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ENVIRONMENT STRESS AND INCREASED VULNERABILITY TO IMPOVERISHMENT AND SURVIVAL IN ETHIOPIA: A SYNTHESIS

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1. INTRODUCTION

At the core of this short paper is explaining the persistence of environment-induced famine conditions in rural Ethiopia. To start with, there are important empirical findings that set the context. First, poverty in Ethiopia is widespread and deep (MEDaC, 1999; MFDE, 2002). Officially reported poverty head-count measure based on the 1995 nationally representative consumption survey, for example, shows that 45.5 percent of the Ethiopian population could not afford costs of privately provisioned basic needs (MEDaC, 1999). The high-order poverty estimates also point poverty is deep and unequal among the poor.

All the poverty measures indicate poverty is largely rural. And, since the majority of the rural poor are primarily dependent on agriculture for their livelihoods, they exhibit agriculture specific poverty characteristics: land scarcity, poor quality of land resources, shortage of assets and working labor, low educational attainment, low technological change, and living in marginal areas with poor agricultural potential (Deracon and Krishnan, 1999; Mekonen, Abebe, Bereket; 1999; Gobeze, 1999). Natural resources such as soil, water and vegetation in particular connect to poverty strongly as the most limiting inputs in agricultural production process (soil and water in particular) and direct source of income.

Second, households experiencing years of consecutive crop failures engage in major food consumption and famine coping or mitigating strategies, as happened in 1973/74 (Mesfin, 1984) and 1984/85 (Dessalegn, 1991; Dagneu, 1995; Markos, 1997; von Braun, Teklu and Webb, 1998). These strategies commonly involve: (1) lowering food consumption and quality (change in diet variety to basic food items, reduction in meal frequency and serving, and dependency on wild foods); (2) shifting to non-farm income sources; (3) disposing and dispersing assets; (4) greater dependency on kin and relations as sources of gift or food exchange, or place of residence for migrant relatives; and (6) abandoning communities and migrating collectively.

However, household income and consumption smoothing strategies become ineffective where (i) frequency and intensity of environmental stress such as drought is increased; (ii) income sources are positively covariate; (iii) share of covariant risk is large in total income variance; (iv) covariance between income and assets exists and strong (for example, livestock as shown in Dercon, 2000) and (v) publicly provided safety nets are inadequate in their response –timing, level of support, targeting, and crowding out private transfers (Tefaye 1996a, 1996b; Subararo, Ahmed, and Teklu, 1996).

¹ This synthesis is drawn from a section of the on-going review of empirical evidence on “changes in living conditions and vulnerability to environmental stress in rural Ethiopia”. For more, contact Tteklu2000@yahoo.com

Third, the African case studies on famine establish that environmental stress such as recurrent droughts translate onto famine conditions where rainfall effect on household income is strong, markets are thin and fragmented (crop, livestock and labor markets), household and community support mechanisms are weakened, and public response is insufficient both in timing and scale of required intervention, (von Braun, Teklu, and Webb, 1998). The thrust of the paper is to underscore the persistence of famine conditions in Ethiopia to changes in these drought and famine links overtime. That is, persistence of famine conditions are due to increased aridity, greater exposure to rainfall-linked income sources, fragility of rural markets under stress, weakening of traditional community-based insurance mechanisms; and insufficient public response augment private coping strategies.

The paper begins by sketching the geography of environmental stress and its correlation with impoverishment and famines. It then traces changes in key factors that cause increased vulnerability to impoverishment and survival. The paper draws its empirical evidence from Ethiopia specific studies on environment, poverty and famine (Elizabeth, 1997; Ethiopian Journal of Economics, volume 8 (1), 1999; MEDaC, 1999; MOFED, 2002; Mesfin, 1984, 1991; Dessalegn, 1991; Webb et al, 1992; Dagneu, 1995, and Markos, 1997. In addition, the experiences and lessons from other African countries are included (Tefaye, von Braun and Zaki, 1991; Tefaye, 1994; and von Braun, Teklu and Webb, 1998)

2. GEOGRAPHY OF VULNERABILITY

The most serious environmental stress is observed in the drought-prone areas of Ethiopia. These areas are mainly located in the north and central highlands (Tigray, Gondar, Wello and northern Shewa) and their associated lowlands, the pastoral lowlands in northeast, southeast, and south, and the Great Rift Valley Lakes region that runs from northeast to south and divides the Ethiopian highlands into west and east. Most of these areas share common biophysical characteristics: short rains that are low and highly variable, soils with inherent low organic matter and essential nutrients, and high evapotranspiration and moisture stress. However, the highlands, as compared to the lowlands, exhibit varied topography, high population and livestock density, and settled mixed crop-livestock agriculture. The lowlands are characterized by low relative relief, low and very erratic rainfall, sparse vegetative cover, extensive pastoral-based livestock farming, and low population and livestock density.

