in key areas. As an example, 57% of children less than 5 years continue to be malnourished and 31% severely so. If conditions remain as they are, every Ethiopian child born now faces these chances of becoming malnourished in the future. Such exceptionally high levels of malnutrition, compared to countries at similar levels of income, have persistent long term impacts. In particular, malnutrition diminishes the future productivity of survivors, thus making them more likely to fall into poverty traps and therefore vulnerability.

1.7 Vulnerability also differs geographically, with the three regions of Tigray, Amhara and SNNP exhibiting the highest estimated levels. Furthermore being elderly or living in families with high dependency ratio and in isolation (that is, further from water and health services, etc.), having no assets or engaging in subsistence agriculture, was associated with higher vulnerability, suggesting localized impoverishment or possibility of a poverty trap, despite positive per capita growth.

REASONS FOR HIGH VULNERABILITY

1.8 The ability of a household to reduce or prevent vulnerability depends on three variables. The first is the severity and frequency of risks it faces. The second concerns the level of the household's own resources, which can be financial (e.g. savings), skills (training, education), or physical (land and livestock). The third regards access to social networks (family, relatives, communal associations, markets, etc.) or public programs. This report finds that vulnerability remains high in Ethiopia because of (a) the presence of multiple and overwhelming risks, and (b) inadequate and ineffective management of these risks by households, through markets and the public domain.

1.9 **Sources of risks and vulnerability:** The most compelling risks faced by Ethiopian households tend to be covariate, in that they affect a network of individuals or communities all at once. The most well-known of these risks is *drought*, and between 1978 and 1994, 15 droughts which have led to the displacement, injury or death of more than a million people have been reported. Drought affects all households regardless of livelihoods and is most often experienced as harvest failure, loss of livestock, food and water insecurity. Another common and disruptive risk is *price risk*, particularly of grains (the main constituent of the diet of the majority population) and coffee, the main export crop. Price volatility inevitably triggers conflicts of interest between net producers or traders on the one hand and net consumers on the other. Periods of low prices favor consumers as they buy the grain cheaply and their welfare improves, but they are injurious for the net producers and sellers. When prices rise sharply the opposite happens. That said, high, frequent and unpredictable price changes introduce uncertainty into market conditions for all concerned. Both farmers and traders hesitate to participate in unstable market without adequate protection against adverse price movements. Many farming households withdraw to self-sufficiency, while traders may not enter the market at all. The outcome may be low production, thin markets, and overall poverty and vulnerability. While price risk affects everybody, the poor are especially vulnerable to the adverse effects of this risk, because unlike the rich, they no savings with which to protect themselves.

1.10 Some risks, though considered individual, are overwhelming and have spillover effects that can easily deteriorate into community-wide risks. One of these is *malaria*, a disease remains prevalent in large areas of the country. It is estimated that 40% of the population is at risk of malaria, and about 24% live in areas in which malaria is at levels epidemic. Pregnant women and very young children are the population groups at highest risk, since they may not have acquired significant levels of immunity against malaria. In areas with unstable malaria exposure, pregnant women may have 2 to 3 times higher risk of contracting malaria than non-pregnant women living in the same area. Moreover, malaria exposure may lead to additional adverse outcomes such as low birth weight, abortion, and neonatal death. Fear of exposure to malaria also leads households to avoid malaria prone areas, thereby creating challenges for population and land use planning. In the past two decades, *HIV/AIDS* has emerged as a new major risk. About 2 million Ethiopians between ages 15 to 49, or 6.4% of the adult population, have already been exposed to this disease. The exposure is higher for urban areas, where adult prevalence rates approached 15%, and for the 25-29 years olds where the rates were 17% by the end of 2001. In the same year, 160,000 died from HIV/AIDS. Cumulative deaths of the past have led to 1 million orphans.

1.11 Vulnerability to poverty induced by these risks can be reduced or abated if the strategies for managing risks are sufficient. However, in the context of Ethiopia, household vulnerability to risk-induced poverty remains high because the household's own resources, opportunities available in the market or current public policies and strategies for managing risks are often inadequate and/or ineffective.

EFFECTIVENESS OF RISK MANAGEMENT STRATEGIES

1.12 **Household strategies to manage risks are often inadequate and ineffective.**

Many of the well-known household strategies to deal with risk either before it occurs (e.g. multiple crops on one field, mixed crop livestock systems), or after (e.g. selling livestock, reducing health expenditures), do not provide all the required protection. But since these strategies involve foregoing activities with high productivity, innovation, or future investment, they come at a high cost to the individual household and to society. Traditional sources of mutual insurance also tend to be localized (confined to networks within narrow geographic reach) and exclusionary (closed to poorer households).

1.13 **Markets for sharing risk are poorly developed.** After many years of control under the Derg regime, the market system is taking root in Ethiopia, but it is still very small. There are only about 25 to 30 grain traders, and they operate in only a few markets and trade primarily within a 200 km zone. Furthermore, most markets, especially factor markets (land, labor, credit) and financial markets (banking, micro-finance, insurance), tend to be incomplete and characterized by high transaction costs. For example, land sales are prohibited and leasing and renting have many restrictions. Because of high costs of handling and transportation, maize farmers get only 1/3 of the market price. For the same reasons, food can take up to 30 days to reach the final consumer.

1.14 **Moreover, existing public risk management programs have their own limitations.** The first is that even though the *risk mitigation* strategies such as supplemental irrigation, water harvesting, agro-ecological packages, and resettlements, provide an important step to address the problem of food insecurity, they introduce their own risks (in health, environment, and conflict) in addition to the challenges of implementation. Unless these risks are addressed at the outset, risk-averse households may not be willing to adopt the strategies. Second, even if implementation is relatively successful, these strategies would not be sufficient to solve all the problems of chronic poverty and vulnerability, since the estimated size of the beneficiaries that can be helped from such programs is only a fraction of those estimated to be in deep poverty and vulnerable. Third, some key strategies are not as effective as they could be, either because of design or unintended consequences of policy. For instance, water-harvesting is designed to reduce intra-annual, not inter-annual, variability of rainfall. If rain fails in one of the two seasons in the year, the households still may not be protected from hunger for part of the year. Similarly, the well-intentioned policy of scaling up fertilizer use by linking its distribution to extension services has driven out private participants, increased farmer debt, and created uncertainty over future fertilizer credit and use, factors which undermine the goals of ADLI and risk reduction.

1.15 Fourth, existing *risk-coping* strategies have a narrow focus on drought risk and its associated food insecurity. While this is understandable given the frequency and devastation of droughts, it has muted needed attention to prevent or reduce other risks such as malaria, HIV/AIDS, and malnutrition, all of which have as much potential to lock households into poverty traps.

1.16 Fifth, the existing national food security program, due (according to Government) to a limited country income level, has a narrow coverage. It targets food-insecure households in 156 woredas in only 4 out of 9 regions and 2 administrative councils, thereby passing over millions of households that are food insecure or vulnerable to severe and long-term poverty. While understandable, both the size of the needy who are currently excluded and the implications of this position for poverty reduction in the long term are difficult to ignore. Consider first, the size of the problem. The food security program now targets about 5 million people, or 1 million households assuming an average household size of 5, which is about 10% of the population. However, in 1995/96, 33% of 10 million households in the country qualified to be food insecure, according to the definition of a minimum of 2200 Kcal/day, and 17% as extremely food insecure, a consumption level of less than 1650Kcal. Even if the current beneficiaries of the program are all extremely food insecure, an additional 7% of all households who are in the same position as the beneficiaries would have no public assistance, which might be the only way for some to avoid sinking deeper into destitution. In addition, when inter-generational transfer of disadvantage is taken into account, the children involved are more likely to have less education and poorer health, not to mention poor nutrition, leading to persistent poverty.

1.17 Sixth, the risk-coping programs are primarily designed and useful for relief. While implementing them, potentially creative ways to use food aid for a much broader objective of building and protecting public and household level assets is missed. At present, there is no active practice to integrate food security programs with efforts to build and protect human capital of the most vulnerable groups such as orphans in poor households, girls, or households in pastoralist areas. To give two examples, food aid transfers directed to households or communities in exchange for sending or keeping children in school is small scale and reaches only about 260,000 even though such programs may be suited to improving the education of orphans, girls or children from pastoralist areas. Similarly, only 20% of food aid distribution is used for public works programs that are aimed at improving community assets.

GROWTH AND WELFARE COSTS OF INEFFECTIVE RISK MANAGEMENT

1.18 Ineffective risk management results in a massive loss of welfare. In Ethiopia, the most visible result is large-scale physical death from two scourges: lives threatened by and lost to drought, have been tragically high, especially in the past; and HIV/AIDS and malaria have killed hundreds of thousands with little abating to date. These scourges have other impacts. Income losses have been staggering. In the most extreme cases, droughts can shrink household farm production by up to 90% of output in a normal year, which magnifies the problems of malnutrition and infant mortality. Disease prevention is also costly. Households must pay up to 30% of their farm income to prevent malaria for one year. Reduced income in turn leads to lower consumption. Specifically, a 10% reduction in income reduces consumption by up to 7%. A decrease in rainfall by 10% can lead up to 10% loss in consumption. For a single household, even a single experience of one of these shocks would be unbearable. But when they are bunched together, as is often the case, the scale of the problem becomes magnified. Such losses, occurring to a large traditional agricultural system, would deter even the bravest

households from adopting high-productivity but high-risk economic activities, such as non-traditional crops, vegetables, fruits or flowers, all of which have been identified as crucial activities for export and agricultural diversification and sustained growth for Ethiopia.

ROLE FOR SOCIAL RISK MANAGEMENT

1.19 To reduce poverty traps and high vulnerability, a better management of risks is necessary. The social risk management strategy recommended in this review seeks to achieve a balance between *risk-reduction or prevention* and *asset protecting* strategies. While Ethiopia's SDPRP is already implementing this approach, there are a number of areas where special attention is needed to improve the effectiveness of existing strategies. These areas encompass strategies aimed at reducing risks to **sustaining rapid growth**, reversing or halting **environmental degradation**, reversing the impact of key community-wide **health risks**, and improving effectiveness and coverage of **asset-protecting programs**. The importance of developing asset-protecting strategies stems from the observation that even the best-intentioned of public programs does not always ensure the full participation of the poor and the vulnerable (e.g. orphans, girls, isolated groups).

1.20 To achieve effectiveness of existing risk management strategies. Some policy obstacles must be removed while other new policies must be initiated. Various actions enhancing rapid growth must be undertaken by improving the functioning of land, fertilizer and grain markets, complemented by public investments in roads. Suggested policy actions needed in this area include:

- The clarification of tenure policies through public statements precluding future land redistributions.
- Restrictions concerning the length of rental contract and size of land that can be rented letting households on either side of the rental market (renting in and renting out) determine themselves how much land to rent and for how long. The government must establish a legal system that will enforce such arrangements.
- Reversing non-competitive market developments in the fertilizer market, by simplifying the complex and anti-competitive bidding and procurement process, leveling the field to access credit and foreign exchange and hastening the separation of fertilizer distribution and extension service.
- Reducing high transaction costs in the grain markets by promoting standardization, increasing road network, increasing credit for storage and encouraging formation of trust-based institutions such as traders association.
- Reversing environmental degradation, by adopting a stronger population control policy, starting with satisfying existing demand for family planning services.

1.21 A second group of priority policy actions concerns programs that already exist, but whose reach and effectiveness can be improved by scaling up. Suggestions in this category are;

- Reducing the incidence of malaria and HIV/AIDS, by scaling up existing programs and promoting new technologies, such as insecticide-treated bednets.
- Expanding the coverage of the food security programs to all the food insecure households in the country through adequate and predictable funding of the program.

1.22 A number of existing strategies, especially to build or protect valuable household assets and public infrastructure, hold great potential to reduce risk and/or help households manage risk better in the future. However, their implementation to date is limited, and their effectiveness has not been carefully monitored. Hopefully, lessons from these pilots can be used to form the basis for future scaling up. The suggestions in this category of strategies include:

- Introducing a nationwide nutrition program, drawing on lessons from the child growth monitoring programs in the food security project and best practice ideas from international experience.
- A nationwide food-for-school program aimed at improving the education of girls, vulnerable children such as orphans, and children in pastoralist areas drawing on lessons learned in existing school-feeding programs.
- Establishing a cash-based nationwide public works program, based on lessons learned from the on-going schemes (under implementation by NGOs) and international best practice.
- Promoting water-harvesting technologies, after a careful cost-benefit analysis of existing designs.
- Encouraging voluntary resettlements, after determining the available size of underused land, eligibility criteria for beneficiaries, minimum infrastructure needs and funding, and taking care to avoid risks such as localized conflict, environmental damage.

1.23 There are also a number of risk management strategies that are widely accepted as needing reforms, but where further evaluation and analyses is warranted. The list of suggested studies include:

- Impact of food aid on markets. What are the relative contributions of food aid inflows and other market imperfections (e.g. poor storage, lack of credit, isolation, etc.) to domestic food price volatility and availability?
- The role of Ethiopian Strategic Food Reserve (ESFR). What market stabilizing role can ESFR play, if any?
- Monetization of food aid. What are the benefits of monetizing food aid? What are the risks? What are the components of a transition process to full or partial monetization?
- Scaling up public works program. What is the design and funding mechanisms for making public works program act as a more effective risk management tool?
- Weather based insurance. How feasible is a weather-based insurance institution for Ethiopia? Who should it target (regional or woreda governments, producers or traders associations)?

1.24 This review has taken the first step to identify the sources of risks in Ethiopia, and how they are managed now, and how they can be managed better in the future, with the active participation of the state. It is hoped that this review would be one of a number of steps to develop a viable social protection strategy that will serve all the poor in Ethiopia. As an immediate next step, it is hoped that the current and future dialogue over the PRSC policy actions can benefit from the findings in this review. In particular, together with other existing assessments, it can serve as an organizing framework for initiating the difficult and complex discussion over objectives of a broad social protection strategy, trade-offs between programs and selectivity.

2. Social Protection Framework

2.1 **Risk and poverty.** Risks are uncertain events whose chances of occurring are not known in advance. Their presence, whether realized as shocks or anticipated, induces behaviors that lead to poverty. Risks can be idiosyncratic, that is, affect a single person, household, or covariate, affect a group of individuals or households at the same time. All households face risks, but differ in their ability to manage them. There are two main avenues through which household management (or lack thereof) of risks leads to deep poverty. First, *Ex-ante* (before risks are realized), whereby a household, which perceives its exposure to a risk to be high, will take action to reduce or mitigate the future impact of the risk. For example, a household might resist diversification of crops and livestock, or be reluctant to adopt a new high-return technology, or persevere in creating redundancies (farming many small disjointed plots, keeping many heads of cattle, or having many children). While these actions offer some insurance in the event of a shock, they come at a high price, in that they lock households into activities with low productivity. Second, *Ex-post*, whereby the household may respond to the shock by taking action that reduces its ability to respond to future economic opportunities. These responses (e.g., selling assets such as oxen or seeds, and pulling children out of school, etc.) may also deplete the household's ability to face the same or other risks in the future.

2.2 **Poverty and vulnerability.** Poverty and risks lead to vulnerability. Vulnerability refers to the potential of being locked into long-term poverty or destitution. A single severe shock can send a poor household into destitution, and repeated shocks can send a previously safe household into poverty. Being vulnerable can therefore be understood as the "propensity of a society (households) to experience substantial damage and disruption as the result of hazards (e.g. drought, flood) and difficulty (lack of resources) to cope with and recover from them" (GoE, 1999b, p. 8)." It is the presence of risk, the idea that future well-being is uncertain, that distinguishes the concept of poverty from vulnerability.

2.3 A risk and vulnerability assessment complements standard poverty assessment in two ways. First, it takes a fluid and dynamic view of poverty and thereby expands the definition of the poor to include the current poor and those who are at risk of being poor in the future. Second, it calls for a more explicit assessment of shocks on household welfare. This allows policy makers to devise different strategies and instruments to effectively combat two sources of vulnerability: the one resulting from a low level of consumption due to lack of assets, and the other resulting from a high level of variance of consumption and poor coping instruments in the event of a shock.

2.4 The ability of a household to reduce or prevent vulnerability depends on four variables. The first is the severity and frequency of the risk it faces. A single catastrophic drought has the capacity to overwhelm even a household that can be considered relatively wealthy (i.e. one with large tracts of land, several heads of cattle, etc.) in many developing countries. When such a drought or a moderate version is repeated more frequently, it can erode the ability of any household to protect itself over time. The second concerns the household's own resources. These resources can be

financial (e.g. savings), skills (training, education), or physical (land and livestock). It is generally believed that the more of these resources the household possesses, the better its chances of weathering adverse circumstances induced by risks. The third regards access to social networks (family, relatives, communal associations, etc.). For a very poor household, the mutual reciprocity of relatives or the generosity of a neighbor, are sometimes the only forms of security standing between it and destitution. But if a repeated or severe shock occurs, even these avenues of assistance can break down, thereby deepening household's vulnerability. The fourth and the final channel is the availability of public assistance. When the household's own resources are insufficient even with the best of effort, perhaps because they are elderly or disabled or just too poor, or the social networks breakdown, say in the face of a large covariate risk, it often turns out that the only line of defense against tragic outcomes is the response of the state.

2.5 Welfare costs of risk and vulnerability. Inefficient and inadequate management of risks by households can have large private and collective costs. As mentioned above, when a household's risk mitigating actions lead it to forgo the value of specialization and higher quality, it becomes locked into low productivity activities. Furthermore, the household' well-intentioned responses to protect itself from a current shock, can lead to perverse consequences and undermine its very survival in the future. For example, selling the family land to meet the cost of a funeral can render a household landless. Similarly, pulling children out of school can reduce the future stock of education for the child withdrawn from school, but also of the household. The result is reduced asset stock (land and human capital), which reduce future inputs to investment, and contribute to persistent poverty.

2.6 The welfare costs of inadequate risk management are not born just by individual households. When a large fraction of the population is trapped in poverty, there is little prospect for sustainable high growth. Instead, aggregate poverty will prevail. Mass poverty diminishes avenues for greater wealth accumulation, revenue collection, public investment and broad development. Put simply, poor protection against risk and vulnerability perpetuates the vicious circle.

2.7 The case for social risk management. Social risk management (SRM) refers to public interventions that help individuals, households and communities to better manage the diverse risks to which they are exposed (World Bank, 2001; Holzmann and Jorgensen, 2000). The case for moving social risk management (SRM) to the center of the economic development agenda rests on four crucial observations. First, risks and inadequate risk management strategies act as major sources of poverty traps. Second, the poor are often those most exposed to diverse risks and at the same time the least able to protect themselves against the risks. Third, because of the huge welfare costs of risk-induced poverty traps, the SRM approach maintains that accelerated poverty reduction and sustained economic and human development cannot be accomplished without adequate and efficient protection against risks. Indeed, as it has been widely recognized in poverty reduction strategy papers (PRSPs), a successful strategy to fight poverty must include helping the current and would-be poor. For the latter, forward-looking poverty interventions are necessary, which must, by definition, be based on an assessment of vulnerability. Fourth and finally, direct and indirect public expenditures on social

protection are investments — not just a drain on public coffers — in so far as they protect or enable household investments in human capital, environmental quality, new products and technologies. Because of these assessments, the SRM approach advocates a multiplicity of instruments (to reduce, mitigate, and cope) as well as institutions (including informal, market, or public) to deal with risks effectively.

2.8 **Objectives of the Study.** The aim of this study is to better understand the connection between risks and vulnerability in Ethiopia and identify key policy measures to reduce household vulnerability. The study attempts to assess risks and vulnerability by:

- (a) undertaking a *literature review* that summarizes existing qualitative and quantitative research on vulnerability in Ethiopia, focusing on a) main sources of risks; b) risk management strategies; and c) the possible existence of poverty traps, and
- (b) complementing it with a *quantitative analysis* of vulnerability to weather and health shocks. The quantitative analysis: (i) measures the impact of weather and health shocks on households' consumption; (ii) establishes a typology of vulnerable groups; and (iii) examines the relative importance of shocks, human capital, assets, and access to public investments in influencing the future probability to falling into poverty.

2.9 **Expected Benefits.** First, by making the connection between risk and growth explicit, the study hopes to raise awareness and elevate the role of social risk management to the forefront of the country's development strategy.

2.10 Second, this assessment will be the first nationally representative study of vulnerability in Ethiopia. Its results are expected to inform policy dialogue on on-going activities such as: (i) Ethiopia's Poverty Reduction Strategy Credits (PRSC), which will focus on issues related to growth and vulnerability, food security, capacity building, and decentralized service delivery, especially in education and health; and (ii) the Public Expenditure Review (PER), which is focusing on social sectors, including safety nets.

2.11 Third, being among the first vulnerability assessments in Africa, the study may serve as a methodological guide for other countries planning to do the same. It shows how poverty dynamics can be linked to the measure of vulnerability in the absence of panel data, by following cohorts, or groups of households with fixed membership, constructed from repeated and independent cross-section surveys, which are available for a number of countries.

2.12 **Organization of the report.** The rest of the report is organized as follows. Chapter 3 provides the context to the rest of the report by tracing, briefly, recent developments in Ethiopia. The first part of the chapter provides a quick overview of the evolution of consumption and non-consumption measures of welfare. The second part extends these measures, especially the standard consumption poverty measure, to include the notion of vulnerability and provide a head count of the vulnerable. In the process we show that the numbers look different if a dynamic view of poverty is taken into

consideration. Chapter 4 takes up a discussion of risks, one of the main causes of vulnerability to poverty. For brevity, it looks at a few core risks that are perceived and experienced as compelling in the country. Chapter 5 discusses how these risks are managed by households (informal insurance) via markets and by the public sector and assesses the effectiveness of these strategies. It also provides an estimate of welfare losses from inadequate management of risks. Chapter 6 provides an outline of a social protection strategy to help households better manage risks. Chapter 7 concludes.

3. Country Context

3.1 The impact of risks on individuals, households, and communities and how best to respond to them can only be understood within a social, economic and political environment. Therefore, this chapter provides a brief background regarding developments in living standards in Ethiopia in the 1990s.

3.2 The 1990s were a decade of great promise for Ethiopia. First, the long and tragic civil war came to an end in 1991. Except for a bloody but short border war with Eritrea in 1998 and again in 2000, the country has enjoyed peace for most of the decade. As a result, significant resources, both material and intellectual, could at last be used to improve the social welfare of the population. Second, major economic reforms were introduced by the government that took power in 1991. The reforms moved the structure of the country's economy from a centralized, command system towards a more liberal, market-based one. The currency was devalued, trade restrictions and price controls were gradually relaxed, and inflation was tamed, all of which spurred long-neglected private activities. Third, a major transformation in the governance structure of the country was introduced, where a federal system of government replaced the communist-inspired centralized and concentrated political power of the past.

OUTPUT GROWTH TRENDS

3.3 **In the last decade, output growth has been high but erratic.** Since the end of the civil war, growth has averaged about 6 percent per year, thus placing Ethiopia among the fastest growing countries in Africa. When adjusted for population growth, this translates to an annual average growth of 2.8 percent during the period 1991-2001. But the positive average growth masks large year-to-year fluctuations. Between 1991/92 and 1997/98, the year-to-year growth rate ranged between 10% down to 1% (Easterly, 2002).

3.4 **The main sources of growth have been services and industrial sectors.** Table 3-1 shows that most of the growth can be explained by growth in non-agricultural sources. Since 1992, growth in the agricultural sector, roughly 50% of economic activity, averaged about 2.1% per annum, while services, with 40% share of economic activity, grew at 9% per annum. Industry, despite its small size, contributed as much as agriculture to growth between 1992 and 2000 (Easterly, 2002). Despite the government's commitment to agriculture-led development, the contribution of agriculture to growth has been modest.

Table 3-1: Ethiopian Growth by Sector in the 1990s

	(1992/93-1999/2000)
Sectoral Share	
Agriculture	48.8 %
Industry	11.0 %
Services	40.1 %
Average log growth per annum	
Agriculture Growth	2.1%
Industry Growth	8.5%
Services Growth	9.1%
GDP growth	5.5%
Decomposition	
Agriculture Component	1.0%
Industry Component	0.9%
Services Component	3.6%
GDP Total	5.5%

Source: Easterly (2002).

3.5 Policy and shocks have played major roles in the growth experience.

Of the 2.8% per capita growth rate, it is estimated that the permanent component (that is the growth trend, which excludes the component of growth associated with temporary recovery from year-to-year fluctuation) averaged only 1.1 percent per year during 1991-2001. Part of the growth is attributed to the recovery from inefficient policies of the previous regime and the civil war. However, about 50% (1.4 percentage points) of the 2.8 percent per capita annual growth can be explained by policy changes on inflation and exchange rate management, fiscal discipline, and infrastructure investment, initiated by the current government (Easterly, 2002). By contrast, the low growth in agriculture has much to do with risks, such as unpredictable international prices, especially of coffee, drought, deforestation, and soil erosion and degradation, which are very common in Ethiopian agriculture.

POVERTY TRENDS

3.6 In development practice, it is now widely believed that growth is important for poverty reduction and, to the extent that poverty and vulnerability are closely associated, to reducing vulnerability as well. In the context of Ethiopia, if exit from poverty is highly responsive to growth, the per capita growth rates in the 1990s would imply large poverty reduction. Moreover, the benefits would be considered broad-based if the beneficiaries are drawn mostly from the ranks of the poorest. On both these counts the news from Ethiopia is mixed.

3.7 **First, there was little growth in private consumption in the 1990s.** The average household consumption per adult equivalent remained unchanged between 1995/96 and 1999/2000. Figure 3.1 shows the ratio of consumption in year 1999/2000 compared to consumption in year 1995/96 by expenditure decile. Ratios greater than one imply consumption growth and vice versa. In general, consumption in 1999/2000 was at about the same level as consumption in 1995/96.

3.8 **Second, the little growth that was realized was captured by poorer households.** Both the richest and the poorest households experienced stagnation in consumption growth. However, while the two bottom deciles saw a 1 to 2 percent growth in consumption over four years, the consumption of the richest decile decreased by 1 percent (Figure 3.1). The average consumption growth in all the other deciles stayed somewhere between these two. The bottom 7 deciles recorded either small positive growth or maintained their consumption, while the top 3 deciles experienced slight decreases in consumption. Effectively, there was little difference in the experience between the rich and the poor with regard to changes in their consumption.

3.9 A look at urban and rural households separately shows that the same pattern of slow consumption growth prevailed (Figure 3.2). But all rural households, except those in the top decile, had small positive consumption growth, while all urban households except those in the bottom and top deciles had negative consumption growth. Among urban households, the middle deciles (4 to 7) experienced the largest decreases in consumption—up to 10% during the period. This suggests that, despite the overall stagnation, rural households maintained or grew their consumption a little, while urban households experienced a decrease in consumption.

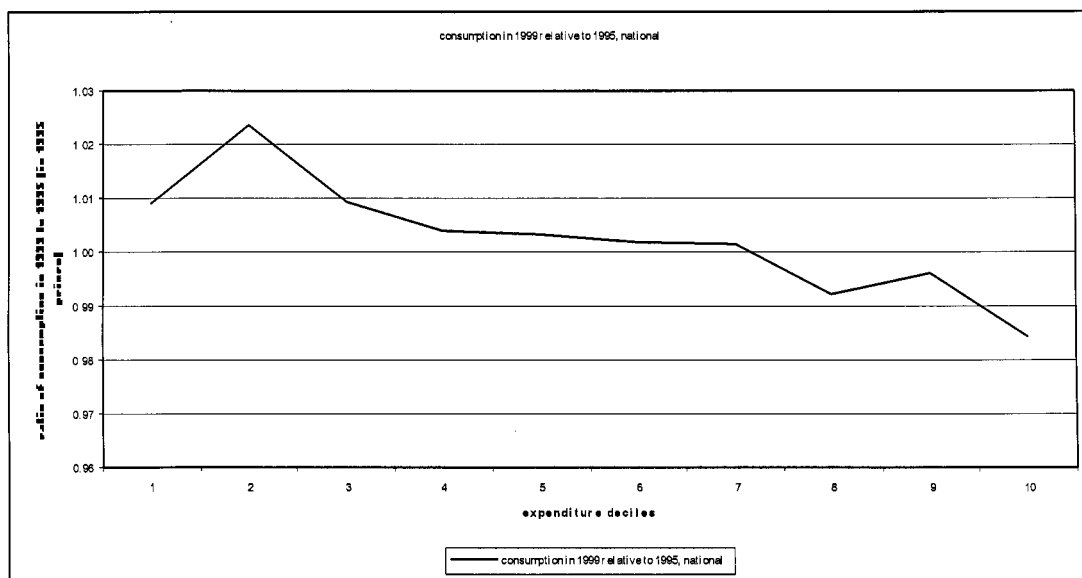
3.10 As in the separation of households into rural and urban areas, an examination of consumption growth patterns by region shows that households in Amhara had improvements in consumption, those residing in SNNP saw no change in consumption, while in Tigray, Oromiya and Addis Ababa household consumption decreased (Figure A2).

3.11 **Third, because of these slow consumption growth rates, poverty rates remained stagnant between 1995/96 and 1999/2000.** Although no official poverty line in Ethiopia has been declared, the absolute poverty line of 1075 birr in 1995 prices that was set in the first poverty study using the 1995/96 household, income, consumption and expenditure survey (HICES), has come to be accepted as the de facto consumption poverty line (GOE, 1999b). Using this line, the Government's analysis showed that the national head count poverty rate declined from 46% to 44% between 1995/96 and 1999/2000 (see Table A5). A recent report shows that national poverty rates remained about 38% in both 1995/96 and 1999/2000, if one uses standard method of calculating poverty—that is, assuming a single poverty line for all households¹. These trends in poverty rates imply low poverty elasticity of growth. Furthermore, the national average

¹ See Well-Being and Poverty in Ethiopia: The Role of Agriculture, Agency and Aid, Report No. 29468-ET. For a discussion on the slight differences between the calculation of poverty lines and the Government's study, see Box 1.3 in the same report.

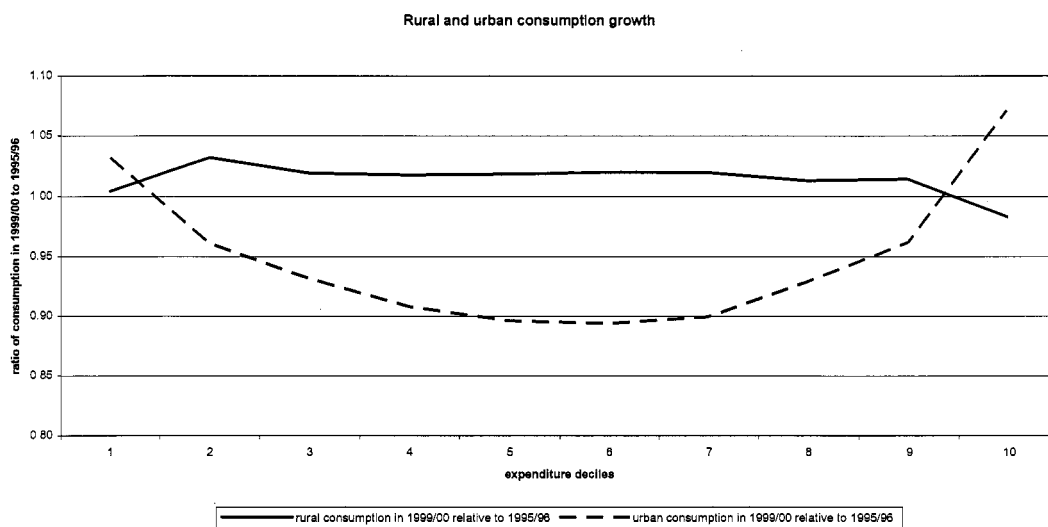
hides the fact that rural poverty declined slightly while urban poverty rose during the same period (see Table A6, Lower poverty lines).

Figure 3.1: Consumption growth by decile, Ethiopia, 1995-2000.



Source: World Bank Staff estimates from HICES/WMS 1995/96, 1999/2000

Figure 3.2: Consumption growth in rural and urban Ethiopia, 1995-2000



Source: World Bank Staff estimates from HICES/WMS 1995/96, 1999/2000

3.12 The limitations of headcount ratio as a measure of welfare are well-known. For one, it is sensitive to the size of the poor households near the poverty line. A small change in average per capita income can lead to a large change in headcount ratio if there was a big initial bunching of households near the poverty line, since the ratio is driven by how many households cross the poverty line. The head count ratio also ignores the extent to which different households fall short of the poverty line. Therefore, we also looked at the poverty gap index, which measures the aggregate shortfall of the poor people's consumption from the poverty line. The poverty gap, the per capita shortfall of the poor, also followed the same trend between years: they remained unchanged during these periods (Table A5).

3.13 **Finally, these slow rates of poverty reduction happened without an increase in aggregate inequality.** The most commonly used measure of inequality, the Gini, decreased slightly at the national level, from 0.30 to 0.29 (see Table A8). The decline of inequality was not general. The Gini coefficient for rural areas declined from 0.28 to 0.27 while in urban areas it increased from 0.35 to about 0.37.

3.14 A look at determinants of changes in consumption across years suggest that distribution of rainfall, public investments, education and assets have contributed to improved consumption while distribution of illness was associated with lower consumption. These conclusions are drawn from comparing counterfactual distributions of consumption. The idea is simple. From the actual distribution of consumption and covariates in 1995/96 and 1999/2000, we create one counterfactual distribution by holding all the covariates of 1999/2000 at their 1995/96 level (called D(a)). We create another counterfactual distribution by holding all the covariates of 1999/2000, except some (say assets or education or rainfall) at their 1995/96 level (called D(b)). The difference between D(b) and D(a) illustrate the impact of variables that changed between 1995/96 and 1999/2000. As the impact of a single or a few variables is often small, it is usually convenient to graph the difference between the densities. Note that the difference between the densities on average has to be zero, but the range of welfare values (in this case, log of consumption per adult equivalent) for which it is positive or negative show the different impact of the variables of interest over the whole distribution. For instance, if the difference is negative below some threshold (say the poverty line) and positive above it, then it means some households have moved above the poverty line and therefore welfare has increased. The resulting counterfactual distributions and the impact of the variables that were allowed to change between 1995/96 and 1999/2000 for the whole sample, rural/urban and for five regions are displayed in a series of graphs (Figure A3-Figure A26). The graphs plotting the difference in the counterfactual distributions show the visual impact of these variables. They lead to conclusions explained below.

3.15 **Favorable rainfall in 1999** had a generally positive impact on consumption. The 1995 to 2000 rainfall season appears to have been good for Ethiopian households. Average rainfall in 1999 was higher than the average rainfall in 1995. Furthermore, the average deviation of the 1999 rainfall from the 30-year average rainfall was minus 8mm, compared to the average deviation of 1995/96 which was minus 45mm. Moreover, the average rainfall in each of the years preceding 1999 (that is 1996-1998) was higher

than the average in 1999. Across space, rainfall has a more positive effect on consumption in Amhara and SNNP, but less pronounced effect in Tigray and Oromiya.

3.16 Asset accumulation had a large effect on changes in consumption. Perhaps because of better rains between 1995/96 and 1999/2000 and general economic recovery, households reported increased accumulation of assets such as farm and transport animals. We find a positive association between asset changes and consumption.

3.17 Public investments in services and infrastructure contributed to growth in consumption. Access to services and infrastructure is measured by distance to schools, health centers, water, food markets and transportation services. Between 1995/96 and 1999/2000, the data shows improved access to some publicly provided goods (Table A1). The average Ethiopian now lives closer to a primary and a secondary school, a health center and water point. We find that the observed improvements in these variables have led to positive improvements in welfare and a reduction of the fraction below the poverty line. The positive effect of infrastructure on welfare was stronger in rural areas, Tigray and Amhara, but less obvious in urban areas, Oromiya and SNNPR.

3.18 The impact of the incidence of illness between 1995/96 and 1999/2000 was negative. The increase of consumption around the poverty line followed by decrease in the upper tail of the distribution suggests that the distribution of consumption resulting from changing reported incidence of illness from its 1995/96 distribution to its 1999/2000 distribution, led to a decrease in consumption, that is, a leftward shift of consumption. The results are particularly strong for rural areas, as well as Tigray and Amhara regions.

3.19 These slow rates of consumption growth and stagnating poverty are not confirmed unanimously by all recent analyses of poverty changes in Ethiopia. Another study using panel data from 15 rural villages in the central and southern parts of Ethiopia found that food consumption between 1989 and 1997 grew by an annual rate of 9%, which is significantly higher than the national average (Dercon, 2002b). Not surprisingly, these growth rates led to substantial poverty declines in these villages, from a food poverty rate of 61% in 1989 to 49% in 1994 (Dercon and Krishnan, 1998). A more recent estimate of absolute poverty rates in the same villages show a decline of 30% to 25% between 1994/95 and 1999 (World Bank, 2004).

3.20 One possible reason for the slow decline in poverty observed with national data sets is that using a single poverty line disguises differences across space. If consumption baskets and prices households pay for them are allowed to vary geographically, we find an overall decrease in consumption but even higher decrease (increase) in rural (urban) areas (Table A3). The poverty gap measure also shows a decrease.

3.21 Tracing trends in household consumption and poverty is harder in practice than is suggested by theory because of problems of data comparability, uneven intervals between surveys which render comparisons across time more challenging, and the choice of the deflators to use in order to make expenditures between periods (and areas) comparable. Since all these hurdles exist for Ethiopia data sets, the debate and disagreements on the extent of the changes in consumption measures of welfare in Ethiopia will

continue. That said, there is less disagreement on the magnitude and the direction of non-consumption measures of welfare.

3.22 Specifically, non-consumption measures of poverty show significant progress between 1995/96 and 1999/2000 (Table 3-2). Stunting, a measure of long-run malnutrition for children less than 5 years, stood at about 58% in 2000 for male children and 55% for female children, both of which are extremely high by international standard. However, this reflects a decrease from 67% for male and 64% for female in 1995 (Christiaensen and Alderman, 2003). Furthermore, extreme stunting declined from 44% in 1995 to 31% in 2000. The decrease, in the level of malnutrition, was experienced in both rural and urban areas, although the reduction in the latter was more pronounced. Regionally, more progress in reducing malnutrition has occurred in Tigray, SNNPR and the two city administrative councils of Addis Ababa and Dire Dawa.

