



IDA14

IDA Countries and Exogenous Shocks

**International Development Association
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Selected Abbreviations and Acronyms

CDD	Community Driven Development
CERF	Central Emergency Response Fund
CFF	Compensatory Financing Facility
CRED	Centre for Research on the Epidemiology of Disasters
DSF	Debt Sustainability Framework
ERC	Emergency Recovery Credits
EU	European Union
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IEG	Independent Evaluation Group
IMF	International Monetary Fund
LICUS	Low Income Countries Under Stress
ODA	Official Development Assistance
UN	United Nations
VAR	Vector Auto-Regression

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IDA COUNTRIES AND EXOGENOUS SHOCKS

EXECUTIVE SUMMARY

- 1. This paper responds to Deputies request that IDA staff continue to explore the feasibility of strengthening IDA countries' response to shocks.** This paper follows on work done in the last few years in the Bank and the IMF on the impact of shocks. The paper looks at recent research estimating the impact of shocks on IDA countries, how these shocks have been responded to by IDA, increased use of market-based mechanisms for risk reduction, and possible ways that IDA could play an even greater role in helping countries reduce their vulnerability.
- 2. IDA helps countries strengthen their resilience to shocks through its broad country-driven and multi-sectoral approach to development financing.** Regular IDA lending for development either through budget support or through investment lending is aimed at reducing structural vulnerabilities over the long term and increasing resilience in the short and medium term. Improvements in economic and export diversification, public expenditure management, irrigation projects, land reforestation, shared power pools, shared resource management, and the development of targeted social safety nets are all ways through which vulnerability can be reduced.
- 3. Such long-term financing is extremely important for reducing countries' vulnerability to exogenous shocks, but short-run alleviation is also critical.** While exogenous shocks cannot account for the majority of GDP volatility, which is still closely linked to domestic policies and domestic shocks, they are still a significant factor. Combined with the disproportionate impact of exogenous shocks on the poorest segments of the population, mitigating the impact of such shocks presents a challenge especially in countries with weak delivery mechanisms.
- 4. However, responding to exogenous shocks has increasingly meant tradeoffs from other development needs.** While IDA has regularly been involved in the financing of *ex post* responses to a shock – be it a natural disaster or a terms-of-trade shock – the overall strong demand for IDA's resources implies tradeoffs with other development needs. The paper presents a number of potential ways that IDA could increase financing to respond to a shock or help countries undertake additional measures to strengthen their resilience to a shock.
- 5. More emphasis on innovative market-based mechanisms within IDA will help better target resources to those most affected by shocks.** Encouraging countries to use their IDA allocations to purchase market-based derivatives and insurance will help countries reduce the volatility of their revenues, and reduce the diversion of resources from other development priorities. It must be acknowledged however, that access to market instruments will require significant technical assistance to help customize products to the risk profiles of a given country and commodity. As a result, mainstreaming market-based derivatives and insurance to a broader group of IDA countries will take time.

6. **Additional *ex post* support in response to natural disasters or other shocks on a case-by-case basis would be possible with additional donor financing.** The IDA14 report states that “in cases where the existing allocation would not allow for a sufficient response, additional allocations may be provided to IDA countries in the aftermath of major natural disasters”. Given the scarce resources for funding recovery and reconstruction, the paper presents options for donors for supporting countries that have made investments in disaster risk reduction. This would increase incentives to undertake investments in disaster risk reduction. The paper points out however, that such financing would need to be additional to regular IDA financing in order to avoid diverting resources away from already constrained IDA allocations.

7. **Additional financing could also be used to provide more automated *ex post* assistance for countries facing shocks to relative primary commodity prices.** The paper outlines some research into a country-specific index of prices of key primary commodity exports and imports and how this could be used to trigger automatic payments to help countries protect priority expenditures when faced by such a shock. Unlike previous instruments, the index-based scheme is based on negative exogenous price movements of primary commodity exports and imports making it more timely and less subject to moral hazard. However, the scheme could be very costly, and the availability of such financing could reduce incentives for *ex ante* prevention. More generally, the paper points out the weaknesses associated with the use of any automatic instrument to capture the heterogeneity of impact of a given input shock on output, the problems experienced by such instruments in the past, and the difficulty in determining the appropriate mix of adjustment and financing.

8. **The paper outlines options to encourage increased attention to disaster prevention and preparedness.** The need for greater focus on prevention was highlighted in the 2006 IEG report on natural disasters, which acknowledged that even where countries were vulnerable to recurrent shocks, these did not receive sufficient attention in assistance strategies. With additional donor financing, IDA could provide stronger incentives for countries to invest in disaster prevention and preparedness through a fund which would allow countries to leverage their IDA allocations, similar to the structure of the regional projects pilot. Such prevention and preparedness investments could ultimately help protect ongoing IDA investments and reduce the cost of future natural disasters.

9. **Depending on Deputies reactions, further analysis of the options presented in this paper could be carried out for a follow-up IDA15 replenishment paper.**

IDA COUNTRIES AND EXOGENOUS SHOCKS

I. INTRODUCTION

- 1. A number of devastating natural disasters in the last few years have drawn donor attention to the costs of natural disasters, and their potential to undo hard won development gains.** Natural disasters claim lives, destroy assets, and are particularly devastating for the poor. The recent Tsunami in the Indian Ocean that claimed over 200,000 lives and left over 1.5 million people homeless, elicited a strong worldwide response.¹ Shortly thereafter, many thousands more were killed by a massive earthquake in Kashmir that affected both Pakistan and India. Added to this, droughts in 2005 affected millions across several countries in Sub-Saharan Africa.
- 2. The costs of natural disasters appear to be increasing, particularly in developing countries.** Some of this increased cost can be attributed to the problem of sustainable development, i.e., higher population density, increasing urbanization, and climate change. Droughts can be the result of deforestation, and floods caused or exacerbated by inappropriate agricultural practices and resulting soil erosion. Natural disaster damages can be magnified by substandard buildings in earthquake-prone areas or inappropriate building in fragile coastal areas prone to hurricanes and storm surges. It is estimated that over 67 percent of global housing and infrastructure stock is vulnerable to natural hazards. Climate variability and climate change have resulted in more frequent extreme events that cause greater inundation in coastal areas. Long term climatic risks also mean an evolving hazard profile of vulnerability.
- 3. Natural disasters occur throughout the world, but are more costly relative to GDP for the poorest.** Relative to area at risk and population at risk low-income countries are similarly exposed as other countries to natural disasters in aggregate. A 2005 Bank publication that analyzes global hotspots, found that 6 IDA countries rank among the top 15 countries most vulnerable to 3 or more natural hazards (see table 1) in terms of area at risk and population at risk.² While the costliest shocks occur in countries with large GDP at risk, average damage from large disasters as a percent of GDP is the highest in low income countries (LICs) and small states.³ The “Hotspots” study (World Bank 2005b) also showed the geographical distribution of different types of hazard risks, for instance showing drought as a significant risk in many African IDA countries, while flooding is a significant risk in coastal areas of IDA countries in Central America, the Caribbean, and Asia and Pacific regions.
- 4. In addition to natural disasters, commodity shocks can have significant impacts on budgetary resources and on the cost of living for the poorest countries.**

¹ World Bank (2006). “Hazards of Nature, Risks to Development an Evaluation of World Bank Assistance for Natural Disasters”, IEG Report, CODE2006-0020, March 7.