Degradation of natural resources (soil, water and forest) is extensive and severe. These areas are marked by extensive deforestation, shallow topsoil, declining soil fertility and increased moisture stress. These biophysical changes are associated with scarcity of crop and grazing lands, declining productivity, increased rainfall-linked production variability and failures, increased exposure to drought-induced risks, out-migration of population, and change in attitude towards fertility and family size

The mapping of poverty by geographical area in Elizabeth (1997) shows poverty tends to be lower in villages with adequate and stable rainfall, moderate population density, and high market access. The worst villages are characterized by poor topography and soils, low and variable rainfall, high population density and poor market access. The regression results in Deracon and Krishnan, (1998) confirm that years of decline in rainfall (measured over a period of last five years) significantly increase incidence of poverty, holding other factors constant. These studies thus suggest incidence of poverty tends to be greater in ecologically fragile marginal agricultural areas.

These environmental stressed areas are not only generally poor but are subject to large transitory as more people move below poverty line and become poor. As the review work for Sub-Saharan Africa in White and Killick (2001) shows, households in transitory poverty constitutes a significant share of the poor in rural Africa.

For example, the findings in the 1994-95 rural household surveys in Ethiopia show the always poor, sometimes poor (transitory poverty) and never poor account for 24.8, 30.1, and 45.1 percent, respectively.

Historical and contemporary records of famines in Ethiopia also show these areas are prone to natural calamities, particularly to droughts and crop failures, and consequently to famine and outbreaks of diseases (for example, Mesfin 1984; Dessalegn, 1991; Webb et al 1992; Dagneu, 1995; Ezra, 1997). As the evidence from the major famines of the last three decades shows, the extent and severity of food shortage, and excess of livestock and human mortality were high in these famine-prone areas (Mesfin, 1984; Dessalegn, 1991; Webb et al 1992; Ezra, 1997).

These drought-famine prone areas are often the epicenters of famines that gradually spread to most of the country through rise in food prices in food market and excess supply and depressed wages in labor markets. Although drought-induced famines are mainly a rural phenomenon, their effects also have a large spatial coverage that including spilling over into urban areas through transmission of prices and movements of factors.

3. INCREASED VULNERABILITY TO POVERTY AND SURVIVAL

Households living in environment stressed areas are facing increased risks of impoverishment and survival due to persistence of famine conditions. First, environmental stress has increased due to aridity and frequent droughts. Second, crop income remains low and is subject to large variability due to its strong link to rainfall. Third, income from livestock is weak to buffer consumption in period of drought. Fourth, incomes from other sources are not sufficient to compensate losses in crop and livestock, and are also exposed to high rainfall-linked covariate risk. Fifth, since rural markets are poorly developed as evident from their thinness and associated large seasonal price fluctuation, they cause large deterioration in terms of exchange in time of distress. Sixth, Household and community based consumption devices are thinning and getting fewer. Finally, conditions of poor nutrition and health amidst rapidly spreading HIV/AIDS pandemic mean that households' ability to survive on reduced food consumption is diminished. Poverty, famine and HIV/AIDS interact in ways that risk the lives of millions of people in East and Southern African countries in years 2002 and 2003.