3.23 School attendance rates in recent years have been explosive. The gross enrollment rate, a widely used measure of access to education, has improved from 30% in the late 1980s to 62% in 2003. This can be said to be one of the major accomplishment of the reformist government of Ethiopia. It will take time before these rising enrollment rates are translated into rising literacy rates, but already, the literacy rates have improved, albeit slightly, from 27% in 1995 to about 30%, in 2000. This gain appears to come from a modest improvement in rural literacy, especially rural male literacy, from 19% in 1995 to 22% in 2000.

3.24 The proportion of the population with access to primary health care, sanitation and clean water has also improved. The distances covered by half the population (50%) to reach a health center and water source have all declined between 1995 and 2000.

Table 3-2: Trends in non-consumption poverty in Ethiopia, 1995-2000

Poverty variables (%)	1995/96			1999/2000		
	National	Urban	Rural	National	Urban	Rural
Stunting						
Stunted	67	56	68	57	45	58
Severely stunted	44	32	46	31	21	32
Literacy rate	27	70	19	29	70	22
Distance (Km) covered by 50% of the population to the nearest:						
Health center	8	1	10	7	1	8
Clean water	2.5	0.1	3	0.7	0.1	1
Primary school	2	0	3	2.5	1	3
Secondary school	18	1	20	15	1	18

Notes: Stunting is an anthropometrics index that are used to measure long run malnutrition for children less than 5 years old. A child is stunted if the standardized height to age ratio is two standard deviations away, and severely stunted if the standardized height to age ratio is three standard deviations away.

Source: Dercon (1999), GOE (2002).

RISKS, GROWTH AND POVERTY TRAPS

3.25 This brief review of growth and poverty trends provides a number of useful lessons for the connection between risk, growth and vulnerability in Ethiopia. First, there was progress against broad measures of poverty, although there is less consensus on the size of the decline in the consumption measure of poverty.

3.26 Second, these positive developments notwithstanding, many Ethiopians remain poor. The Government's estimate of 44% national poverty rate in 2000, would translate to about 28 million Ethiopians below the poverty line. This does not include additional millions who may be just above the poverty line and could be forced to cross the line downward by the slightest of misfortune. Since, as we have argued, there is a close connection between high poverty rates and vulnerability, this implies that large numbers of Ethiopians remain vulnerable to poverty.

3.27 Third, despite impressive gains in non-consumption measures of poverty, major concerns remain. As stated above, 57% of children less than 5 years continue to be malnourished and 31% severely so. If conditions remain as they are, every Ethiopian child born now faces these chances of becoming malnourished in the future. Such exceptionally high levels of malnutrition, compared to countries at similar levels of income, have persistent long term impacts. In particular, malnutrition diminishes the future productivity of survivors, thus making them more likely to fall into poverty traps and therefore vulnerability.

3.28 Fourth, even with a run of a period of good macro-economic outcomes, explained in part by good fortune (a period of good rains) and reasonable policies, the recent drought (2002/03) in Ethiopia – which threatened up to 10 million people with starvation -- is a vivid reminder of just how exposed the population is to potentially catastrophic risks.

3.29 Finally, overall reduction of poverty does not rule out localized impoverishment. Our study suggests that there were spatial differences in the gains from growth. A separate look at regional poverty trends shows that poverty rates declined only in Amhara (Table A6 and Figure A2), but increased or remained the same in most other regions, a result that is largely confirmed by the poverty study of the government. Moreover, as already reported, the growth of average consumption in urban areas lagged behind at the growth in rural areas.

3.30 Purposely sampled surveys in various parts of Ethiopia also provide additional evidence on the possibility that specific groups may have been locked out of the benefits of growth, and therefore, may be trapped in poverty. The ongoing study by IDS/SC-UK on destitution in the Northeastern Highlands in the Amhara region (IDS/SC-UK, 2002), found that in 9 village sites (2,160 households), 20% of the sample of households that were not destitute (extremely poor) in 1992/93 became destitute by 2001/02. The study also found the widespread feeling among the participants that: (i) the poorest people now are in a more severe situation than a decade ago; (ii) the proportion of poor households had increased; and (iii) the proportion of households in the 'better-off' group had fallen.

Those better-off households previously provided access to productive resources to the poor (e.g. use of their land or oxen by the poor), as well as assistance in times of need (cash or food loans). This community-wide 'slide' towards destitution greatly exacerbates the vulnerability of those already at the bottom end of the scale.

3.31 In the next section, we look at the size and the characteristics of the vulnerable population.

IDENTIFYING THE VULNERABLE

3.32 One way to see, unambiguously, who is vulnerable to poverty (or another measure of welfare, say malnutrition) and who is not, as a result of a shock, is to observe the same individuals' consumption and timing of the shock over a long period of time. This calls for panel data. In Ethiopia, the only panel data available is for about 15 villages in the rural areas. While rich in detail about these villages, the data cannot give us a nationally representative story. For this report, therefore, we created a panel of cohorts — a group of household heads in the same age grouping and living in the same administrative zone. We used two nationally representative surveys, HICES/WMS 1995/96 and 1999/2000, to create two period observations for each cohort. We also obtained information on rainfall received in these zones for a period of 30 years. These two sets of information, allowed us to predict how the rainfall variability affected the consumption variability, and then, further, how the variability predicts consumption attributable to rainfall variability to predict the probability of falling below the poverty line (for a fuller discussion of the methodology and data sets used, see Annex 1).

3.33 Since the effect of rainfall shock was mostly felt by agricultural households, we used only rural households in the estimation. Furthermore, we dropped all observations from Addis Ababa, Dire Dawa and Harari, even if they were coded as rural principally because these were mostly urban areas with small pockets of peri-urban households classified as rural. In addition, we dropped all observations from Afar and Somali because only sedentary populations were surveyed in these regions, excluding the majority of the residents there who were more likely to feel the effect of rainfall shocks. Finally, we dropped all observations of households that did not earn any income from agriculture, even if they resided in rural areas.

3.34 A cohort whose probability of falling below the poverty line is greater than 50%, is defined as vulnerable to poverty. Table 3-3 shows estimated levels of vulnerability. If we used total consumption variance, as many as 70% of Ethiopian cohorts are estimated to be vulnerable (row 1, Table 3-3). However, we find that rainfall shocks alone account for 41% (that is the ratio of 29% to 71% in Table 3-3) of the vulnerability. These results imply that 29% of the approximately 41 million rural Ethiopians (or about 12 million people) living in the 6 regions in the sample are likely to fall below the poverty line due to exposure to rainfall shocks. The results in row 4 refer to the estimated size of the vulnerable using the empirical distribution of rainfall. This measure is obtained by a) simulating the log consumption of household for observed levels of rainfall shocks, given a simple of consumption that links consumption and shocks, and b) then counting the proportion of households with half the simulated log consumption

falling below the poverty line in 34 years. The results show that using the empirical distribution of rainfall would imply that 15% of households are vulnerable to poverty. Finally, we find that changes in transitory income account for up to 4 percentage points of the vulnerable.

Table 3-3: Vulnerability to consumption poverty line due to rainfall and income shocks, 1995/96-1999/2000

Variable	Mean (%)	Std. Dev.
Total estimated vulnerability	0.71	0.46
Estimated vulnerability attributable to rainfall shocks alone	0.29	0.46
Estimated vulnerability attributable to transitory income changes	0.04	0.20
Estimated vulnerability using empirical distribution of rainfall	0.15	0.36

Source: World Bank staff estimate using HICES/WMS 1995/96 and 1999/2000

3.35 Another way to count the vulnerable is to look at movements in and out of poverty. Table 3-4 shows the proportion of cohorts who have been counted in one of the four mutually exclusive states of welfare, using the rural sample. About 10% of the cohorts were poor in both periods. These cohorts form the group that would typically be classified as chronically poor. About 55% were classified as non-poor in both periods. That leaves another 35% to have experienced an episode of poverty between periods, the transitory poor.

3.36 Recent estimates of the fraction of the Ethiopian population below the poverty line, show that poverty in rural areas declined from 48% to about 45% between 1995/96 and 1999/2000 (GOE, 2002, Table 3.6). While slow decline of poverty is consistent with the results in Table 3-4 (which shows a slight increase), there are two ways in which the dynamic view of poverty adopted here enriches the static estimates. First, we provide a clear distinction between the chronic and the transient poor. Since the static poverty measure is silent about this distinction it masks the size of the population that could be caught in a poverty trap, a knowledge that is important for policy choices. With this distinction, it is worth noting that our estimates indicate that significant churning took place within this period. Only 10% of the rural population was chronically poor, but three and a half times as many moved in and out of poverty. Second, by expanding the definition of the poor to include the current poor and those who are at high risk of becoming poor, we show that the static poverty estimates potentially under-estimate the true level of poverty and therefore vulnerability. That is, while the population estimated to live below the officially accepted poverty line remained below 45% in both 1995/96 and again in 1999/2000, we estimate that about 71% of the population has a high chance of falling below the poverty line. This suggests that a simple comparison of head count ratios in two periods may give the impression that poverty rate remained the same, when in fact it may have increased in the interim years.

Table 3-4: Transition in and Out of Poverty based on actual and predicted expenditure, Ethiopia, 1995/96-1999/2000

Variable	Mean	Standard deviation	Year
Poor only in 1995	0.10	0.30	
Poor only in 1999	0.25	0.43	
Poor in both 1995 and 1999	0.10	0.30	
Not poor in both periods	0.55	0.50	
Static poverty measures (headcount poverty)			
	mean	Standard deviation	
Headcount index	0.40	0.49	
poverty gap	0.10	0.16	1995
poverty gap squared	0.04	0.07	
headcount	0.42	0.49	
poverty gap	0.11	0.17	1999
poverty gap squared	0.04	0.08	

Source: World Bank staff estimates based on HICES/WMS 1995/96 and 1999/2000.

3.37 The 15 village rural panel also suggested high levels of vulnerability. About one-third to one-half of the measured poor households were no longer poor in the following period. Specifically, for the period covering 1989-1994/95, about 35% of households remained poor, 26% moved out of poverty and 16% moved into poverty. Moreover, in a “bad” year (defined as a year in which the household experiences problems in many areas, including rainfall at 50% less than the long run mean) nearly 60% of households would be poor ignoring seasonality effects, and it is this fraction that were classified explicitly as vulnerable (Dercon and Krishnan, 2000a). In these studies, movement out of poverty was linked to better education, proximity to all-weather roads, and possessing crucial assets such as oxen and extensive land.

3.38 These quantitative measures of vulnerability accord well with self-reported prospects of future well-being. The household income consumption and expenditure survey of 1999/00 asked households to report (a) whether their expected income one year ahead would be worse than their current income, and (b) whether or not they could cope with a negative shock to their income of 100 birr, within a week, and how they would do so. Overall the results indicated that households considered 1999/00 a good year, except in Tigray and Somali. In fact the rainfall data in Tigray and Somali appeared to have been lower in 1999 and 2000 compared to recent years (see Figure A29). Furthermore, the respondents expected income a year ahead to decrease.

3.39 Regarding the ability to cope, about 34% of rural and 38% of urban residents reported inability to raise 100 birr in a week (GOE, 2002d). In the draft *Participatory*

Poverty Assessment (PPA) urban households in Addis Ababa reported decreased living standards due to high unemployment, rising food prices, and increases in crime and prostitution (World Bank, 1998). The *Consultations with the Poor in Ethiopia* (World Bank, 1999) study found that respondents in both urban and rural areas reported decreases in living standards over the past ten years. This may be due to the recall period or to the fact that Ethiopia experienced extremely volatile rainfall pattern, especially in the early part, in that decade. Both urban and rural households listed seasonal variance in rainfall as the major cause of vulnerability (World Bank, 1998).

THE DISTRIBUTION OF THE VULNERABLE

3.40 Turning to the characteristics of the vulnerable, we find that they are different from the non-vulnerable in several ways (Table A9). The results indicate those who would be considered vulnerable are older, have larger family sizes and have higher proportions of female-headed households compared to the non-vulnerable. They are more likely to live in Amhara and SNPPR and more likely to report higher incidence of ill-health and decrease in livestock assets. The reported reduction in livestock assets could be a general indication of either loss or sale of these assets due to shocks. Fewer of them have had some primary education compared to the non-vulnerable, and more of them live further away from water points. Finally, proportionately fewer of them engage in cash crop farming. In particular, while 27% of them produce coffee, about 35% of the non-vulnerable do. Similarly, while only 2% of them engage in chat production, 15% of the non-vulnerable do. With regard to income from cash crops, we find that those vulnerable to poverty due to exposure from rainfall shock earn about 44% less income from coffee than the non-vulnerable. **Geographically, vulnerability is widespread.** Although, vulnerability is common in the larger regions of Amhara, Oromiya and SNNP, it is measurably higher in smaller and isolated regions such as Benshangul-Gumuz and Gambella, and Tigray which is encompassed by the highly degraded Northeast highlands.

3.41 The purposively sampled surveys place risks at the center of the vulnerability that households face. For instance, both the IDS/SC-UK and the 15 rural village panel, place weather conditions as a critical determinant of changes in poverty status. These studies suggest that repeated rainfall failures are a source of poverty persistence or poverty traps. In particular, they show that although some loss in consumption due to a decrease in rainfall is recovered the following period, a full recovery occurs only over several years. In general, persistently poor households appeared to live in unfavorable environments, generally in remote areas characterized by poor road connections, and to be poorly endowed in terms of land and technical inputs. High incidences of illness in these households have also strongly limited their ability to grow and reap the benefits of the reforms. Conversely, moving out from poverty was mainly associated with better geographic (good rain; more and better land), infrastructure (good access to roads and towns) and technical (higher use of fertilizers) endowments and with higher producer crop prices.

3.42 Because risks are crucial to the varying trajectories towards, and degrees of, vulnerability that households experience in Ethiopia, we now turn to a review of the most common risks in the country.

4. Identifying Sources of Risks in Ethiopia

4.1 As was mentioned at the start, risks can be correlated or covariant in that they affect a network of individuals or communities, either in a localized area or spread across the entire geography of a country. Or they can be uncorrelated—idiosyncratic—if they affect individuals within communities. Some risks are repeated with relative frequency, while others are very rare. Risks also differ in their effect. Some can have catastrophic consequences while others are mere nuisances.

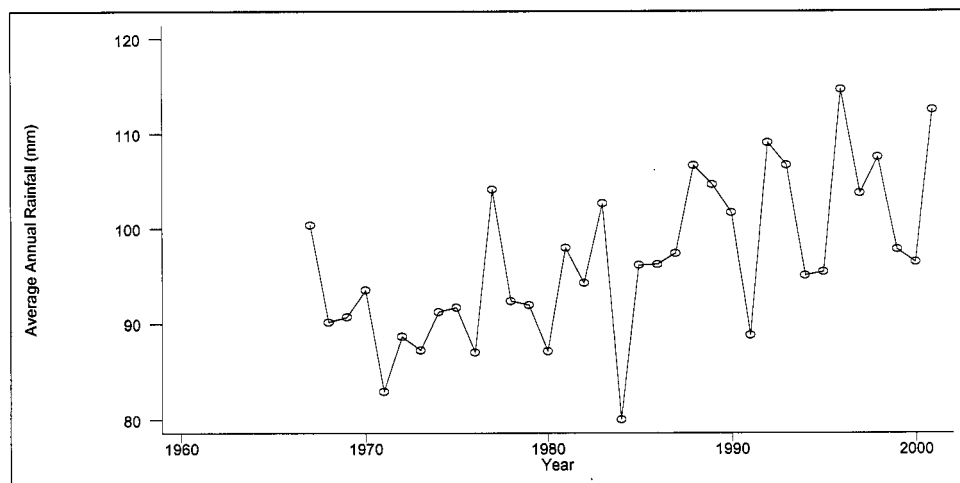
4.2 In this chapter we rely on a number of qualitative and quantitative surveys and existing studies to identify the different risks that individuals and communities in Ethiopia face, based on their geographic location and source of livelihood. The discussion examines only key community and individual risks, as well as structural and life-cycle factors, which when bunched or interacted with other risks, makes living conditions harder for individuals.

COVARIATE RISKS IN ETHIOPIA

Low and unpredictable rainfall (or frequent droughts)

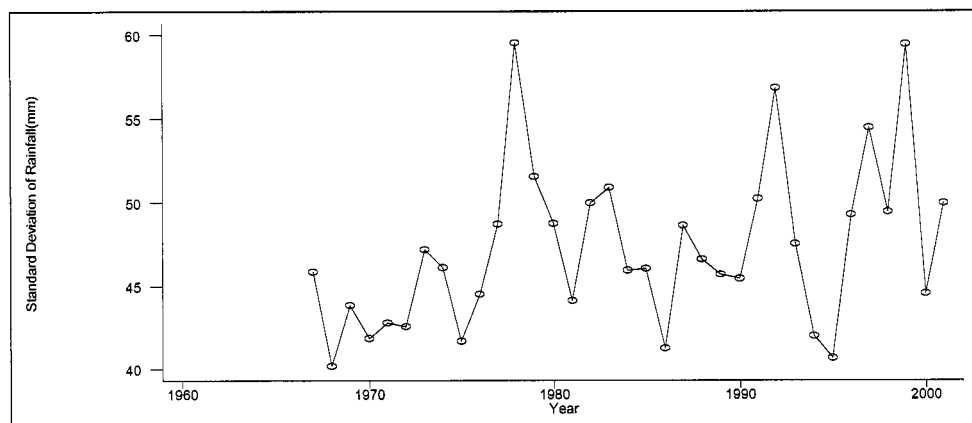
4.3 There is no doubt that drought risk is the most well known of the risks facing Ethiopia, and we begin our discussion there. Rainfall in Ethiopia, on average, is low. A plot of the realized annual average rainfall over the last 30 years shows a concentration towards the lower values (see Figure A27). The average annual rainfall is estimated at about 1100mm, all of which is realized within a period of 5 months, split into two rainy seasons. But the most striking observation about the rainfall pattern in Ethiopia, which may be masked by the low average, is the volatility. Figure 4.3 shows the average annual rainfall over the 1967 to 2000 period. The year-to-year averages exhibit large swings, a clear indication of risk.

Figure 4.1: Average annual rainfall, Ethiopia (1967-2000)



4.4 Another way to measure volatility is to look at the standard deviation directly (see Figure 4.2). The figure plots average deviation from the national mean rainfall for a given year. The long run (that is 30 years) mean deviation is about 400mm, which is almost 40% of the long run mean annual rainfall. Because the deviation for each year is obtained from average rainfall reported over various zones of the country in each year, the standard deviation demonstrates that there are potentially large spatial variations in average rainfall in the country.

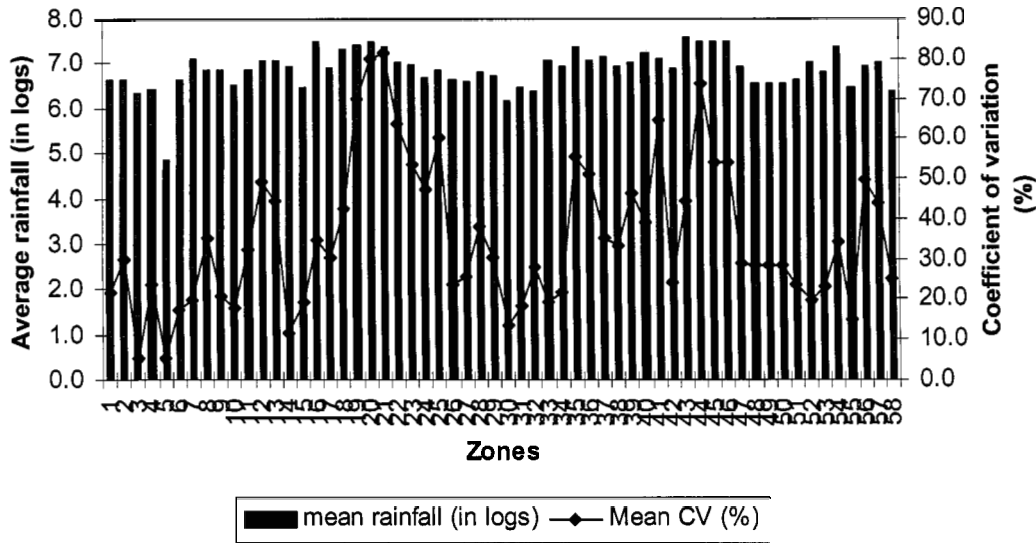
Figure 4.2: Average standard deviation of annual rainfall, Ethiopia (1967-2000)



4.5 Further evidence of the extreme variability, and inequality of rainfall across space, is shown in Figure 4.3, which plots the long run mean and the coefficient of variation, the standard deviation of rainfall relative to the mean for each zone. In other words, for each zone, the mean rainfall for 30 years and the ratio of that mean to the standard deviation is obtained and plotted. The results imply that both expected rainfall and their variability are very unequal. Spatial variability (comparison of coefficient of

variation across zones) ranged from a low of 15% to a high of 81%. These levels of variation are similar to Morocco, and appear to be among the highest in the world (Peter Hazell, IFPRI, personal communication).

Figure 4.3: Average zonal rainfall and coefficient of variation, Ethiopia, 1967-2000



4.6 Put together, the distribution of mean rainfall and its standard deviation imply that Ethiopia experiences more frequent episodes of low and highly variable rainfall. The high variability of rainfall both across space and time, presents problems and opportunities. A major problem is that it leads to frequent, and sometimes catastrophic droughts. As an example, between 1978 and 1994 alone, there were 15 droughts and famines that have led to the displacement, injury, or death of more than a million people (World Bank, 2000). The pervasive nature of drought risk in Ethiopia is evident in the multiplicity of experiences, told through quantitative and qualitative surveys, from which it is reported.

4.7 **Drought risk is often experienced as harvest failure.** Households in the 15 village rural panel were asked to identify the shocks they experienced over the past 20 years (Table 4-1). About 78% of households reported harvest failure, often caused by rainfall failure, as the most common type of hardship. The survey, conducted in 1994-95, also reveals that shocks have a long lasting effect in forming household expectations that might shape their subsequent behavioral responses: when households were asked to report the most recent occurrence of a particular shock that has led to loss of income or wealth, the majority recalled the 1984 drought year (Dercon and Krishnan, 2000a).

Table 4-1: Percentage of Households Reporting That Particular Type of Event Has Caused Considerable Hardship (Loss of Income or Wealth) During the Last 20 Years

	<i>Percentage of households reportedly affected by type of event</i>	<i>Mode year of the most recent serious event</i>
Harvest failure	78	1984
Policy problems	42	1985
Labor problems	40	1993
Oxen problems	39	1993
Other livestock	35	1984
Land problems	17	1989
Asset losses	16	1985
War	7	1989
Crime/banditry	3	1986

Source: Dercon and Krishnan (2000a); *Based on data from the 1994-1995 Ethiopian Rural Household Survey*

Definitions: Harvest failure: due to drought, flood, pests, storage losses, frost, etc.
 Policy: villagization, resettlement, ban on migration, ban on wage labor, forced labor, etc.
 Labor problems: illness or death of household members, divorce, etc.
 Oxen problems: disease, theft, drought related death and distress sales, etc.
 Other livestock problems: disease, theft, death and distress sales, etc.
 Land problems: land reform and nationalization, loss of land due to disputes, transfers to family members.
 Asset losses: destruction of house (fire, etc.) theft, house loss due to villagization, etc.
 War: abduction of men and women, destruction of markets, crops and livestock, death or disability.
 Crime/Banditry: theft, killing, wounding, disability due to banditry or other crime.

4.8 Another way in which drought risk is experienced is loss of livestock.

Livestock losses (oxen and other livestock), which also cause considerable hardship of rural households, is also caused by -- but not exclusively -- rainfall failure. Over 35% of rural households reported this form of hardship (Table 4-2).

4.9 A study tracking the distribution of herd mortality rates for seventeen years among Borena households in southern Ethiopia, found that average annual mortality of herds was 16% of beginning period stocks and peaked at 46% in 1991/92, a drought year (McPeak and Barrett, 2001). Other evidence, from villages located in the drought-prone upland and semi-arid lowlands, shows that average mortality could rise to 70% of the herd in a drought year, compared to 11% in a good rainfall year (Webb and Reardon, 1992)².

4.10 **Drought risk is also reported as food and water insecurity.** When a sample of 49 groups (mostly pastoralists) from the arid and semi-arid parts of the Oromiya region, were asked to identify key risks in their lives, food and water insecurity came to the top

² Figures as high as 50-80% for cattle and 30% for sheep and goats are often cited (Fafchamps (1998), Lybett et al, 2001). Yet as noted by Fafchamps, one need to remain cautious since these figures may include physical loss as well as distress sales.

of the list (see Table 4-2). Next to these hardships, the respondents cited poor livestock health, poor accessibility to health clinics and to schools, and unavailability of inputs as the most important sources of vulnerability (Smith, Barrett, and Box, 2000).

Table 4-2: Sources of Risk in Ethiopia summarized by subjective risk index of incidence and severity of risks

<i>Source of risk</i>	<i>Full Sample</i>	<i>Ethiopia</i>	<i>Kenya</i>	<i>Female</i>	<i>Male</i>	<i>Poor</i>	<i>Agricultural</i>	<i>Pastoral</i>
Sample size (number of groups)	120	49	71	59	61	60	21	68
Food Availability	0.56	0.69	0.47	0.64	0.48	0.62	0.37	0.6
Water availability	0.53	0.46	0.59	0.46	0.6	0.52	0.65	0.51
Animal disease	0.31	0.30	0.32	0.24	0.21	0.26	0.16	0.35
Access to health clinics	0.23	0.23	0.24	0.21	0.26	0.33	0.38	0.17
Availability of farm inputs	0.07	0.16	0	0.06	0.07	0.09	0.15	0.02
Access to schools	0.12	0.17	0.09	0.12	0.12	0.16	0.21	0.09
Livestock prices	0.15	0.15	0.14	0.08	0.21	0.08	0.07	0.18
Human disease	0.09	0.12	0.08	0.09	0.1	0.12	0.06	0.15
Wildlife crop destruction	0.07	0.01	0.11	0.08	0.06	0.04	0.21	0.02
Conflict/violence	0.14	0.06	0.19	0.15	0.13	0.2	0.09	0.17
School fees	0.06	0	0.09	0.07	0.04	0.08	0.06	0.06
Crop failure	0.05	0.11	0.08	0.03	0.07	0.04	0.1	0.04
Access to transport	0.05	0.01	0.08	0.03	0.07	0.02	0.08	0.05
Pasture availability	0.04	0.05	0.04	0.01	0.08	0.03	0.05	0.05
Consumer goods availability	0.04	0.02	0.05	0.05	0.03	0.04	0.02	0.05
Spatial mobility	0.01	0	0.01	0.02	0	0.01	0	0.01

Source: From Table 1 of Smith, Barrett and Box (2000)

Note: The communities surveyed were allowed to decide on their own what the most important sources of vulnerability were and to make subjective ranking of the most important sources of their vulnerability. Based on their responses, a risk index ranging from 0 (no incidence) to 1 (universally most severe risk) was constructed by dividing the risk incidence by the reported severity.

Crop and livestock diseases.

4.11 Harvest failure, is caused not only by drought but also by pests, storage losses, frost, flood etc. The risk of crop disease is underlined in the survey on destitution in 9 villages (“gott”) in the Northeastern Highlands of Amhara region, which found that the overwhelming determinants of good or bad years were natural factors affecting crop production: rain, but also pests, and crop diseases (IDS/SC-UK, 2002). Similarly, livestock losses can be caused by, diseases and a variety of other factors, including theft and natural death.

Domestic and international price volatility.

4.12 Highly unstable prices are very disruptive to economic activities and living standards. Instability arises from a variety of reasons including poor road networks that

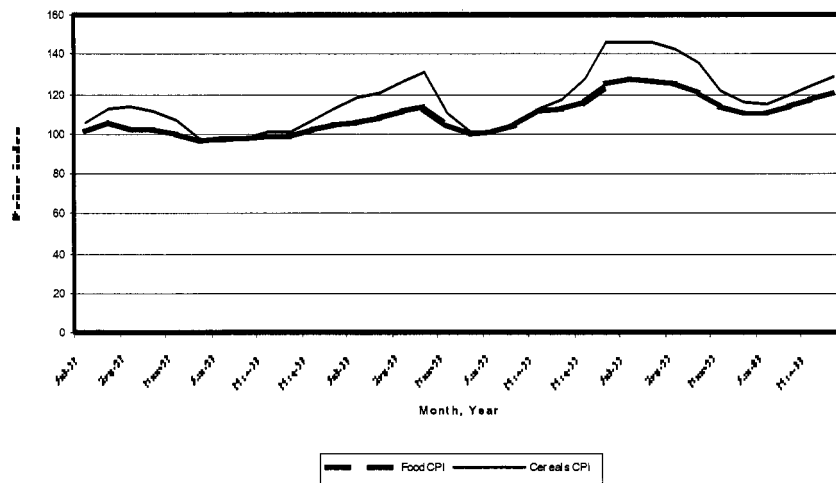
perpetuate isolation, poor storage facilities, and inflation. While price risk affects everybody, the poor are especially vulnerable to the adverse effects of this risk because, unlike the rich, they often do not have access to savings instruments to protect themselves.

4.13 In Ethiopia, grain and coffee price risks pose the greatest sources of vulnerability to households. The first, because a majority of the population rely almost exclusively on grains for their livelihood, and the second, because it is the main export crop for the country.

4.14 **Grain prices:** A discussion on grain price volatility inevitably brings up the well-known conflict between net producers or grain traders on the one hand and net consumers on the other. The interests of these groups are not always the same. In particular, periods of price collapse are good for consumers as they can buy grain at cheap prices and their welfare improves, but they are injurious to the net producers and sellers. Price hikes have the opposite effect. So, even though the discussion that follows is presented more from the point of view of net producers and sellers, these conflicting interests should be kept in mind.

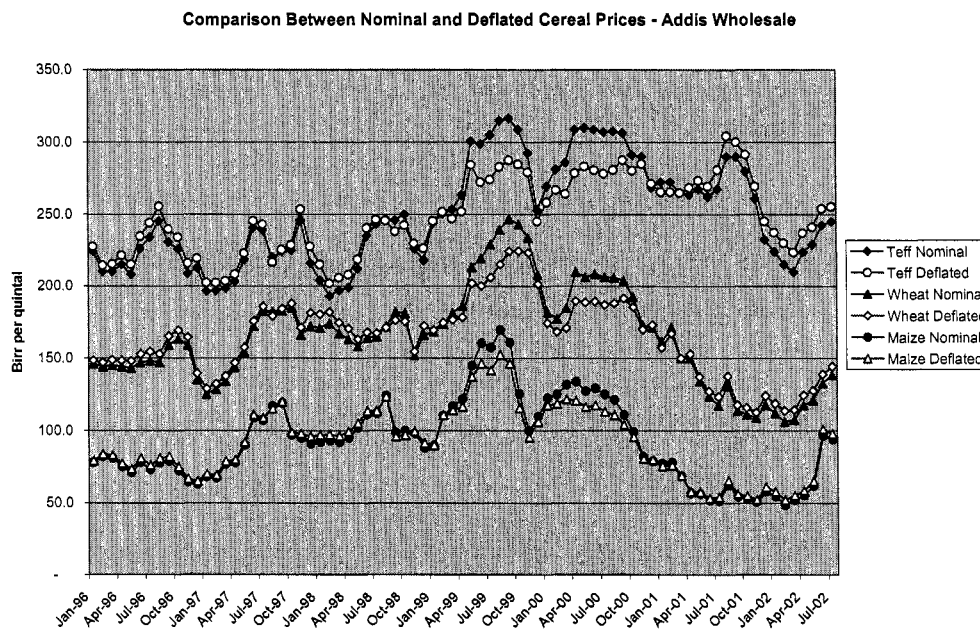
4.15 To begin, Figure 4.4 shows the movements of general food and cereal prices in the period from July 1997 to April 2000. For the entire period, overall food price increase was low, reflecting the success of the Ethiopian government to control overall inflation in the period. However, the cereal prices, which constitute the main consumption bundle of the poor majority, rose higher than overall food prices. As the figure illustrates the cereal price index was everywhere higher than the food price index.

Figure 4.4: Cereal and Food Price Indexes, Ethiopia, July 1997-April 2000



4.16 Additional evidence from a recent grain market review in Ethiopia points to the existence of high spatial and temporal volatility in grain prices (Harrison, 2002). The month-to-month movements of wheat and maize prices varied within a narrow band between 1996 and 1998, but then rose sharply in 1999, before falling dramatically in 2000 and 2001 (Figure 4.5). The prices of teff followed the same pattern, although the decline in prices between 1999 and 2000 was slower. Together, these three cereals constitute 80% of cereals produced and consumed in Ethiopia, so that their price movements mirror the nature and magnitude of grain price risk faced by Ethiopians. An additional price risk comes in the form of spatial isolation, especially for households and communities located far from the centers of cereal production such as Dire Dawa where opportunities for price gouging are ideal. In Dire Dawa prices, especially of maize, were among the highest (Harrison, 2002, pg.12).

Figure 4.5: Cereal prices in Addis Ababa wholesale market, Ethiopia, 1996-2002



Source: Harrison (2002).

Box 4.1: Multiple risks (bunching of risks) worsen vulnerability.

Price risk alone is often bad enough for the poor, but when it is bunched with other risks, it can be devastating. For instance, drought risk can and often do magnify price instability. Grain prices fluctuate significantly throughout the year, but they are usually at their highest during the dry season or immediately preceding a bad harvest (World Bank, 1998, pp. 34). Yet, this is the period when significant wealth loss amongst the agriculturalists and pastoralists occurs thus exposing households to an additional vulnerability. For example, during a drought, pastoralists would be compelled to sell livestock in order to purchase cereals. But if distress sale of livestock floods the market, both the increased supply and poor quality livestock can lead to as much as 90% drop in livestock prices³ (Sellen et al., 2001).

4.17 In Ethiopia, such bunching of risks is believed to have led to a recent collapse of grain prices, from January 2001 to January 2002. First, unexpectedly good rains in the preceding season, (October 2000 to January 2001), led to an increase in cereal output of about 17% above average. Second, because of a poor road network, the price differences between surplus and deficit areas could not be smoothed (arbitraged away), so that a spatial price differential remained. Finally, and at the same time, first food imports of 1 million tons (2000) and another half a million tons (2001), were brought into the country in succession. The result was a collapse in prices, which while helpful to some consumers, such as low-wage laborers, led to huge losses to producers of cereals (Harrison, 2002). In the year 2002, the same arbitrage problems and a failure of the rains began to push prices upwards.

4.18 So, whether bunched or not, unstable grain prices bring about specific types of losses to farmers, especially those on the margins of profitable farming, low income consumers, and grain traders, which increases the vulnerability of households.

4.19 **Coffee prices**⁴. Although this risk is not captured by numerous household surveys, the Government of Ethiopia identifies the collapse of the world coffee price as a major shock to small farmers who are responsible for 95% of the total coffee production. According to the SNNP Bureau of Agriculture, the 2001/02 prices of coffee and coffee beans declined by 62% and 72% respectively compared to 1997/98. Similarly the report of the Oromiya Region shows that the price of red cherry coffee has decreased by 70% and the one of dry coffee by 40% between 1998/99 and 2001/02 (GOE, 2002c, p. 196; Table 4-3).

³ “During times of drought, the livestock/grain terms of trade tend to collapse with the herd, especially when the proximate cause is drought that also reduces grain supply” (Lybbert et al, 2001).

⁴ Coffee is the most important export crop in Ethiopia.

Table 4-3: Price of Coffee Received by the Farmer (in Birr per Kg).

	<i>Ethiopian Fiscal Year (corresponding international calendar years)</i>				
	1990 (1997/98)	1991 (1998/99)	1992 (1999/2000)	1993 (2000/2001)	1994 (2001/2002)
Southern NNP Region					
Red Cherry Coffee	2.25	2.50	1.90	1.60	0.85
Coffee whole	5.10	4.10	3.55	3.50	1.45
Coffee beans	10.20	8.20	7.10	7.00	2.90
Oromiya					
Red Cherry Coffee		2.33	1.40	1.00	0.70
Coffee whole		3.02	3.20	2.80	2.46
Coffee beans		6.05	6.40	5.61	4.93

Source: GOE, 2002b

Note: The years in parenthesis correspond to international calendar years.

Box 4.2: Declining coffee prices may deepen poverty.

There is a real possibility that the developments in the coffee market are not temporary phenomena, but instead long term expectations of the price regime, with very little prospect of recovery. According to the GoE, the coffee sector employs over 25 percent of the country's active population (directly or indirectly). In that case, the persistence of this shock, will make a large fraction of Ethiopian households lose the return on their long term investment (perennial coffee trees) and deepen already high poverty levels.

Unpredictable policy changes

4.20 Households surveyed in the 15 village rural panel ranked policy shocks (such as villagization, resettlement, ban on migration and wage labor in the 1980s) of the Derg regime, second only to harvest failure as events that had caused considerable hardship (see Table 4-2). Poor households interviewed in the *Consultations with the poor* study also identify policy changes as having led to considerable losses in welfare. Finally, 9 villages sampled in the Northeastern Highlands in Amhara region identify changes in land tenure, from the Derg land reform to the most recent redistributions, as major events affecting their livelihoods (IDS/SC_UK, 2002).

Box 4.3: Changes in policy have a long lasting effect.

It is clear from Dercon and Krishnan (2000a) and IDS/SC_UK (2002) that changes in policy have a long lasting effect. Policy changes of the 1980s are remembered, particularly, as having created severe problems. However, some recent policy changes to correct past policies have had unintended consequences of worsening the situation of several groups. For instance, those who were once subject to forced settlement did not get their land back in the land re-distribution under the reformist government of EPRDF when they returned. As a result, most have had to migrate since they could not find jobs other than porters (World Bank, 1999). While some households lost land, others were given poor quality plots (small in size and/or less fertile). People too young at the time of the redistribution were also left out, as well as large families, as the size of the household was not used as a criterion in allocation.