² World Bank (2005b) “Natural Disaster Hotspots, A Global Risk Analysis”, Disaster Risk Management Series, No.5.

³ IMF (2003). Fund Assistance for Countries Facing Exogenous Shocks. Policy Development and Review Department, August, 2003.

While the last few years have seen a positive shift in the prices of many commodities, sharp downturns in commodity prices can wreak havoc on exporters. Sharp increases in import prices can have similarly costly impacts on developing countries, especially on the poorest segments of the economy. Natural disasters have also induced commodity production loss or loss of employment, resulting in long term deprivation for affected families.

5. **During the IDA14 replenishment Deputies asked staff to continue to explore the feasibility of strengthening IDA countries' response to shocks, with due consideration given to the role played by other entities, including the IMF.** This paper describes the impact of shocks on IDA countries, how IDA has responded, recent innovations in IDA and other entities in managing and responding to shocks, and possible ways that IDA can play a greater role in helping countries to reduce their vulnerability.

6. **The paper concentrates primarily on terms of trade shocks (as opposed to longer-term secular declines) and natural disasters, as these are clearly exogenous events.** These shocks can be either slow-onset or fast-onset. Slow-onset shocks refer to those which are slow to develop, such as droughts and commodity price shocks. Their slow-onset nature also makes it difficult to know when and at what level to respond. Fast-onset shocks primarily relate to most natural disasters: typhoons, hurricanes, earthquakes, landslides, floods, locust invasions. The paper also focuses primarily on temporary shocks, that may be one-time or recurrent, but such distinctions also influence policy choices. Other shocks that can have significant impacts on macroeconomic management include exchange rate volatility, conflict or a crisis in a neighboring country and aid shocks. These shocks are not dealt with in the paper since exchange rate volatility and aid volatility are not wholly exogenous and can be linked to domestic policies, while conflict in a given country is dealt with through other specific policy measures (i.e., support to LICUS, post conflict, fragile states, etc.).

7. **The paper is based on a number of sources, including a number of key background studies.**⁴ The paper also draws on the March 2006 IEG report entitled Hazards of Nature, Risks to Development, An Evaluation of World Bank Assistance for Natural Disasters⁵ and follow-up work to incorporate lessons from this evaluation into Bank operations. Numerous research papers as well as recent overview papers on the impact of shocks form the backdrop to this paper.⁶

8. **The paper is structured as follows.** Section II describes the economic impact of shocks and Section III discusses the poverty impact of shocks. Section IV looks at IDA's

⁴ These background studies include analyses on the macroeconomic impact of shocks on different groups of IDA countries, the poverty impact of exogenous shocks, exploring some potential structures for providing additional resources to countries in the face of shocks, and a look at the vulnerability-sensitivity of IDA commitments.

⁵ World Bank (2006).

⁶ The key overview papers are IMF (2003) *ibid*, Varangis, P., S. Varma, A. dePlaa, and V. Nehru (2004) "Exogenous Shocks in Low Income Countries: Economic Policy Issues and the Role of the International Community", mimeo, World Bank.; and World Bank (2005a), "Managing the Debt Risk of Exogenous Shocks in Low Income Countries", SecM2005-0112, March 24, 2005.

role in addressing exogenous shocks and asks whether IDA could do more. Section V discusses a few options for IDA to play a greater role in helping countries manage exogenous shocks and Section VI concludes.

Table 1. Ranking of IDA borrowers among countries most exposed to multiple hazards

Three or more hazards (top 15 based on land area)				
Country	Ranking	Percent of Total Area Exposed	Percent of Population Exposed	Max. Number of Hazards
Vanuatu	3	28.8%	20.5%	3
Viet Nam	9	8.2%	5.1%	3
Solomon islands	10	7.0%	4.9%	3
Nepal	11	5.3%	2.6%	3
Tajikistan	13	5.0%	1.0%	3
Nicaragua	15	3.0%	22.2%	3
Two or more hazards (top 60 based on land area)				
Country	Ranking	Percent of Total Area Exposed	Percent of Population Exposed	Max. Number of Hazards
Vanuatu	6	80.8%	75.6%	3
Nepal	9	60.5%	51.6%	3
Viet Nam	14	45.1%	38.7%	3
Somalia	15	43.1%	53.8%	2
Bangladesh	19	35.6%	32.9%	4
Cambodia	21	27.9%	4.4%	3
Tajikistan	25	23.2%	9.5%	3
Solomon islands	26	22.8%	16.6%	3
Madagascar	27	20.2%	9.9%	2
Bhutan	28	20.1%	29.2%	4
Georgia	29	17.4%	5.9%	3
Kenya	31	16.9%	8.8%	2
Lao PDR	34	15.2%	12.6%	3
Nicaragua	38	12.4%	49.8%	3
Afghanistan	39	11.1%	29.5%	3
Myanmar	40	10.7%	10.4%	4
India	41	10.5%	10.9%	4
Lesotho	42	10.3%	3.7%	2
Kyrgyzstan	46	8.3%	5.8%	2
Dominica	47	8.1%	6.2%	2
Papua New Guinea	51	5.9%	6.4%	3
Pakistan	53	5.6%	18.2%	2
Indonesia	54	4.5%	14.1%	3
Armenia	57	3.1%	1.5%	3
Mongolia	58	2.8%	0.7%	2
Nigeria	59	2.7%	6.7%	2

Source: Summary from World Bank (2005e)

II. THE IMPACT OF SHOCKS ON GROWTH

9. **While exogenous shocks are common in most low-income countries, their impact on economies varies (Varangis et al. 2004).** For price shocks, their frequency and duration appear to be greater for primary commodities than for other tradable, industrial goods. Low-income countries with high dependence on receipts from primary commodity exports face higher current account vulnerability to these shocks relative to countries with more diversified export bases. Vulnerability is also linked to the commodity itself, with some primary commodities experiencing shocks more frequently than others. The extent to which countries can influence export and import prices can also be a consideration, although the majority of IDA countries are price-takers (Tabova and Gilbert, 2006). For natural disasters, although the economic destruction wrought can be larger in developed countries because of the level of assets at risk, the relative socioeconomic costs can be much greater for LICs.