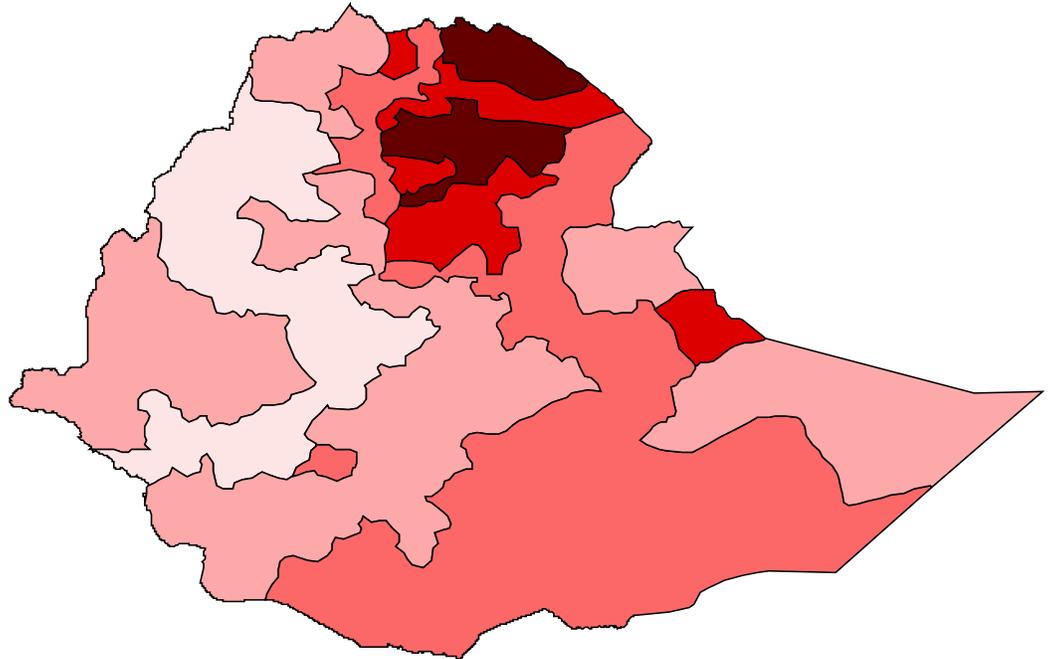
Increased frequency of droughts: These areas are prone to natural calamities, particularly to droughts. The meteorological data shows increased frequency of droughts in the last three to four decades. Workneh (1987) identifies notable drought periods during 1953 and 1984:1953, 1957-58, 1964-65, 1965-66, 1971-75, 1978-79, 1982, and 1983-85. Although the meteorological records show no trend or cycle in drought episodes, the author concludes the frequency and intensity of drought has increased over the 1953-84 period. The data obtained from monitoring of drought or disaster affected population also identifies large numbers of drought-affected population in 1985 (6.99 million), 1986 (6.14 million), 1991 (7.22 million), 1992 (7.85 million), and 1994 (6.70 million).

Location-specific studies also confirm the pattern of increased frequency in drought episodes. According to the 1999 study in South Wello, for example, 38% and 62% of the communities experienced 2 to 3 and 4 to 7 years of crop failures and severe threat of hunger respectively in the preceding 10 years (Yared et al 2000).

Based on reports of oral historians in Wolaita district in southern Ethiopia, Dagnew (1995) identifies seven major food shortage and famine years over the period between 1963 and 1991: 1963/64,

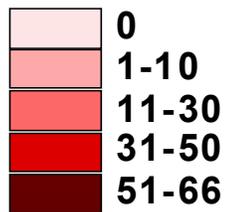
Percentage of Population in Need of Food Aid Assistance 1978-88

Source: DPPC Annual Warning Reports, Vulnerability Mapping Group, DPPC, UN/EUE & UN/WFP (97/95)



300 0 300 600 Kilometers

Percent of Population



1965/66, 1970/71, 1980/81, 1983/85, 1987/88, and 1990/91. The frequency of droughts in both studies markedly increased in the 1980s. Secular decline in rainfall translates into large decline in agricultural production as evidenced in South Wello in 1973/74 (Mesfin, 1984), in 1984/85 (Dessalegn, 1991) and in 1999/2000 (Yared et al, 2000).

Declining crop production per capita: Among the settled highland farmers where crop-livestock is the basic livelihood system, crop income remains the principal source of income and subsistence. Crop production per capita is on decline because of two reinforcing trends --decline in farm size and yields. Farm size is declining because of depreciating stock of productive land and a growing population that claims on land for cultivation (see the review in Tesfaye, 2003). With land suitable for cultivation declining, yield growth has to increase sufficiently to avert decline in labor productivity. However, yield growth performance has been nearly constant over the years because of inadequate soil fertility measures. Use of productivity enhancing technology such as improved seeds and fertilizers is low because of high cost, low return, high production risk in moisture-stressed drought-prone environment, and low effective demand for new technology.

Production is not only low but it is also highly variable in such moisture stressed areas where there is a strong link between rainfall and crop yield. Coefficient of variability in rainfall often exceeds 30 percent, as compared with less than 10 percent in the more rainfall abundant and stable humid zones (Workineh, 1987). Frequent occurrences of droughts, as evident in the second half of the last century, mean that farmers are faced with increased exposure to downside variability around declining mean production level. They are faced with both declining production and increased exposure to downside production risk.