4.21 Moreover, the reduction of plot size following the redistribution is seen as having jeopardized traditional agricultural practices aimed at maintaining soil fertility, such as fallowing and crop rotation. This is believed to have had a negative impact on farm productivity, leading to households' and communities' impoverishment.

Environmental degradation

4.22 A combination of intensive farming practices and demographic pressure, have led to substantial land degradation and growing numbers of rural households with inadequate landholdings. About 50% of the highlands are believed to be eroded, and 25% of them severely so. This has constrained agricultural productivity and rural income growth. It is increasingly seen as a major cause of vulnerability, especially among the youth (World Bank, 1999).

4.23 A constant message in this analysis is that seemingly rational actions from the point of view of individual households could have large negative social consequences. In this case, the time-tested household strategies to cut and burn trees either to meet its own energy needs or to earn some income, as a coping mechanism, can lead to ruinous effects on the environment and the natural resource base for current and future generations. In surveys, this strategy is not identified as a significant source to cope with a 100 Birr negative shock on income (Table 5-3, page 41), but this may be partly because these activities are considered illegal and punishable.

IDIOSYNCRATIC RISKS

HIV/AIDS

4.24 Strictly speaking HIV/AIDS affects individuals, but the key lesson from the last two decades is that, much like the plagues of the past, it has a huge social effect. In Ethiopia, 2 million people between ages 15 to 49, or 6.4% of the adult population, have already been exposed to this risk. The exposure is higher for urban areas, where adult prevalence rates approach 15%, and for the 25-29 years olds where the rates were 17% by the end of 2001 (UNAIDS, 2002). This risk does not appear to be diminishing in the foreseeable future if the expressed fears of the population interviewed in *Consultation with the poor*, is any indication. In 2001 alone, 160,000 Ethiopians have died from HIV/AIDS, and cumulative deaths of the past have led to 1 million orphans.

Malaria

4.25 Like HIV/AIDS malaria not only affects individuals, but has social costs. Malaria outbreaks tend to be spatially concentrated and bunched with other risks associated with rain. As a result, its impact tends to be magnified. In Ethiopia, malaria remains a persistent risk in large areas of the country. It is estimated that 40% of the population is at risk of malaria and about 24% live in areas in which malaria risk often exceeds expected levels (epidemic). Pregnant women and very young children are the population groups at highest risk, since they may not have acquired significant level of immunity against malaria. In areas with unstable malaria exposure, pregnant women may have 2 to 3 times higher risk of contracting malaria than non-pregnant women living in the same area. Moreover, malaria exposure may lead to additional adverse outcomes such as low birth weight, abortion, and neonatal death. Malaria related admissions to hospitals have risen from 20% in 1999 to 31% in 2001, while an additional 20% receive malaria related outpatient care. Meanwhile, only 26% of pregnant women are reported to have visited

antenatal care at least once in 2000. This means the majority of pregnant women in Ethiopia do not have access to treatment, which would help them reduce the impact of the risk. Also, only 1% of households have mosquito or insecticide treated nets and only 3% of under-5 children receive any anti-malarial treatment (WHO/UNICEF, 2003).

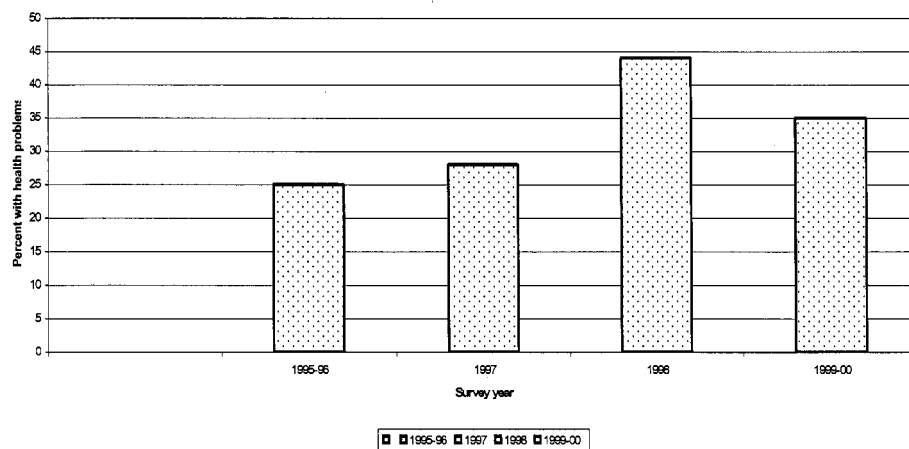
4.26 It is important to remember that for both HIV/AIDS and malaria, when many families become affected, the disease overwhelms the mechanisms available to households, communities, and even countries to mitigate its impact.

Ill-health, disability and mortality

4.27 Although idiosyncratic health risks affect individuals and may sometimes appear to be purely due to chance, their contribution to increased vulnerability is not necessarily small. For many households on the margins of destitution, a single episode of illness to the main income earner for an extended period of time can be the difference between life and death. An accident that disables an adult can bring hardship to the whole household and deepen the potential of the disabled to fall into a poverty trap. The death of a breadwinner can have equally long lasting effect.

4.28 Figure 4.6 shows the proportion of heads of households who reported having health problems two months prior to the start of the survey. The incidence of illness ranged from 25% to 44% of households. Given that there are 10 million households in Ethiopia, this implies that in any given year 2.5 to 4.0 million Ethiopian household heads experience an episode of idiosyncratic shock. Although, the questionnaire did not ask for identification of the cause of illness, the most common causes of inability to work are reported to be illnesses such as typhoid, tuberculosis, and HIV/AIDS. Such diseases make all families, irrespective of income level, exposed to substantial risk.

Figure 4.6: Percent of heads of households reporting health problems two months prior to start of survey.



Source: World Bank Staff estimates from HICES/WMS (1995/96, 1997, 1998, 1999/2000)

4.29 Ethiopia's burden of disease is dominated by peri-natal and maternal conditions and acute respiratory infections. About 18% of all life years lost are due to peri-natal and maternal causes. Acute respiratory infections account for another 16% of life years lost. The burden of illness is also often extremely intense among children. Diarrhea and nutritional deficiencies result in 17% of children's deaths (GOE, 1998). Even if a child survives nutritional deficiencies, they stand a very high chance of becoming stunted (57%), which is known to lower productivity in the long term.

STRUCTURAL AND LIFE-CYCLE FACTORS

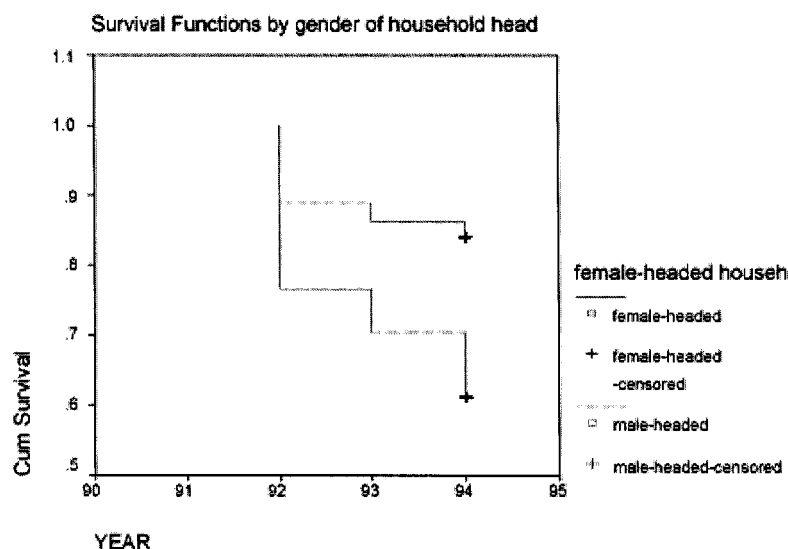
4.30 Strictly speaking structural and life cycle factors are not treated as risks, since they are not always random events. That said, they play an important role in compounding the impact of risks. Structural factors are used broadly to refer to all economic, social, cultural and legal factors that place constraints on individuals' and households' livelihoods. In the Ethiopian context some of the key structural factors include long term unemployment, layoffs, and cultural practices that prevent girls from attending school. By contrast, life-cycle factors include old age, widow-hood or female-headed status.

4.31 **Structural factors:** In qualitative surveys, housewives point out events like their husbands' loss of a government job or the demobilization of the Derg soldiers as the main causes of insecurity. The youth, on the other hand, feel the direct effects of government legal policies — particularly the policy that disbanded their cooperatives — as the main cause of their insecurity. Apart from the redistribution policy, land shortage and vulnerability may also arise from poor inheritance laws or misguided marriage endowments.

4.32 More recently, indebtedness has become an issue. Many farmers indicate having three or four years' worth of debt for fertilizers owed to the government and fear they may be arrested at any time (World Bank, 1999). Finally, those rural farmers who have to rent out their land as a strategy of last resort — after a labor shortage and/or drought power or seeds following a crop failure- may also face severe destitution from decreased supply of grain and animal feed. (IDS/SC-UK, 2002)

4.33 **Life-cycle events that magnify the impact of risks.** Some social events can push households into poverty. *Widows* are especially vulnerable to extreme poverty. The purposely sampled survey on destitution, found that female-headed households have a greater likelihood than male-headed households of falling into extreme poverty over the 10 years preceding the survey. More precisely, female — headed households that were not destitute in 1992/93 have a cumulative probability of about 40% to become destitute by 2001/02, compared to 15% for male-headed households (ISD-SC-UK, 2002, Figure 4.7).

Figure 4.7: Probability functions of becoming destitute by sex of household head.



Source: IDS/SC-UK, November 2002

Note: This figure plots the cumulative probability for the sample of households that were not destitute ten years ago of becoming destitute over the decade leading up to the present time, again based on the self-assessment data for four years: 1992/93, 1999/00, 2000/01, 2001/02. The vertical axis in the

Figure represents the probability of 'survival', that is, the probability of not becoming destitute. For consistency, the time-line on the horizontal axis should show the period between 1992/93 and 2001/02.

4.34 **The elderly** form another group facing greater risks. Many of them are unable to adequately exploit their land as their own physical capacity and the external (labor supply diminishes over time. In addition, the tradition of providing children with endowments of land at the time of the marriage tends to deplete the land holdings and other storable assets from the elderly (IDS/SC-UK, Nov 2002). Old people are also increasingly taking responsibility for children infected by HIV/AIDS and grandchildren. The cost of caring for the sick and related unexpected medical and household expenses can impose considerable pressure on them to sell assets and even to become full time beggars (GOE, 2000).

4.35 **Orphan-hood and children in extreme circumstances** are becoming increasingly visible. The latest estimate suggests that the number of children who became orphans⁵ regardless of the cause was 3.8 million in 2001 of which 1 million (26% of all orphans) were AIDS orphans. This figure is expected to increase to 43% of all orphans by 2010 (UNAIDS, 2002). Whether orphan hood comes from AIDS mortality or from other deaths, the fact remains that, orphans suffer loss of educational opportunities, malnutrition, and inadequate access to health care, which are the very factors that are known to increase poverty and perpetuate inter-generational disadvantages. Orphans are also subject to property grabbing, abuse and exploitation, stigmatization and

⁵ Orphans, in this case, are defined as children aged less than 15 years who have lost either one or both parents (UNAIDS, 2002).

psychological trauma. As a result there is a strong likelihood for these children to end up on the street (along with the current estimated 150,000 to 200,000 street children in Ethiopia), become HIV infected, or be engaged in criminal activities.

Box 4.4: Effect of household size on household vulnerability is ambiguous.

Household size is also believed to be an important determinant of vulnerability.
“Large family size can be either an advantage or a disadvantage. Someone with a small household may have no one to support him if he’s sick, and no one to keep animals or pests away from more distant fields. On the other hand, if you have a large family you may have trouble feeding them all, so you may be forced to sell animals to feed them”
(IDS/SC-UK, Nov 2002).

5. Assessing Effectiveness of Risk Management Strategies

RISK MANAGEMENT STRATEGIES BY HOUSEHOLDS

5.1 Ethiopian households, like many households in similar circumstances around the world, employ a variety of strategies to manage the risks they face. The actions they take can be classified as falling into two broad strategies. Some actions are aimed at **reducing or mitigating the risk**. All actions taken before the shocks occur with the intention of lowering the expected negative impact of the shock are classified in this category. Other actions are meant to **cope with risk** and include those actions that are undertaken after the shock has occurred in order to reduce or negate the impact of the shock. Table 5-1 highlights examples of the types of actions that are commonly employed by households under each of the broad strategies.

Table 5-1: Types of actions to manage risk by individuals and households.

<i>Risk management strategy</i>	<i>Goal or objective of the strategy</i>	<i>Types of actions undertaken by individuals or households</i>
Risk reduction or mitigation	Actions taken <u>before</u> the shock occurs in order to protect against the anticipated negative impact of a shock	<ul style="list-style-type: none"> • Diversification of economic activity (multiple crops, multiple species of livestock, multiple jobs) • Insurance (formal or informal) • Migration (seasonal) • saving
Risk coping	Actions taken <u>after</u> the shock has occurred in order to negate, minimize or survive the adverse effects of the shock.	<ul style="list-style-type: none"> • Reducing or delaying expenditures or investments (e.g. in health) • Reducing consumption (e.g. forgo current nutrition) • Withdrawing children from school • Borrowing (informal –relatives, neighbors- or formal-banks, credit societies, micro-institutions) • Migration • Selling assets (land, oxen, jewelry, etc.) or drawing down savings

Risk mitigation strategies

5.2 In the context of Ethiopia, the most common **risk mitigating** actions include crop diversification, where households grow cereals and pulses, coffee and food crops, and maintaining mixed crops and livestock systems at the same time. A parallel diversification effort among the pastoralists include, keeping multiple species of livestock (goats, sheep, camels, cattle). Households also informally insure, by joining rotating credit groups (iqub) and funeral societies (idir), the latter in order to meet the expected costs, well-known to be huge, in the event of the death of a household member.

5.3 Both poor and wealthy households believe that income diversification enhances their ability to withstand external shocks, and thereby smooth consumption. In 1996/97, it was estimated that as many as 62% of rural households worked less than one hectare of land, making it necessary for many of these households to supplement their farm income with off-farm earnings to meet their consumption need (Resal, 2000, p.18). Table 5-2 shows off-farm participation rates as well as shares of income obtained from non-farm activity by 402 heads of farm households in two woredas in Tigray Region in 1996/1997. At least 81% of the households participated in some form of off-farm work, which is described as wage employment, self-employment, food-for-work, and skilled and manual non-farm wage work. As indicated in Table 5-2, 35% of all household income in these two woredas was obtained through off-farm work. The two main sources of off-farm work were wage employment and food-for-work activities (Woldenhanna and Oskam, 2001).

Table 5-2: Off-farm Work Participation in two Woredas, Tigray Region.

Activities	Participation Rates (%)			Share of income from the activity in total income (%)
	Total sample	Enderta (N=200)	Adigudom (N=202)	
Total off-farm work	81	87	75	35
Wage employment	72	71	73	28
Off-farm self-employment	28	43	13	7
Food for work	58	42	73	17
Manual non-farm wage work	19	38	0.01	9
Skilled non-farm work	4	7	0	2

Source: Woldenhanna and Oskam (2001).

Risk coping strategies

5.4 **Risk coping** actions are just as widespread, and encompass a diversity of strategies such as selling productive assets (livestock, oxen, and donkeys), foregoing current investment and consumption, child labor, borrowing or drawing down savings. The 1999 WMS asked households to identify how they would cover a negative shock—a decrease in their income equivalent to a 100 Birr (12 USD). Table 5-3 shows that urban and rural households would have used different strategies to cope with such a shock. The top three actions, available to 54% of rural households, include the sale of animals and animal products, the sale of other agricultural products, and loans from relatives. By contrast, the two main coping instruments for urban people were withdrawal of own savings and loans from relatives.

Table 5-3: Sources to Get 100 Birr for Unforeseen Circumstances in a Week.

Sources to get the 100 Birr	Percent of households identifying the source		
	Rural	Urban	Total
Sale of Animals & Animal Products	26.10	2.94	22.74
Sale of Agricultural Products	16.22	1.77	14.13
Sale of forest product	0.61	0.09	0.54
Reserved money (own savings)	2.45	16.49	4.48
Bank or saving account	0.08	2.59	0.44
<i>Iqub</i> ⁶	0.16	0.78	0.25
<i>Idir</i> ⁷	2.87	1.60	2.69
Bank equivalent loan	0.15	0.70	0.23
Loan from relatives	12.74	17.88	13.49
Gift from relatives	0.59	3.96	1.08
Loan from non relatives	2.95	7.75	3.65
Gift from non relatives	0.09	0.33	0.12
Sale of household assets	0.42	1.85	0.63
Others (Not stated or Missing)	34.57	41.29	35.54
Total	100.00	100.00	100.00
<i>Source: GOE (2002d).</i>			

5.5 One coping mechanism that has emerged is an informal system of **land futures** that has arisen to deal with price risk. Leasing land two years in advance is, done by the poor families to cope with emergency expenses. Land lease is common in Negda and Dugda (World Bank, 1998).

5.6 **Child labor** is a particularly damaging form of coping. Demand for labor has been identified as the most important reason for not sending children to school in Ethiopia (Yamano, 2000, pp. 1). Not surprisingly, according to ILO, Ethiopia has the highest incidence of child work in the world with a 42% participation in full-time productive labor⁸. Rural girls are particularly at risk: a survey of 1,477 rural households found that 60% of all children, and 80% of 11-15 year old girls, have work as their primary activity. Some of the child labor is a strategic move to mitigate the impact of a future shock by using children's contribution to build assets, while some is a direct action to manage the ex-post effects of a shock. Indeed, each working child has been shown to contribute between 4% to 7% of household's income in rural areas (Cockburn, 2002).

5.7 Another damaging form of coping strategy is the **reduction of food consumption**. In time of food stress, households cut back the number of daily meals. Almost 70% and 58% of the poorer and richer households respectively in the 3 lowland villages surveyed by Webb and Reardon (1992), resorted to this solution. In the upland villages surveyed, 62% and 39% of poor and rich households cut down current consumption. Consumption of "famine" food was also observed.

⁶ *Iqub* is a traditional rotating credit and savings association.

⁷ *Idir* is a burial society that covers funeral expenses of its members.

⁸ This definition excludes domestic work.

EFFECTIVENESS OF HOUSEHOLD STRATEGIES

5.8 Although households resort to a diversity of risk management strategies, often they are not very effective. In general, there are four drawbacks to household's own risk management strategies, as observed in Ethiopia.

5.9 **First, they achieve only partial insurance at a high cost.** Although many households diversify their economic activities to attain self-insurance, they are still unable to do so. Consider, for example, the insurance value of a common strategy, which involves undertaking a mixed farming system of crops and livestock. Livestock sales as a means to smooth consumption work best for idiosyncratic shocks. In the event of a drought that wipes out the crops, the household expects to sell livestock to maintain its level of consumption. However, in a study conducted in Burkina Faso, which provides a similar setting as Ethiopia, it was found that livestock sales, at best, do compensate for 30% of income shortfalls after rainfall shocks — 15% being more realistic. Indeed cattle sales seemed less respondent to income shortfalls (except for the households experiencing large negative shocks), compared to small stocks (e.g., goats and sheep) (Fafchamps, Udry and Czukas, 1998). Another example of a household's attempt to self-insure is the widespread practice of reducing risk by planting multiple crops, some of them drought and pest resistant. In semi-arid parts of India, farmers forego as much as 25% of income to reduce exposure to risk (World Bank, 2001). This suggests that the cost of attempting complete self-insurance is too high for individual households, especially when it is considered that these households also forego innovation, experimentation and adoption of high-productivity technologies in the effort to diversify.

5.10 **Second, they are localized and of limited scope.** Borrowing from relatives is a common ex-post coping strategy in urban and, to a lesser extent, in rural areas (Table 10). However, as stressed by Webb and Reardon (1992), most transfers and borrowing among kin-relatives generally are of small amount, more to maintain social bonds, than significantly improve the income or nutritional status. Table 10 shows that only 8% of urban households and 3% of rural households obtained loans from non-relatives. Moreover, traditional sources of social insurance, commonly known as *Idir*⁹ and *Iqub*¹⁰, were found to be limited as sources of consumption insurance for both rural and urban households (GOE, 2002d).

5.11 Table 11 shows that nationally, while rural households were slightly better at finding informal insurance than urban households, up to one-third of households would have been unable to find 100 Birr (about 12 USD) within a week for unforeseen problems. Within regions, ability to insure is also very diverse. Households that are less likely to find insurance tend to be located in geographically less endowed regions (Tigray and Amhara, Afar), geographically isolated regions (Gambella and Benshangul-Gumuz), and the urban administrative area of Dire Dawa (see Table 5-4).

⁹ *Idir* is a burial society that covers funeral expenses of its members

¹⁰ *Iqub* is a traditional rotating credit and savings association

Table 5-4: Proportion of Households who can Get 100 Birr in a Week for Unforeseen Problems.

Region	Rural	Urban	Total
Tigray	60.91	38.21	57.16
Afar	63.08	47.61	57.67
Amhara	58.73	64.53	59.34
Oromia	67.34	65.74	67.16
Somalie	68.06	66.04	67.40
Benshangul-Gumuz	53.71	61.67	54.31
SNNPR	79.16	67.24	78.28
Gambella	61.02	47.91	58.03
Harari	74.28	69.81	71.66
Addis Ababa	77.90	62.37	62.66
Dire Dawa	66.21	44.50	50.20
Total	66.85	61.95	66.14

Source: GOE (2002d)

5.12 Third, informal insurance often marginalizes the most vulnerable.

The already limited scope of *Idirs* to insure consumption shortfall is made worse by the fact that they often exclude the most needy households, especially when mutual reciprocity is a condition for participation. While entry costs in some communities such as Mecheke, are low, they are prohibitive in others, e.g. Korate (World Bank, 1998, pp. 36). Another form of risk pooling, in the form of labor groups which exist to share labor at planting and harvest times to help community members in case of family illness, may however restrict employment by excluding certain members (such as widows) of the community from joining their organization.

5.13 Finally, informal insurance has high hidden costs. Put simply, some of the household risk management strategies such as delaying nutrition, health care, keeping children at home rather than school (or withdrawing them from school) for their labor, have the potential to permanently reduce the human capital and future prospects of the household members, individually and collectively.

5.14 Many of the shortcomings of the informal insurance strategies can be overcome if markets for risk sharing functioned well. For instance, functioning labor and land markets, can be a conduit for landless individuals or households, to smooth consumption. Similarly, if insurance markets existed and worked efficiently, farmers exposed to weather risk can still smooth consumption by buying crop insurance albeit at a high premium given the variability of rainfall. It is therefore appropriate to ask and explore how well markets address the shortcomings of the informal insurance arrangements discussed above.

MARKETS FOR RISK SHARING

5.15 After decades of suppression under a centrally controlled economy, developing a market economy has been a major goal of the new government. From the view of risk management, a set of fully functioning and integrated markets are important sources of

risk pooling. Therefore, the commitment to a market economy should be a welcome development.

5.16 That said, it is widely acknowledged that at present markets in Ethiopia do not provide adequate avenues for sharing risk. Most markets are considered to be **thin**, in that they have only a few buyers and sellers at any time and place. Markets are also considered to be **incomplete** and characterized by **high transaction costs**. These characteristics of markets introduce substantial risk, rather than reducing them, which in turn limits market development.

5.17 The limitations of existing markets to provide insurance for households are best illustrated by looking at some markets that are crucial for the poor households, starting with the **grain markets**. First, only 28% of total production is marketed. As a result there are few intermediaries and little value added. The market is dominated by the government-owned Ethiopian Grain Trading Enterprise (EGTE). Private traders number no more than 25 to 30. Most manage small enterprises, have limited human and physical capital assets, and poor access to finance, all of which limit their scale of operations. Specifically, these traders operate in few markets, an average of 9 contacts (75% of which are from the same region), and trade little outside of 190 km. Furthermore over 60% have loan repayment problems, which suggest a risky environment (Gebre-Madhin, 2002; GOE, 2002b). The market is also characterized by high transaction costs. For instance, only 40 birr of a final price of 120 birr (33%) goes to the producer of maize, the rest going to transport, handling, storage and brokerage fees. Furthermore, it takes 20 to 30 days for food to get from the producer to the consumer (Gebre-Madhin, 2002).

5.18 The review of risks above has shown that farmers face unusually high weather risks. From this short assessment of the output markets for grain, we see that there is no reprieve, since additional risks are introduced into the chain. Which means that both farmers and traders face high risks and costly transactions. The result is a high probability of market failure, as may have happened in 2002.

**Box 5.1: How long can the average subsistence household rely on own harvest?
At most 7 months.**

The household income consumption and expenditure survey of 1999/00 asked rural households to report how long their own harvest produce would last. On average, subsistence farmers' harvested produce lasted only 7 months, and 6 months in Tigray, Somali, SNNP, Harari and Dire Dawa, leaving them vulnerable to hunger and poverty for the remaining half of the year, especially since such households often rely exclusively on their own harvest to sustain their livelihood (GOE, 2002d).

5.19 If grain markets do not provide protection from risks, neither do existing **insurance markets**. These markets are poorly developed and have yet to recover from the nationalization decrees of 1975. Overall insurance penetration, measured as value of insurance relative to GDP, is very low — about 1% of GDP. In 1994, private actors were allowed back into the market, and so far 8 such firms are known to operate, reinforcing the thinness of these markets as well. And except for the Ethiopian Insurance Corporation, the dominant player, they are small and provide insurance to only limited

markets, and almost none for agriculture except for goods in warehouses and transit (World Bank, 2000).

5.20 For the poor, factor markets in labor, land, and credit can serve as alternative sources to mitigate or cope with risk. For instance, those who are landless can rent, and those with abundant land who cannot till it all can lease for additional income. Formal or informal credit markets can be a source of capital for able individuals who lack money to buy inputs for their farm or start-up capital for non-farm enterprise. So how well do land, labor and credit markets work in Ethiopia?

5.21 Prior to 1991, land sales, leasing, mortgaging and bequests were prohibited, and only periodic redistribution by peasant associations guaranteed access to land for additional members of the associations. This precluded any mutually beneficial exchange between households – between those well-endowed and those less endowed in land. It also diminished the role of land markets to act as a way to share risk. Since 1991, regulations governing land markets have changed again. Under the new land policy, temporary lease of land is permitted, although private ownership, sales, and bequests are prohibited. Despite the new relaxed regulations, the potential for land markets to provide insurance have not yet been realized.

5.22 An important problem is that farmers feel that they do not have security of tenure and so are reluctant to engage in many land transactions including renting (Nega, Adenew, Gebreselassie, 2002). At present, households have use, but no ownership, rights. The government's position is that limiting land rights to use rights, prevents a "fire sale"— massive distress sale — from households too desperate to survive, in the event of a shock. While this is understandable, given the prevailing social conditions in Ethiopia, maintaining such a policy should be weighted against historical evidence and long run welfare costs.

5.23 With regard to historical experience, Mexico's abolition of restrictions on the land market, especially in rental markets, in the 1992 constitution, did not lead to the original fear of a fire sale, but to higher productivity and equity (World Bank, 2002). And in China, provision of more security in the original land use rights following the 1978 Household Responsibility System is shown to have led to more mutually beneficial inter-household land transactions (Deininger and Jin, 2002). Turning to welfare impact, one unintended consequence of such a policy stand is that it creates expectations about future land redistribution. In a 1999 survey, 10% of rural farmers surveyed (20% in Amhara region) expected land redistribution within the following 5 years. Moreover, producers who expected to gain land through redistribution were twice as many as those who expected to lose (Deininger, Jin, Adenew, Gebreselassie, and Demeke, 2002). These expectations have three negative effects on agricultural productivity and poverty reduction. First, the fear of land redistribution can lead to slow exit from rural areas, slow growth of off-farm economy, more people per land and lower agricultural productivity, which would completely undermine the efforts of the government's declared intention under ADLI. Analysis of recent rural surveys show that land owners with off-farm employment have a 10%-15% perceived likelihood ("subjective probability") of losing land through redistribution in the future (Deininger, Jin, Adenew,

Gebreselassie, and Demeke, 2002). Second, long term improvements (investment) on land will be lower, if households have the fear that they will not obtain the full benefits of their investments. Finally, the full potential of already restricted secondary markets, such as rental land and sharecropping, will be undermined even further if there is a threat of losing land that is rented out. The evidence from Ethiopia, shows that those who rent in land have higher expectations of receiving land in the future. By contrast, it is the productive farmers with part time jobs in the off-farm sector who perceive a greater threat from land redistribution.

5.24 An additional constraint that limits the potential role of land markets to act as sources to share risk is that land per household, especially in the heavily settled highlands where its risk-pooling role can be great, is very small, averaging less than 3 hectares, thereby limiting the scope of the lease markets. However, empirical evidence suggests that it is not the size but, many restrictions imposed on secondary land markets that reduce their role as risk-sharing institutions. In Oromiya region, for instance, a farmer cannot rent out more than 50% of land held, and maximum contract lengths are 3 years for traditional and 15 years for modern technologies (Deininger, Jin, Adenew, Gebreselassie, and Nega, 2002). However, despite these limitations recent analyses show significantly positive effects of land rental markets in Ethiopia. First, as many as 24% of households report to using market transactions to get access to some other household's lands. To underscore the risky nature of Ethiopian agriculture, the majority of these arrangements, turn out to be sharecropping, where the household who rents in and the one who rents out, share the risks of production. Second, the findings show that these transactions tend to transfer land from households with more land but less agricultural ability to those with less land but higher agricultural productivity. Additionally, households with lower land per capita are found to use the market mechanisms to gain access to land, while those with larger per capita land use the same institution to rent out land. Together, these two findings imply that the market transactions are both efficiency and equity-enhancing, and there is really no need to fear the emergence of land concentration if the restrictions are relaxed (Deininger, Jin, Adenew, Gebreselassie, and Nega, 2002). In some villages of Oromiya, land gifts and donations, were more likely to be given to poorer, younger, and credit constrained households (Pender and Fafchamps, 2000) for longer durations. Indeed these results suggest that constraints to secondary land markets, which restrict the insurance role that these markets can play for many households, have much larger negative welfare effects than currently known.

5.25 Finally, labor markets, are characterized by lack of spatial mobility. Use of migration for risk-coping has been suppressed for many decades in Ethiopia, and although this has improved in recent years there are few opportunities for wage labor. The Tigray data (Table 5-2) is an exception rather than the practice. According to a survey of 6,000 households representative of the households in the four largest regions which represent 85% of the population (Amhara, Oromiya, SNNPR, and Tigray) and the sedentary populations in Afar region, only 15% of rural households earned income through rural wage employment, and only 9% through handicrafts. This represents only 5% of the rural population in these regions (GOE, 2000, p.19). This rate is much lower when compared to other African countries where non-farm activities provide for about

20% to 30% of employment to the agricultural labor force, and non-farm income is 30% to 50% of rural household income (Reardon, 1997).

PUBLIC RISK MANAGEMENT STRATEGIES

5.26 Ethiopia's social risk management programs include indirect efforts to build assets and incomes of the poor – keeping inflation under control, stimulating the private sector, relaxing undesirable regulatory controls, sector specific investments, and so on – and direct instruments, such as cash and in-kind support to specific groups.

5.27 The government's proposed approach to risk management is to tailor programs to specific agro-ecological zones. It makes a distinction between fertile and high potential areas with regular and reliable rainfall, and unproductive, highly degraded and drought-prone areas. For the former, it proposes to implement agricultural development led industrialization (ADLI), whose main purpose is to increase agricultural productivity and rural incomes, while for the latter, it proposes to provide food security using a mix of instruments. The thrust of the proposed strategies for high potential areas are risk-preventing or mitigating by purpose, while the strategies for the low productive areas focus on coping. The next section provides a short overview of the main elements of risk-mitigation in the country.

Risk-reducing programs.

5.28 Most of the risk-mitigation programs are recent, and mostly targeted at rural population. Because they are new, we cannot yet evaluate the operational outcomes, such as the target areas, number of beneficiaries, or the difficulties encountered by beneficiaries. That said, several activities to reduce or prevent some of the risks identified above have been proposed for implementation under the sustainable development and poverty reduction program (SDPRP, Ethiopia's PRSP). Table 5-5 lists a selection of these activities, and below we discuss in a bit more detail some of the programs that have been identified as either key or for scaling up in the country.

Table 5-5: Risk mitigating or risk-prevention activities.

<i>Drought</i>	<i>Terms of Trade risk (coffee price risk)</i>	<i>Grain price risk</i>	<i>HIV/AIDS</i>	<i>Environmental degradation</i>
<ul style="list-style-type: none"> • Promote and support small scale irrigation. • Water harvesting. • Voluntary resettlement. • Increase delivery of farm inputs. • Produce and promote drought resistant crops. • Promote off-farm income generating activities. • Expand food security program to regions not yet covered. 	<ul style="list-style-type: none"> • Encourage diversification of export products (to horticulture, textiles, garments, and oilseeds and pulses). • Niche marketing of organic coffee. • Lower cost of production for exports through lowering tariffs in power and telecommunication sectors. • Enhance the application of export guarantee scheme. 	<ul style="list-style-type: none"> • Encourage rural banks, savings and credit cooperatives, and micro-finance institutions. • Introduce warehouse receipt schemes. • Introduce commodity exchange. • Remove hindrances to improved functioning of markets for agricultural inputs. • Organize and promote cooperatives for marketing services. 	<ul style="list-style-type: none"> • Increase clinics providing voluntary HIV/AIDS counseling and testing services • Promote HIV/AIDS education in schools • Strengthen prevention and control of HIV/AIDS by increasing and building capacity of regional and woreda level HIV/AIDS councils. 	<ul style="list-style-type: none"> • Establish seed nurseries, especially of indigenous species. • Prevent deforestation (through tree planting, imposing fines on illegal cutting of trees). • Promote efficient and planned land use strategies. • Promote alternative sources of energy (e.g. heat-efficient stoves).

5.29 **Water harvesting.** The government rightly recognizes that some parts of the country, especially drought-prone Northeast highlands and lowland pastoral areas require a diversification of livelihoods in order to reduce the drought risk. The primary instrument advocated is rain water harvesting, as a way to respond ex-ante to the risk of crop failure that would result from a drought.

5.30 At present the main water harvesting technology is a cistern, but river water diversion and small or micro-dams are also encouraged. The goal of the program is to help households bridge within-season variability in rainfall, since the water from a cistern (typically about 100 cubic meters) provides at most a three-week supply of water, if use is restricted to drinking and plot irrigation. It is also hoped that the availability of a regular supply of water within a growing season would encourage households to shift

their production to high-value crops, such as vegetables and livestock, which would guarantee a minimum income.

5.31 The government meets nearly all or most of the capital cost of the water harvesting technology, which at USD 200 per cistern, is substantial. To ease the financial burden on the government, a rotating fund, which involves credit from the Food Security Program to individuals, families or a community, has been started. As it is currently designed, water-harvesting is expected to bridge the intra-annual variability in rainfall only. So, a major concern is the risk-reducing value of a program that does not bridge inter-annual variability of rainfall. Another is that, because the program is less than two years old, there is little documentation on the profile of beneficiaries and benefits. It is unclear how many of the food insecure households are receiving the water-harvesting technologies.

5.32 **Supplemental irrigation.** At present Ethiopia's irrigation potential is considerably under-exploited and one of the strategic goals of the government is to use it as an instrument for reducing risks and by consequence poverty and vulnerability. In fact, among the many objectives that a well-developed irrigation system is expected to accomplish are: attain food security and reduce dependence on food aid, reduce vulnerability to drought, enhance intensification and promote high-value export crops.

5.33 In the medium term, the focus of the irrigation activities is expected to be on supplemental irrigation: irrigation water kicks in only when the rainfall is interrupted mid-season, or fails. While the overall goals of the program are well-articulated, it is yet unclear whether the beneficiaries will be food insecure households, small-scale farmers, large capital-rich farmers, or even private developers. Furthermore, there are still unresolved issues regarding how fast irrigation programs can be brought into operation and on a scale that will make a big difference among the millions of food insecure households.

5.34 **Resettlement program:** Although not traditionally recognized as a safety net, the government of Ethiopia has made resettling populations as an important instrument to deal with poverty in general and food insecurity in particular. This shift stems from the recognition that specific strategies to address the needs of the chronically food insecure, primarily food aid, have proven inadequate. Resettlement is also seen as part of the government's development strategy — Agricultural Development Led Industrialization (ADLI) — whose major objective is to improve agricultural productivity.

5.35 The goal of resettlements is to move populations from areas that have low agricultural potential — highly degraded, drought-prone, and small farm sizes — to those with better and more predictable rains, more fertile soils, and low population density. By design, these programs are supposed to be (a) voluntary, (b) intra-regional, and (c) to target areas that have been clearly identified to possess the potential to receive migrants. The design of the program has been on-going for a couple of years, but it is only in 2004 that significant populations have been moved.

5.36 A feasibility study exploring the potential for voluntary resettlement in Oromiya region found that only 27,000 people showed willingness to resettle, and among these registered volunteers, only 1% was female heads of households. This is partly because of the received message regarding who the target groups are and not necessarily because of their unwillingness to move. The study also showed that not all areas targeted as sources for settlers were truly “drought-prone.” Moreover, in a number of woredas (districts) near to many areas targeted to receive settlers, problems similar to those experienced in settler “source areas”, such as population pressure on land and degradation of hillsides and forest lands, were common. The concern is that failure to offer the option of resettlement to equally vulnerable households near to “destination areas” could lead to resentment of settlers and conflict (Environment and Development Group, 2002).