10. **Shocks can have both direct and indirect economic impacts.** Export price shocks have direct impacts on the revenues of both the public sector and the private sector. Similarly import price shocks mean a higher import bill for the public sector and higher prices for consumers. In some cases, however, export and import shocks may offset each other. For instance the recent high oil prices were the result of a demand shock, which has larger covariances with the prices of metals and primary commodities than would be expected from a supply shock. Natural disasters can have direct economic impacts through the destruction of physical assets and reduced output (for instance if a drought or flood destroys crops) (IMF, 2003). Shocks also result in loss of employment for households, a reduction in household income and loss of household assets that may drive poor households into a cycle of poverty even if there is not an impact on national income. There is also evidence pointing to a higher risk of civil war in countries where primary commodities are a large share of exports, possibly due to rent-seeking behavior, but also due to greater economic instability (Collier and Hoeffler, 2004).

11. **Shocks can impact long-run growth through reductions in government investment and worsening of economic policy.** The uncertainty associated with shocks also complicates the management of fiscal policy (Kumah and Matovu, 2005). Adverse shock can cause fiscal deficits by lowering revenues, while increasing demand for higher expenditures on social protection and immediate reconstruction, rehabilitation and relief projects. Positive shocks can create pressure for increased government expenditures that may require difficult adjustments in the longer term.

12. **Adverse shocks can also lead to trade deficits, increased financing needs, and greater indebtedness.** Capital inflows offer temporary relief for countries faced by adverse shocks that can help protect long-term development projects and finance trade deficits, but this could further contribute to unsustainable debt unless provided on sufficiently concessional terms.⁷

⁷ Schiff, M. et al (2005) find evidence that remittances increase during negative shock periods.

13. **While negative price shocks can impede growth, positive price shocks do not necessarily contribute to growth.** Studies find that resource-rich countries benefiting from export price increases tend to spend the revenue windfall, and use the strengthened fiscal position to increase borrowing (Raddatz, 2005), leading to the phenomenon of ‘unsustainable growth’ (Collier and O’Connell, 2006). While the country benefits in the short run, this spending leads to an even greater macroeconomic contraction when prices return to lower levels. Furthermore Collier, Goderis and Hoeffler (2006) find evidence that there may even be an adverse long run effect on GDP from a positive export price shock.⁸

14. **Shocks have a significant impact on growth but the size of that impact is still a subject of some debate.** The results depend upon the methodology employed for the analysis, with larger impacts of shocks on growth being demonstrated by studies that employ time-series and calibrated general equilibrium models than those using a panel vector autoregression method. Studies using different definitions of shocks have generally found that negative shocks have a significant adverse impact on growth, but some studies point out that shocks fall short of explaining the volatility of output in LICs. Box 1 summarizes some of the literature on the impact of shocks on growth through various different methodologies.

15. **Recent research shows that shocks explain only a small part of GDP volatility in low-income countries on average.** Over the long run, Raddatz (2005a) finds that 11 percent of variance of real GDP can be explained by shocks. The remainder is accounted for by endogenous factors and policy conditions. Of the variance that can be attributed to exogenous shocks, 37 percent is attributable to terms of trade shocks, 25 percent to aid shocks,⁹ 14 percent to climatic disasters and 12 percent to humanitarian crises. These findings “suggests that the attention to exogenous shocks as the source of economic instability in low-income countries is misplaced” (Raddatz, 2005a).

16. **This implies a need to be realistic about what can be achieved in the short run by smoothing external shocks.** While aid in response to a shock can be helpful, it may be that large increases in aid are necessary to elicit small output responses (Raddatz 2005a). IMF (2003) and Guillaumont and Chauvet (2001), assert that aid influxes in response to exogenous shocks help cushion some of the adverse impact of the shocks. Clemens, Radelet, and Bhavnani (2004) in their influential study found that “short-impact” aid had a strong positive relationship to economic growth, and it could be argued that a timely response to a negative shock for reconstruction or for budget support would

⁸ Collier, Goderis and Hoeffler (2006) for instance find that while a positive 10% increase in commodity prices raises GDP cumulatively over the next three years by about 1.0%, over the longer term it will lower GDP by 2.2%.

⁹ Aid volatility, while not considered in this paper as an exogenous shock, can in itself have an adverse affect on growth. Arellano et al (2005) suggest that a one-standard-deviation increase in aid volatility is associated with a decrease in manufactured good exports by up to four percentage points. Celasun and Walliser (2005) find that unpredicted aid volatility may bear permanent costs in terms of lost output. However, Markandya et al (2006) find that aid volatility negatively associates only with long-term growth; and this tends to be greater in Sub-Saharan Africa, countries with poor quality of institutions and policies, or low-income countries.

qualify as “short-impact” aid. Prati and Tressel (2006) find that the impact of aid on exports varies by country circumstances. Aid flows during periods of adverse shocks or of reconstruction efforts subsequent to adverse shocks could have positive effects on exports.

Box 1. The Impact of Shocks using Alternative Methodologies

Using growth regressions, various studies find that shocks have an important impact on growth rates. Collier and Dehn (2001) for instance include extreme negative shocks¹⁰ into the Burnside Dollar regression and find that a 40 percent decline in commodity prices would result in a 1.4 percent decline in GDP *growth rates per year* over a period of 4 years. Easterly et al. (1993), using a definition of shocks that includes terms of trade, war related casualties, and debt crises, found that the variance of shocks explained as much of the variance in growth rates over 10 year periods as policy, and in addition they influenced policy and thus estimates of policy variables.

As pointed out by Raddatz, 2005, however, cross-country regressions may not be the most appropriate way to analyze the impact of shocks on growth. Cross-country regressions involve timing issues, both with respect to sensitivity to the cut-off year and the length of the period of analysis. Other methodologies, as discussed below may shed a different light on the issue.

Other authors have used calibrated general equilibrium small-open-economy models to analyze the effect of shocks on growth. Mendoza (1995) and Kose and Riezman (1999) using such models simulate that a terms of trade shock can account for about 50 percent of GDP volatility, although designing a model that can fully capture a country’s economy is difficult.