Income from livestock is weak to buffer consumption: Income from livestock is an important source of income among the sedentary farmers, but more prominently among the pastoral population in the lowlands. However, conditions of increased aridity and scarcity of rangelands, restricted livestock mobility, and poorly functioning pastoral markets are weakening the livestock economy.

Ability of livestock to buffer income is much reduced in time of crop failure because periods of droughts are often marked by poor pasture and water conditions, decline in livestock production (low birth, delay in maturity, decreased milk production), worsened disease environment, and increased livestock loss through death and distress sales. And reconstituting lost livestock is slow and costly under prevailing conditions of increased periodicity of droughts and poorly functioning markets where prices tend to rise rapidly in post-famine period.

Other income sources are thinning and risky: As the importance of income from crop and livestock declines, rural households are moving towards other income sources: petty trading in food and beverages; sale of collected environmental goods such as firewood and charcoal; casual wage labor; and land rental. Among the pastoral population, increasing numbers are shifting towards crop cultivation, trading in livestock (i.e., business of selling milk, live animals and butchery), trading in beverages and crafts, wage employment, gathering and selling collected firewood and charcoal, renting property, and retail shops.

However, the possibilities for income expansion through these income sources are shrinking and exposure to covariate risks loom large particularly in the incomes of the poor.

First, income sources such as trading beverages and food are linked to crop production, and hence positively co-vary with crop income. Second, agricultural wage employment is marginally available in rural areas. More people are moving to rural towns and market centers to settle and work in low-skilled casual wage employment. However, wage employment is generally scarce because of strong link to agriculture dominated local urban economy.

Distant migration as an alternative source of wage income has diminished in recent years because of three important factors that constrain mobility of labor. First, for most farmers, the cost of migration is high relative to expected employment opportunity and return. Secondly, the permanent residency requirement of the existing land policy closes the option of migrating for work away from place of origin. Thirdly, the current aggregation of people by ethnicity and drawing administrative boundaries further restrict mobility of labor because of territorial claim and restriction of access to land. As labor mobility is restricted, using migration as a way to pool climatic risk through spatial diversification of livelihood diminishes. This is particularly an important income smoothing strategy for people in drought-prone areas, who, without long-migration, are confined to local income sources that often co-vary positively.

Third, environmental goods and services (e.g. forest products as source of firewood, charcoal, medicine and grass products such as straw, basket, etc) are important sources of income for most of the rural households. Because they are “freely” available, they represent a large share of the income of the poor. However, continuous dependency on natural forests is unsustainable since most of these forests are almost depleted in the northern highlands (Belay, 2002; Kebrom and Hedlund, 2000; Mesfin, 1991). Further depletion occurs at considerable high economic and environmental costs.

Local markets are under continuous stress: In many respects, the risky attribute of the aforementioned income sources is due to the behavior of local markets under distress. For rural households with no or little land to cultivate, labor is the primary source of livelihood. Both the level of employment and wage rate determine wage income earned. The evidence points to a general abundance of labor in ecologically fragile northern highlands, as indicated by existence of involuntary unemployment or under employment (Markos, 1997).

Local urban labor markets are under continuous stress because of their strong links to local farm economy. In time of severe crop failure, for example, economic activity in rural towns is depressed because of decline in local purchasing power due to increase food price and slow down in activities such as grain trading and transportation. Such period often coincides with increase in labor force participation amidst depressed demand for labor, which translates into lowered real wages both in agriculture and in urban labor markets. Such positive co-variation of wages with agricultural production reduces effectiveness of rural labor market in buffering income in persistent drought conditions.

The existing evidence also indicates that prices of forest products such as fire wood and charcoal fall in local markets in time of prolonged droughts because of increasing supply in markets experiencing weakening demand (Yared et al, 2001; von Braun, Teklu and Webb, 1998; Dessalegn, 1991). Income from “freely” available natural resources, which is an important source of income for food-deficit households, thus fails in time when it is critical to supplement agricultural income.

In most of the cases, the commodity terms of exchange in these markets move in ways that erode the real purchasing power of sellers of assets (livestock in particular), labor and forest products, and buyers of food. Commonly, prices for food crops increase markedly while the prices of livestock, wages, and prices of collected or gathered products drop appreciably. The disposal of assets and sell of labor and forest products occur often in markets with excess supply and depressed prices. Hence, the returns from these sources are positively correlated with crop income and thus risky because of poor functioning of the markets under distress. Some of the markets disappear in some cases for lack of effective demand (von Braun, Teklu, Webb, 1998). As Dessalegn (1991) illustrates for South Wello, there were famine-free areas in the drought years of 1984-85 that were in a position to export food grains but there was not sufficient flow of trade to avert famine in areas with severe crop failures because of lack of effective demand.