5.37 **Agro-ecological packages.** The government’s strategy is to tailor agricultural development packages to specific agro-ecological zones, in order to maximize the absolute comparative advantage of each ecological zone. The idea is to develop specialization within each ecological zone, while at the same time striving for diversification across the country.

5.38 Farmers are supposed to choose among a menu of products deemed suitable for their ecological area. The drought prone areas are advised to get packages that will enhance their capacity to be food secure, including improving productivity, off-farm activities and price policies (GOE, 2002c). For the areas deemed to have adequate rainfall the focus will be intensive agriculture, that is geared towards crop and fodder, while the package for pastoral areas will combine water and livestock development. In fact the key promise of ADLI is that the packaging will lead to higher agricultural input use, especially high risk, but productivity enhancing inputs, which will in turn lead to higher output and food security.

5.39 A key component of the input package is **fertilizer**. In the early reform years, the prospects for fertilizer market development and its widespread adoption looked good. The issuance of a national fertilizer policy and deregulation of fertilizer prices, including removal of subsidies, encouraged competition and entry of private sector participation, which quickly moved to supply up to 68% of fertilizer by 1996. Just when the new participants were beginning to develop the infrastructure needed to add value to the entire supply chain — build storage, bulk transfer, retail outlets, as well specific reputations and competencies — the government introduced a new way to deliver fertilizer input that began to erode these positive developments and long run improvement in fertilizer use.

5.40 The new way involved mobilization of the government’s agricultural extension services to deliver farm inputs — fertilizer, seeds, pesticides and other farm inputs — as a package. Also linked at the same time were credit and retail and wholesale of farm input distribution. In this program, the regional governments provide credit guarantees to participating commercial banks. The banks, in turn, assess the credit-riskiness of farmers, lend them funds, and collect the payments. But one of the consequences of linking credit and input distribution has been that the extension agents (and not the banks) became, effectively, the managers of risk — assessment of credit worthiness of farmers and subsequent delivery of the credit.

5.41 Although the original intent of these policies were to promote and scale up the use of farm inputs, the unintended consequences, may lead to opposite results, especially in the long run. Take the linking of fertilizer input and the extension service. Although different regions use different institutions – for instance, party-affiliated trading houses in Amhara, cooperative unions in Oromiya – the net outcome of linking extension services and input marketing has been the introduction of significant market risks for private participants and farmers. Not surprisingly, there has been an almost complete exit of the private sector from the market, and both the quality of information, in terms of relevance and timeliness, and availability of inputs for farmers are believed to have gone down. In addition, bureaucratic objectives of the extension agents that are not tied to market incentives, have led to excessive supply and undoubtedly inappropriate use of fertilizers. In one survey, while 73% of households reported using fertilizers, only 19% and 31% used improved seeds and chemicals (Deininger, Jin, Adenew, Gebreselassie, and Demeke, 2002). This cannot possibly be the intended objectives of packaging. With regard to inter-linked credit and input distribution, one of the unintended consequence has been “over-supply” of credit, through extension of credit to non-creditworthy farmers, which in turn has led to increase in the size of non-performing debt owed by farmers.

5.42 Ethiopia Social Rehabilitation and Development Fund (ESRDF):

The Ethiopia Social Rehabilitation and Development Fund (ESRDF), established nationwide in 1996, plays a key role in the risk management strategy of the government. This \$270 million program (1996-2004) invests on average at least 50 km away from an all weather road, targeting isolated communities, who by definition face higher vulnerability. ESRDF has already benefited about 21 million people or roughly one-third of the total population. As a provider of basic services requested by the poor themselves, ESRDF has financed about 4,000 projects that help households mitigate or prevent some of the most important risks, such as drought and environmental degradation (through small-scale irrigation, soil conservation projects -- implemented through cash-for-work), human and animal diseases (through better access to health services, rural water supply and sanitation, and veterinary clinics) or strengthen households' ability to manage risks (through better access to education, and support to saving and credit associations). Unfortunately, despite ESRDF's unique expertise in helping isolated communities mitigate risks, the future of this fund is uncertain.

Public programs for coping with risk

5.43 The main focus of Ethiopia's social protection programs for coping with the after effects of a shock is on food security. To be sure, there are pension programs for the public sector workers and electricity subsidies for homes and businesses, but they are small in scale. The food security program has been designed to respond to two types of food insecurity: chronic and transient food insecurity. To address large-scale transitory shocks, such as nationwide rainfall failure in a given year, the government has relied on international community to protect the populations affected. To fight chronic food insecurity, the government targets 156 woredas in four regions — Tigray, Amhara,

Oromiya and SNNPR¹¹ — which are classified as food insecure. Within these woredas, the food security activities make further distinction between, (a) those that are unable to work — children, women with many children, the elderly and the disabled, and (b) those that are able to work but sometimes fall on hard times because of a shock. Table 5-6 shows the distinguishing characteristics of these groups.

Table 5-6: Indicative category of food insecure households in Ethiopia.

<i>Chronic</i>	<i>Rural</i>	<i>Urban</i>	<i>Others</i>
	<ul style="list-style-type: none"> • Resource poor households • land-less or land-scarce <ul style="list-style-type: none"> • oxen-less • poor pastoralists • female-headed households • elderly • disabled & sick • poor non-agricultural households • newly established settlers 	<ul style="list-style-type: none"> • Low income Households employed in the informal sector <ul style="list-style-type: none"> • Those outside the labor market, such as but not exclusive to: <ul style="list-style-type: none"> - Elderly - Disabled & sick - Some female-headed households - Street children 	<ul style="list-style-type: none"> • Refugees • Displaced people
Transitory	<ul style="list-style-type: none"> • Less resource poor households but vulnerable to shocks, especially but not only drought <ul style="list-style-type: none"> • farmers and others in drought-prone areas • pastoralists • others vulnerable to economic shocks. e.g. in low potential areas 	<ul style="list-style-type: none"> • Urban poor vulnerable to economic shocks, especially those causing food price rises 	<ul style="list-style-type: none"> • Groups affected by temporary civil unrest

Source: GOE (2002a).

5.44 First, the program covers only rural households. Second, to a large extent, separate social protection programs are designed to address the needs of these two categories of rural households or communities. Those who cannot work typically receive pure transfers, while those who can work, receive aid in exchange for labor. The majority of transfers reach those in need through two major programs — free food distribution and employment generation scheme. In addition, there has been a long-standing food for work program, and in recent years, a school feeding program, and a variety of small-scale cash and work-based safety net pilot programs run by NGOs have emerged.

¹¹ In the recent Safety net design additional woredas in these regions and the pastoralists regions of Afar and Somali and two woredas in Harari and Dire Dawa has increased the number of woredas covered to 262. This is a significant progress and such enlargement is a recommendation of this study as well.

5.45 **Free food distribution (or Gratuitous Relief (GR))** – The target group for this program is all vulnerable individuals who are unable to work. In theory, approximately 20 percent of total donated food aid (which has averaged 700,000 tons a year for the last 15 years) is to be used for GR, but in reality as much as 80% is used for that purpose. The distribution to direct beneficiaries is the responsibility of a district committee drawn from woreda officials and members of the community. The interesting features of this program are that (a) unlike other programs, it is available throughout the year, both in good and bad years, although the duration for which an individual might receive food rations can vary between 3 to 12 months, (b) households are selected by communities (Peasant Associations) through ‘means-testing’, using administrative guidelines on the specific groups at risk based on access to land and other productive assets, and (c) while the benefit as percent of extreme poverty line is not insignificant, the cost of administering the program – comprising mostly the cost of transport to the distribution center – is also not insignificant, but as much as 55% of the total cost (T. Woldehanna, 2002).

5.46 **Employment Generation Program (EGS).** The intended goal of the EGS is to protect individuals from the adverse effects of a temporary shock, such as drought, while at the same time creating socially valuable assets. The idea is to use timely transfer of food in exchange for labor to prevent individuals or households from depleting their critical financial and physical assets and become trapped in poverty forever. Additionally, the labor can be used to build public assets such as rural access roads, soil and watershed conservation mechanisms, reforestation, activities, and bridges--in short, assets that have the potential to improve incomes in the long term. Therefore, EGS attempts to exchange relief for development or private insurance for public investment.

5.47 It is stipulated that 80 percent of all food aid is to be allocated to EGS activity, and the balance of 20 percent to GR. The Guidelines also stipulate the wage rate (15 kg per person per month) and other norms for participation for pregnant and nursing women. In practice, a number of evaluations have pointed out that in most locations EGS has degenerated into GR, and food meant for EGS was distributed without a work requirement, largely due to lack of any non-food budgetary support at the woreda to implement a workfare program. Wage rates offered were generally lower than the stipulated 15 kg/per person per month. In general, most participants never received more than 12.5 kg per person per month. The program operates almost entirely with donated foods; the cost to the government is nil or negligible (Subbarao and Smith, 2003).

5.48 **Food for Works Program (FFW):** Unlike the case of EGS, there is much greater participation of the government. The program combines geographic and household targeting. It selects communities where the soil is degraded and deforested and where there is a shortage of water. Within these areas, poor people self-select themselves into the program at times when the program wage is lower than the market wage. Moreover, since it is long-term and covers many woredas, it is able to reach more of the poor. At times when the program wage exceeds the market wage, and when the activities are undertaken during the slack agricultural season, some non-poor farmers may also participate. Because the program by its very nature benefits able-bodied poor, it benefits

labor-rich households. Some very poor households with no adult labor may not benefit from the program.

5.49 **School Feeding Program (SFP).** The objective of the SFP is to increase student retention in some food insecure districts by offering nutritional supplements through the school system. At present the program's coverage is small, reaching only 258,400 students in 600 schools located in Tigray, Afar, Amhara, Oromiya and Somali regions. Although it was first piloted in 1994, not much is known about its effectiveness, and potential for scalability.

5.50 For a variety of reasons, key among which is inconsistent data and lack of systematic reporting and the fact that most transfer programs are donor funded and therefore off-budget, it is difficult to say with clarity how much is spent on each program, or the characteristics of beneficiaries and the size of the benefits they receive. Within these constraints, Table 5-7 presents a rough guide to estimated size of beneficiaries and estimated program costs (see World Bank, 2003-Ethiopia PER 2003).

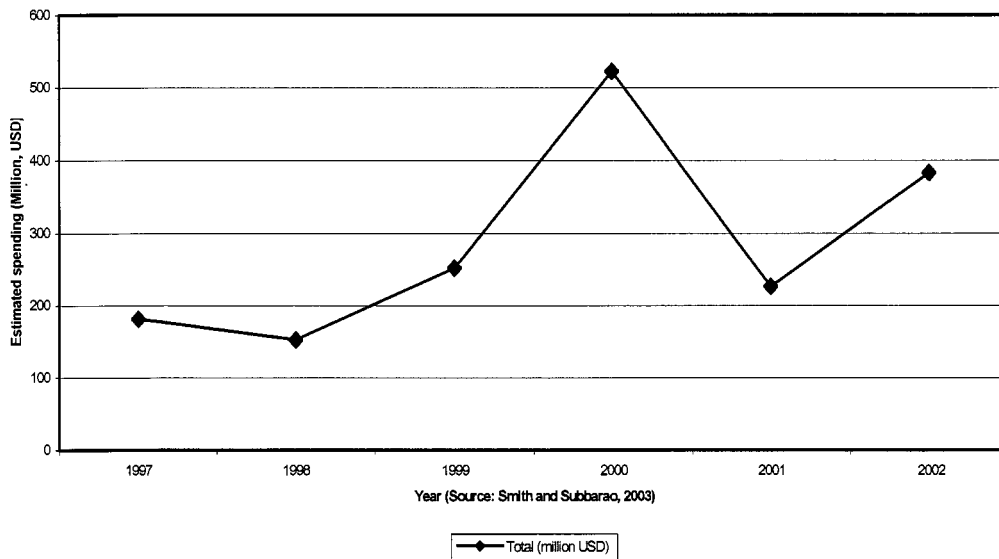
Table 5-7: Programs, estimated costs and size of beneficiaries, Ethiopia.

<i>Program</i>	<i>Estimated size of beneficiaries</i>	<i>Benefits to Beneficiaries</i>	<i>Total costs (million USD)</i>
Free Food (Gratuitous Relief)¹	2-5 million during normal year, but up to 10 million in bad years.	<ul style="list-style-type: none"> • 8.8 USD per person 	70 to 500 ^a
Employment Generation Scheme (EGS)²	An average of 200,000 per year, but 600,000 (2002).	<ul style="list-style-type: none"> • 11.2 USD per person • 5.1 million person days of employment (2002) 	2.3 to 6.9 ^b
Food For Work (FFW)³	357,000 per year	<ul style="list-style-type: none"> • 7 USD per person 	20
School Feeding Program (SFP)⁴	600 schools or 258,000 students	<ul style="list-style-type: none"> • 15 USD per person 	4.1

Note: 1) For FFW--expenditure is based on World Food Program (WFP) country program of about 60 million USD over 3 years. Benefits per beneficiaries are based on distribution of 134, 824 metric tons of food over 3 years. Food transfers are valued at 2 birr/kilogram, and 1 USD=8.6 birr. 2) EGS expenditures are based on WFP transfers of 47.7 kg of food per beneficiary, which are valued at 2 birr per kg. 3) GR benefits are evaluated using WFP showing average receipt of 37.5 kg/person, valued at 2 birr per kg. Also cost of delivering food is estimated at USD 350/metric ton. 4) School Feeding Program, based on WFP cost of USD 12.4 million over 3 years. ^a) The low estimates is the annual estimate based on 2 million receiving 12.5 kg/month each when food is valued at 2 birr/kg. The high cost is based on 5 million chronically food insecure receiving 37.5 kg/month each and food is valued at 2birr/kg. Both values do not include administrative and transportation costs. ^b) The high cost is based on the average of 200,000 people receiving 37.5kg/month each for 4 months in a year when food is valued at 2 birr/kg, while the low cost is based on the same number of people receiving 12.5kg/month each for 4 months in a year, when food is valued at 2 birr/kg.

5.51 There are three points that need to be kept in mind about these numbers. First, these are very conservative estimates. Only direct benefits are estimated here, and even these are indicative as the size of the beneficiaries and the benefits per person are known to vary widely. Second, indirect costs, of administration, transportation, and implementation are not included. The average costs of buying and shipping (internationally), and locally delivering food in Ethiopia is estimated at around USD265 per metric ton (Smith and Subbarao, 2003). In 2001, which was not a bad year, about 500,000 metric tons of food was distributed, suggesting that food aid cost at least USD132 million. Once administrative costs are added (typically 50% of program costs), the costs may approach about USD200 million a year. This is about 10% of total public spending, where the latter includes budgeted expenditures and food aid inflows. More specifically, Figure 5.1 shows some recent estimates (again rough) of public spending on risk-coping programs. It confirms that the value of these programs is substantial, and subject to volatility. Finally, the majority of program costs are funded by donors. The government's contribution is estimated to be at about 7% of total program costs in the period 1996-2000 (Smith and Subbarao, 2003).

Figure 5.1: Total Spending on risk-coping programs (million USD).



5.52 In addition to total program cost, Table 5-7 also gives a rough estimate of the benefit per beneficiary for each program. However, because of the data problems mentioned above, it is often difficult to know who receives these transfers. To get some idea, we turn to household data. In both 1995/96 and 1999/2000 surveys, households were asked to provide information on sources of financing expenditure on commodities and services they purchased. One such source included “gifts and remittances received from governmental organizations, non-governmental organizations, other households, and from abroad.” In the 1995/96 survey, the sources were not explicitly identified. Instead, we observe total “gifts and /or obtained for free.” First, in each household, we computed total transfers from all four sources (government, non-government, other households and remittances from abroad) per adult, after adjusting for spatial and temporal differences in prices. Second, for the 1999/2000, where attribution to each of the sources is identifiable, we calculate the per capita real transfers from what we refer to as public (government and non-government) sources. Finally, after obtaining total and public transfers, we calculate average per capita benefit by consumption groups (deciles), for all, urban and rural households.

5.53 Figure 5.2 shows total transfers per capita, while Figure 5.3 shows public transfers per capita, to households by income group. It is important to bear in mind that these numbers do not all refer to food aid, although it is reasonable to expect in the context of Ethiopia that a significant share would be, especially when we refer to governmental and non-governmental transfers. With this caveat, there are several observations worth noting from the data. First, all household income groups receive some form of aid, including what we have called public aid. This last observation is particularly interesting since, in principal only really poor households are supposed to receive public assistance. Second, not only is there a lot of “leakage” (that is, more than the target group receives assistance), the transfers are not particularly pro-poor since each income group receives roughly the same level of transfers per adult. Third, separating rural from urban households indicates that rural households receive higher public transfers per capita than urban households, especially in 1995/96, and this is true for each comparable income group (Figure 5.2). Fourth, in general public transfers are too small as a share of household expenditure per capita. As indicated in Figure 5.3, the average transfer per capita for all households is at most 13 birr (but only 7 birr on average), which is only 1% of average per capita expenditure of the poorest decile. An additional thing to note is that, the largest component of transfers is between households. Unfortunately, poorer households – that is lower deciles – who need the assistance the most, also happen to receive the lowest levels of transfers (see Tables A11-A14). This makes the case for strengthening the targeting effectiveness of public transfers all the more important.

Figure 5.2: Per capita free aid and gifts, 1995/96 and 1999/00.

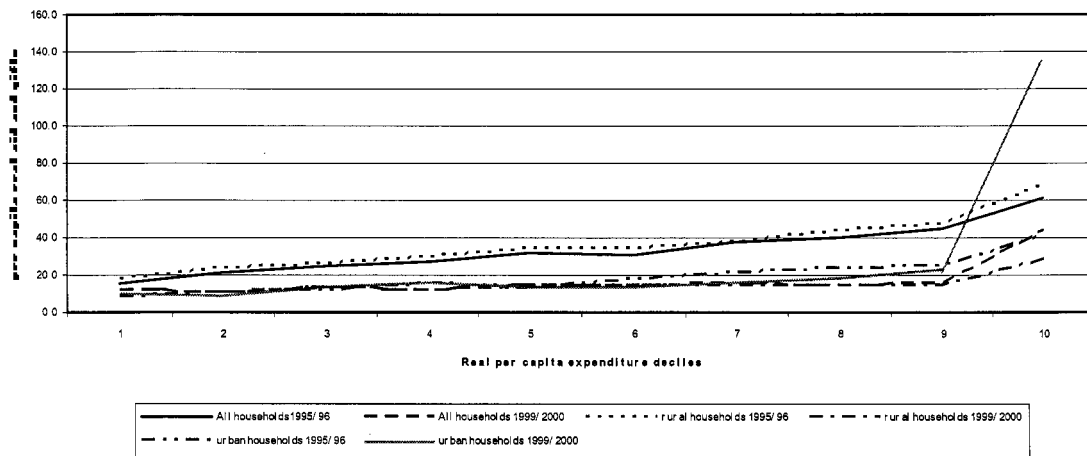
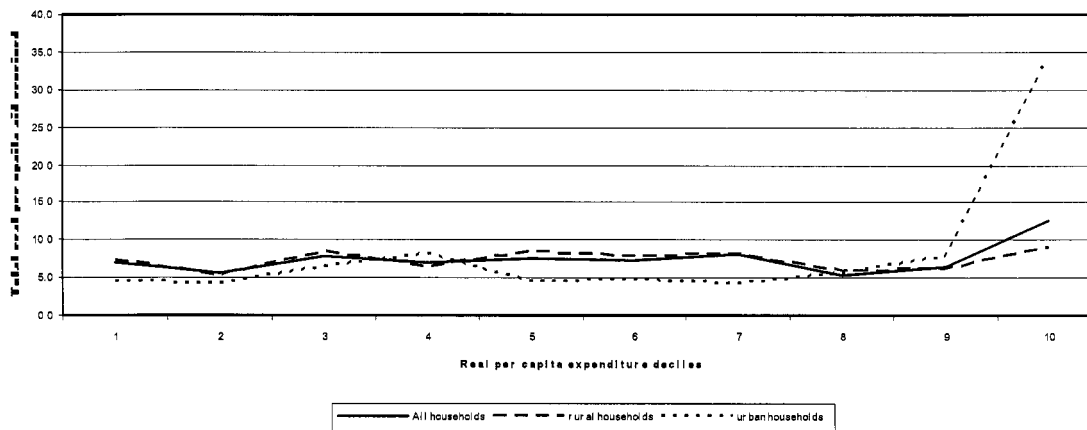


Figure 5.3: Real per capita aid from government and non-governmental organizations.



5.54 These observations on public transfers are consistent with local assessments of risk-coping transfers in Ethiopia. A number of studies have pointed out that many more people than originally intended receive aid. These studies report that local administrators are often unable to exclude any family in the community from aid distribution, perhaps because the local norms do not permit such an action or the needy are more than estimated. As a result, benefits per recipient were often too little to have a significant impact on the incomes of the recipients (Save the Children, 2001; Jenden, 2002). This then brings us to a more general assessment of the effectiveness of the public risk management strategies, to which we now turn.

EFFECTIVENESS OF PUBLIC RISK MANAGEMENT PROGRAMS

5.55 Before taking up the assessment of public risk management strategies, it is important to remember two points. First, Ethiopia's most visible and relatively well-known risk management programs have been and continue to be dominated by risk-coping strategies, primarily financed by international donations. The risk-mitigation strategies discussed above are not completely new, but have not been implemented in the past on a scale comparable to the risk-coping strategies. At present significantly more is envisioned for these risk-mitigating and prevention programs, but knowledge of their effectiveness is many years away. Second, the combination of various risk-coping programs, supplemented on occasion by rare national reserves, have evolved over time to save many lives in the wake of periodic rainfall failures. The fact that there has been no major famine of the type that took place in 1984 goes to the credit of the government's approach and an impressive aid delivery mechanism. Additional features, such as adoption of community (peasant association) led identification of participants alongside administrative and self-targeting approaches, undoubtedly helped food reach the most vulnerable groups. And the use of local NGOs to deliver programs with donated food (which reduced the burden on the government), speak to the programs' flexibility and reach. However, both the risk-mitigation and risk-coping programs as they are currently conceived and implemented have several drawbacks.

5.56 We start with the risk mitigation and prevention programs. The first is that even though the *risk mitigation* strategies such as irrigation, water harvesting, agro-ecological packages, and resettlements provide an important step to address the problem of food insecurity, they introduce their own risks (in health, environment, and conflict) in addition to the challenge of implementation. Second, even if the implementation issues are executed relatively successfully, unless these activities are carried out on a large scale, they may not be sufficient to solve all the problems of chronic poverty and vulnerability, since the estimated size of the beneficiaries that can be helped from such programs is only a fraction of those estimated to be in deep poverty, and therefore vulnerable.

5.57 More specifically, the relatively high unit costs of establishing irrigation schemes even of a modest size -- up to USD 10,000 per hectare for large and medium schemes and USD 5,000 per hectare for small schemes -- introduce a high risk of failure. For instance, at the same time that small scale irrigation expanded the area covered by 21,000 hectares, some 41,000 hectares in medium and large scale irrigated areas were lost between 1991-1998.

5.58 Equally grave risks have emerged from the unintended consequences of scaling up input use by linking input delivery and extension services. The low-priced, public-sector input delivery system had three consequences. One, it crowded out the private sector participants and in the process undermined market development and deepening in an area that is crucial for the success of the ADLI, the government's linchpin for the take-off of rural development. Complex procurement rules, sometimes requiring up to 220 days to clear, and cumbersome foreign currency requirement have added to the difficulties of the private sector entrants. Two, linking of fertilizer sales and credit has led

to inappropriate and, in some cases, excessive application of the fertilizer, especially on marginal farms. This in turn has led to excessive farm debt and potential disruption of future production. Three, the federal government has begun deducting the amount of the un-recovered credit guarantees from regional block grants, who have in turn cut back on their commitment to guarantee credit. This, plus the significant size of non-performing farm debt held by commercial banks, have created uncertainty regarding the future availability of credit to obtain these inputs. Already, local availability of inputs hangs in the balance. At present, there are hardly any private fertilizer distributors left, and the party-affiliated companies have reduced their activities because of the credit-tightening. As a result, fertilizer use, which rose from 150,000 tons in 1990 to 290,000 in 2000, is expected to decline to 260,000 in 2003. Because the retail intermediaries supplied useful technical and market information, their disappearance has resulted in loss of transfer of valuable production knowledge to farmers. Also, at the local level, the bulk procurement of inputs from wholesalers by the extension services, often failed to take account of supply and demand conditions and has led to major input spoilage and losses.

5.59 When it comes to resettlement, Ethiopia's past experience alone has revealed a number of risks associated with resettlement. One is death. It is estimated that up to 20,000 people died en route to their new location and many more from disease after arrival. In addition, property and social capital was lost as community life became disrupted. Furthermore, agricultural and other production goals were not achieved because complementary infrastructure and services failed to materialize. Finally a bad situation became worse with social conflict between immigrants and local residents. Therefore, unless these risks (in resettlement, irrigation, and input use) are addressed at the outset, risk-averse households may not be too willing to adopt the strategies.

5.60 Third, and turning to the *risk-coping* programs, the overwhelming reliance on foreign sources of finance undermines these programs' sustainability and their predictability-- two essential characteristics of a safety net in the long run. If a catastrophic risk occurs and international response or logistical delivery of aid fails, many households may simply drop through the net. Fourth, the targeting approach of the current programs misses millions of households who are food insecure. At present the program targets food insecure households in 156 woredas in Tigray, Amhara, Oromiya and SNNP regions. This list has recently been expanded to 262 woredas, under the new Safety Net Program, to include Afar, Somali and one woreda each from Dire Dawa and Harari. The government's position is that the country's income level does not support a national food security program that reaches all the food insecure households, and therefore it is forced to make these painful choices. While understandable, both the size of the needy who are currently excluded and the implications of this position for poverty reduction in the long term are difficult to ignore. Consider first, the size of the problem. The food security program now targets about 5 million people, or 1 million households assuming an average household size of 5. However, in 1995, 33% of 10 million households in the country would have qualified to be food insecure, since they could not obtain 2200Kcal, defined as the minimum level of calories essential to function, which also defines the food security line. Moreover, 17% would have been classified as extremely food insecure, since they consumed less than 1650Kcal. Even if the current beneficiaries of the program are all extremely food insecure, an additional 7% of all

households who are in the same position as the beneficiaries would have no public assistance, which might be the only way for some to avoid sinking deeper into destitution. In addition, when inter-generational transfer of disadvantage is taken into account, their children are more likely to have lower education and health, not to mention nutrition, leading to persistent poverty.

5.61 Fifth, the current safety net programs have a narrow focus on drought shocks and its associated impact on food insecurity. To be clear, drought is one of the biggest risks faced by Ethiopia and given its devastation in the past and its continuing threat, it is understandable that overwhelming national effort goes into dealing with it. There should be no mistake that such effort must continue. But there are other risks, some old and some new, that claim just as much lives and that require concerted public action. Among these risks are malaria, HIV/AIDS, and malnutrition, all of which have the potential to lock households into poverty traps.

5.62 Sixth, there is little to no synergy between existing programs. For example, there is no attempt to integrate food security programs with efforts to build and protect human capital of the most vulnerable groups such as orphans in poor households, girls, or households in pastoralist areas. Similarly, workfare programs are not integrated with activities at various levels of government. Food meant for public works program is often distributed free, and its disbursement among more than intended recipients reduces its impact on the incomes of the poor. Furthermore, implementation of these projects is left to communities or NGOs, at times. With no resources of their own, and with no provision of government funds for implementation, the design and supervision of projects suffered. As a result, use of food aid as a “dual purpose instrument of relief and development” did not materialize and neither did the creation of assets consistent with regional (community) needs and priorities (Subbarao and Smith, 2003).

WELFARE COST OF SHOCKS

5.63 The review of household risk management strategies has shown that although households actively call upon a diversity of strategies to insure against risk, many of these strategies tend to be weak and ineffective since they do not provide full insurance. The review also revealed that markets — most of which are thin, incomplete or missing, and characterized by high transaction costs — fail to provide insurance to the large majority of Ethiopians, and even introduce additional risks that lead to complete market failures. The report then examined if the existing public risk management strategies meet the needs of the poor that could not be met through informal and market mechanisms and found them to fall short both in their targeting (of risks and beneficiaries) and in their choice of instruments to protect the poor.

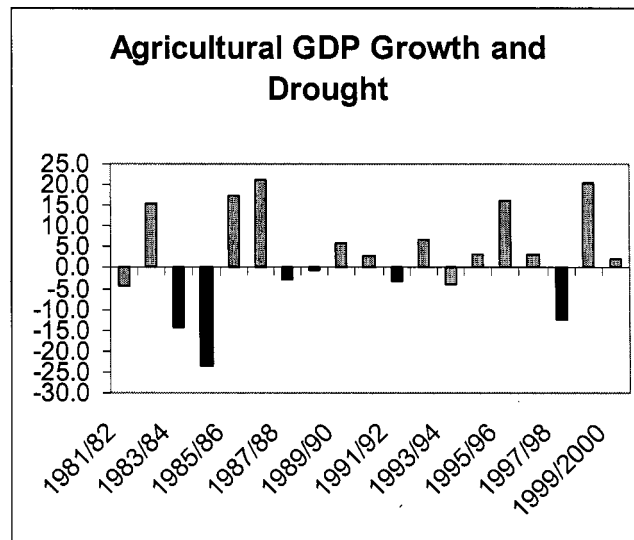
5.64 When risks are not adequately protected against, they lead to huge welfare losses. At worst they cause large-scale physical death. In many instances they induce asset depletion (land and livestock sales, land degradation, etc.) or delay investments (in education, nutrition, etc.), which propel households into a spiral of irreversible losses and eventually poverty traps and high vulnerability. How large are these risk-induced losses in Ethiopia? And how can these losses be reduced? In the next section, we look at the

first question, and in the following chapter we discuss the outline of better risk management through a reformed social protection strategy.

5.65 Welfare costs of droughts: In the last three decades drought has occurred with alarming regularity in the country. In every instance, it has threatened the physical survival of one to seven million people. The most well known is the 1984 drought, which is believed to have led to the death of 1 million people. Even in years with favorable rains, Ethiopia remains food insecure. In 2001 about 6.2 million people needed emergency food aid, and in 2000 about 10 million were in need. In 2001/02, a year of exceptionally good harvest, the country still needed food aid for six months for 5.2 million people, or 9% of the rural population, most of whom are concentrated in the pastoral areas of southern Ethiopia and the belt (March – May agricultural season) dependent areas of eastern Tigray, Amhara and Oromiya (FEWS, 2002).

5.66 At the macro-economic level, droughts lead to large income losses. Figure 5.4 shows that droughts in 1983/84, 1984/85, 1987/88, 1991/92 and 1997/98 have all led to big contractions in agricultural output (excluding forestry and fishing), some by as much as 25% (Easterly, 2002).

Figure 5.4: The effect of drought on agricultural growth, Ethiopia, 1981/82-1999/2000.



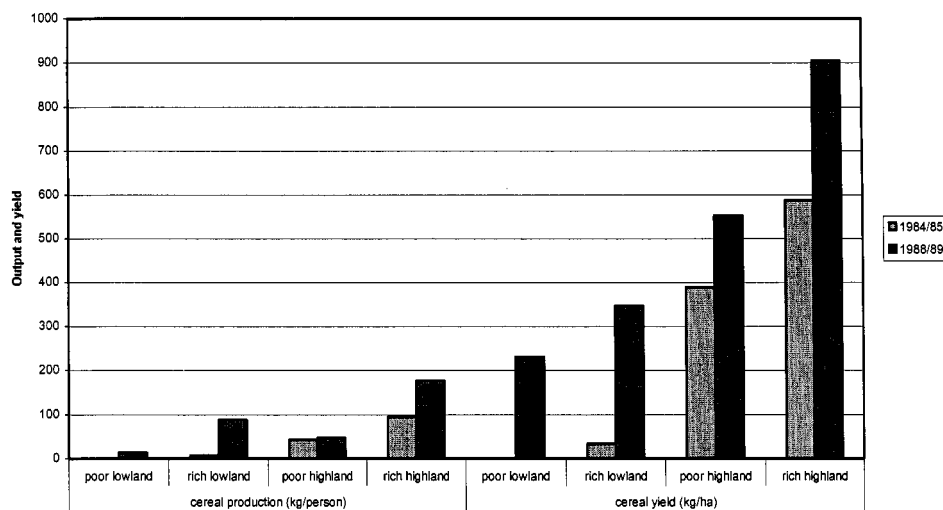
Source: William Easterly (2002)

5.67 At the household level, a careful study by IFPRI based on a household survey in seven drought prone areas encompassing different farming systems and key ethnic and religious groups, found that income losses were devastating (Figure 5.5). On average, cereal yield, measured as output (in kilograms) per hectare in the 1984 drought year, was only 35% of the yield in a normal year. Relatively better-off households (that is, less poor) in the highland areas did a bit better since their cereal yield fell to 65% of a normal year, although their production, or output per person, fell to 54% of normal. By contrast,

production of poorer households in the lowlands collapsed completely, while cereal yield dropped to only 10% of the normal (Webb and von Braun, 1994).

5.68 Similarly, during drought, livestock losses may be massive and the consequences for livestock output, such as milk production, may be dramatic, especially for poorer households, who experienced severe drops in milk production from a 4.8 liters per day to a one liter per day¹², compared to richer households, who were able to sustain a production of 5 liters of milk per day, because of their ability to purchase enough feed for their livestock (Webb and Reardon, 1992).

Figure 5.5: Impact of 1984 Drought on Cereal Production and Yield.



Source: Webb and von Braun, 1994, Table 4.5

5.69 Our study, which constructs a panel of cohorts—that is groups of households with fixed membership, using the HICES/WMS 1995/96 and 1999/2000 — also show high sensitivity of consumption to rainfall variation. The study finds that consumption elasticity of rainfall is around one. Specifically, it shows that a 10% decrease in rainfall can lead to between 7% and 10% decrease in consumption (Table 5-8). Another study, using only rural household consumption changes, shows that a 10% decrease in rainfall leads to about 8% decrease in consumption (Dercon, 2002c).

5.70 Losses in consumption can also be estimated by assessing the impact of transitory income—that is, changes in income due to variation in rainfall and temporary changes in health—on changes in consumption. Using HICES/WMS, we find that a 10% decrease in income attributable to changes in rainfall and ill-health will lead to a similar decrease in consumption (7%) as decrease in rainfall (Table 5-8).

¹² Because poor households do rely relatively more on their livestock for milk (and/or blood) [because of their smaller number], their livestock are likely to be weaker and exposed to greater risks during drought (Lybbert et al, 2001).

Table 5-8: Estimated effects of rainfall and transitory income on consumption (1995/96-1999/2000).

	Between Estimates (standard errors)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Annual rainfall	1.0 (0.025)		0.9 (0.029)			
Deviation from long run mean		0.8 (0.39)		0.4 (0.18)		
Income shocks					0.70 (0.56)	1.23 (0.34)
Other variables included				Yes		Yes
	Fixed Effects Estimates (standard errors)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Annual rainfall	1.0 (0.005)		0.90 (0.007)			
Deviation from long run mean		0.80 (0.06)		0.2 (0.04)		
Income shocks					0.70 (0.19)	0.4 (0.15)
Other variables included				Yes		Yes
Number of groups	237	231	231	231	231	231
Minimum	5	3	3	3	3	3
Average	50	42	42	42	42	38
Maximum	125	105	105	105	105	102

Source: World Bank staff estimates from survey data.

5.71 Such huge consumption losses attributable to droughts add to the already high direct welfare costs of droughts. A study in the Gode District of Ethiopia between December 1999 and July 2000 found that during the famine, the crude mortality rate was 3.1 per 10,000 people per day compared to the normal 0.5 per 10,000 per day, a six-fold increase. This is a staggering number because it implies that during those seven months, about 6,000 excess deaths occurred (Salama et al., 2000).

5.72 **Welfare costs of HIV/AIDS.** Most common estimates of the economic costs of HIV/AIDS compare the annual GDP growth with and without HIV/AIDS and attribute the gap to HIV/AIDS. The estimated macroeconomic costs for Africa range from 0.3% to 1.5% (Arndt and Lewis, 2000; Bonnel, 2000; Sackey and Raparla, 2000). Although these losses add up over time to significant income losses, they are still considered modest, in part because the underlying assumption is that the increased mortality from AIDS is to increase productivity of remaining people—fewer people per unit of land or physical capital.

5.73 However, AIDS does more than destroy existing human capital. By killing young adults and creating many orphans, it disrupts social channels through which learning of traditional farming systems and new technology can be passed on. At sufficiently high levels of prevalence and mortality, it could lead to a complete economic collapse.

A recent study of the economic impact of HIV/AIDS in South Africa, that takes into consideration the importance of these socially disruptive effects of AIDS, shows that if there is no public spending to contain the disease and treat the infected, and if no effort is made to aid orphans to acquire education, then a complete economic collapse will result in only four generations (Bell, Devarajan, and Gerbach, 2003). While tragic outcomes are possible if no action is taken, the example of Uganda offers a hopeful sign for all poor countries. It shows that, aggressive policy to contain the spread of the disease and innovative ways to increase the schooling levels of orphans (but not exclusive to AIDS), can prevent collapse.

5.74 Welfare costs of Malaria. The welfare cost of malaria has tended to be equated with direct economic losses, or the sum of lost productivity and medical costs, associated with the disease. However, such costs neglect the physical pain and suffering, and the cost of the disease on all those who are not engaged in productive activities such as children, elderly, and pregnant women. In particular, it ignores that malaria is one of the main causes of low birth weight which leads to higher mortality and lower adult productivity of the survivors.

5.75 The only known source to infer the economic costs of malaria in Ethiopia is a careful study that sought to measure what households in Tigray would be willing to pay to prevent malaria altogether. The study asked households to reveal what they would be willing to pay for a hypothetical vaccine and contrasted that with the direct costs of preventing the incidence of malaria using insecticide treated bednets (ITNs) (see Cropper, Haile, Lampietti, Poulos, and Whittington, 2000). As the authors state, using willingness to pay for a malaria vaccine, in principle captures all the benefits of malaria control: the vaccine eliminates the risk of death, time lost to engage in productive activities and leisure due to illness from the disease, medical and other expenditures related to the disease, and discomfort from pain.