Others have employed a panel vector auto-regression (VAR) approach to time-series analysis and find that while significant, the impact of exogenous shocks on growth is small. The VAR approach has the benefit of exploiting within-country and across-time variation in the data. Using the VAR methodology, Deaton and Miller (2006), Hoffmaister et al. (1998) and Broda (2004), look at the impact of exogenous terms of trade shocks on growth and find only a small impact. Raddatz (2005) expanded the use of the VAR approach to look at the impact of different types of shocks including both natural disasters and terms of trade shocks, to determine to what extent they could explain GDP volatility. This analysis found that an estimated 1 standard deviation to commodity prices (equal to a change of about 15 percent on average) decreases output by about 1 percent of GDP. An additional finding was that commodity price shocks tended to have a greater impact on more open economies, more indebted economies, those which receive less aid flows and those with worse policies. The key result from these VAR analyses is that while exogenous shocks contribute to GDP volatility, policy is a greater explanatory variable.

17. **Follow-up work suggests that the impact of commodity price shocks and droughts varies importantly across countries.** A follow-up study looked beyond the averages to see if for a given country or a group of countries with given characteristics, the impact of droughts and terms-of-trade shocks might be greater than the average, and how aid has responded to these shocks. Point estimates on a country by country basis show that the shock required to produce a 2 percent decline in output fluctuates across countries between a 17 and a 40 percent decline in commodity prices. The median shock required to produce such a decline in output occurs rather infrequently – approximately

¹⁰ Extreme negative shock is referred to as the bottom 2.5% tail of the distribution of the export price index.

once every 19 years (Raddatz, 2005b). Table 2 shows the occurrence of droughts in 39 African countries over the last 24 years.

18. **The most vulnerable countries to commodity price shocks are those that produce mainly coffee, followed by the group that produces mostly oil.** In these groups, commodity price shocks that reduce GDP by 2 percent occur about once every 5 years. Interestingly, countries that have grown faster seem to be significantly more resilient than those with slower growth. As expected, Countries high on the UN Vulnerability index¹¹ also fare worse than those with low vulnerability in their resilience to shocks.

Table 2: Occurrence of droughts in 39 African countries (1980-2004)

Country	Droughts	Country	Droughts
Ethiopia	16	Senegal	6
Mozambique	14	Burundi	5
Sudan	11	Cape Verde	5
Kenya	10	Guinea Bissau	5
Mauritania	10	Eritrea	4
Niger	10	Rwanda	4
Tanzania	10	Benin	3
Zimbabwe	10	Guinea	3
Somalia	9	Cameroon	2
Uganda	9	Central African Rep.	2
Angola	8	Ghana	2
Chad	8	Nigeria	2
Zambia	8	Sao Tome & Principe	2
Madagascar	7	Togo	2
Malawi	7	Comoros	1
Burkina Faso	6	Congo	1
Gambia The	6	Cote d'Ivoire	1
Lesotho	6	Liberia	1
Mali	6	Congo, Dem. Rep.	1

Data source: CRED

19. **As countries improve their policies and institutions, however, the relative importance of external shocks in explaining the causes of macroeconomic volatility may be increasing.** Research on the impact of shocks in Africa in recent years seems to demonstrate a more prominent role for shocks in explaining GDP volatility in the last 15 years than in the previous 15 year period. In fact their importance increased 2.5 times (Raddatz, 2006). The relative importance of exogenous shocks is also greater when oil prices are included in addition to other commodity price indices, implying that oil price shocks themselves are quite disruptive.

¹¹ The UN Economic Vulnerability Index (EVI) is designed to capture a country's structural exposure to shocks. It is constructed from 6 components. These components (population size, share of agriculture in GDP, export concentration, instability of exports of goods and services, instability of agricultural production, share of population displaced by natural disasters) reflect both the structural exposure of countries to shocks (first three measures) and the size and frequency of shocks (last three measures).

20. **While exogenous shocks may not be the primary cause of macroeconomic volatility in LICs, the damage caused by large natural disasters can undo many years of ODA-funded investments.** Low-income countries on average have a larger number of natural disasters than other developing countries, and the damage caused by these shocks tends to be higher. On average, low-income countries experience a disaster about every 2.5 years, while other developing countries experience such shocks every 4.5 years (IMF, 2003). Case studies showing the magnitude of a natural disaster as measured by the economic loss that it imposes indicate the potential for substantial losses, especially for smaller countries. Damages caused by natural disasters can be multiples of GDP (for instance Hurricane Mitch damage was close to 41 percent of GDP in Honduras, and Hurricane Ivan damage was about 200 percent of GDP in Grenada).¹² For low-income countries the direct economic loss from large natural disasters as a share of GDP, on average (simple average) has been estimated to be about 13 percent (Linnerooth-Bayer et al, 2005).

21. **A number of factors that may have longer-term repercussions on an economy may not be well captured in the macro studies.** These factors may be highlighted better through case studies. For instance large natural disasters may involve population displacement, long term disruption to education, and infrastructure degradation, with resultant impact on longer-term growth that becomes difficult to attribute to a given shock. Reducing consumption as food prices rise is another coping strategy that can have major and lasting adverse effects on health, especially for small children. Such factors give added weight to the importance of a preventative approach to natural disasters, especially recurrent disasters, and having mechanisms in place to increase the ability to respond quickly and avoid long-term disruptions.

22. **Overall, while the research evidence shows that blaming external shocks for the large economic volatility of LICs is an easy and probably mistaken answer, this does not mean that they do not have a significant impact.** It is necessary to adjust expectations regarding what can be achieved in the short run by smoothing external shocks, but short-term financing can help prevent costly disruptions to priority spending. At the same time, countries also need to find ways to reduce their vulnerability to shocks, through strong policies, and taking other direct measures, such as building up reserves to act as a cushion in bad times and export diversification to reduce reliance on individual commodities.

III. THE IMPACT OF SHOCKS ON POVERTY

23. **The 2001 World Development Report states that risks and uncertainty preoccupy poor people's livelihoods, and their inability to effectively deal with exogenous shocks often lies at the core of their poverty.**¹³ Poor populations within countries are usually those most affected by natural disasters. The poorest live in the most marginal locations – floodplains and urban areas with insufficient health and sanitation infrastructure – and hence are disproportionately affected by shocks. Shocks

¹² World Bank (2006).