Options for smoothing consumption are getting fewer

With income sources getting thinner and most of them co-varying positively with crop production, farmers are increasingly left with fewer options to smooth consumption in times of crop failures. Yared et al (2000) conclude from their community assessments in South Wello that the general trend is towards decline in availability and effectiveness of coping options as a result of repeated production failures, progressive impoverishment, and declines in possibilities for income-earning in other regions.

The moral economy that is characterized by networks of social support and reciprocity is weakening because of years of recurrent droughts and production failures, and associated impoverishment. The evidence from South Wello even points some of the support institutions fall apart under prolonged food stress and increased impoverishment (Dessalegn, 199; Yared et al, 2000). As noted in Yared et al (2000), traditional exchange and support mechanism were almost non-existence in the drought year of 1999. And the level of assistance channeled through these institutions has declined overtime as a result of impoverishment of the rural population.

Typically, farmers start rationing food consumption early on to protect disposal of valuable productive assets and dispersal of families under stress. Consumption adjustments frequently involve adjusting diets to basic (or, cheap) food items, supplementing with edible wild plants, and reducing frequency of meals and serving.

But there are limits to adapt to lowered consumption level. First, food consumption level is already low. Second, there is no evidence to suggest the nutritional status of the rural population is improving, especially those at high risk of vulnerability despite deliberate effort to favor allocation of food to vulnerable members within households as demonstrated in coping the famine of 1984-85 in Wello (Dessalegn, 1991). Third, the spread of HIV/AIDS pandemic degenerates the ability of body to adapt to lowered food intake. The critical food security challenge in such environment is not to attain food consumption at all times for healthy and productive life (a universal threshold), but to survive (meet a minimum threshold).

4. THE POOR ARE AT MORE SURVIVAL RISK

Although the poor are not all homogeneous groups, they exhibit some common characteristics. Proportionately, they live more in degraded areas (this does not mean there poor are more in number in these areas, which is commonly claimed). They have more dependents than working adults. In some instances, they have no working adults because of age, health, and separation, particularly among the female-headed households who are disproportionately poor as compared to male-headed households.

They have a few or no assets, particularly large animals. They may or may not have Kebele land given through the official channel. Those with Kebele land lack complementary inputs such as labor and oxen. Others may not have and depend on informal land transactions to work as sharecropper and/or engage in casual labor in nearby towns.

The most at risk are households who are always poor. These are mainly households who are unable to generate income on account of lack of labor due to aging, poor health, and physical incapacitation. They have little or no assets. They are heavily dependent on community support networks and/or relief food aid.

These poor are vulnerable to elevated consumption risk and survival. First, their income and asset level is low. They are heavily dependent on farming, particularly on producing food crops, but often unable to produce enough to meet food consumption need year round.

Second, their income sources are diversified. Commonly, these include petty-trade, selling collected products including firewood, grass, and dried dung, and wage-labor. These income sources are, however, both mean-income reducing and risky. That is, the poor are diversifying more into low-return income sources with increased risk exposure because of the close interdependency of these incomes with risky crop and livestock incomes. The poor are often constrained to diversify effectively to reduce risk and preserve mean income level because of constraints on choices due to limited access to credit or inadequate capital. Distress migration is high among the poor who often opt to move to towns where they face a new set of survival constraints.

Third, access to the thinning indigenous support system is constrained more to the poor. As Yared et al (2000) noted from the survey of communities in South Wello, provision of assistance has become discriminatory against those with weak social capital and links in support networks. Giving becomes less generous and more focused on one's immediate social network.

Finally, the ability of the poor to adapt to lowered food intake is limited because of their poor nutritional and health conditions. The poor thus continue to face elevated food consumption and survival risk as environmental stress sustains.

5. THE CYCLE OF POVERTY, FAMINE AND POVERTY CONTINUES

Persistence of famine conditions has poverty enhancing effect directly on population affected by famine. Those who are already poor experience deepening poverty as they experience decline in income level (some are forced to diversify onto marginal income generation activities), erosion of physical asset base (for most this is mainly loss of livestock), constrained access to credit and social support network including complete exclusion, and decrease in food consumption and body adaptability to survive on low food intake.