5.76 Among the 18 villages covered in the survey, 7% of the households had lost someone to, and 78% of respondents had an episode of, malaria in their lifetime. Furthermore, the malaria incidence was evenly distributed across households members split into adults, teenagers and children. The out-of-pocket costs of travel to see a health practitioner, consult, and buy medicine, was estimated at USD 3.5 to 5 per household, assuming that an adult, a teenager and a child had an episode of malaria in the same year, which amounts to 4% to 5% of household farm income (or 2% to 3% of total median household income). In addition, for every episode of malaria, 21, 26 and 12 working days are lost for an adult, a teenager, and a child, respectively. When these lost days are converted into monetary equivalent, the lost productivity ranges from USD 9 to USD 31, or 9% to 31% of household farm income. The households were also asked what they would be willing to pay for a vaccine that would prevent the incidence of malaria for a year. On average, households were willing to pay USD 36 (the median price is USD 25), which again is about 36% of household farm income (or 20% of total median income). These households are also willing to pay USD 18 for ITNs (Cropper, Haile, Lampietti, Poulos, and Whittington, 2000, pg. 21).

5.77 Income loss from idiosyncratic health shocks. There is no doubt that HIV/AIDS and malaria constitute two of the biggest sources of burden of disease in Ethiopia, and their cost on welfare are staggering. But they are not the only sources of illness in the country. Other infectious diseases are common and a few days work lost to one of these may be all it takes to reverse the fortunes of households. From the household surveys data, it is possible to estimate the income loss from these idiosyncratic health risks. We find that a simple separation of households into those reporting an incidence of poor health from those who are not, reveals as much as 10% less income for the former, which cannot be considered small, especially for poor households who in addition may have to incur extra expenditures to improve their health.

5.78 To summarize, this chapter presented a brief review of existing household and market strategies for risk sharing and found both to be weak and largely ineffective. It then discussed, the welfare cost of inadequate protection focusing on key risks such as drought and health (HIV/AIDS and malaria). It showed that the losses in life and incomes are intolerably high. High levels of risk in a poorly developed market for risk sharing create enormous strains on the households, sometimes leading to catastrophic social outcomes. There is therefore a need for public action to help reduce or mitigate the risks faced by households and to strengthen their coping efforts. The next chapter provides suggestions for a social protection strategy.

6. Helping Households Manage Risks Better: Building Blocks of a Social Protection Strategy

6.1 To overcome the shortcomings of risk management strategies and reduce massive welfare losses, Ethiopia needs to develop an alternative social risk management strategy that achieves a balance between **coping with risks** and **reducing or mitigating risks**. In the Ethiopian context, we suggest that this strategy should include:

Sustaining Growth.

6.2 Ethiopia's poverty reduction strategy document (SDPRP), recognizes that the long run prospects to end hunger and vulnerability in the country rests on industrialization underpinned by increasing rural productivity, hence ADLI. Early empirical evidence indicates that the rural reforms and investments of the 1990s have already led to observable poverty reduction (Dercon and Krishnan, 1998; Bigsten, Kebede, Shimeles and Tadesse, 2002), but that much vulnerability remains and much needs to be done in order to sustain the momentum and achieve the true promise of ADLI. To do this, the developing and deepening of key markets is essential, and below we propose three such markets where large gains can be made.

- **improving the functioning of land markets.** The report's analysis reveals that the two main problems impeding the full poverty-reducing potential of land markets is uncertainty over tenure and restrictions on secondary markets, such as leasing of land. The available empirical evidence shows that despite the structural reality of small plots and administrative restrictions on land markets, households continue to use the market mechanisms to undertake mutually beneficial land use arrangements. More specifically, productive land owners with little land have found access to land from larger but less productive land owners. And this is as it should be. These observations suggest that having already achieved a fairly egalitarian land "ownership" structure, further interventions to maintain the status quo may neither be necessary nor beneficial for the country.

6.3 The need to make land markets work is all the more important in view of the problems besetting other markets such as output, labor, oxen and credit. At this point several policy actions are available to the government. It can officially announce the ceasing of further land redistribution. In addition to eliminating the uncertainty surrounding the status of existing use rights, such a move would encourage expansion of the secondary markets and off-farm sector. The beneficial impact of such a policy stand could be increase by other policy changes, such as turning existing use rights into ownership rights and then letting the market process work. Another alternative would be to maintain the existing use rights but remove the current restrictions on secondary land markets. Together or in combination, these land policies could go a long way to increasing rural production, improving risk-sharing, and reducing vulnerability.

- **Developing fertilizer markets.** The fertilizer market started on a promising note, but has since become problematic. The entry of sizeable private participants at all stages of the market (bulk procurement, wholesale, retail, etc.) and the creation of competencies along the areas of operations had the imprint of a process where risk-sharing was beginning to take shape in a natural way. But the policy decision to use extension services as the conduit for fertilizer sales, permitted party-affiliated and politically connected companies to enter the market and impose large foreign exchange requirements to procure fertilizer. This has led to increased risk to farmers. As things stand, interruptions to fertilizer supply from the few firms left in the market and uncertainty regarding what the government will do with rising farmer debt, have increased the risk in production. A potentially undesirable response to this risk is that farmers will avoid using fertilizer to reduce the risk. Already, it is estimated that fertilizer use will drop from 290,000 tons in 2002 to 260,000 tons in 2003. This will be detrimental to the efforts to increase productivity, improve incomes, and reduce poverty traps and vulnerability.

6.4 There are three policy moves that can help reduce the risk in the fertilizer markets and eventually lead to higher and more economically rational use of fertilizer. The first is to promote competition in the market. The government has introduced a uniform bidding document in the high-fertilizer consuming regions, which is expected to remove bureaucratic hurdles for all firms. But for this to work, transparent rules for selection of bid winners and equal access to credit will also be necessary. The second policy action would be to separate fertilizer distribution and extension services. This will reduce the excess supply and the growth of bad debts. The government is already making efforts in this area by encouraging cooperative unions and societies to be the channels for distributing fertilizer. Care must be taken, however, to ensure that the cooperatives themselves do not turn into monopolies. Finally, there is a need to reform the rules of access to credit and foreign exchange, so that private entrants can have a level playing field.

- **Deepening the operations of grain market institutions.** Many aspects of the grain markets, especially for the main staple, teff, appear to work relatively well, especially following the reforms implemented by the EPRDF government. This has been observed for short term (spot) transactions. Unfortunately, grain markets continue to be volatile, as the most recent price collapse (in 2002) testify, markets are still thin, and transaction costs are still high due to lack of standardization, large distances between production and consumption areas and poor road network, inadequate storage facilities necessary to arbitrage, and lack of localized market information (regional) by traders.

6.5 Policy changes should target the obstacles in all or most of these areas. Many traders do not have the training or the finance to participate in markets that are large and diverse (that is, markets outside of their regions). Therefore, availability of training to improve the business and human capital skills of traders, in addition to credit availability can improve competition and efficiency in the market. Regarding credit, a major

constraint is that many traders do not have enough physical assets that to serve as acceptable collateral for commercial banks. One suggestion might be to use grain stocks as collateral: the trader could deposit grain in a warehouse, which would issue a receipt indicating the value of the grain. The trader could then use the receipt to obtain credit from a commercial bank. Such a system could serve as an important initial phase of developing the market until more predictable assets could be accumulated by traders. However, to ensure bank participation, reliable market price forecasts from a public information system managed by professional bodies such as trader associations would be necessary. Alternately, professional associations could also act as guarantors of credit for members lacking acceptable collateral by commercial banks. Poor road networks, especially in rural areas, may be the single most important factor for high transaction costs. A key policy action in this area, of course is to continue to widen the reach of these roads. In addition to reducing the transaction costs of obtaining market information, or making a trade, etc., roads reduce the isolation of many households, promote labor mobility, and integrate markets.

Diversification of the economy.

- To sustain growth, the government is already pursuing diversification of the economy. Plans to diversify the export base to include horticulture, textiles, and tourism could bring significant pay-offs. The success of some of these activities, such as horticulture and textile manufacture, would hinge on how successful the government is in harnessing water resources.

Reversing or halting environmental degradation.

6.6 The long term impact of unchecked environmental damage can be observed in many areas of the country, but most vividly in the areas declared to be chronically food insecure. It is commonly maintained that these areas have been depleted through years of population growth with no land-quality-enhancing technological innovations, and it is feared that if this pace of erosion continues with no environmental measures, many more areas will be depleted, thereby increasing the size of the population caught in a poverty trap. Therefore, special efforts are needed to prevent further damage to the quality of the natural resources. Unlike many other shocks, the effects of environmental degradation are often harder to reverse.

6.7 A key policy action is to have a more pro-active population control policy. For this nothing radical is suggested. Indeed, simply meeting the existing excess demand for family planning services will go a long way in achieving some of the objectives expected for this policy. However, general population control policy is but one of several activities to achieve environmental protection. Others include, carefully planned *resettlements*, affordable and sustainable *supplemental irrigation*, and *water harvesting*. But all three activities carry risks, which have been highlighted in previous pages of this report. For them to be successful, such risk must be addressed. Water harvesting, for example, could significantly improve the welfare of Ethiopian households if all or most of its promises are realized: in addition to enhancing resource conservation, it will improve agricultural

output, reduce the burden of domestic work (water fetching) on women and children, and improve nutritional status through diversification of diet consumed. However, at present there is little knowledge on the risk-reducing value of this program and the characteristics of the beneficiaries in terms of food security. Therefore, a suggestion is to conduct a cost benefit analysis of water-harvesting interventions and also to estimate the size of food insecure households benefiting from them.

Special focus on covariate health risks.

6.8 Among the sector developments, reducing the incidence of HIV/AIDS and Malaria should be considered a priority item. The welfare costs of HIV/AIDS in terms of lives lost has already taken its toll. The results from the study on South Africa show that inaction can lead to a complete economic and social collapse. Regarding malaria, the Ethiopia study implies that to the extent that the vaccine is bought in anticipation of preventing the future cost of illness, the willingness to pay price must be viewed as an indicator of household evaluation of the real cost of malaria, measured as income loss. Based on these results we can infer that an episode of malaria incidence has the potential to reduce household income by 30% every year. This estimate is about 3 times the expected losses in household income from the disease, that would be obtained by looking at only direct medical costs and productive days lost. This should place malaria as one of the key risks that reduces household prospects to escape poverty. In fact, a study of neighboring Kenya showed that reducing incidence of malaria in each community to less than 10% will reduce vulnerability (the probability of consumption shortfall in the future) by 20% (Christiaensen and Subbarao, 2001).

6.9 It is important to remember that although there is no vaccine for malaria in the market at the moment, these households are nonetheless expressing their value for a vaccine or a program with comparable results. At the moment, bednets provide such an alternative, but since their price is not very sensitive to demand, it would be necessary for the government to subsidize these product for it to achieve significant market penetration.

Making existing safety nets more effective and complementary.

6.10 Existing social safety net programs only reach a small fraction of the very needy (except when there is a widespread emergency), and they are totally dependent on donor funding. As a result they are not covered by normal government budget, and thus fail to take advantage of obvious complementarities across programs. As a result, the programs neither protect livelihoods nor create productive assets, such as roads, dams, water catchment's areas, or human capital.

6.11 To rectify these weaknesses, we offer several recommendations. First, expand the reach of the safety net programs to benefit all those who are food insecure, rather than only 156 woredas. Since ESRDF is both nationwide and has built capacity to deliver community initiated public programs, one possibility is to use it as the instrument to scale up the food security program and reach households beyond the 156 woredas. Second, to improve sustainability and reliability of these programs, it is crucial to provide adequate funding — preferably a line item budget provision in the federal budget. Third, to make

these programs serve the dual purpose of helping cope with shocks and generate valuable assets (that is make them enhance productivity of public investments), reform the design and increase the coverage of the existing public works program. The public works program should be timed to kick in when protection for the poor is greatest. But to be effective, they have to pay a wage (or equivalent compensation) that will attract only (or mostly) the poor, and they have to have adequate provision of complementary inputs (say tools). And although they can be selected by the community, they must be integrated with woreda (district) level development programs. Finally, a long term strategy of reforming food aid (or cash equivalent if monetizable) to serve the purposes of protecting assets should be given priority.

6.12 As to which assets should be protected, we note that even though Ethiopia continues to undertake public investments for reducing broad groups of risks, the most vulnerable groups often do not get the benefit of the protection. The investments must be carefully targeted to prevent potentially irreversible asset losses. We suggest targeted transfers aimed at protecting education, health, and nutrition. In Ethiopia, this can be done by reshaping existing food aid transfers as an instrument to maintain or improve these assets. A few examples here include:

- **Education:** The transfer of food aid (or cash equivalent) to poor or isolated households when they send or keep children in school, which, in turn, reduces child labor, endures schooling of orphans, improves girls' enrollment, expands education of isolated and pastoralist people, and so on. **Orphans** need special attention because even when broad free education programs are available, they still receive less education. A study of 10 African countries, including neighboring East African countries of Kenya, Uganda, and Tanzania showed that orphaned children had lower school enrollment. This did not appear to be due to their poverty level (Case, Paxson and Ableidinger, 2002), but rather to discrimination. This provides the scope for public action. There are good reasons to target reduction of **child labor** in Ethiopia. First, the country continues to have one of the highest child labor incidence in the world, despite positive government action to promote flexibility in school calendars in the country. Second, food aid has been shown to be effective in reducing child labor. In one study, the probability of child farm labor supply, the main reason cited for child labor in the country, decreased from 58% to 37% when the per capita value of food aid received by food aid recipients increased by USD 4.2 (Yamano, 2001).
- **nutrition program:** Although malnutrition levels have fallen in recent years, they remain very high relative to comparable countries, perhaps because chronic malnutrition has not been addressed. One way to do this is to start providing better nutrition to children early in their lives by targeting children less than 30 months. Indeed, in Ethiopia, food aid has been shown to have a large positive effect on growth of children in that age category. Studies find that food aid can mitigate the negative effects on child growth that would result from plot damage (Yamano, Alderman, and Christiaensen, 2003). In addition to early childhood development and growth monitoring, an effective nutrition program should include community management, expanded immunization, and increased education of mothers.

6.13 It must be emphasized that these targeted transfers have to be treated as complementary to the broad risk-reducing programs in education and health that are already on-going. When done jointly, these types of interventions offer greater potential for effective targeting and better cost-effectiveness of the programs. By integrating the instruments from each of the broad strategies that complement one another, the country can increase the overall returns to public investments and reduce the populations vulnerability to poverty.

7. Conclusion and Next Steps

LESSONS LEARNED

7.1 A number of useful lessons have emerged from this review of risks and vulnerability in Ethiopia. First, the pattern of welfare dynamics indicates that several measures of well-being have improved in the 1990s. However, the extent of the decline in the consumption measure is still unclear. While our analysis of the data show stagnation and support the recent official estimates which report very slow rates of poverty reduction (GOE, 2002c), other studies show substantial declines. The factors determining poverty reduction include several years of favorable rains (what we have called “good luck”), peace, and public investments.

7.2 Second, the improvements in welfare were not observed in every village or every region. Tigray, Oromiya, and SNNP and possibly smaller and isolated regions such as Afar, Somali, Benshangul-Gumuz and Gambella, witnessed slower reduction in poverty between 1995/96 and 1999/2000. Our data suggests (though insufficient to claim positively) that Tigray’s ascent from poverty was delayed during this period because of the degradation of its highlands and poor rainfall, while the SNNP region — where the rainfall was good — suffered from collapsed world market prices for its main cash crop of coffee.

7.3 Third, despite the general improvement in welfare measures, large fractions of Ethiopians remain vulnerable to poverty from a multiplicity of risks. The most pervasive of these are community wide risks such as weather, malaria and the newly emerging HIV/AIDS, and idiosyncratic health shocks. Moreover, we find that the welfare costs of these risks, whether measured as physical death, income, or consumption losses are very large. As a result, risk-induced vulnerability to poverty is very high. Specifically, we find that about 10% of Ethiopian cohorts are chronically poor, while an additional 35% move in and out of poverty in any given year. Additionally, we find that the most vulnerable tend to be older, live in households with more dependents, and live in remote and isolated populations places, far from public-provided services.

7.4 The value added of this risk and vulnerability assessment is to point out that the definition of the poor should be expanded to include not just the persistently poor but also those currently non-poor who stand a high chance of becoming poor in the future. An additional contribution of this risk-focused perspective is to show more explicitly the impact of risks on the welfare of households.

7.5 In terms of policy, this perspective argues that it is not enough to only move the poor out of poverty, but that it is just as important to prevent them from falling back into poverty. This means that a sustainable poverty reducing strategy should have a balance between risk-reducing or -prevention activities and risk-coping activities. Secondly, the risk and vulnerability analyses call for a multi-sectoral approach to preventing, reducing or coping with risks. For example, dealing with drought risk may involve closer integration and coordination of risk-reducing activities such as water management, resettlement, income diversification, rural roads, and risk-coping strategies such as food or cash based public works, school feeding programs, nutritional supplementation and so on. Therefore, from the view of risk management, all public expenditures --risk-reducing and-preventing and risk-coping – are investments when their objective is to prevent households from falling into poverty traps.

7.6 In terms of strategy, the focus on reducing risk-induced poverty traps implies the need to make risk and vulnerability assessments as an integral part of the regular monitoring and evaluation of development policy. They can be done as stand-alone analytical document or as part of the standard poverty assessment. However they are done, they should begin with an identification of the main risks and those vulnerable to those risks. They should then evaluate existing risk management strategies by households, communities, and the public sector. Such evaluations should examine the existing balance between ex-ante risk management strategies and ex-post (risk-coping) strategies. This knowledge should provide the efficiency of a country investment strategy in dealing with all aspects of risk management. After evaluating existing risk management strategies, the assessment should develop an implementation plan of sustainable public interventions that are likely to be pursued.

NEXT STEPS

7.7 This review is intended to be a first step in what is hoped to be a continuous process of dialogue about how to build a robust and cost-effective social protection strategy for Ethiopia. As an immediate next step, it is hoped that the current and future dialogue over the PRSC policy actions can benefit from the findings in this review. In particular, together with other existing assessments, it can serve as an organizing framework for initiating the difficult and complex discussions over objectives of a broad social protection strategy, trade-offs between programs, and selectivity.

7.8 To inform the dialogue on making public risk-management strategies more effective, there are several outstanding issues requiring more knowledge in key areas where there is a felt need for reform. These include:

- Impact of food aid on markets. What are the relative contributions of food aid inflows and other market imperfections (e.g. poor storage, lack of credit, isolation, etc.) to domestic food price volatility and availability?
- The role of Ethiopian Strategic Food Reserve (ESFR). What market stabilizing role can ESFR play, if any?

- Monetization of food aid. What are the benefits of monetizing food aid? What are the risks? What are the components of a transition process to full or partial monetization?
- Scaling up public works program. What are the design and funding mechanisms for making public works program act as a more effective risk management tool?
- Weather-based insurance. How feasible is a weather-based insurance institution for Ethiopia? Who should it target (regional or woreda governments, producers or traders associations)?
- Finally, although environmental degradation is a major risk, there is no focused effort to combat it. What are some international best practices in environmental rehabilitation that Ethiopia can draw upon?

ANNEXES

Annex 1: Methodology and Data

1. In this annex we discuss, in a bit more detail, the data and the methodology underlying the analysis in the main report. In the first part, we describe the data used, including their comparability over time. In the second part, we start with the methodology and demonstrate the role that shocks play in the variability in consumption and therefore uncertainty of future welfare, and how to use the knowledge of the distribution of shocks to estimate vulnerability to poverty.

DATA USED

2. Ethiopia has several large and nationally representative household surveys. The household income, consumption, and expenditure surveys (HICES) as the name suggests, collect information on expenditure and incomes. Since 1995, two such surveys have been conducted. The welfare monitoring surveys (WMS), collect information on a broad set of household characteristics, including education, health, housing, and distances to markets and public services (clinics, schools, etc.). A recent demographic and health survey (DHS) gives information on maternal and child health and family planning services; and a labor force survey (LFS) presents information on the working world.

3. To understand the changes in consumption or non-consumption (health, education, malnutrition, etc.) measures of welfare, it is important to use data sets that have rich information on these variables and are comparable if available, over time,.

4. **Data comparability:** In addition to household characteristics, the WMS includes a short module on consumption, and, because there are four years of such surveys, it would seem reasonable to use them, together with HICES, to do a richer analysis of welfare changes in Ethiopia. However, the information on consumption in WMS and HICES are not comparable. The data collected under WMS was much more limited than in HICES, and the recall period, (voiced by questions such as “how much have you spent on clothes in the last one week, one month, and so forth?”) was not the same. Finally, the 1998 WMS was done a bit later in the year than the other three years. By contrast, the combined HICES/WMS of 1995/96 and 1999/2000 are comparable. As indicated in Table A1, the months of the year the survey was in the field were the same so that issues of seasonality were handled the same way in both periods. Also, the recall period for the information, especially on important variables like consumption, was the same.

Table A 1: Type and Time of Survey.

Survey	Year	Sample size (no. of households)	Month	
			Round 1	Round 2
<i>WMS</i>	1996	12,260	July 1995, January 1996	
	1997	15,034	February 1997	
	1998	45,123	March/April, 2000	
	2000	25,917	January/February 2000	
<i>HICES</i>	1999/2000	17,283	July/August, 1999	
	1995/1996	12,260	July 1995	January, 1996
<i>DHS</i>	2000		February –May	
<i>LFS</i>	1999		March 1999 (?)	

5. Price date from the various surveys was also not comparable. Because the surveys were separated in time, and households live in different geographical areas that have different prices, real expenditures could not be computed. We used reporting level specific poverty lines to account for geographic differences in consumption baskets and prices. For temporal changes in prices we used inflation numbers computed by the Government of Ethiopia Central Statistical Authority (CSA). Each reporting level poverty lines and therefore deflators were derived using the expenditure data collected in the respective years (GOE 199b, 2002d). For these reasons, we use the combined HICES/WMS 1995/96 and 1999/2000, a summary of which is provided in Table A1.

6. To get an idea of the dynamic nature of poverty and to implement the concept of vulnerability as discussed in this report, one requires panel data. Although, HICES/WMS 1995/1996 and 1999/2000 surveys are not *panel data*, large cross-sections are repeated over time and can be used to follow groups of households. With such surveys, the same households cannot be followed over time, as fresh households enter the surveys each time. Instead, cohorts or groups of households with a fixed membership can be followed over time. Once cohorts are identified, panel data methods can be applied and vulnerability of cohorts estimated.

7. **Creation of cohorts:** First, we group individuals into their administrative zone of residence. This is a level of geography lower than the region, but it provides us with significantly more observations. This alone provides us with about 48 cohorts from the 6 regions that are included in the sample. In each zone, we group the data into 10-year age bands for individuals over 20 years old. We are able to identify 5 such age groupings. This gives us a total of 240 cohorts. Then we have 2 years of data, which provide us with 480 cohort-year observations. The cohorts are groups of household heads belonging to the same age group living in the same administrative zone. We dropped some cohorts that had missing rainfall and other variables. We also dropped all cohorts with less than 5 members. Altogether 474 cohort-year observations were used in the estimation. The average cohort had 37 members in 1995/96 and 36 in 1999/2000. Table A2 shows the sizes of our cohorts.

Table A 2: Size of age cohorts and average size of cells, rural Ethiopia, 1995/96-1999/2000.

Size of age group and cohort cells		
age group	1995	1999
21 – 30	1,504	2,135
31 – 40	1,744	2,161
41 – 50	1,567	1,502
51 – 60	1,056	1,048
Greater than 60	1,098	781
Cohort cell sizes		
mean	37	36
median	36	34
minimum	5	5
Maximum	79	112

Source: World Bank staff estimate from survey data.

8. **Data on shocks.** The HICES/WMS data has very little information on shocks. The only valuable shock data collected is health shocks. In the health module, each individual was asked whether s/he experienced an episode of illness two months prior to the start of the survey. We use this data on incidence of ill health to estimate the impact of health shocks on consumption. However, we do not estimate vulnerability to health shocks since there are not sufficient observations to calculate the variance of consumption due to health shocks. Table A3 shows that between 1995/96 and 1999/2000, more people reported to have suffered an episode of ill health. The proportion of people who reported having been sick two months prior to the start of the survey rose from 25% to 35% in that period.

9. *Rainfall data:* Although not available in the HICES/WMS, we were able to obtain rainfall data recorded over 30 years for each of the 55 zones in the country. By merging the rainfall data to the HICES/WMS data, we are able to estimate the sensitivity of consumption to rainfall and the vulnerability of cohorts to this shock. Table A4 shows summary statistics of rainfall, while Figure A28 plots distribution by region.

METHODOLOGY

10. To motivate the discussion, consider a simple model, where consumption (in logs) of an individual i in period t , which we label as C_{it} is determined by a set of observed endowments in period t , X_{it} , and a random event, S_{it} , that is;

$$\log C_{it} = \alpha + \delta X_{it} + \beta S_{it} \quad (1.1)$$

11. To make the exposition simple and relevant, we shall refer to the random variable, S_{it} , as a shock, and the constants α , δ and β as returns to the fixed characteristics, observed endowments and shocks respectively.

12. In a world without uncertainty (where random events or shocks do not occur), the log consumption of this individual is perfectly predictable by the level of his/her endowments and the returns to those endowments in each period. Using equation (1.1), and setting the last term on the right hand side equal to zero, we get,

$$\overline{\log C_{it}} = \bar{\alpha} + \bar{\delta}X_{it} \quad (1.2)$$

13. Where we have used “bars” to distinguished the true and often unobserved relationship of equation (1.1) from the predictable log consumption in equation (1.2). In typical settings, the fixed characteristics would include factors like gender, while endowments may include education levels, experience at work, or occupation. If we now introduce shocks to this world, log consumption in the future (t=1, 2, 3, ...,T years ahead) will be the sum of the predictable log consumption in (1.2) plus the size of the realized shock in the relevant year. Since the shock will vary randomly over time, each household faces a log consumption level each period that has the potential to deviate quite substantially from the predictable level. We refer to the variation of log consumption around the predictable level, $Var(\log C_{it})$, as **consumption risk**, and the chance of falling below a given poverty line as **vulnerability**.

14. For empirical purposes, a long series of observed log consumption per individual coupled with detailed knowledge of the timing of shocks would constitute an ideal data set in order to obtain the impact of shocks on the variation in log consumption. This matters because if all the data came from the same distribution, it is possible to predict the average log consumption and its variance over time and use this information to predict the probability that the shock will hand this household a log consumption level below the poverty line, which is exactly what we would want.

15. But since such data sets are almost never collected anywhere, and since calculation of vulnerability requires a reasonable knowledge of both predictable and variance of log consumption, we have to design a less perfect, but nonetheless credible procedure to predict the probability of falling below the poverty line. Two questions come to mind. First, how does one estimate log consumption variance? Second, how does one resolve the absence of a panel? In the data section, we discussed the issue of how to obtain a panel, in the absence of one. In the next section we provide an answer to the first question.

16. **Measuring variance of log consumption:** Recall that our interest is to find some way to associate movements in log consumption to incidents of shocks. There are two practical difficulties to obtaining total variance of log consumption. One is the well-known problem of measurement error and the other is the fact that we do not have a long panel (that is many years of observation) of individuals. To see the first problem, suppose that

$$\log C_{it} = \overrightarrow{\log C_{it}} + \varepsilon_{it} \quad (1.3)$$

17. Where observed log consumption (first term on the left hand side) is a function of true log consumption (first term on the right hand side) and measurement error (last term). If we wanted to obtain the variance of log consumption in this environment, we would get,

$$R_c(.) = \text{var}(\log C_{it}) = \overline{\text{var}(\log C_{it})} + \text{var}(\varepsilon_{it}) + \overline{\text{cov}(\log C_{it}, \varepsilon_{it})} \quad (1.4)$$

18. Since the true log consumption is not observed directly, even though the last term is zero which will be the case if measurement error is independent of the log consumption level, the variance of true log consumption is over-estimated by the presence of the variance of measurement error (the middle term on the right). Since measurement error can account for up to 50% of the variance in log consumption (Dercon, 2002c), this is a major problem. Furthermore, the common way to deal with this problem, which involves finding a variable or set of variables that can predict true log consumption variance but are not correlated with measurement error, face practical difficulties of their own.

19. The second challenge we face when we try to estimate total variance of consumption is that while we do have many years of data on rainfall (the shock of interest), we do not have a long series of observations on log consumption per individual. Therefore, rather than estimate directly the total variance in log consumption, we take the modest route of measuring the portion of variance in log consumption that is explained by the variance in rainfall. To see this, consider the variance of log consumption implied in equation (1.1), and in order to focus on the role of shocks, ignored the terms for observable characteristics. Then,

$$R_c(S) = \text{var}(\log C_{it}) = \beta^2 \text{var}(S_{it}) \quad (1.5)$$

20. Our parameter of interest is β which measures the effect of changes in the shock on the changes in log consumption. Unlike the difficulties of obtaining total log consumption variance mentioned above, all the data needed to calculate $R_c(S)$ is available. We can obtain β by regressing log consumption on rainfall¹³. We use the repeated cross-section method of Deaton (1985). Put simply, we obtain two periods of observations on log consumption at the cohort level. We also obtain corresponding rainfall records for the two periods. We treat these observations as a two-period panel. In the context of this annex, the idea is to use equation (1.1), but obtain the data at the cohort (discussed above), rather than individual level. We then apply a difference method, that is regress changes in log consumption on changes in rainfall between the two periods. We obtain two results — with and without controlling changes in other observable variable. We can also obtain the variance of the shock ($\text{Var}(S_{it})$) using the 30 years of observed rainfall data. The two (equation 1.5) gives us the likely size of log consumption variance implied by rainfall shock. As given, $R_c(S)$ can be interpreted

¹³ Since, ideally, this parameter should be obtained by a long series of consumption to match the rainfall years, we have to live with the assumption that the period relationship (what we have) is stable and reflects the long run impact of rainfall on consumption.

as the portion of consumption risk explained solely by variation in the shock. Thus, from an analysis of variance perspective, the ratio $R_c(S)/R_c(.)$ is equivalent to R^2 of consumption regressed on an observable shock after having partialled out the effect of other variables.

21. To focus on the impact of shocks, we had put aside the connection between shocks and observable characteristics. It is important to recognize that in reality, the observed or reported log consumption does not always go up or down by the exact size of the shock because, in the event of a negative shock to log consumption, households may rely on coping mechanisms to make up all or some of the implied shortfall. Similarly, in the event of a positive shock, they may lend or save some of the increase. Because we rarely observe these responses, for practical purposes, we try to estimate the total shortfall in log consumption that cannot be bridged when a shock occurs.

22. **Measuring consumption risk from income shocks.** So far, we have argued using rainfall shock as a direct measure of log consumption shock. However, it is more likely that rainfall shocks enter into log consumption function only indirectly. In particular, it is fairly well-known that there is a stable relationship between permanent income and consumption, and short-run fluctuation in consumption come from short run changes in income — that is, transitory income. Therefore, in this paper we estimate permanent and transitory income and use the latter as the measure of consumption risk. We do this in two stages. First we estimate the size of the transitory income by running a regression of total income on quantities that determine permanent and transitory income. To estimate transitory income, we use the deviation of current rainfall from the long run regional mean rainfall, the standard deviation of current rainfall, and an indicator of a negative health shock during the survey year. In the second stage, we use the predicted values of transitory income from stage one to estimate the sensitivity of consumption to the predicted transitory income. Then we use the coefficient of and the value of the predicted transitory income in the consumption model to predict consumption risk.

23. **Estimating Vulnerability:** Vulnerability is defined as the probability of falling into an undesirable condition (poverty in this case) due to a shock. A shock is defined as the realization of a random event, such as a drought, ill-health, sudden death, etc. Then, formally, V can be stated as,

$$V = \Pr(\log C_{it} < PL) = \int_0^{PL} (\log C_{it}, PL) dF(\log C_{it}) \quad (1.6)$$

where PL is the poverty line. To estimate vulnerability we need, knowledge of the mean log consumption, variance of log consumption, poverty line, and a probability threshold to classify individuals into vulnerable and not vulnerable. The mean of log consumption can be obtained from the cross-section data. To obtain variance of log consumption notice that since we are interested in obtaining vulnerability due to a shock (specifically random arrival of rainfall), we use the variance of log consumption due to rainfall calculated in equation (1.5).

24. *Poverty line:* For the poverty line, we use the 1995 poverty line for rural Addis, converted into log to maintain consistency with the log consumption.

25. *Defining the threshold probability:* With regard to the threshold a household can be classified as being vulnerable if it faces an even or worse chance of falling below the poverty line. This fixes the threshold probability that defines the vulnerable from the non-vulnerable at 50%.

Annex 2: Tables

Table A 3: Summary Statistics for 1995/96 and 1999/2000.

Variable	1995/96		1999/2000	
	Mean	Std. Dev.	Mean	Std. Dev.
number of children and elderly	3.25	1.85	3.26	1.80
hhsiz	5.98	2.39	5.90	2.27
number of adult equivalent	4.90	2.05	4.81	1.94
children	2.92	1.78	1.94	1.41
numinfants	1.10	0.95	1.19	0.99
numadults	2.34	1.13	2.54	1.23
depen	1.39	0.99	1.44	0.99
age	44.86	14.04	44.55	13.87
agelt18	0.00	0.04	0.00	0.05
age18_30	0.17	0.37	0.16	0.37
age31_45	0.40	0.49	0.41	0.49
age46_60	0.28	0.45	0.29	0.45
agegt60	0.14	0.35	0.14	0.34
married	0.83	0.37	0.83	0.37
divorcese or separated	0.05	0.22	0.05	0.21
widow	0.09	0.28	0.10	0.30
femhead	0.18	0.38	0.19	0.39
urban	0.15	0.36	0.13	0.34
primary	0.26	0.44	0.18	0.38
secondary	0.04	0.19	0.03	0.18
postsecondary	0.01	0.08	0.02	0.12
primary incomplete	0.24	0.43	0.16	0.37
completed primary	0.02	0.13	0.02	0.13
completed secondary	0.02	0.15	0.02	0.13
education of male adults	3.08	5.97	2.48	5.44
education of female adults	3.26	16.18	3.24	18.23
Tigray	0.07	0.25	0.06	0.24
Afar	0.00	0.06	0.00	0.07
Amhara	0.29	0.45	0.26	0.44
Oromiya	0.37	0.48	0.38	0.49
Benshangul-Gumuz	0.01	0.09	0.01	0.11
SNNP	0.21	0.40	0.22	0.41
Gambella	0.00	0.04	0.00	0.05
Harari	0.00	0.05	0.00	0.05
Addis Ababa	0.04	0.19	0.04	0.19
Dire Dawa	0.01	0.07	0.00	0.07
Indisttofood	1.59	0.97	1.52	0.85
Indisttopost	2.56	1.18	2.57	1.04
Indisttoprimary	1.15	0.89	1.16	0.74
Indistto secondary	2.69	1.18	2.57	1.06

Indisttohealth	1.86	0.99	1.78	0.87
usehealth	0.88	0.32	0.91	0.28
Indisttewater	0.46	0.90	0.37	0.54
Indisttophone	2.54	1.27	2.51	1.16
Indisttransport services	2.12	1.35	2.15	1.28
Indistto all weather road			1.62	1.28
Indistto dry weather road			1.46	1.26
rent	0.06	0.24	0.06	0.23
electricity	0.10	0.30	0.10	0.30
notoilet	0.86	0.35	0.82	0.38
ownmoferkenber	0.59	0.49	0.60	0.49
ownplough	0.62	0.49	0.63	0.48
ownsickle	0.75	0.43	0.79	0.41
ownsprayer	0.01	0.09	0.01	0.10
owntractor	0.00	0.04	0.00	0.03
ownfarmanimals	0.54	0.50	0.86	0.35
owntransport animals	0.24	0.43	0.34	0.47
ownhouse	0.92	0.27	0.90	0.30
ownland	0.92	0.27	0.93	0.25
ownfridge	0.01	0.10	0.01	0.10
owncar	0.01	0.08	0.00	0.06
owntvradio	0.16	0.37	0.21	0.41
employed	0.89	0.31	0.89	0.32
Incons	7.35	0.49	7.34	0.49
coffeepro	0.29	0.45	0.25	0.43
chatpro	0.09	0.28	0.09	0.29
teapro	0.02	0.14	0.01	0.10
cashcroppro	0.39	0.49	0.38	0.48
wassick	0.25	0.43	0.35	0.48
lesslivestock assets	0.16	0.36	0.64	0.48
decreased food exp			0.33	0.47
decreased clothing exp			0.30	0.46
decreased welfare			0.38	0.48
adequacy of harvest			17.92	28.12
access to coping			0.72	0.45
Sample size	11668		16536.00	

Source: World Bank Staff estimates from survey data.

Table A 4: Summary statistics of rainfall variables (mm), Ethiopia, 1967-2000.

Variable	Mean	Standard deviation
long run (30 year) average rainfall	1121.41	392.54
coefficient of variation of rainfall	0.24	0.09
Actual average rain in 1995	1105.33	372.43
Actual average rain in 1999	1136.26	472.70
Deviation of actual 1995 from long run mean	-44.76	206.47
deviation of actual rain in 1999 from long run mean	-8.30	265.01

Source: World Bank Staff calculation from survey data.

Table A 5: Estimates of head count ratio, poverty gap and squared poverty gap indexes, Ethiopia, 1995 and 2000 (%).