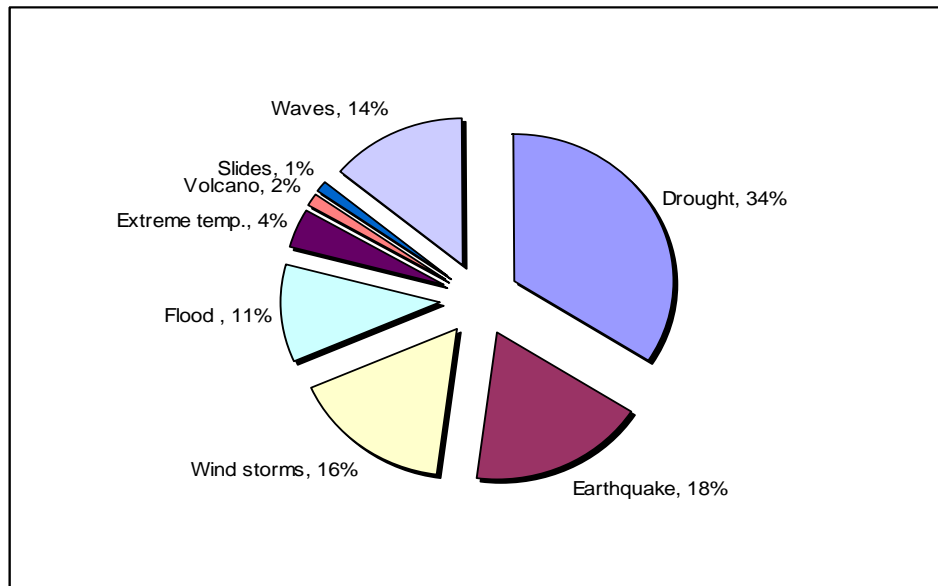
¹³ World Bank (2001).

can also hit the poorest most disproportionately because they have limited labor skills, little or no savings or physical assets to cushion against the impact of a shock, and little opportunity for risk diversification. Exogenous shocks can increase poverty not only through the destruction of assets, but also indirectly through lower overall growth in the economy, higher inflation (the poor are more vulnerable to inflation), and lower government spending for social services (IMF, 2003).

24. **The poverty impact of shocks is most effectively assessed using household surveys specifically tailored to capture a particular disaster and its impact on households given their exposure and coping strategies.** Moreover, since there is significant variation in the impact of these disasters across countries and within different segments of the population of a given country, country case studies are better able to capture this variation.

25. **Such empirical case studies provide evidence on the pervasive negative effects of slow-onset shocks, such as drought and commodity price shocks, on the well-being of households in poor countries, and specifically in rural areas.** Drought shocks are found to lead not only to severe harvest failure causing thus significant direct impact on income and food supply, they often have long-lasting effects and are a major cause of poverty persistence in drought-prone regions, and have lead to more deaths than other types of natural disasters (see Figure 1). Similarly, commodity price shocks have negatively affected household income, consumption and poverty indicators (Tabova, 2006).

Figure 1. Distribution of number of people killed from natural disasters (1980-2004)

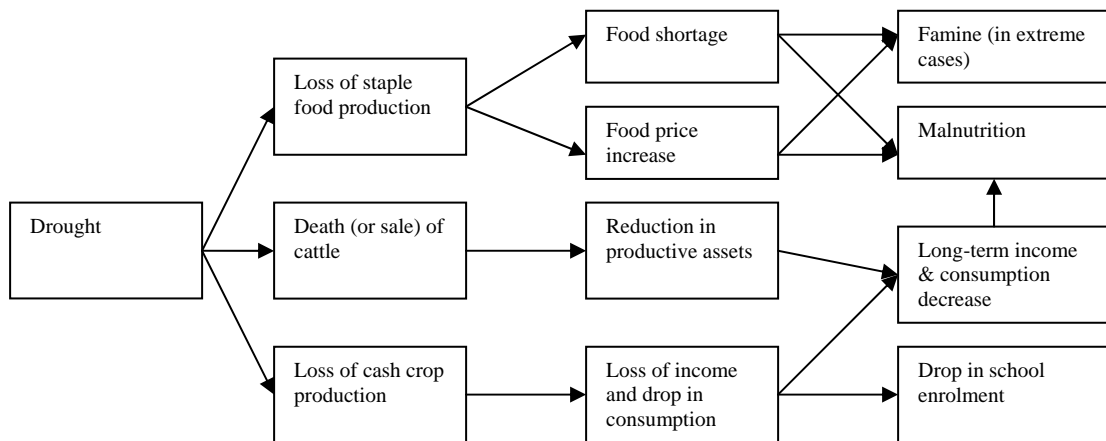


Source: CRED Database

26. **The disproportionate impact of shocks and volatility on developing countries is closely linked with the lack of risk management tools available for mitigating their**

effects.¹⁴ Shocks can have long-term effects, due at least partially to the destructive coping strategies households embrace when there are no alternatives. Figure 2 provides a stylized view of the impact of droughts, and the coping strategies that are described in case studies. These point out that the poor suffer from a high degree of vulnerability and given the absence of formal safety net mechanisms, rely to a large degree on self-protection and group-based arrangements to protect themselves against risk. However, these household and community level strategies usually provide inadequate protection to the poor, and moreover are likely to lead to adjustments with significant long-term negative effects on their productivity and ability to climb out of poverty. This is particularly true in cases where shocks are recurrent, as is the case with droughts in many African countries.

Figure 2: How do droughts affect households?



Source: Tabova, 2006.

27. **Empirical studies point out that short-term shocks can also have disproportionate effects on women and children.** In Zambia over the period 1992-1999, data was being collected annually on the same group of households and individuals in 20 villages. Mid-way through this sample period, Zimbabwe experienced a severe drought. Analysis of this data shows that women and children were the most affected (Alderman et al, 2004, Hoddinott, 2004 and Hoddinott and Kinsey, 2001). More specifically, young children lost 15-20 percent of their growth velocity and those living in poor households are likely to have suffered a permanent loss in height, schooling and earnings. The studies find also permanent effects in reduction of height in adulthood as a result of the droughts. The significance of these results lies in a growing body of literature showing that slowed growth in childhood can have long-term consequences in adulthood and point to the permanent effects short-lived shocks can have.

28. **Fast-onset shocks also have significant impacts on poverty in LICs.** Modeling catastrophic losses in the macroeconomic framework and poverty outcomes has shown that natural disasters have a negative impact on both absolute and relative poverty. In the

¹⁴ Hnatkovska and Loayza, 2004; Collier and Dehn, 2001.

example of Honduras post Hurricane Mitch, one of the poorest countries in Central America, the incidence of extreme poverty increased from 46 to 49 percent, and that of moderate poverty from 63 to 66 percent. The disproportionate impact of the natural disaster on the poorest is also apparent from the fact that among households suffering losses, poorer households lost a greater percentage of their productive wealth (31 percent) than did wealthier households (8 percent).¹⁵

29. **Whether or not a shock turns into a disaster is closely correlated with the level of development and policies, which influence vulnerability to natural hazards and exogenous economic developments.** Disasters are not completely natural phenomena, they start as natural hazards but in most cases their transformation into a disaster is linked to the population's coping capacity, and country policies. The causes of famine are a good illustration of this. Research has shown a direct link between shocks and famine, but a famine is usually induced by unfavorable rainfall *and* diminished coping capacity of rural population due to a decline in assets and land-holding, productivity and income that can stem from previous droughts. This emphasizes the importance of coping strategies and government policies (i.e., through the provision of buffer stocks or safety nets).