Some of the non-poor also cross the poverty line and swell the ranks of the poor. For example, Dessalegn (1991) concludes from his case study of Wello region that the losers of the prolonged and intense food shortage of the 1982-85 period in South Wello included not only the poor but also the relatively more prosperous in the pre-crisis period but unable to successfully defend their asset (physical and social) and food consumption².

² However, all were not losers. There were emerged better-off groups that included farmers who lived in communities that were not hit by drought, particularly those engaged in trading in high price products or

Dagnev (1995) also finds that in the aftermath of three periods of mainly drought-triggered severe food crises in Wolaita district, the income rankings of some of the households were lowered: 6.1 percent of the rich households dropped to middle class and 9 percent to poor income status. 18.4 percent of the middle-income households became poor and complete destitute.

The effects of rural famines are not limited to famine-affected areas. They are passed on indirectly to non-famine affected population including urban through food market effect (shortage of food and increase in food prices) and labor market effect (a large influx of rural population, increased labor supply and depressed wages). The living conditions of the urban poor are particularly aggravated as these low-skilled migrants compete for scarce social services and meager non-skilled wage employment

Reversing the processes of impoverishment are slow as evident from more people moving in than moving out of poverty and persistence of non-declining poverty incidence and depth. Recovery in post-famine period such as reconstituting lost assets (for example, livestock) and stabilizing food consumption is costly and slow. It is costly because prices of assets such as livestock tend to rise rapidly from their lowest points at which farmers disposed them in famine period. And, because of increased impoverishment, farmers lack the financial capacity to buy these assets. In addition to increased cost and reduced ability to purchase, recovery is interrupted by recurrent droughts and associated distress sale of assets.

6. CONCLUDING REMARKS

The persistence of famine conditions as evident from widespread starvation and population displacements suggests that these household and community based coping strategies are not effective to contain downside variability in income and food consumption. The trend is towards declining effectiveness of coping options. Farmers continue to diversify their income sources but unable to reduce their exposure to covariate risk by lowering their links to rainfall dependent incomes. Because of the frequency of droughts and market failure, both cultivators and pastoralists are also hampered from reconstituting their assets. Consumption smoothing devices such as calling on indigenous support networks are diminishing. Finally, public response is largely reactive and inadequate. Hence, food consumption and survival risk is elevated because of low and variable income (income sources exhibit high positive covariation), a low asset base such as livestock to protect consumption shortfall, constrained access to local support networks, and low body adaptability to survive on low food intake.

The long-term strategy for reversing the environment, poverty and famine downward spiral is addressing the key environment-poverty-famine links: improve return to water productivity while reducing its downside variability; enhance household capability to diversify income sources while reducing exposure to common income shock; improve market infrastructure and institutions; minimize restrictions on labor mobility; strengthen indigenous support network, and enhance public response capability to monitor and intervene timely without crowding out private effort.

buying livestock at low prices. These new well-to-do farmers were in a better position in the post-famine period as they were able to rent out their livestock or exchange livestock for labor, rent land for cultivation or engage in crop sharing arrangements.

At the core of such strategy is promoting sustained pro-poor growth. However, the debate on development strategy and priorities for Ethiopia at large and environmental stressed areas needs to be carefully thought through to save lives and enhance living conditions at affordable low economic and environmental costs to the society. Addressing poverty and famine in environmental stressed areas calls for a careful deliberation on development strategy that gives priority to saving lives whilst dealing with long-term structural problems of the country as one entity (not as fragmented regions).

Whilst agriculture is not the only growth vehicle for poverty reduction, it is the primary way. Getting agriculture on sustainable pro-poor growth path requires focusing on conditions required for broad-based pro-poor growth and setting tight standards to reduce cost and risk to enhance profitability and competitiveness of agriculture while reducing poverty (Teklu, 2003b). The first order of priority is halting the declining trends in key growth “movers”. Second, greater capitalization of agriculture is necessary to have the basic conditions of growth in place. While the types of investments are bound to vary between different areas of agricultural growth potential, emphasis should be in areas where return to investment in agriculture is high and stable. The effort of capitalization needs to be supported by pro-poor policies and institutional changes to ensure the growth process captures and benefits the poor. The argument that poverty is high in environment stressed areas is persuasive. However, such statement is not equivalent to saying most of the impoverished people are in these areas and agricultural growth should be pursued at high social cost and risk.

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