Government estimates			Without a common basket and prices				With different prices and consumption bundles				
			Lower Poverty Lines		Upper poverty lines		Lower poverty lines		Upper poverty lines		
Poverty measure	1995	1999	1995	1999	1995	1999	1995	1999	1995	1999	
Rural	P0	0.47	0.45	0.40	0.38	0.59	0.58	0.37	0.29	0.54	0.39
	P1	0.13	0.12	0.10	0.10	0.19	0.18	0.10	0.07	0.16	0.10
	P2	0.05	0.05	0.04	0.04	0.08	0.08	0.04	0.02	0.06	0.04
Urban	P0	0.33	0.37	0.31	0.37	0.46	0.53	0.32	0.46	0.47	0.70
	P1	0.1	0.1	0.09	0.10	0.15	0.17	0.09	0.14	0.16	0.29
	P2	0.04	0.04	0.04	0.04	0.07	0.08	0.04	0.06	0.07	0.15
National	P0	0.46	0.44	0.38	0.38	0.57	0.57	0.36	0.32	0.53	0.43
	P1	0.13	0.12	0.10	0.10	0.18	0.18	0.10	0.08	0.16	0.13
	P2	0.05	0.05	0.04	0.04	0.08	0.08	0.04	0.03	0.06	0.05

Source: Welfare Monitoring Unit (WMU) estimates are results from the recent poverty profile study by the named unit, GOE (2002c). The rest of the results are calculated from the HICES/WMS, 1995/96 and 1999/2000.

Table A 6: Regional poverty count, Ethiopia, 1995/96-1999/2000.

Region	Lower poverty rates		Upper poverty rates	
	1995	1999	1995	1999
Tigray	0.45	0.49	0.66	0.69
Afar	0.20	0.43	0.26	0.63
Amhara	0.45	0.36	0.65	0.55
Oromiya	0.28	0.32	0.46	0.52
Somali	0.08	0.15	0.18	0.33
Benshangul-Gumuz	0.49	0.54	0.72	0.71
SNNP	0.49	0.48	0.67	0.65
Gambella	0.35	0.66	0.48	0.79
Harari	0.25	0.29	0.43	0.47
Addis Ababa	0.34	0.41	0.50	0.57
Dire Dawa	0.47	0.49	0.65	0.68

Source: World Bank Staff estimates from survey data.

Table A 7: Consumption growth rates by decile, Ethiopia, 1995/96-1999/2000.

Expenditure Decile	National		Rural		Urban		Growth rates of consumption		
	1995	1999	1995	1999	1995	1999	National	Rural	Urban
1	617.85	623.45	622.46	625.11	594.06	613.06	1.01	1.00	1.03
2	848.65	868.52	845.07	872.13	878.88	844.39	1.02	1.03	0.96
3	1013.60	1023.15	1003.20	1022.50	1104.04	1028.30	1.01	1.02	0.93
4	1171.17	1175.88	1152.63	1172.91	1315.24	1194.32	1.00	1.02	0.91
5	1328.80	1332.98	1303.37	1327.24	1537.32	1377.76	1.00	1.02	0.90
6	1507.89	1510.58	1471.28	1500.63	1782.35	1593.39	1.00	1.02	0.89
7	1713.51	1715.73	1665.45	1698.37	2088.66	1879.13	1.00	1.02	0.90
8	1984.38	1968.59	1912.50	1937.19	2511.20	2332.84	0.99	1.01	0.93
9	2400.74	2391.27	2283.28	2315.92	3181.47	3059.03	1.00	1.01	0.96
10	4090.46	4026.65	3736.71	3672.82	5580.36	5978.02	0.98	0.98	1.07
Average							1.00	1.01	0.95

Source: World Bank Staff estimates from survey data.

Table A 8: Consumption inequality (Gini index), Ethiopia, 1995/96 and 1999/2000.

	1995	1999
National	0.300	0.287
Rural	0.284	0.272
urban	0.350	0.365

Source: World Bank Staff estimates from survey data.

Table A 9: Characteristics Of the chronic, transient, and not so poor (rural households), Ethiopia, 1995/96-1999/2000.

Variable	All vulnerable		Estimated vulnerable due to exposure from rainfall shocks only		Estimated vulnerable due to changes in transitory income		Not vulnerable	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<i>Demographic characteristics</i>								
number of children or elderly	2.81	1.75	2.76	1.80	2.33	2.00	2.55	1.69
Household size	5.19	2.22	5.20	2.29	4.50	2.40	4.80	2.10
Number of adult equivalent	4.24	1.85	4.28	1.90	3.77	2.04	3.87	1.75
Number of children	2.10	1.57	2.01	1.60	1.55	1.65	1.84	1.55
Number of infants (< 6 years)	0.98	0.94	0.92	0.95	0.55	0.79	1.03	0.93
Number of adults	2.16	1.03	2.23	1.13	1.90	1.12	2.05	0.95
Dependency ratio	1.31	0.96	1.29	1.02	1.21	1.27	1.26	0.98
Age	46.85	13.39	47.82	13.10	54.43	16.83	41.87	15.76
Age group 18 to 30	0.10	0.29	0.09	0.29	0.10	0.30	0.32	0.47
Age group 31 to 45	0.43	0.50	0.36	0.48	0.27	0.44	0.35	0.48
Age group 46 to 60	0.31	0.46	0.39	0.49	0.24	0.43	0.17	0.37
Age greater than 60	0.16	0.37	0.16	0.36	0.39	0.49	0.16	0.37
married	0.80	0.40	0.78	0.42	0.71	0.46	0.82	0.38
Divorced or separated	0.06	0.23	0.07	0.25	0.05	0.23	0.05	0.22
widow	0.13	0.33	0.15	0.35	0.22	0.42	0.10	0.30
Female head of household	0.22	0.41	0.24	0.43	0.27	0.45	0.19	0.39
<i>Human capital endowments</i>								
Primary education	0.18	0.38	0.18	0.38	0.21	0.41	0.22	0.41
Secondary education	0.01	0.11	0.01	0.09	0.00	0.00	0.02	0.13
Did not complete primary	0.16	0.37	0.17	0.37	0.19	0.40	0.20	0.40
Completed primary	0.01	0.11	0.01	0.09	0.01	0.11	0.01	0.12
Education of adult males	1.44	2.98	1.85	3.56	1.73	3.06	1.57	3.04
Education of female adults	0.61	3.21	0.85	3.76	0.88	3.47	0.62	3.32
<i>Spatial distribution</i>								
Amhara	0.32	0.46	0.19	0.39	0.00	0.00	0.27	0.44
Oromia	0.25	0.44	0.19	0.40	0.30	0.46	0.42	0.49
Benshangul-Gumuz	0.07	0.26	0.08	0.27	0.00	0.00	0.01	0.11
SNNPR	0.29	0.45	0.20	0.40	0.11	0.31	0.26	0.44
Gambella	0.00	0.00	0.18	0.38	0.59	0.49	0.00	0.00
<i>Access to public infrastructure and services</i>								
Distance to food market (logs)	1.69	0.82	1.79	0.95	1.98	1.09	1.77	0.84
Distance to post office (logs)	2.90	0.86	3.02	0.89	3.33	0.80	2.90	0.89
Distance to primary school	1.26	0.77	1.24	0.86	1.42	1.10	1.30	0.82

Variable	All vulnerable		Estimated vulnerable due to exposure from rainfall shocks only		Estimated vulnerable due to changes in transitory income		Not vulnerable	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
(logs)								
Distance to secondary school (logs)	2.89	0.87	2.95	0.90	2.90	1.00	2.98	0.90
Distance to health facility (logs)	2.02	0.80	1.93	0.94	2.07	1.06	2.05	0.81
Whether or not used health facility	0.89	0.32	0.89	0.31	0.91	0.29	0.88	0.33
Distance to water (logs)	0.49	0.86	0.55	0.97	0.53	0.72	0.46	0.78
Distance to phone (logs)	2.88	0.92	3.06	0.94	3.60	0.97	2.90	0.97
Distance to transport services (logs)	2.47	1.21	2.56	1.15	2.91	1.14	2.56	1.19
Distance to all weather road (logs)	1.92	1.30	1.80	1.33	1.60	1.33	1.96	1.25
Distance to dry weather road (logs)	1.64	1.21	1.44	1.26	1.62	1.24	1.64	1.17
<i>Asset endowments</i>								
Fraction without toilet	0.91	0.28	0.90	0.30	0.94	0.24	0.92	0.26
Fraction with mofer kenber	0.62	0.48	0.53	0.50	0.23	0.42	0.61	0.49
Fraction with plough	0.65	0.48	0.55	0.50	0.24	0.43	0.63	0.48
Fraction with sickle	0.83	0.37	0.81	0.39	0.55	0.50	0.76	0.43
Fraction with farm animals	0.73	0.44	0.69	0.46	0.76	0.43	0.71	0.46
Fraction with transport animals	0.27	0.44	0.25	0.43	0.14	0.35	0.24	0.43
Fraction with a house	0.96	0.19	0.95	0.22	0.87	0.33	0.96	0.19
Fraction with TV or Radio	0.09	0.29	0.11	0.31	0.10	0.30	0.09	0.29
<i>Livelihoods and income</i>								
Fraction employed	0.89	0.31	0.90	0.29	0.84	0.37	0.89	0.31
Real income (logs)	8.36	0.75	8.24	0.80	7.76	0.88	8.51	0.73
Real consumption (logs)	7.30	0.48	7.24	0.47	7.13	0.52	7.49	0.49
Income from tea	93.51	2173.33	106.83	1709.80	261.42	2987.59	80.77	1670.70
Income from Coffee	3495.85	13693.78	1881.35	9043.62	766.45	3546.06	3319.41	12174.86
Income from chat	551.82	5419.99	89.48	1683.72	0.00	0.00	6492.95	29665.68
Fraction producing coffee	0.30	0.46	0.27	0.44	0.20	0.40	0.35	0.48
Fraction producing chat	0.05	0.22	0.02	0.14	0.00	0.00	0.15	0.36
Fraction producing tea	0.01	0.10	0.01	0.11	0.02	0.15	0.01	0.09
<i>Incidence of shocks</i>								
Fraction reporting ill-health	0.35	0.48	0.33	0.47	0.44	0.50	0.29	0.45
Fraction with less livestock assets	0.41	0.49	0.45	0.50	0.57	0.50	0.37	0.48
Fraction with decreased food exp	0.37	0.48	0.35	0.48	0.32	0.47	0.32	0.47
Fraction with decreased clothing exp	0.32	0.47	0.31	0.46	0.31	0.46	0.32	0.47

Variable	All vulnerable		Estimated vulnerable due to exposure from rainfall shocks only		Estimated vulnerable due to changes in transitory income		Not vulnerable	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<i>Expectations of welfare</i>								
Fraction expecting decreased welfare	0.41	0.49	0.39	0.49	0.37	0.48	0.38	0.48
Months harvest is adequate	8.37	12.86	7.75	12.44	8.23	11.93	8.81	13.42
Fraction with access to coping	0.67	0.47	0.64	0.48	0.64	0.48	0.67	0.47
Average Size of rainfall shock in 1995	-44.38	207.10	22.32	181.51	63.20	201.16	-71.86	208.32
Average size of rainfall shock in 1999	-9.98	242.68	-22.85	266.51	-186.33	118.34	0.27	285.81
Sample size	5138		2058		165		4737	

Source: World Bank Staff estimates from survey data.

Table A 10: Determinants of consumption, Ethiopia, 1995/96-1999/2000.
(Dependent variable = log of consumption).

	Estimated coefficients
rainfall (log)	0.842 (0.017)***
education male adults	0.002 -0.002
education female adults	0.004 (0.001)**
household size	-0.081 (0.003)***
dependency	-0.03 (0.006)***
Indisttofood	0.018 (0.006)***
Indisttopost	0.019 (0.009)**
Indisttoprimary	0.002 -0.006
Indisttosecondary	-0.006 -0.007
Indisttohealth	0.001 -0.006
Indisttransservice	-0.024 (0.005)***
Indisttewater	-0.029 (0.006)***
Indisttophone	-0.005 -0.008
jage31_45	-0.043 (0.018)**
jage46_60	-0.024 -0.026
agegt60	0.044 -0.042
primary	0.115 (0.013)***
secondary	0.199 (0.045)***
postsecondary	0.659 (0.108)***
seccomplete	0.197 (0.063)***
divorceparate	0.014 -0.024
widow	-0.025

	Estimated coefficients
	-0.021
employed	0.083 (0.018)***
femhead	0.058 (0.018)***
Amhara	0.569 (0.152)***
Oromiya	1.982 (0.125)***
Benshangul-Gumuz	0.983 (0.178)***
SNNP	1.21 (0.139)***
Gambella	2.354 (0.252)***
rent	0.138 (0.080)*
electricity	-0.014 -0.046
notoilet	-0.052 (0.017)***
ownmoferkenber	0.061 (0.017)***
ownplough	0.057 (0.017)***
ownsickle	0.04 (0.014)***
ownsprayer	0.044 -0.05
owntractor	-0.06 -0.105
ownfarmanimals	0.069 (0.012)***
owntransanimals	0.105 (0.010)***
ownland	0.088 (0.029)***
ownfridge	0.207 -0.14
owncar	-0.236 (0.140)*
owntvradio	0.155 (0.015)***
coffeepro	0.043 (0.011)***
teapro	0.038

	Estimated coefficients
	-0.041
chatpro	0.117 (0.019)***
wassick	0.004 -0.009
Constant	2.091 (0.197)***
Observations	10759
Number of cohortid	231
R-squared	0.82
Standard errors in parentheses	

Source: World Bank staff estimate from survey data. All variables adjusted for cohort size.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A 11: Determinants of income, Ethiopia, 1995/96-1999/2000.
(Dependent variable = log of total income).

	Estimated coefficient
depen	0.048 (0.008)***
numinfants	0.023 (0.008)***
edumaleadults	0.028 (0.003)***
edufemadults	0.009 (0.002)***
age31_45	0.095 (0.018)***
age46_60	0.192 (0.020)***
agegt60	0.072 (0.025)***
primary	0.054 (0.019)***
secondary	-0.058 -0.058
postsecondary	-0.442 (0.171)***
divorceseparate	-0.352 (0.036)***
widow	-0.192 (0.030)***
employed	0.053 (0.025)**

	Estimated coefficient
femhead	-0.219 (0.027)***
Amhara	0.233 (0.026)***
Oromiya	0.342 (0.027)***
Benshangul-Gumuz	-0.067 (0.039)*
SNNP	0.256 (0.029)***
Gambella	-0.095 (0.046)**
Indisttofood	0.031 (0.009)***
Indisttopost	-0.007 -0.012
Indisttoprimary	-0.015 (0.009)*
Indisttosecondary	0.04 (0.010)***
Indisttohealth	0.038 (0.009)***
Indistransservice	-0.04 (0.007)***
Indisttewater	-0.005 -0.008
Indisttophone	0.019 (0.011)*
rent	-0.127 -0.12
electricity	-0.114 -0.074
notoilet	-0.078 (0.024)***
ownmoferkenber	0.203 (0.025)***
ownplough	0.153 (0.024)***
ownsickle	0.027 -0.018
ownsprayer	0.091 -0.077
owntractor	0.013 -0.177
ownfarmanimals	-0.082 (0.017)***

	Estimated coefficient
owntransanimals	0.214 (0.015)***
ownland	0.148 (0.042)***
ownfridge	0.425 (0.230)*
owncar	0.009 -0.219
owntvradio	0.158 (0.022)***
coffeepro	0.163 (0.015)***
teapro	0.172 (0.062)***
chatpro	0.269 (0.023)***
srzshock9599	0.212 (0.032)***
wassick	-0.099 (0.014)***
Constant	7.417 (0.068)***
Observations	10759
R-squared	0.29
Standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

Source: World Bank staff estimate from survey data. All variables adjusted for cohort size.

**Table A 12: Determinants of consumption including transitory income,
Ethiopia, 1995/96-1999/2000.
(Dependent variable = log of consumption)**

	Estimated coefficients
transinc (log)	1.21 (0.146)***
edumaleadults	0.002 -0.002
edufemadults	0.004 (0.002)***
hhsiz	-0.076 (0.003)***
depen	-0.028 (0.006)***
Indisttofood	0.022 (0.007)***

	Estimated coefficients
Indisttopost	0.014
	-0.009
Indisttoprimary	0.004
	-0.007
Indisttosecondary	0.012
	-0.008
Indisttohealth	0.004
	-0.007
Indisttransservice	-0.025
	(0.005)***
Indisttewater	-0.006
	-0.006
Indisttophone	0.01
	-0.008
age31_45	0.047
	(0.020)**
age46_60	0.11
	(0.029)***
agegt60	0.246
	(0.046)***
primary	0.126
	(0.015)***
secondary	0.236
	(0.050)***
postsecondary	0.722
	(0.120)***
seccomplete	0.222
	(0.070)***
divorceparate	0.043
	-0.027
widow	-0.001
	-0.024
employed	0.178
	(0.020)***
femhead	0.095
	(0.020)***
Amhara	6.253
	(0.107)***
Oromiya	7.158
	(0.077)***
Benshangul-Gumuz	6.412
	(0.154)***
SNNP	6.482
	(0.098)***
Gambella	7.8
	(0.250)***

	Estimated coefficients
rent	0.212 (0.089)**
electricity	0.028 -0.051
notoilet	0.026 -0.019
ownmoferkenber	0.063 (0.019)***
ownplough	0.069 (0.018)***
ownsickle	0.077 (0.015)***
ownsprayer	0.052 -0.056
owntractor	-0.113 -0.116
ownfarmanimals	0.043 (0.013)***
owntransanimals	0.102 (0.012)***
ownland	0.276 (0.032)***
ownfridge	0.142 -0.155
owncar	-0.18 -0.155
owntvradio	0.168 (0.016)***
coffeepro	0.054 (0.012)***
teapro	0.066 -0.046
chatpro	0.11 (0.021)***
wassick	0.138 (0.018)***
Constant	3.134 (0.220)***
Observations	10759
Number of cohortid	231
R-squared	0.77

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: World Bank staff estimate from survey data. All variables adjusted for cohort size.

Table A 13: Per capita real aid and gifts to households (in Birr), Ethiopia, 1995/96.

decile	Total gifts and free aid		Rural households		Urban households	
	per capita real expenditure	per capita real gifts and free aid	per capita real expenditure	per capita real gifts and free aid	per capita real expenditure	per capita real gifts and free aid
1	694.2	15.6	716.8	17.7	584.8	8.6
2	938.7	21.6	949.3	23.3	867.4	11.0
3	1113.9	24.1	1118.2	25.8	1083.7	11.7
4	1282.8	26.8	1283.1	28.8	1283.4	15.1
5	1448.5	31.9	1442.3	33.8	1492.4	13.0
6	1624.3	30.7	1611.6	33.9	1723.6	18.0
7	1840.9	37.6	1816.6	38.1	2028.3	20.8
8	2123.7	39.8	2084.8	43.2	2448.3	23.2
9	2542.2	45.0	2462.3	47.4	3095.7	24.6
10	4159.1	60.9	3921.6	67.9	5250.2	41.5
Average	1776.6	33.4	1740.2	36.0	1984.0	18.7

Note: The expenditures and gifts and free aid are deflated by adult equivalent household size. They are also adjusted for regional differences in prices (spatial deflators). There is no distinction made between gifts between private households and food aid in 1995/96.

Table A 14: Per capita real aid and gifts to households (in Birr), Ethiopia, 1999/2000.

Decile	Per capita real expenditure	Public assistance			Private assistance			Total public and private gifts and free aid
		Government	Non-government	Total	inter-household transfers	remittances from abroad	Total	
1	684.8	5.2	1.7	6.9	4.6	0.0	4.6	11.4
2	936.4	4.1	1.4	5.5	5.4	0.1	5.6	11.0
3	1099.4	5.5	2.4	7.9	5.2	0.1	5.2	13.1
4	1262.5	4.6	2.3	6.9	5.2	0.0	5.2	12.1
5	1423.9	4.3	3.2	7.5	6.0	0.1	6.1	13.6
6	1600.3	4.5	2.9	7.4	6.2	0.2	6.4	13.8
7	1803.3	6.0	2.2	8.2	6.6	0.3	6.9	15.2
8	2076.6	4.2	1.1	5.2	8.4	0.1	8.5	13.7
9	2486.7	4.7	1.7	6.4	8.8	0.2	9.0	15.4
10	4150.5	6.4	6.0	12.5	20.4	10.4	30.8	43.2
Average	1752.4	4.9	2.5	7.4	7.7	1.1	8.8	16.3

Note: The expenditures and gifts and free aid are deflated by adult equivalent household size. They are also adjusted for regional differences in prices (spatial deflators) and inflation.

**Table A 15: Per capita real aid and gifts to households (in Birr),
rural Ethiopia, 1999/2000.**

Decile	Per capita real expenditure	Public assistance			Private assistance			Total public and private gifts and free aid
		Government	Non- government	Total	inter- household transfers	remittances from abroad	Total	
1	707.4	5.9	1.5	7.4	4.5	0.0	4.5	11.9
2	954.0	4.0	1.4	5.3	5.6	0.1	5.6	10.9
3	1115.0	5.8	2.5	8.3	4.9	0.0	4.9	13.2
4	1276.7	4.5	1.9	6.4	5.2	0.0	5.2	11.7
5	1434.8	5.0	3.4	8.5	5.8	0.0	5.8	14.3
6	1606.0	4.6	3.4	7.9	5.8	0.2	6.0	13.9
7	1800.9	5.9	2.2	8.1	6.5	0.1	6.6	14.6
8	2058.9	5.0	0.9	5.9	8.3	0.0	8.4	14.3
9	2433.2	4.6	1.5	6.1	8.1	0.0	8.1	14.2
10	3833.3	5.0	4.0	9.0	18.6	0.8	19.4	28.4
Average	3833.3	5.0	4.0	9.0	7.3	0.1	7.5	16.4

Note: The expenditures and gifts and free aid are deflated by adult equivalent household size. They are also adjusted for regional differences in prices (spatial deflators) and inflation. In 1999/2000, it is possible to make a distinction between gifts between private households and food aid (public help).

**Table A 16: Per capita real aid and gifts to households (in Birr),
urban Ethiopia, 1999/2000**

Decile	Per capita real expenditure	Public assistance			Private assistance			Total public and private gifts and free aid
		Government	Non- government	Total	inter- household transfers	remittances from abroad	Total	
1	584.5	2.5	1.9	4.4	4.5	0.1	4.6	9.0
2	819.6	2.1	2.1	4.1	4.4	0.1	4.5	8.6
3	994.3	4.3	2.2	6.5	6.1	0.4	6.5	13.0
4	1163.6	4.4	3.8	8.2	6.8	0.4	7.2	15.4
5	1335.9	1.9	2.5	4.4	7.9	0.2	8.1	12.6
6	1548.1	3.4	1.5	4.9	7.6	0.4	8.1	12.9
7	1831.8	3.2	1.0	4.1	9.0	2.0	11.0	15.1
8	2285.9	1.5	4.0	5.6	11.6	1.0	12.6	18.1
9	3005.7	2.7	5.0	7.7	13.4	1.5	14.9	22.6
10	5968.5	18.1	15.6	33.7	28.5	72.2	100.6	134.4
Average	1953.4	4.4	3.9	8.4	10.0	7.8	17.8	26.1

Note: The expenditures and gifts and free aid are deflated by adult equivalent household size. They are also adjusted for regional differences in prices (spatial deflators) and inflation. In 1999/2000, it is possible to make a distinction between gifts between private households and food aid (public help).

Annex 3: Figures and Graphs

Figure A 1: Cumulative distribution of consumption, Ethiopia, 1995/96 and 1999/2000.

CDF: national, rural and urban

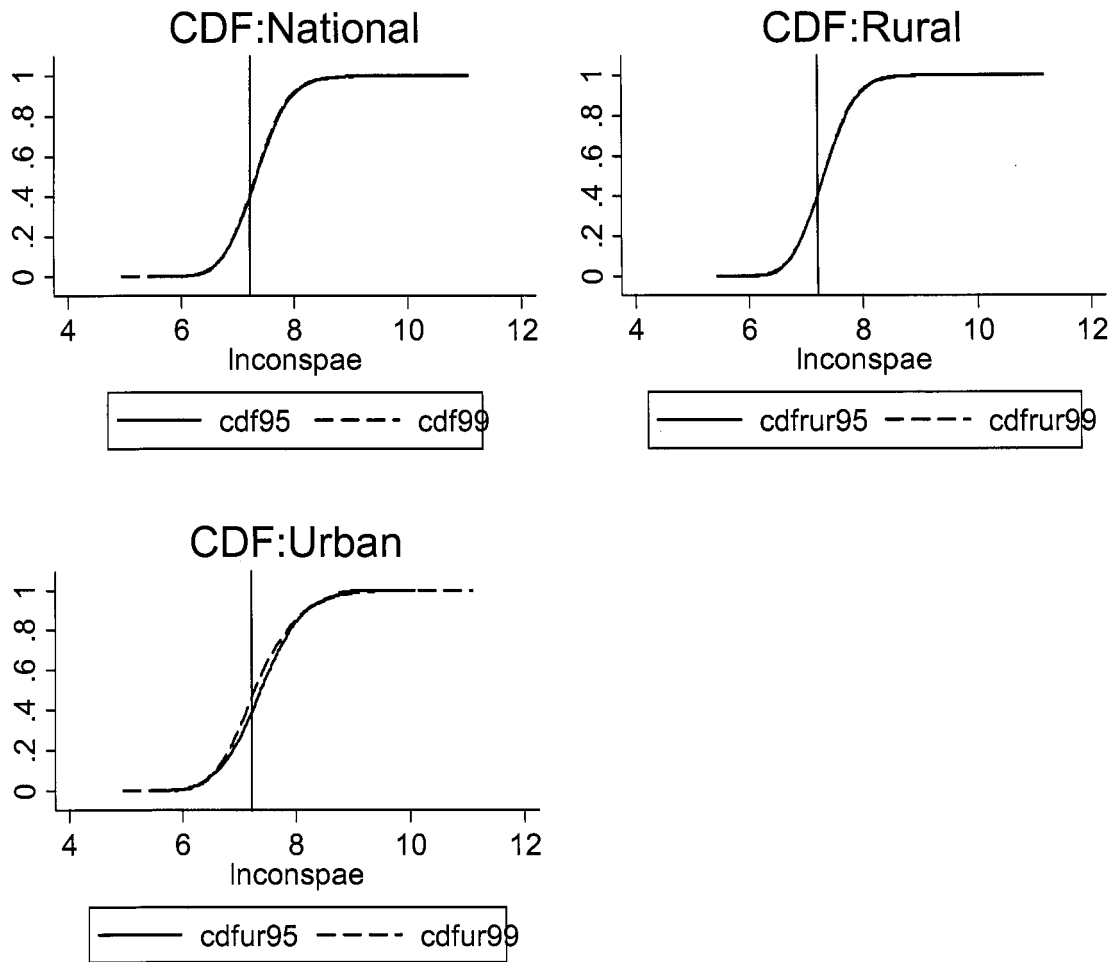


Figure A 2: Cumulative distribution of consumption, Ethiopia regions, 1995/96 and 1999/2000.

CDF: Regions

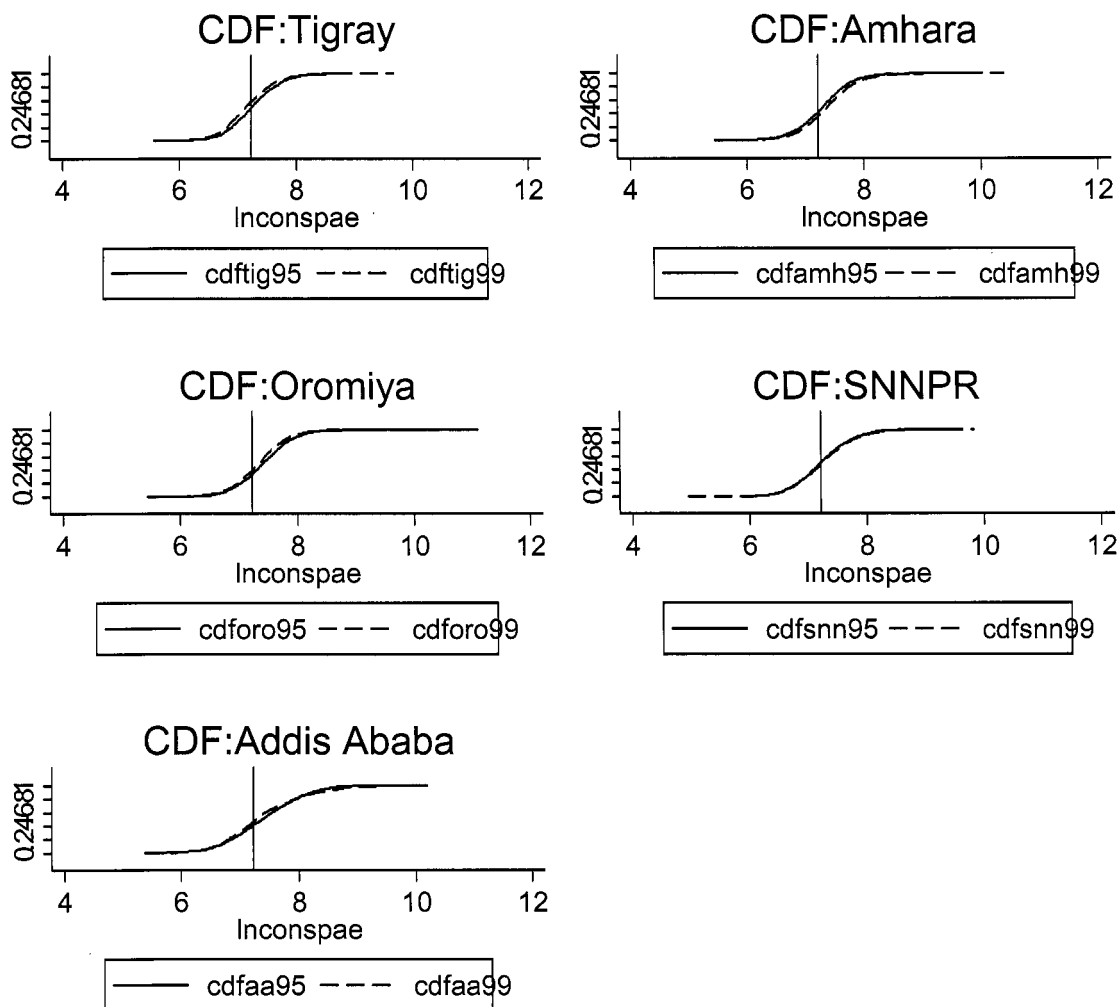


Figure A 3: Shift in consumption distribution, Ethiopia, 1995/96 – 1999/2000.

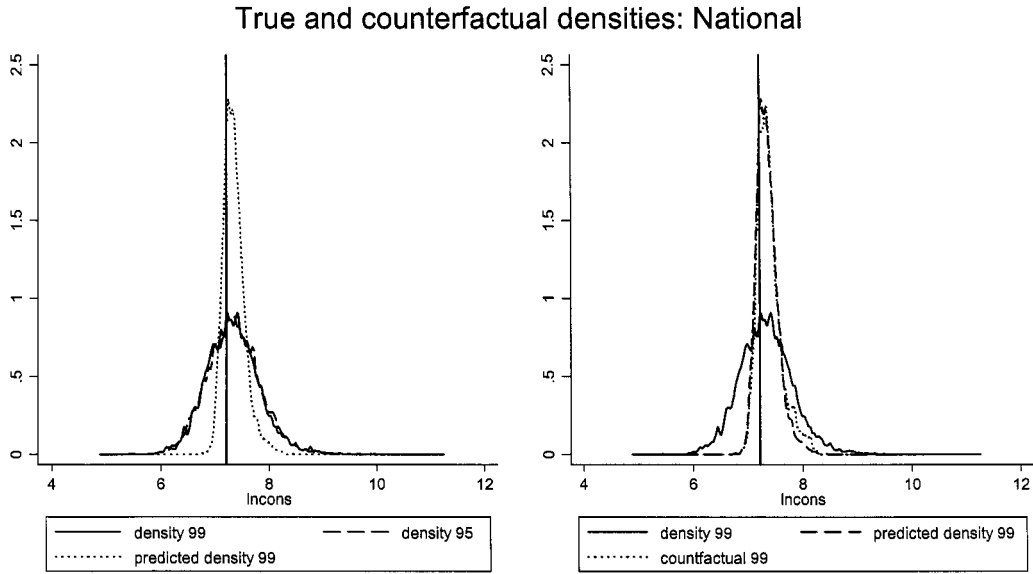


Figure A 4: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Ethiopia, 1995/96-1999/2000.

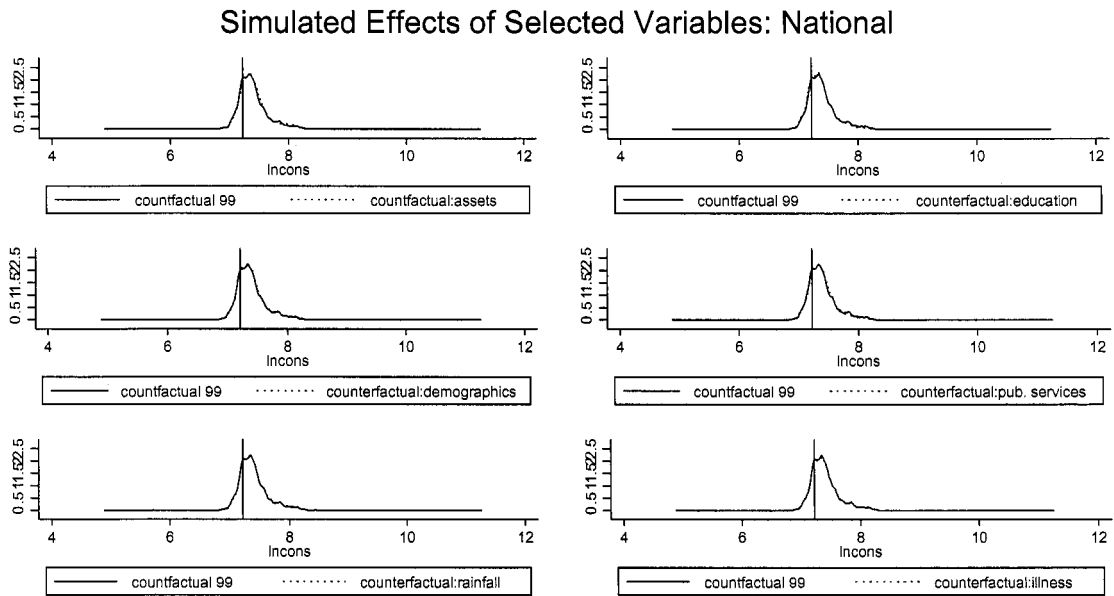


Figure A 5: Visual Impact of variables on changes in consumption, Ethiopia, 1995/96-1999/2000.

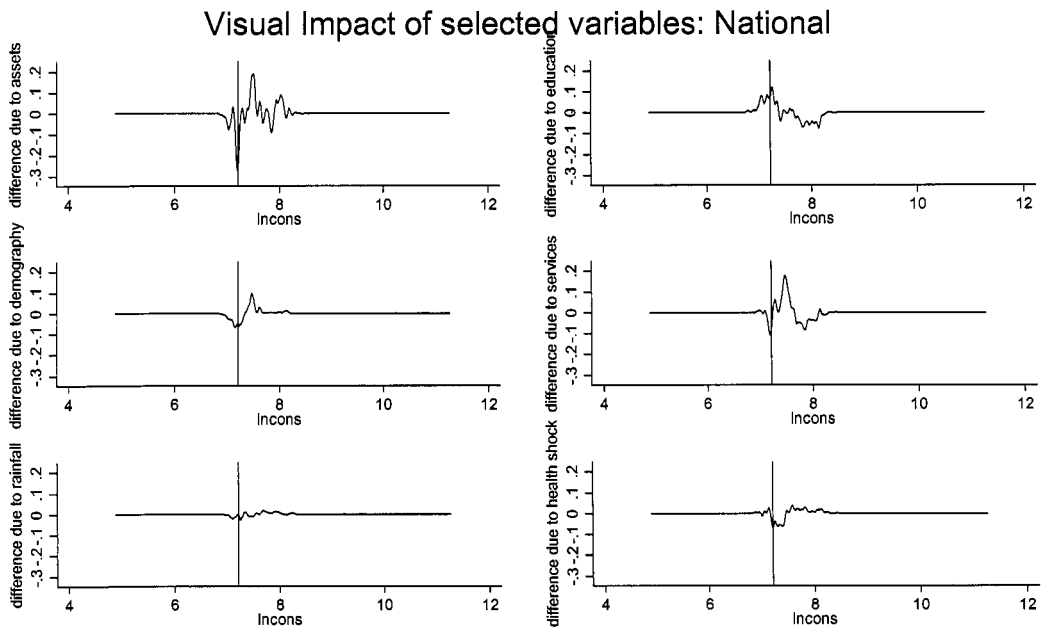


Figure A 6: Shift in consumption distribution, Rural Ethiopia, 1995/96 – 1999/2000.

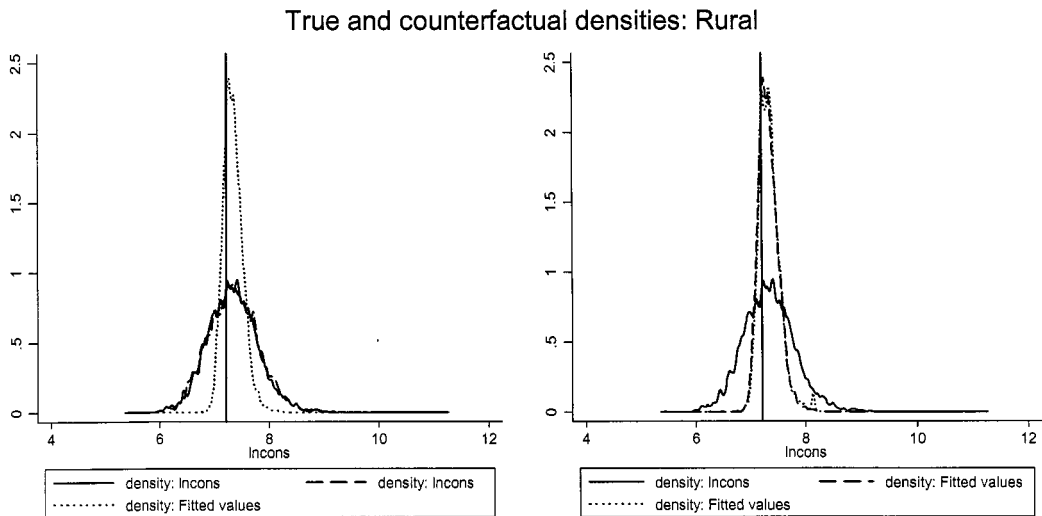


Figure A 7. Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Rural Ethiopia, 1995/96-1999/2000.