30. **Based on the evidence on the impact of shocks on poverty, it would be important to prevent large disruptions in income in the aftermath of a shock.** Research pointing out the asymmetric effect of income volatility on poverty may be partly due to the impact of shocks. This research shows that a given percentage increase in per capita income will not change poverty as much as a similarly large contraction in per capita income (World Bank, 2000).

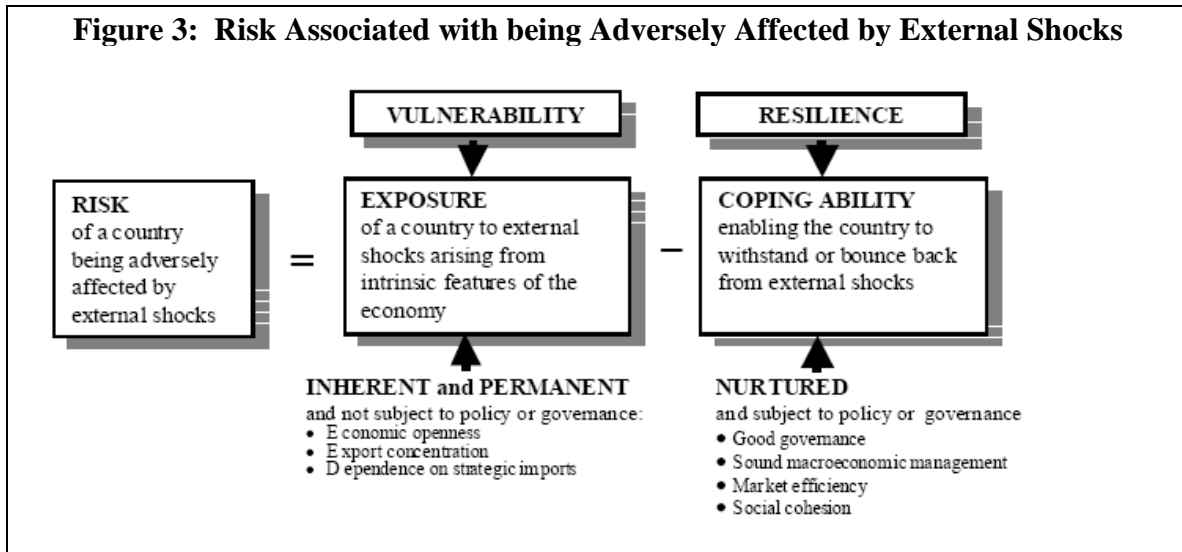
IV. IDA'S RESPONSE TO EXOGENOUS SHOCKS

A. REDUCING VULNERABILITY TO SHOCKS

31. **As a development institution, IDA finances projects intended to help countries reach their long-term development goals, including building resilience to shocks.** Lending is provided to countries based on their development priorities as set out in the PSRP and the CAS. Some of this lending is directly linked to reducing a country's risk of being adversely affected by shocks. The risk of being adversely affected is a function of vulnerability (or exposure) and resilience (or coping ability).¹⁶ As Figure 3 points out, reducing exposure is a longer-term goal, and for some countries exposure may be an inherent economic characteristic that is unlikely to change. Increasing resilience includes many of the areas that are the focus of IDA support, such as encouraging good governance and sound macroeconomic management, and helping with areas of specific vulnerability.

¹⁵ Carter et al (2005). "The Long-Term Impacts of Short-Term Shocks: Poverty Traps and Environmental Disasters in Ethiopia and Honduras". BASIS Brief No. 28, Collaborative Research Support Program.

¹⁶ Briguglio et al. 2006.



Source: Briguglio et al. 2006.

32. **Long-term development plans by a given country may successfully address a country's vulnerability to terms-of-trade shocks or natural disasters.** For instance, long-term efforts at export diversification can help reduce the vulnerability of countries to volatile primary commodities exports. Strengthening financial sectors can also reduce vulnerability, as can improving public expenditure and revenue management to help build up reserves needed to respond to shocks. Specific investment projects can also be identified that help reduce countries' vulnerability to recurrent shocks. Improved building codes can help reduce hurricane damage; investments in reforestation can help reduce the risk of soil erosion and floods. Investments in irrigation will increase agricultural yields while reducing the risks of recurrent droughts. For instance, the Loess Plateau Watershed Rehabilitation Project over a period of seven years helped to reverse severe environmental degradation that led to flash floods and soil erosion in rural areas of China. The Loess Plateau Project involved terracing, planting trees, shrubs and grasses on steep slopes, cessation of farming on steep slopes, and building small check dams to control sediment.

33. **An appropriate response to a shock that targets the poorest and most affected by the shock is a challenge.** IDA, through its country-based model of assistance, aims to provide the analysis and the tools to develop country-specific strategies that reach the poor. Building on the experience in other countries, population-specific safety nets can be developed as one modality to give the poorer segments of society some help that may prevent hasty decisions in the event of a shock that may reduce their chances of escaping long-run poverty. Such programs can provide additional income or in-kind transfers, or provide employment through public works programs to populations most affected by a given shock. Development of such a social safety net program may be a consideration in providing automatic assistance for recurrent shocks, in that it would provide a way for the benefits of the assistance to better reach to the poor. In countries that experience recurrent shocks, such as Ethiopia – ongoing IDA programs

have been tailored to reduce food insecurity, and identify ways to prevent the shock from becoming a disaster through increased reliance on irrigation (see Box 2.).

34. **IDA's Regional Projects Pilot can also help countries to reduce their vulnerability to shocks.** Transboundary risks necessitate regional cooperation in risk management, e.g. river basin management, flood/locust/tsunami early warning systems. By providing leveraged funding for regional public goods, regional funding can reduce vulnerabilities linked to shared natural resources (such as the Senegal River Basin) and shared energy needs (such as the Southern or Western Africa Power Markets). Encouraging intra-regional trade and transportation also enables the expansion of available markets needed to ultimately diversify exports.

35. **The 2005 Strategic Framework for IDA in Africa describes a number of actionable items to reduce vulnerability.** This includes plans to produce complete vulnerability assessments for 10 countries that are frequently affected by shocks by end-FY08. Such vulnerability assessments would create the knowledge base necessary to develop targeted social protection mechanisms to lessen the impact of shocks. The SFIA also aims to help countries develop and implement commodity risk management techniques that would incorporate needs of producers and producer organizations. A recent poverty and vulnerability assessment for Zambia pointed to four policy challenges: the need for expanded opportunities for the poor; to provide the poor with the necessary tools – education, skills, health, access to goods and services – to take advantage of such opportunities; the need to improve the security of poor households in the face of shocks through formal and informal risk management strategies; and to improve governance and develop an institutional environment that facilitates healthy private-sector led growth¹⁷.