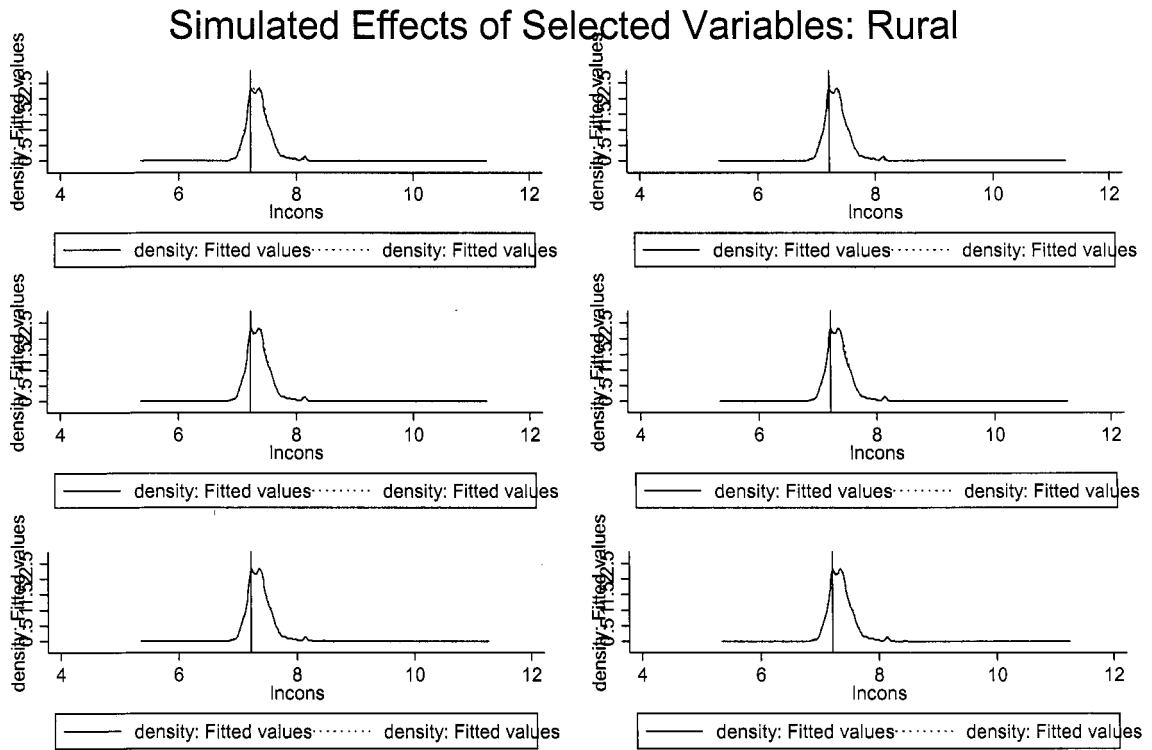


Figure A 8: Visual Impact of variables on changes in consumption, Rural Ethiopia, 1995/96-1999/2000.

Visual Impact of selected variables: Rural

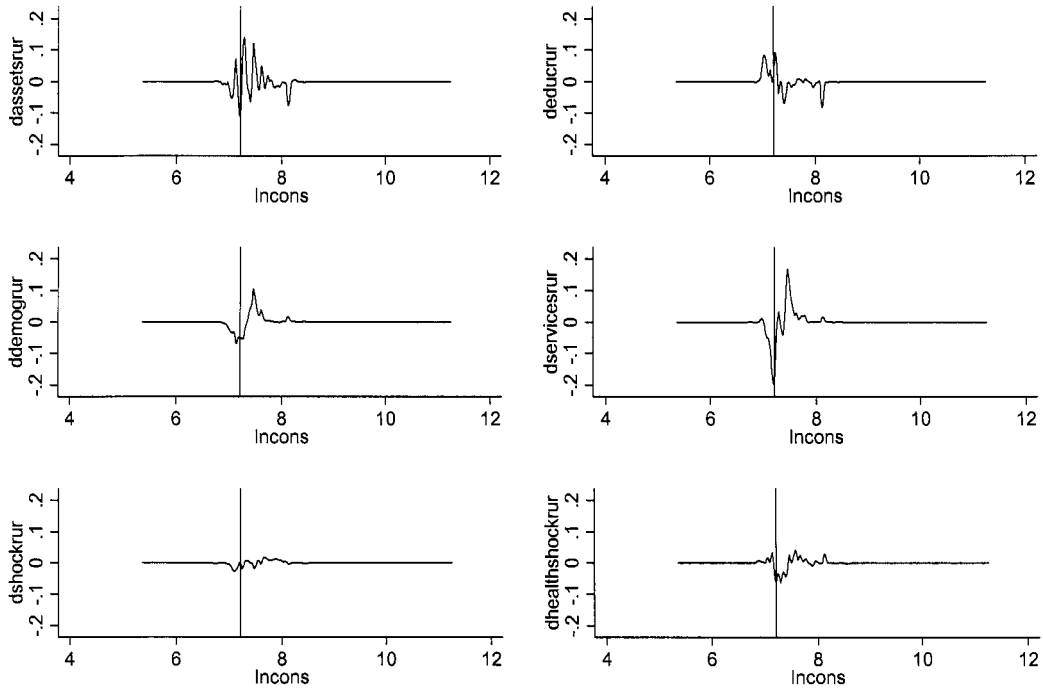


Figure A 9: Shift in consumption distribution, Urban Ethiopia, 1995/96 – 1999/2000.

True and counterfactual densities: Urban

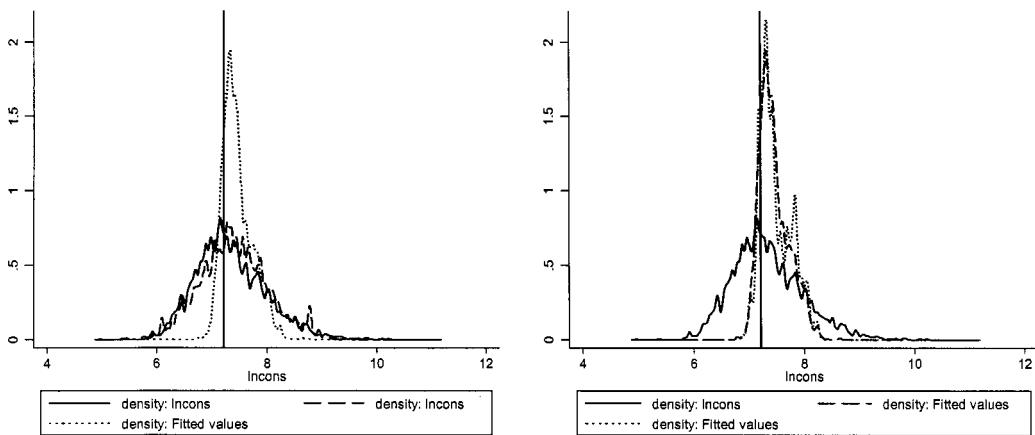


Figure A 10: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Urban Ethiopia, 1995/96-1999/2000.

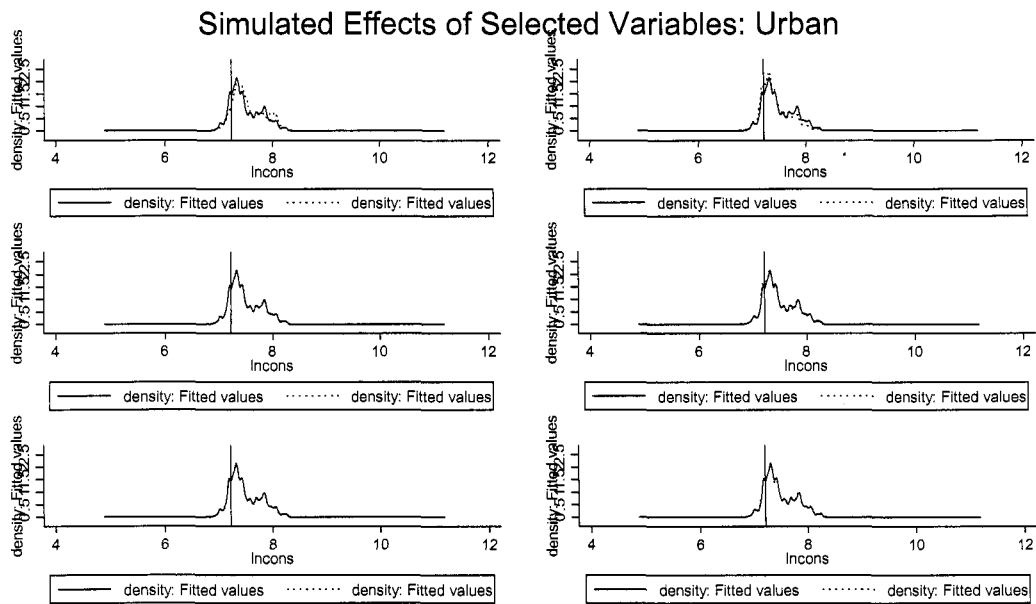


Figure A 11: Visual Impact of variables on changes in consumption, Urban Ethiopia, 1995/96-1999/2000.

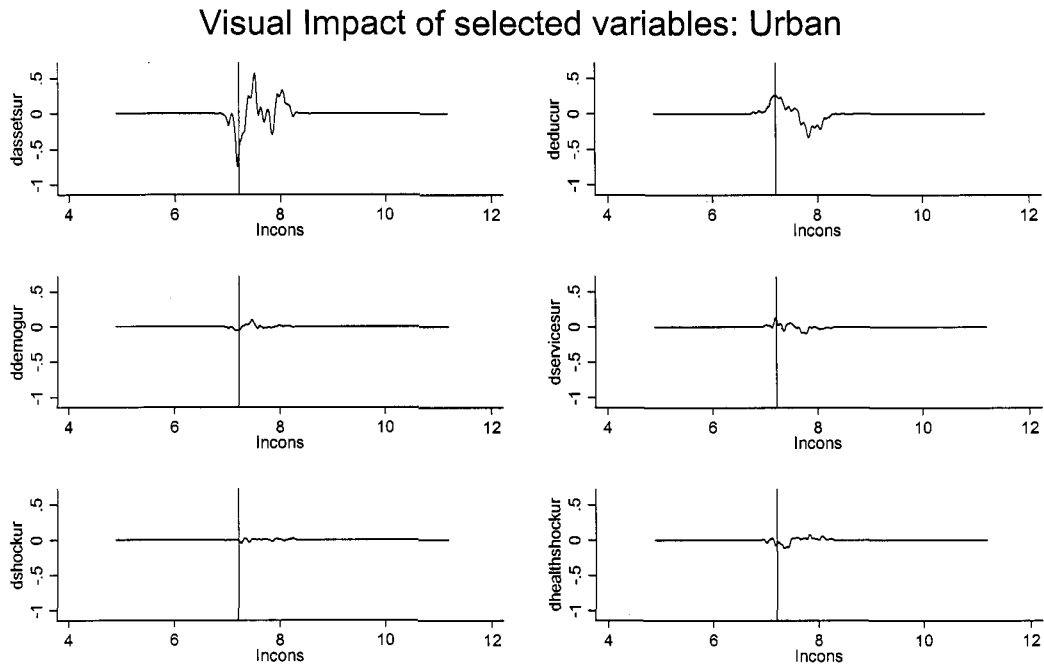


Figure A 12: Shift in consumption distribution, Tigray region, 1995/96 – 1999/2000.

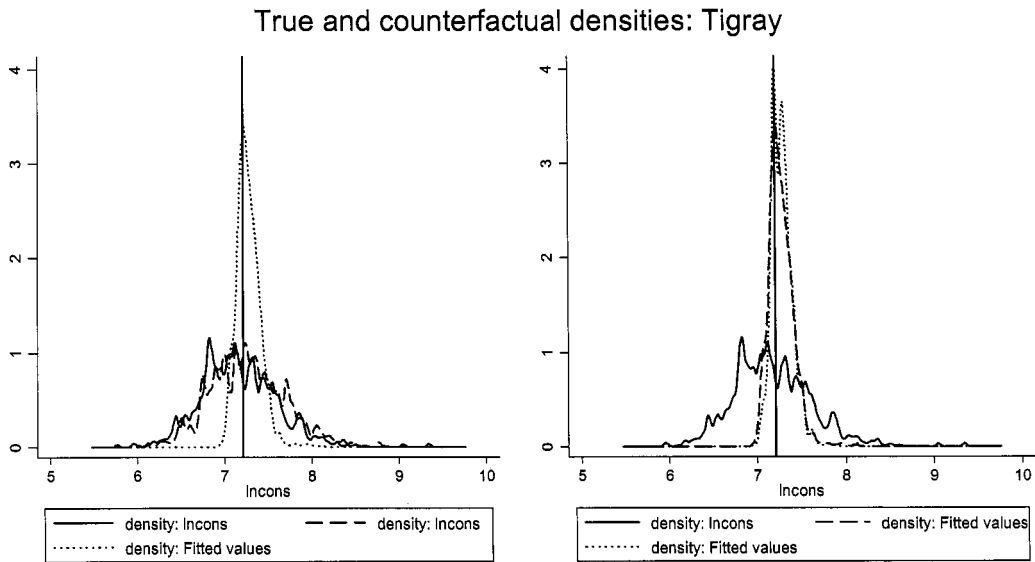


Figure A 13: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Tigray region, 1995/96-1999/2000.

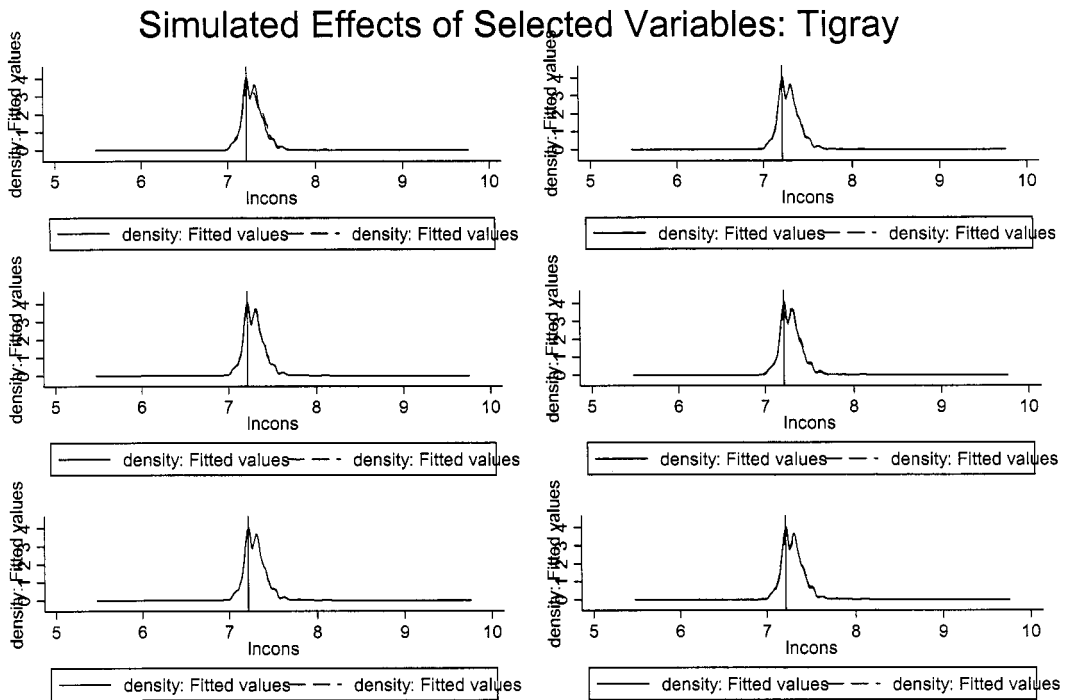


Figure A 14: Visual Impact of variables on changes in consumption, Tigray region, 1995/96-1999/2000.

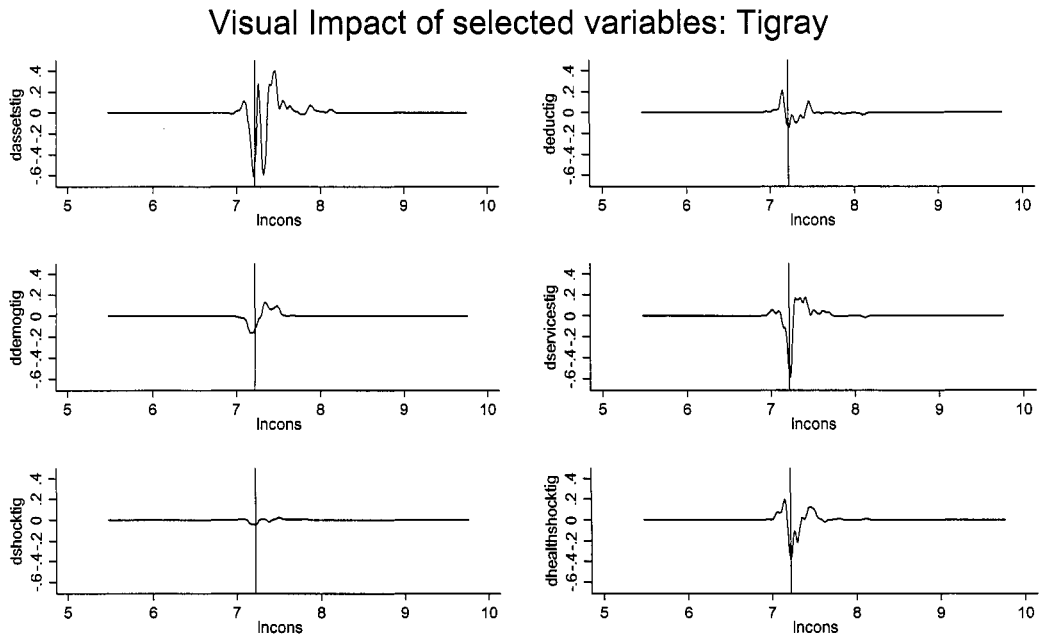


Figure A 15: Shift in consumption distribution, Amhara, 1995/96 – 1999/2000

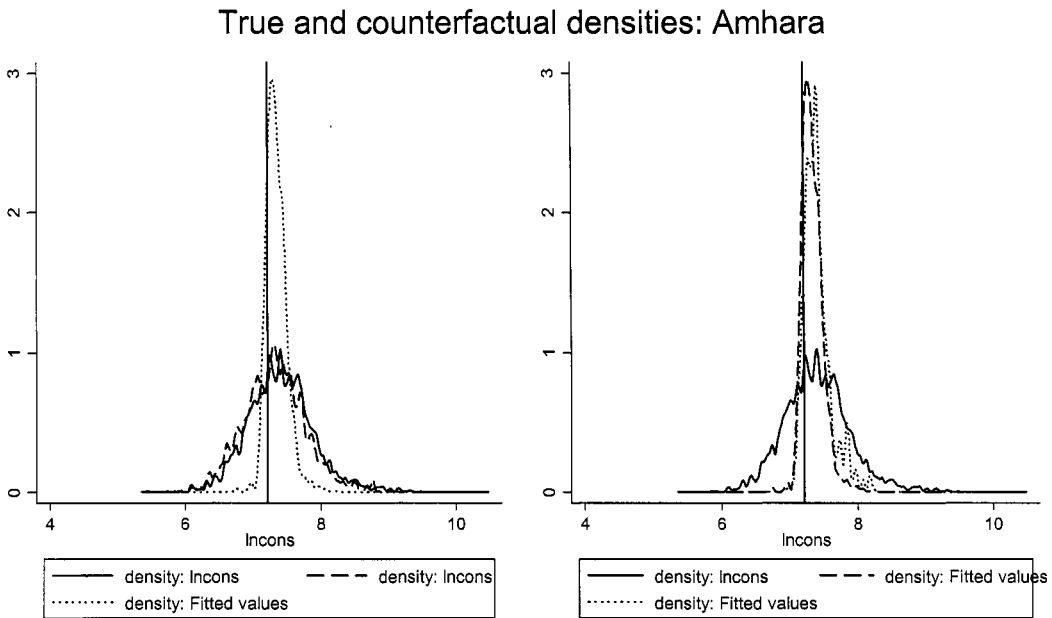


Figure A 16: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Amhara, 1995/96-1999/2000.

Simulated Effects of Selected Variables: Amhara

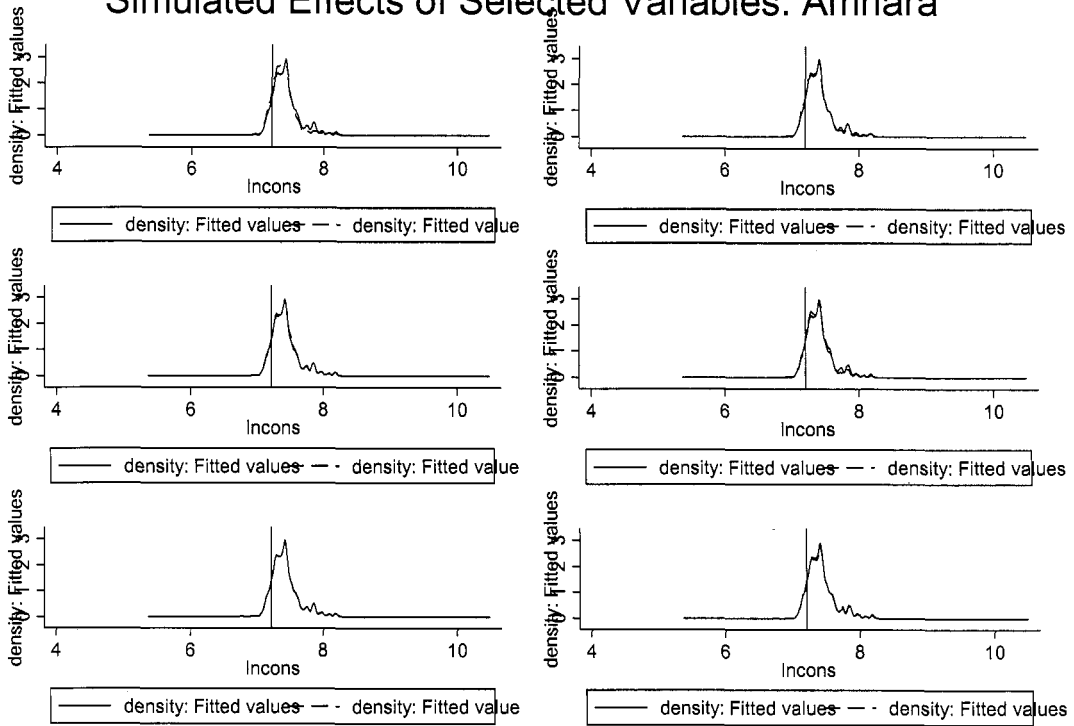


Figure A 17: Visual Impact of variables on changes in consumption, Amhara, 1995/96-1999/2000.

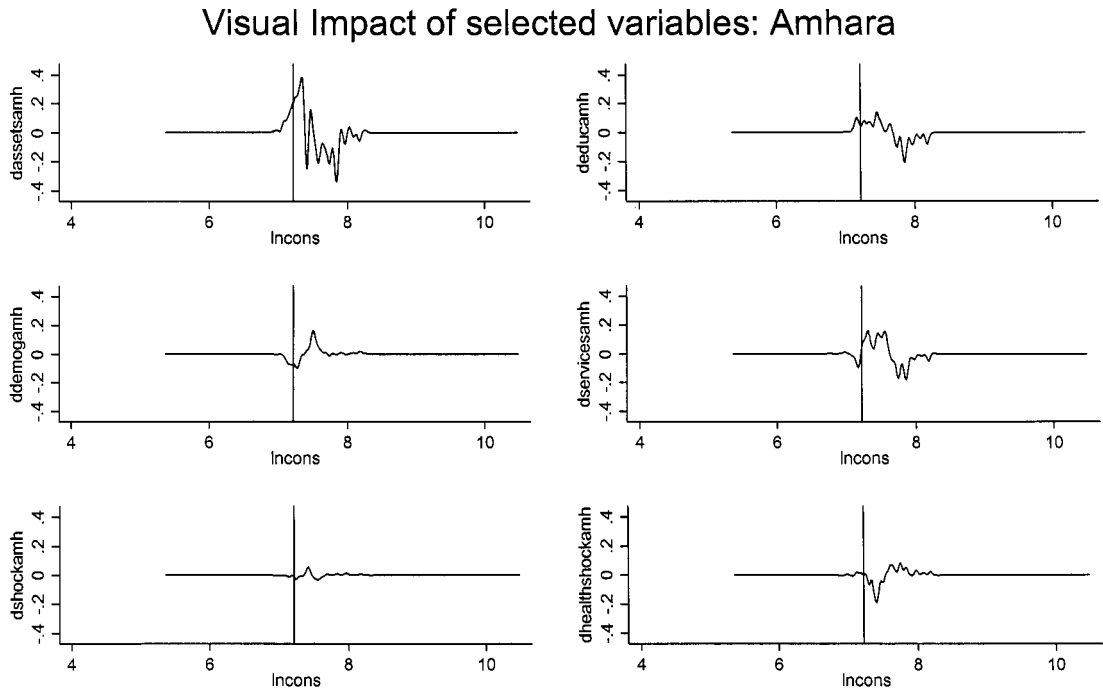


Figure A 18: Shift in consumption distribution, Oromiya region, 1995/96 – 1999/2000.

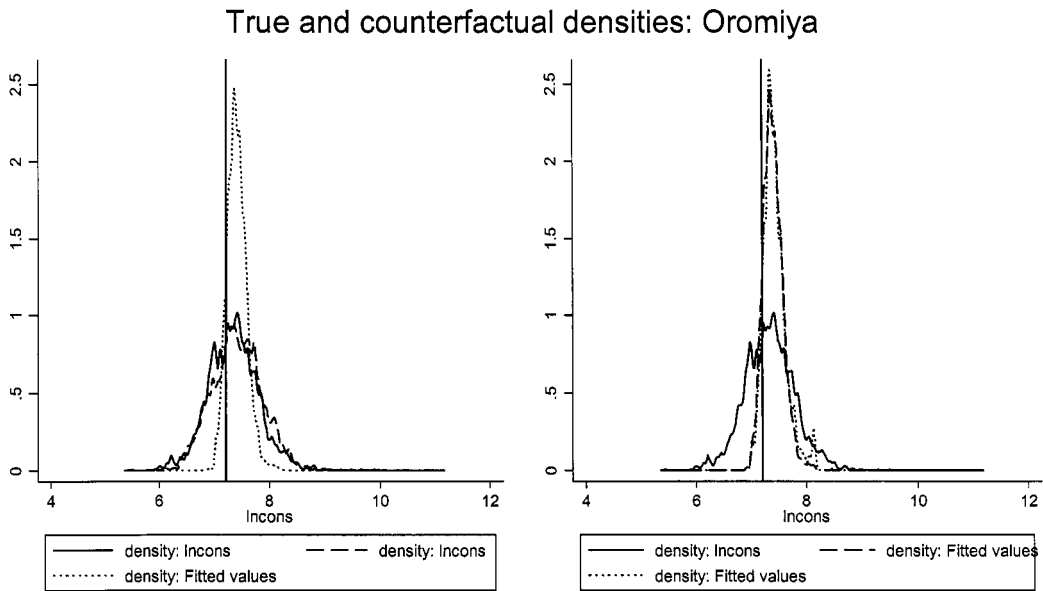


Figure A 19: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Oromiya region, 1995/96-1999/2000.

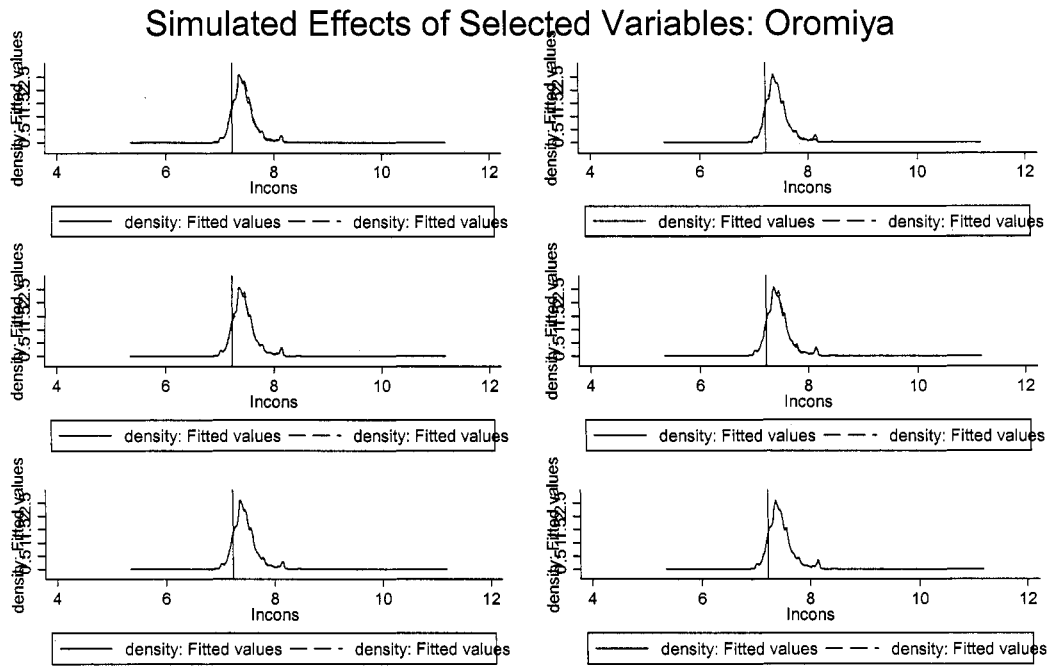


Figure A 20: Visual Impact of variables on changes in consumption, Oromiya region, 1995/96-1999/2000.

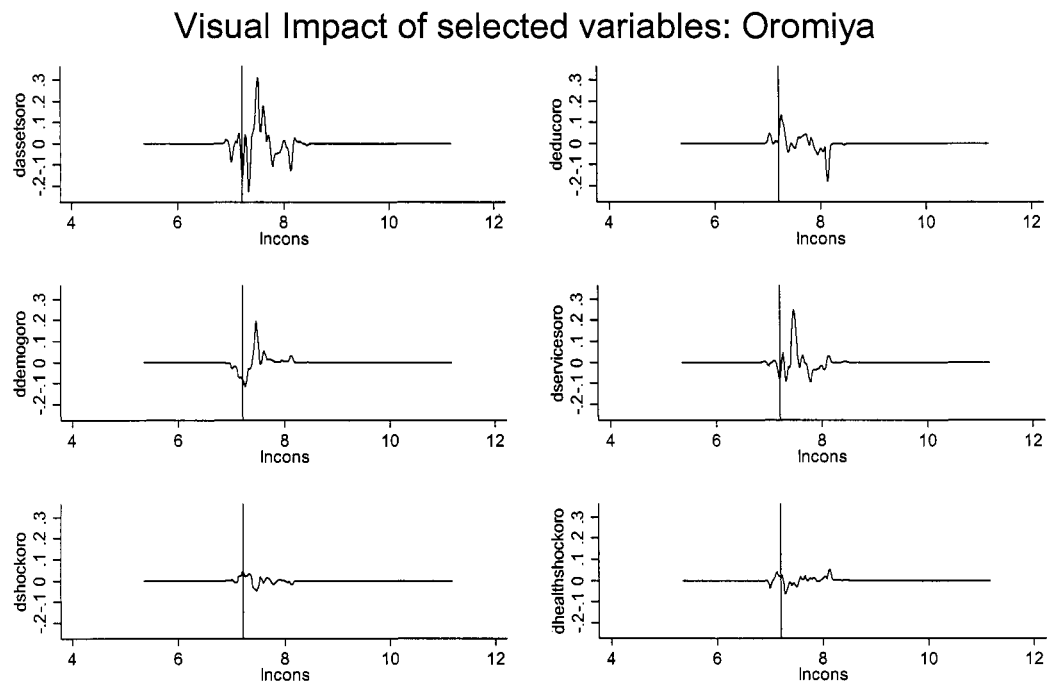


Figure A 21: Shift in consumption distribution, SNNP region, 1995/96 – 1999/2000.

True and counterfactual densities: SNNPR

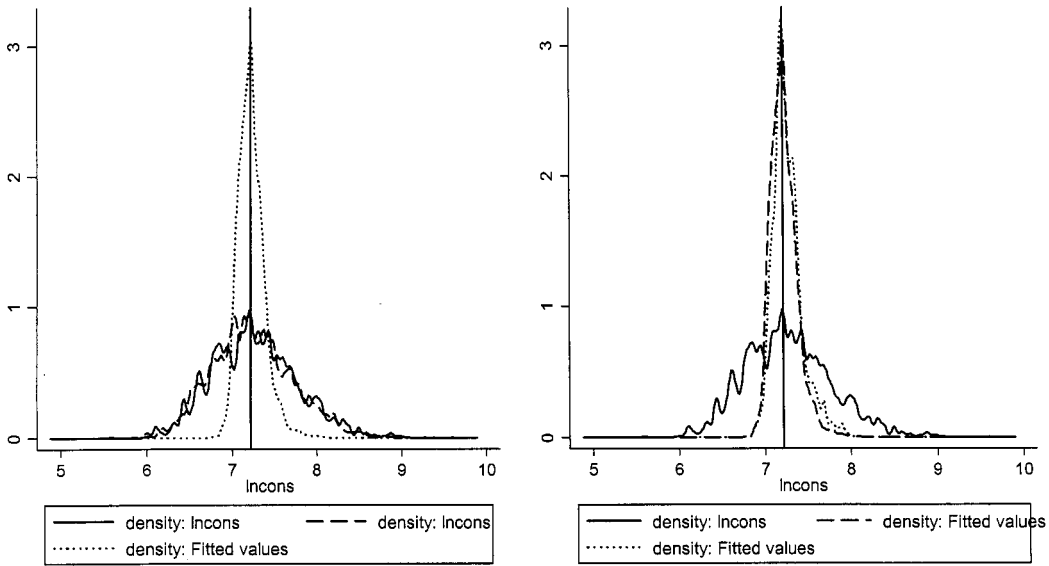


Figure A 22: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, SNNP region, 1995/96-1999/2000.

Simulated Effects of Selected Variables: SNNPR

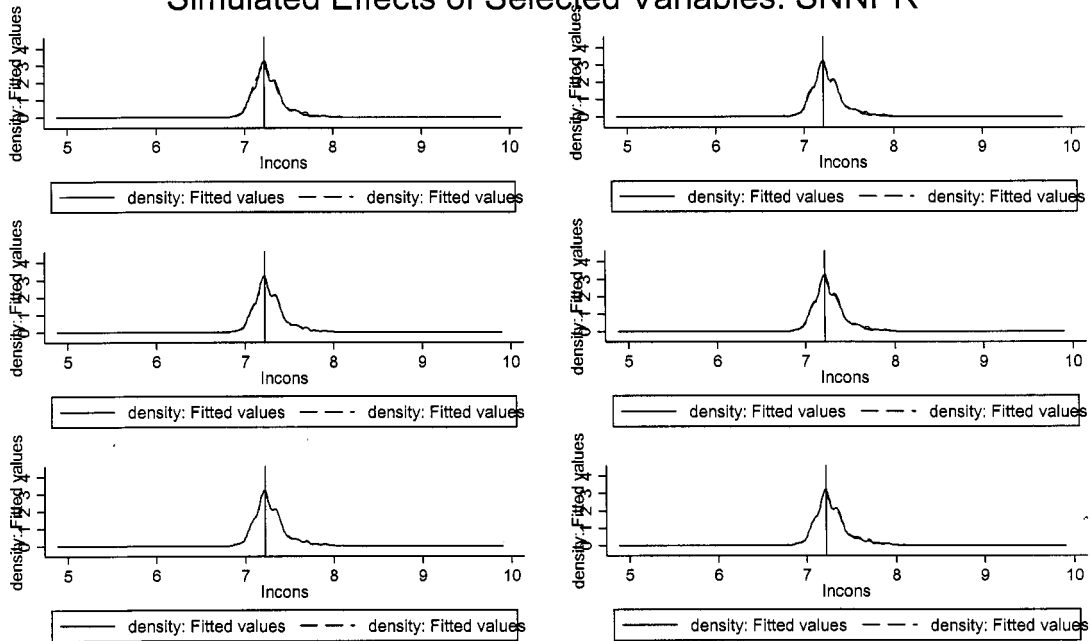


Figure A 23: Visual Impact of variables on changes in consumption, SNNP region, 1995/96-1999/2000.