¹⁷ World Bank (2005c), Zambia Poverty and Vulnerability Assessment, Discussion Draft, June 29, 2005.

Box 2. The Effects of Recurrent Droughts in Ethiopia

Famine periods have covered a total of 25 of the past 100 years in Ethiopia. The share of the steadily increasing population affected by these droughts has increased over time. Despite efforts to improve food and aid allocation, resettlement and broader development measures, famine continues to plague the country and it is estimated that the population affected will increase from 10-19 percent in 1980-2004 to 30 percent in 2020 and 40 percent in 2030.

Droughts have been found to be the most significant shock affecting rural populations. According to Dercon (2004) a 10 percent decline in rainfall reduces food consumption by 5 percent in a number of villages in Ethiopia most affected by droughts and famine. Looking at two rounds of rural household surveys in 15 Ethiopia villages between 199-2004, Dercon *et al* (2005) find that droughts are the most significant shock that impacts rural households, lowering per capita consumption by about 20 percent, with even greater negative impacts for the most vulnerable households.

A number of studies find that droughts in Ethiopia have long term impacts on household income, consumption, and welfare indicators. 10 years after the famine of 1984/85 rural households' cattle holdings were still only two-thirds of what they were in the years immediately preceding the famine (Dercon 2001). Consumption continued to be affected by the impact of the 1985/85 shock well into the 1990s (Dercon 2004). Ethiopia's high rates of child malnutrition can be attributed mainly to its extreme vulnerability to recurring droughts and dependence on rain-fed agricultural production. Alderman et al. (2005) find that harvest failure can significantly reduce child growth. Their study focused on a sample group of children between 6 and 24 months over a 6-month period; they compared child growth rates in communities where half the crop area was damaged due to droughts to those without crop damage and found significant variation.

The World Bank has worked with Ethiopia and other development partners to develop ways to tackle these droughts and the resultant food insecurity, and move away from emergency responses to recurrent droughts. A key part of that strategy, The Productive Safety Net Program was developed to address not just short-term food needs, but also the underlying causes of household food-insecurity. The program forms a core component of the government's successive poverty reduction strategies. It contributes to improving the productivity and efficiency of transfers to chronically food insecure households, reduces household vulnerability, improves resilience to shocks by avoiding asset depletion, and helps promote sustainable community development. This is combined with further technical assistance regarding the feasibility of reducing the reliance of rain-fed agriculture by developing small-dam irrigation systems.

Source: Tabova, 2006.

B. FINANCING IN RESPONSE TO NATURAL DISASTERS

36. **In addition to regular development financing, IDA has had the flexibility to finance an *ex post* response to shocks when needed.** This support is provided through various mechanisms, including new emergency recovery credits (ERC), reallocations or restructuring the existing project portfolio to help support recovery activities, providing supplemental financing for an on-going development policy operation (DPO), and augmenting a planned DPO. An example is the recent supplemental operations in response to the 2005 Pakistan earthquake, where PRSC-1 was supplemented with \$150 million and the North-West Frontier Province SAC-II was supplemented with an

additional \$50 million. IDA has usually been able to mobilize a timely response to quick-onset disasters,¹⁸ although timing of a shock may affect the ability to mobilize resources. For instance, the ability to mobilize resources will be limited towards the end of a replenishment when nearly all resources available under the replenishment have been fully committed. The IEG evaluation of the Bank's assistance in cases of natural disasters stressed that the Bank has shown "considerable flexibility in its approach to natural disasters and has learned to manage large and small responses well".¹⁹

37. **IDA's assistance in the aftermath of a natural disaster is primarily aimed at financing reconstruction, and complements the role of other organizations including the UN and the IMF.** The emergency relief phase is primarily the mandate of the UN OCHA, while IDA resources aim at physical assets restoration and social and economic recovery. In 2006 the UN established a new stand-by relief fund, the Central Emergency Response Fund (CERF), which will provide the UN with immediate resources to deal with the relief phase of natural disasters rapidly once they occur. The IMF has a number of policies and instruments for purposes of responding to natural disasters: The Emergency Assistance for Natural Disasters (ENDA) which can be provided at subsidized rates of charge for low-income countries;²⁰ augmentations to ongoing PRGF arrangements, and the recently announced IMF Exogenous Shocks Facility (ESF) which would support an adjustment program lasting one or two years (see Box 3).²¹ Many other development partners have established other mechanisms, although international donor coordination at the global and country levels has been an issue that needs serious attention.²²

¹⁸ For instance, the Pakistan earthquake occurred on October 8, while the concept review meeting was on October 18 and the approval date was October 25.

¹⁹ World Bank (2006) pp xi.

²⁰ IMF (2005b) Subsidization of the Fund's Emergency Assistance for Natural Disasters to PRGF-eligible Members, January 10, 2005.

²¹ While the World Bank has on occasion provided balance of payments support in the aftermath of a natural disaster, this has been relatively rare, with World Bank support focused primarily on reconstruction.

²² Varangis et al (2004) provides a summary of the various forms of emergency and rehabilitation assistance from donors and creditors in Annex Table 1.

Box 3. IMF's Exogenous Shocks Facility

In November 2005, the IMF Board approved the establishment of an Exogenous Shocks Facility (ESF) within the Poverty Reduction and Growth Facility (PRGF) for balance of payments needs resulting from exogenous shocks.²³ The proposed second window was designed to fill the gap in financing instruments for Low Income Countries in the IMF.²⁴

While countries under an existing PRGF arrangement could receive augmented assistance prior to the establishment of the ESF window, the new window enables the IMF to finance balance of payments needs arising from sudden exogenous shocks for PRGF-eligible countries that do not have a current PRGF arrangement in place, and lending is on PRGF terms. The window would be a useful complement to the Policy Support Instrument – a new arrangement in the IMF for low-income countries that may not need financial support from the IMF, but would still want the IMF to support and endorse their policies. While the PSI is not a prerequisite for access under the ESF, it can help facilitate an ESF program.

The types of shocks eligible for support under the exogenous shocks facility include terms of trade shocks, natural disasters and conflicts and crisis in neighboring countries that disrupt trade. The facility would be accessed flexibly, in the hope that immediate financing could help to mitigate the direct and indirect effect of the shock in low-income countries. However, IMF support is intended to play a catalytic role, with the expectation that other donors would provide additional concessional financing to help countries mitigate the shock.

In setting up the Exogenous Shocks Facility, the IMF also highlighted the need for funds to protect the poor, given the disproportionate impact of shocks on the poorest segments of the population, and pointed to the ideal case where the PRSP has adequate contingency plans for how to respond to a shock. Since its approval in November, 2005, there has been no activity under the ESF.