Visual Impact of selected variables: SNNPR

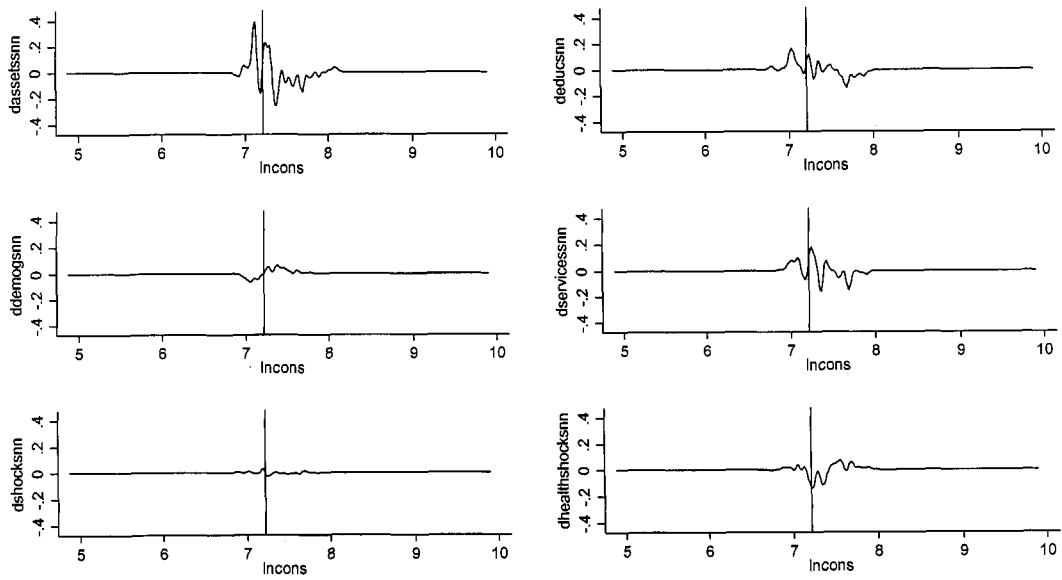


Figure A 24: Shift in consumption distribution, Addis Ababa, 1995/96 – 1999/2000.

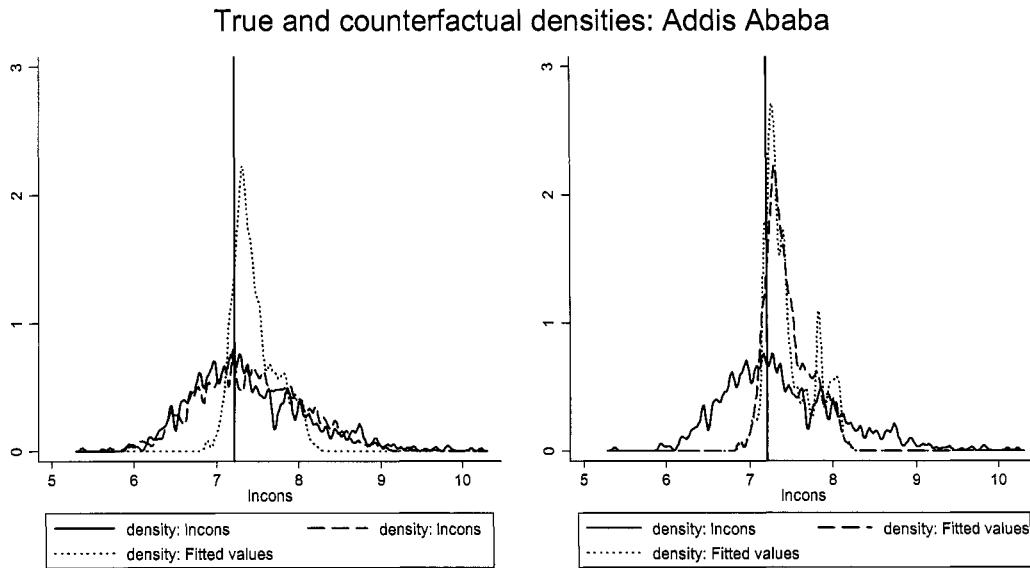


Figure A 25: Simulated effects of Assets, Education, Demographics, Services, and Shocks (rainfall and health) on Changes in Consumption, Addis Ababa, 1995/96-1999/2000.

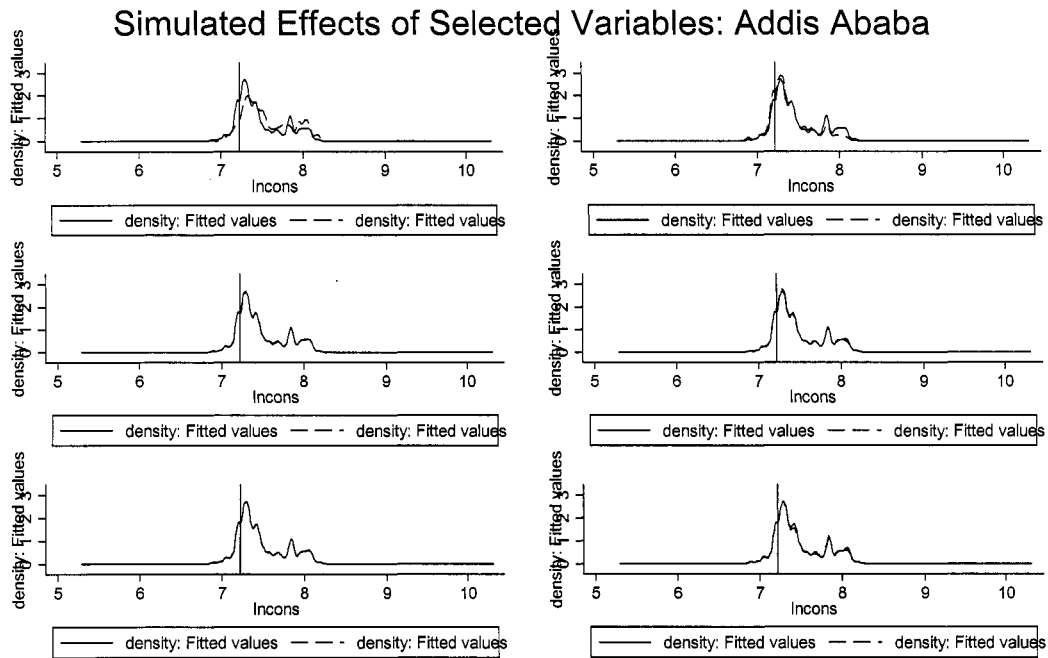


Figure A 26: Visual Impact of variables on changes in consumption, Addis Ababa, 1995/96-1999/2000.

Visual Impact of selected variables: Addis Ababa

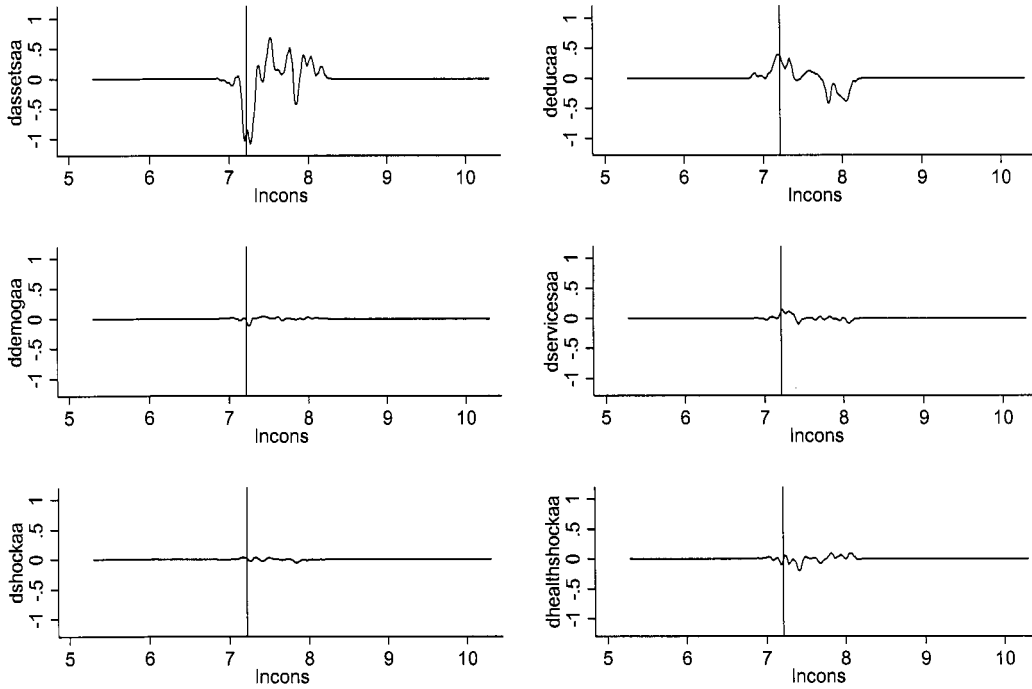


Figure A 27. Empirical distribution of average annual rainfall, Ethiopia, 1967-2000.

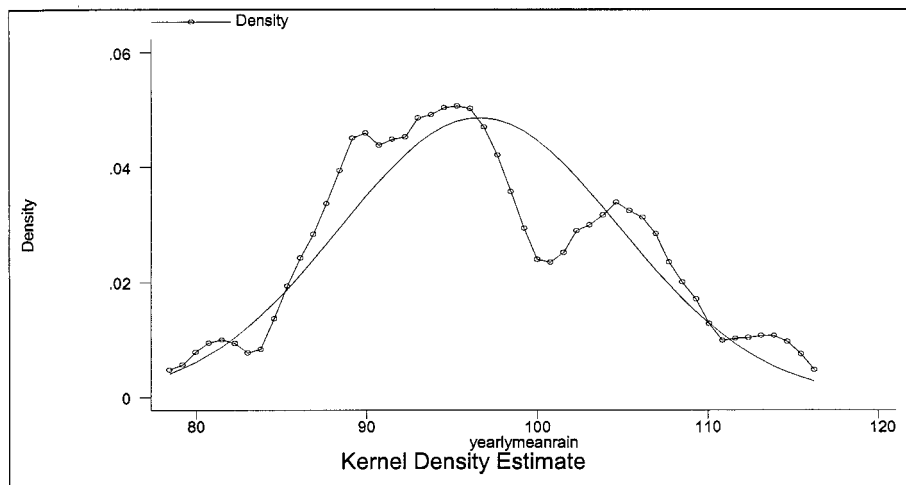


Figure A 28. Empirical distribution of standard deviation of Rainfall, Ethiopia, 1967-2000.

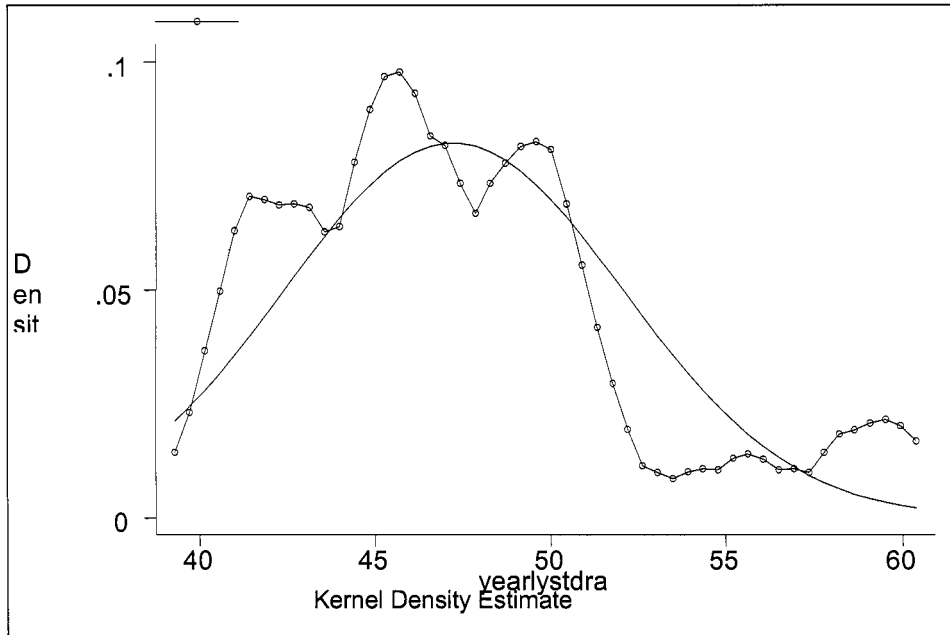
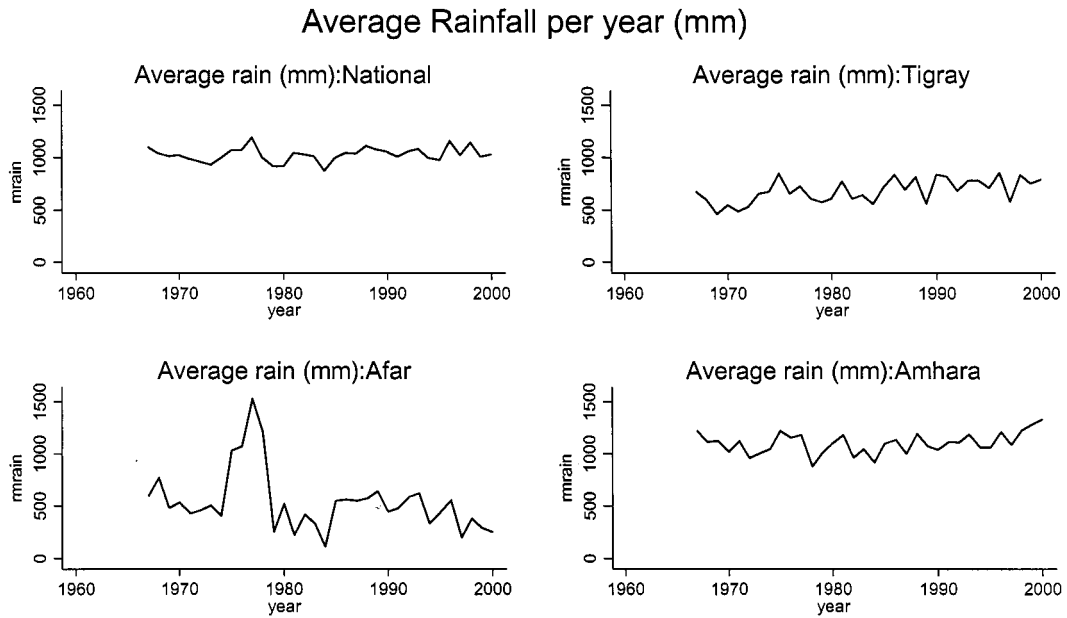
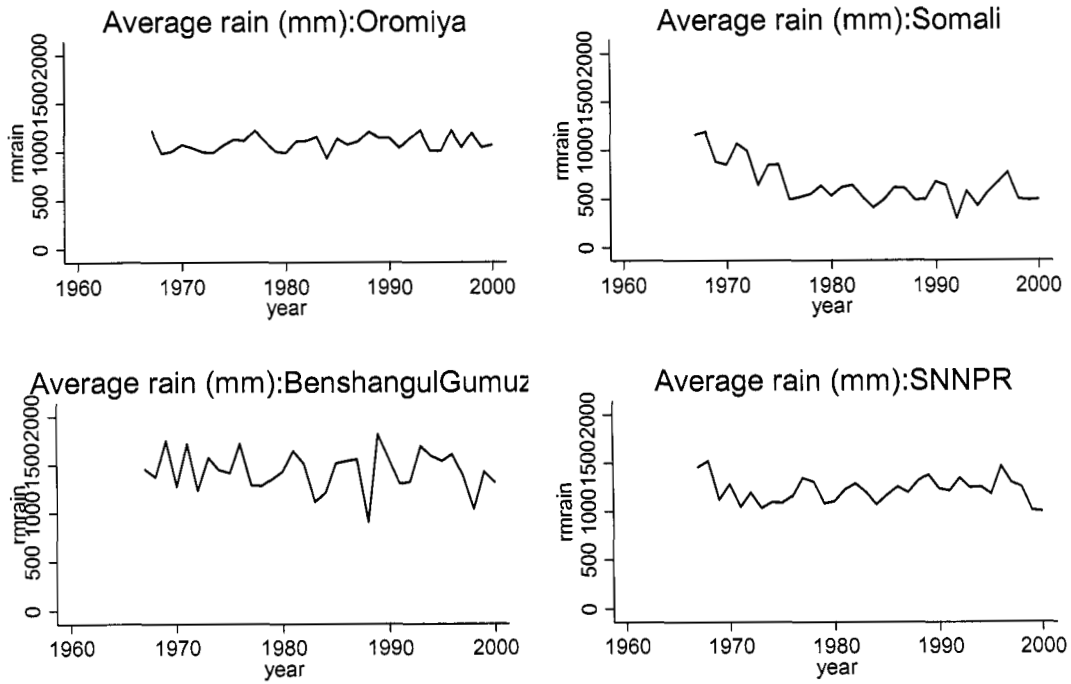


Figure A 29: Average annual rainfall, national and by region, Ethiopia (1967-2000).



Average Rainfall per year(mm)



Average Rainfall per year(mm)

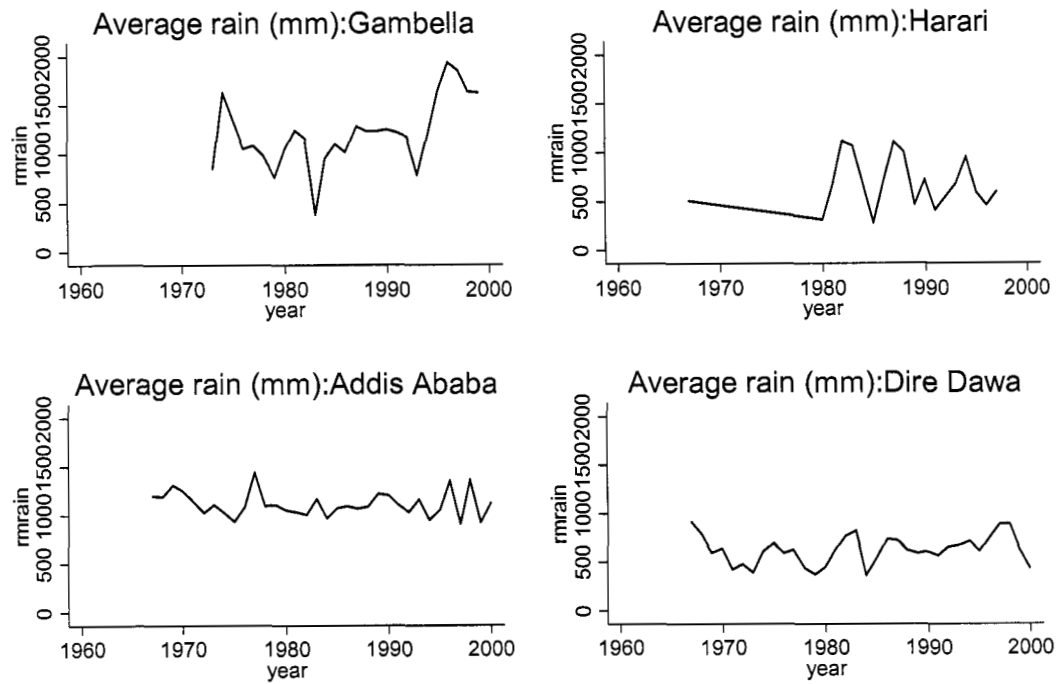
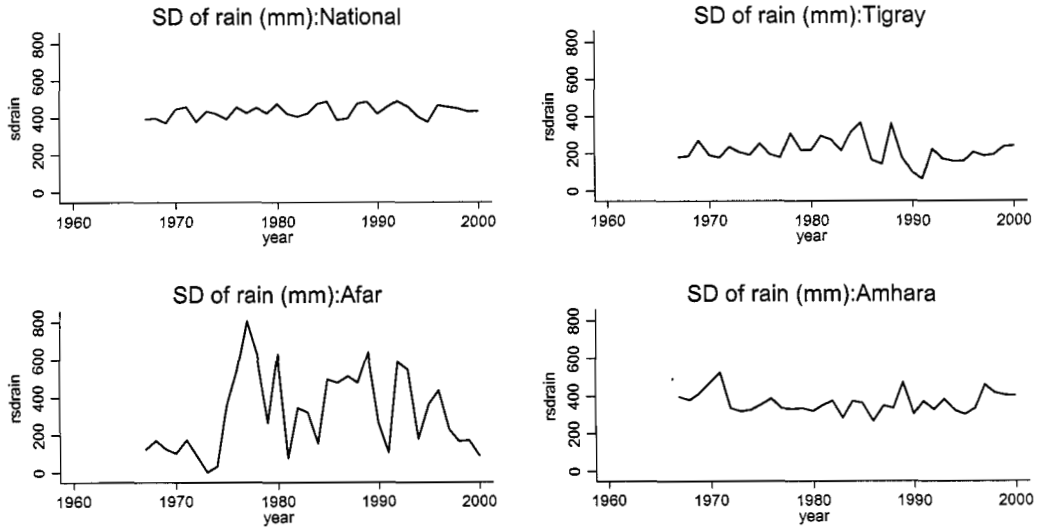
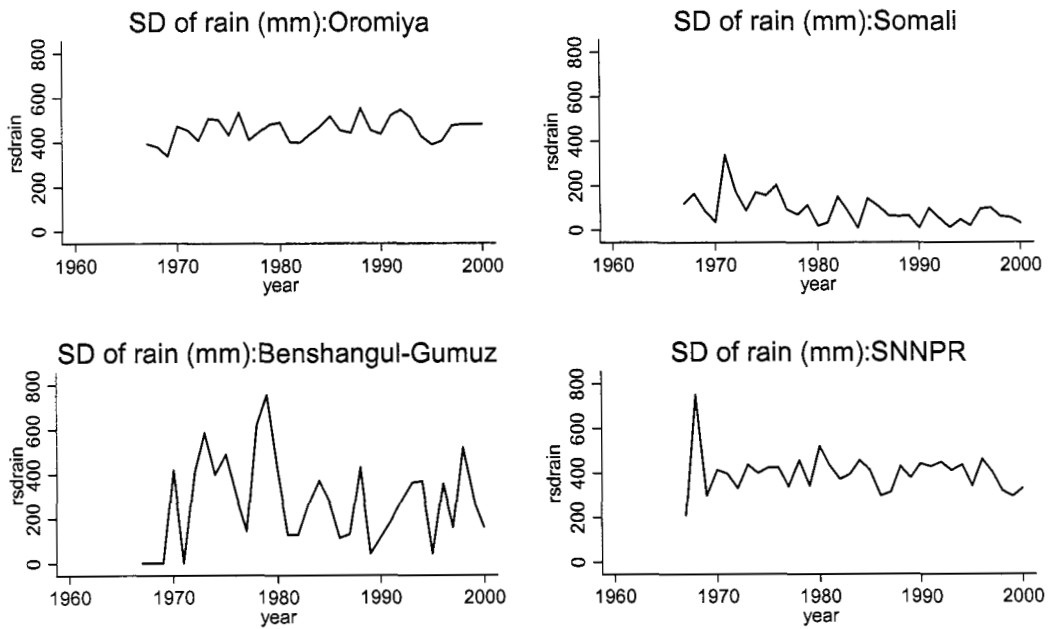


Figure A 30: Standard deviation of annual rainfall, national and by region, Ethiopia (1967-2000).

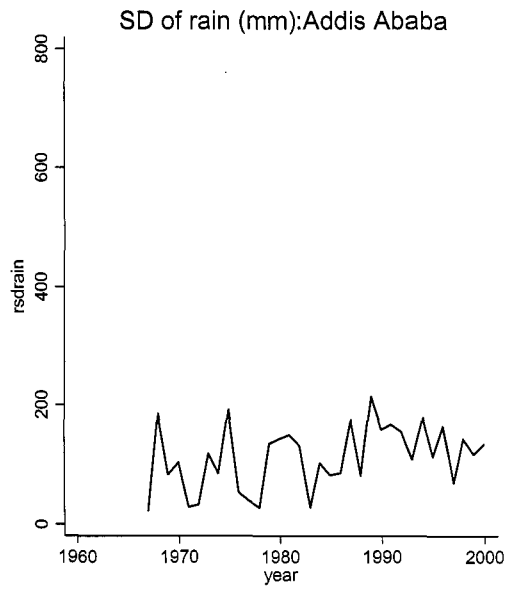
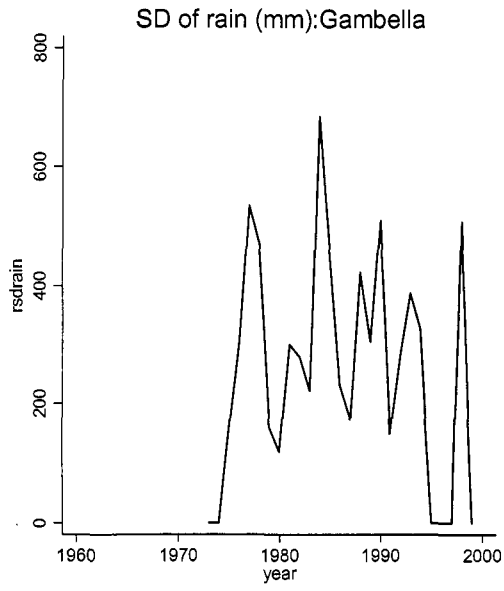
Standard Deviation of Rainfall per year (mm)



Standard Deviation of Rainfall per year(mm)



Standard Deviation of Rainfall per year(mm)



Annex 4: References

- Alwang, J., P. Siegel, and S. Jorgensten. 2001. "Vulnerability: A View From Different Disciplines," mimeo. The World Bank, Washington, D.C.
- Anderson, G. 1996. "Non-parametric tests of stochastic dominance in income distributions," *Econometrica*, Vol. 64 (5): 1183-1193.
- Arndt, C. and J. Lewis. 2000. "The Macro Implications of HIV/AIDS in South Africa: A Preliminary Assessment," Africa Region Working Paper Series No. 9, The World Bank. Washington, DC.
- Barrett, C. 2001. "Does Food Aid Stabilize Food Availability?" *Economic Development and Cultural Change*. 335-349.
- Bell, C., S. Devarajan, and H. Gersbach. 2003. "The Long-run Economic Costs of AIDS: With An Application to South Africa," Draft. The World Bank. Washington: DC.
- Bigsten, A., B. Kebede, A. Shimeles and M. Tadesse. "Growth and Poverty Reduction in Ethiopia: Evidence from Household Panel Surveys," Working paper in economics #65. Goteburg University, Goteburg: Sweden.
- Block, S. and P. Webb. 2001. "The Dynamics of Livelihood Diversification in Post-Famine Ethiopia," *Food Policy*, Vol. 26: 333-350.
- Bonnel, R. 2000. "HIV/AIDS: Does it Increase or Decrease Growth in Africa?" ACT, Africa Region, The World Bank. Washington, DC.
- Case, A., C. Paxson, and J. Ableidinger. 2002. "Orphans in Africa," Working Paper, Research Program in Development Studies, Princeton University. Trenton; NJ.
- Christiaensen, L. and H. Alderman. 2003. "Child Malnutrition in Ethiopia: Can Maternal Knowledge Augment the Role of Income?," *Economic Development and Cultural Change*, forthcoming.
- Christiaensen, L. and K. Subbarao. 2001. "Towards an Understanding of Vulnerability in Rural Kenya," mimeo. The World Bank, Washington, D.C.
- Christian Relief and Development Association (Resal). 2001. "NGOs' Contributions to Food Security in Ethiopia," Interim Report. Addis Ababa, Ethiopia.
- Cockburn, J. 2002. "Income Contribution of Child Work in Rural Ethiopia," Working Paper #2002-12, Center for the Study of African Economies, Oxford University. Oxford: UK.
- Cropper, M., M. Haile, J. Lampietti, C. Poulos, and D. Whittington. 2000. "The Value of Preventing Malaria in Tembien, Ethiopia," Draft. The World Bank. Washington: DC.

- Deininger, K. and S. Jin. 2002. "Land Rental Markets as an Alternative to Government Re-allocation? Equity and efficiency considerations in the Chinese land tenure system," World Bank Policy Research Working Paper #2930. The World Bank. Washington:D.C.
- Deininger, K., S. Jin, B. Adenew, S. Gebre-Selassie and M. Demeke. 2003. "Market and Non-market Transfers of Land in Ethiopia: Implications for efficiency, equity and non-farm development," mimeo. The World Bank. Washington:D.C.
- Deininger, K., S. Jin, B. Adenew, S. Gebre-Selassie and B. Nega. 2002. "Tenure security and land-related investment: evidence from Ethiopia," mimeo. The World Bank. Washington:D.C.
- Dercon, S. 2002a. "The impact of Economic Reforms on Rural Households in Ethiopia", Poverty Dynamics in Africa, The World Bank, Washington D.C.
- Dercon, S. 2002b. "Growth and Shocks: evidence from Rural Ethiopia", Center for the Study of African Economies, Oxford University, Oxford, U.K.
- Dercon, S. 2002c. "Risk and Poverty: Can Social Protection Reduce Poverty?" Center for the Study of African Economies, Oxford University, Oxford, U.K.
- Dercon, S. 2000. "Changes in Poverty and Social Indicators in Ethiopia in the 1990s: (at last) some good news from Ethiopia," mimeo, Center for the Study of African Economies. Oxford: UK.
- Dercon, S. 1999. *Ethiopia: Poverty Assessment*, Center for the Study of African Economies, Oxford University, Oxford, U.K.
- Dercon, S. and P. Krishnan. 2000a. "Vulnerability, Seasonality and Poverty in Ethiopia." *Journal of Development Studies*, Vol. 36, No. 6: 25-53.
- Dercon, S. and P. Krishnan. 2000b. "In Sickness and in Health: Risk Sharing Within Households in Rural Ethiopia." *Journal of Political Economy*, Vol. 108, No. 4: 688-727.
- Dercon, S. and P. Krishnan. 1998. "Changes in Poverty in Rural Ethiopia 1989-1995: Measurement, Robustness Tests and Decompositions." Working Paper #98-7, Center for the Study of African Economies. Oxford: UK..
- DiNardo, J., N. Fortin and T. Lemieux. 1996. "Labor Market Institutions and the Distributions of Wages, 1973-1992: A semi-parametric approach," *Econometrica*, Vol. 64 (5): 1001-1044.
- Easterly, W. 2002. "Growth in Ethiopia: Retrospect and Prospect," mimeo, Center for Global Development, Institute of International Studies, Washington, D.C.

- Environment and Development Group. 2002. Feasibility Study for Voluntary Resettlement Programme. Final Report. Volume 1: Main Report. University of Leeds. Leeds: UK
- Ezra. M. 2001. "Ecological Degradation, Rural Poverty and Migration in Ethiopia: A Contextual Analysis," Population Council, Policy Research Division, Working paper # 149.
- Fafchamps, M. 1998. "The Tragedy of the Common, Livestock Cycles and Sustainability," *Journal of African Economies*, Vol. 7(3): 384-423.
- Fafchamps, M., C. Udry and K. Czukas. 1998. "Drought and Savings in West Africa: Are Livestock a Buffer Stock," *Journal of Development Economics*, Vol. 55: 273-305.
- FEWS. 2002. "Ethiopia-Monthly Food Security Update." (<http://www.fews.net/centers/>)
- Gebre-Madhin, E. 2002. "Rural Markets and Institutions in Ethiopia: The Challenge of Getting Markets Right," Paper prepared for the workshop on Rural Development, November 13-15. Addis Ababa, Ethiopia.
- GOE. 2002a (December). Food Security Strategy. The Federal Democratic Republic of Ethiopia. Draft. Addis Ababa, Ethiopia.
- GOE. 2002b (December). Rural Development Policy Note. The Federal Democratic Republic of Ethiopia. Draft. Addis Ababa, Ethiopia.
- GOE. 2002c (May). *Sustainable Development and Poverty Reduction Program*, Draft. Addis Ababa, Ethiopia.
- GOE. 2002d (March). *Development and Poverty Profile of Ethiopia: Analysis based on the 1999/2000 household, income, consumption and expenditure survey and welfare monitoring survey*. Welfare Monitoring Unit, Ministry of Finance and Economic Development. Addis Ababa: Ethiopia.
- GOE. 2000 (June). *Proceeding on Capacity Building Training for Regional Heads and experts on Ageing and development Issues in Ethiopia*, Ministry of Labour and Social Affairs and Helpage International Ethiopia, June 19-23. Addis Ababa, Ethiopia.
- GOE.1999a (May). *National Guidelines For Vulnerability Profile (VP) Development*. Strengthening Emergency Response Abilities (SERA), Policy, Planning and Program Department, Disaster Prevention and Preparedness Commission (DPPC). Addis Ababa, Ethiopia.
- GOE. 1999b (February). *Poverty Situation in Ethiopia*. Welfare Monitoring Unit. Ministry of Economic Development and Cooperation. Addis Ababa, Ethiopia.

GOE. 1998. Program Action Plan for the Health Sector Development Program, Ministry of Health. Addis Ababa, Ethiopia.

Harrison, Paul. 2002 (August). "Ethiopia Grain Marketing—Review of Recent Trends", Mimeo.

Holzmann, R. and S. Jorgensen. 2000. *Social Risk Management: A New Conceptual Framework for Social Protection and Beyond*. Social Protection Discussion Paper No. 0006, Human Development Network, Washington, D.C.: The World Bank.

IDS/SC-UK. 2002 (November). Destitution in the Northeastern Highlands (Amhara Region), Interim Report.

Jenden, P. 2002. *Revisiting Koisha Wereda, Wollaita: The Potential of Employment Safety Nets for Asset Protection*. SOS Sahel. Addis Ababa: Ethiopia.

Lybbert, T., C. Barret, S. Desta and D.L. Coppock. 2001. "Pastoral Risk and Wealth-Differentiated herd Accumulation in Southern Ethiopia," Draft. Cornell University. Ithaca: NY.

Krishnan, P., T. Selassie, and S. Dercon. 1998. "The Urban Labor Market During Adjustment: Ethiopia 1990-1997," Working Paper # 98-9, Center for the Study of African Economies, Oxford: UK.

McPeak, J. and C. Barrett. 2001. "Differential Risk Exposure and Stochastic Poverty Traps Among East African Pastoralists," *American Journal of Agricultural Economics*. 674-679.

Nega, B., B. Adenew, and S. Gebreselassie. 2002. "Land Tenure and Agricultural Development in Ethiopia," Paper prepared for the workshop on Rural Development, November 13-15. Addis Ababa, Ethiopia.

Pender, J. and M. Fafchamps. 2000. "Land Lease Markets and Agricultural Efficiency: Theory and Evidence from Ethiopia," Working paper #2002-19, Center for the Study of African Economies, Oxford University. Oxford: UK.

Reardon, T. 1997. "Using Evidence of Household Income Diversification to Inform Study of the Rural Non-Farm Labor Market in Africa," *World Development*, Vol. 25(5): 735-748.

Raisin, J. 2003. "Development with the Poor: The Transitional Asset Protection System (TAPS)—A Middle Road to Social Protection," Discussion Paper. Addis Ababa, Ethiopia.

Sackey, and Raparla. 2002. *Report on the Global HIV/AIDS epidemic*. UNAIDS. New York: NY.

- Sandford, J. undated. Review of Assessment Currently Undertaken in Ethiopia.
- Salama, P., F. Assefa, L. Talley, P. Spiegel, A. van der Deen, C. Crawford. 2000. "Malnutrition, Mortality, and the Humanitarian Response During a Famine, Gode District, Ethiopia" Centers for Disease Control, Atlanta, GA.
- Sellen, et al. 2001 " Pastoral Area Development in Ethiopia." Issues Paper, Discussion Draft for Submission to Government, World Bank, Washington, D.C..
- Smith, K., C. Barrett, and P. Box. 2001. " Not Necessarily in the Same Boat: Heterogeneous Risk Assessment Among East African Pastoralists," *The Journal of Development Studies*. Vol. 37, No. 5: 1-30.
- Smith, K., C. Barrett, and P. Box. 2000. " Participatory Risk Mapping for Targeting Research and Assistance: With an Example from East African Pastoralists," *World Development*. Vol. 28, No. 11: 1945-59.
- Smith, W. and K. Subbarao. 2003. "Safety Nets Versus Relief Nets: Towards a Medium-term Safety Net Strategy for Ethiopia," Draft. The World Bank, Washington: DC.
- UNAIDS. 2002. *Ethiopia: Epidemiological Fact Sheet on HIV/AIDS and Sexually Transmitted Infections*, 2002 Update, <http://www.unaids.org/>
- Webb, P. and T. Reardon. 1992. "Drought Impact and Household Responses in East and West Africa," *Quarterly Journal of International Agriculture*, Vol. 31: 230-46.
- Webb, P. and J. von Braun. 1994. *Famine and Food Security in Ethiopia: Lessons for Africa*. IFPRI. Washington: DC.
- WHO/UNICEF. 2003. *The Africa Malaria Report*. Geneva: World Health Organization, and New York: UNICEF.
- Woldehanna, T. 2002. "Evaluation of Safety Net Programs in Ethiopia," Draft. The World Bank. Washington: DC
- Woldehanna, T. and A. Oskam. 2001. "Income Diversification and Entry Barriers: Evidence from the Tigray Region of Northern Ethiopia," *Food Policy*, Vol. 26: 351-365.
- World Bank. 2004. Well-Being and Poverty in Ethiopia: The Role of Agriculture, Agency and Aid. Report No. 29468-ET.
- World Bank. 2002. "Mexico-Land Policy A Decade After the Ejido Reforms," The World Bank, Rural Development and Natural Resource Sector Unit. Washington: D.C.
- World Bank. 2001. *Dynamic Risk Management and the Poor: Developing Social Protection Strategy for Africa*, Africa Region Human Development Series.

World Bank. 2000. *Weather Insurance Project Study: Ethiopia, Feasibility Assessment*. Draft. Washington, D.C.

World Bank, 1999. *Ethiopia: Consultation with the Poor*; A Study Prepared for Global Synthesis Workshop, prepared by prepared Rahmato, Dessalegn and Akilu Kidanu for the Poverty Group, Poverty Reduction and Economic Management, of the World Bank.

World Bank. 1998. "Participatory Poverty Assessment for Ethiopia (Draft)." World Bank Discussion Paper. Macroeconomics 2, Africa Region. Washington, D.C.

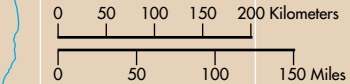
Yamano, Takashi. "Does Food Aid Reduce Child Farm Labor Supply in Ethiopia?" 2001.

MAP SECTION



ETHIOPIA

- SELECTED CITIES AND TOWNS
- ⊙ PROVINCE CAPITALS
- ⊕ NATIONAL CAPITAL
- ~ RIVERS
- MAIN ROADS
- RAILROADS
- PROVINCE BOUNDARIES
- - - INTERNATIONAL BOUNDARIES



NOVEMBER 2004

This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

BRD 33405