38. The appropriate level of support from the international community to a given country in the aftermath of a natural disaster is determined on the basis of damage and loss assessments and cost-sharing with other donor partners. IDA has historically played a very large role in disaster recovery and reconstruction, including in leading damage and needs assessments. The World Bank is the largest financier of disaster recovery and reconstruction projects in the world. Since 1984, it is estimated that 528 projects and more than \$26 billion in financing has been provided by the Bank related to natural disasters.²⁵ The size of the natural disaster portfolio is large relative to the total portfolio, and according to IEG 2006, the Bank supported 60 distinct types of activities in response to disasters, including provision of supplies and equipment, rehabilitation of various types of infrastructure, irrigation and drainage, and planning for disaster management.

²³ IMF (2005a). Establishment of an Exogenous Shocks Facility under the Poverty Reduction and Growth Facility Trust, October 4.

²⁴ This gap stems partly from the fact the Compensatory Financing Facility (CFF) is non-concessional and generally considered expensive for LICs. In addition the Stand-alone CFF requires that the BOP shortfall be clearly linked only to the export shortfall, which in practice has been difficult to do, and these factors led to the CFF not being used in recent years.

²⁵ World Bank (2006).

39. **There is a gap between the end of the humanitarian phase and the commencement of the recovery phase which may exacerbate the impact of disasters on the poor.** Post-tsunami vulnerability and poverty assessments in the Maldives have demonstrated this. Recovery and reconstruction has also remained underfunded in all disasters. It is simply not possible to replace everything which was estimated to have been lost. Soon after the humanitarian phase, recovery and reconstruction start converging with development programs, and in many cases recovery needs start competing with normal development needs.

40. **There is also an increasing awareness of the need for attention to *ex ante* measures to reduce the impact and increase the effectiveness of disaster responses.** As was highlighted by IEG Report on Natural Disaster Assistance (World Bank, 2006), despite the frequency of natural disasters and their costs, governments as well as the Bank and others have often given inadequate attention to *ex ante* measures to reduce their impacts. The IEG evaluation demonstrated a number of countries which did not articulate measures to improve their resilience to natural hazards in their country strategies, despite the relative frequency with which disasters occur in those countries. As a result it is clear that there needs to be more emphasis on disaster prevention and changing incentives towards disaster prevention and advanced preparedness.

41. **As a result, projects in response to natural disasters have increasingly included disaster prevention and planning components, although more needs to be done.** IEG's report highlighted 246 projects in which a prevention related activity was included. In Honduras, for instance, an ongoing project aims to reduce the vulnerability of Honduras to future flooding by undertaking studies that highlight changed risks from flooding and landslides as a result of hurricane Mitch, provide community based flood early warning systems, strengthen the project management capability of the natural resources and environment ministries, and strengthen the national emergency response capacity through both national and local governments.

42. **The Global Facility for Disaster Reduction and Recovery (GFDRR) supports national capacity building to deal proactively with natural disaster risks.** This work is also intended to help enhance speed and efficiency of international assistance for disaster recovery operations when disasters do occur. This initiative, financed initially by the Bank's Development Grants Facility (DGF)²⁶ and multi-donor trust funds, is part of the Bank's support to implement the Hyogo Framework for Action in countries at high risk of disasters. The work has a primary goal of integrating disaster risk considerations into sustainable development policies in the highest risk countries. With \$5 million a year from DGF and \$350 million to be mobilized from partners in the multi-donor trust fund for mainstreaming disaster reduction, this global program will provide seed technical assistance at the global level and to 86 natural disaster "hotspot" countries in a phased manner. Assistance is aimed at mainstreaming hazard risk management into their poverty reduction strategies. Early discussions have also begun with a number of donors

²⁶ Funded as part of the IBRD budget, the DGF is an important complement to the Bank's lending and advisory role.

on a potential stand-by fund to provide additional financing to respond to disasters in countries that have initiated investments in disaster prevention and preparedness.

43. **In addition, to the increased emphasis on prevention, a Bank-wide review has been initiated on strengthening the policy and strategy for emergency operations and how to enhance collaboration with other partners.** This strategy includes how to mobilize a response quickly and with the right mix of skills, drawing on Bank-wide expertise and country dialogue. A skills register of experienced staff has been assembled. This “Quick Reaction” team of 57 staff drawn from different sectors and with past experience in disaster projects can be tapped for new disasters.²⁷ An early presence by Bank staff at the relief phase will help ensure synergies between the relief and eventual recovery and reconstruction phases, and avoid costly mistakes. These process-type steps will help ensure that IDA assistance is mobilized quickly and effectively.

C. FINANCING IN RESPONSE TO TERMS OF TRADE SHOCKS

44. **Like IDA, most development partners provide *ex post* funding for exogenous shocks on a case-by-case basis.** However, a few instruments have been established in the past that have attempted a more systematic and pre-determined level of support to an exogenous shock, especially in the case of terms of trade shocks. For instance EU FLEX and the IMF’s CFF were established to help provide more automatic *ex post* assistance (see Box 4).

45. **Reviews of *ex post* assistance for terms-of-trade shocks by the international community have shown that it has been mostly ad-hoc and is often procyclical.** Various attempts by the international community to provide more automatic assistance to help countries respond to commodity-price or terms of trade shocks have also been fraught with problems such as low levels of assistance, untimely assistance or inappropriate assistance given the lack of consideration of the overall country situation (see Box 4 for an overview of these compensatory financing arrangements). The evolution of compensation schemes has led to a case-by-case pragmatic approach based on a broad assessment of the impact of the shock (see dePlaa and Tabova, 2005). Given the heterogeneity of impacts, the recently announced Exogenous Shocks Facility of the IMF is based on a case-by-case assessment of the impact of the shock on the balance of payments position.

46. **An *ex post* response to a terms-of-trade shock is possible in IDA through supplemental DPOs, although these have been used infrequently to address terms of trade shocks.** Eight supplements were approved that responded to the sharp increase in oil prices in 1999-2000, and one was provided to respond to the sharp decrease in cotton

²⁷ An Operations Manual for the Quick Reaction Team is also under preparation.

Box 4: Compensatory Schemes for Terms of Trade Shocks

Two main instruments have been developed to compensate countries in the event of a terms of trade shock – the IMF’s Compensatory Financing Facility (CFF) and the EU FLEX program (and prior to that the EU Stabex and Sysmin programs). The CFF was designed to provide funds to countries that experience temporary shortfalls in export earnings (or a rise in cereal import costs) that are clearly exogenous and lead to balance of payment difficulties. To be eligible for a stand-alone CFF, the member must have an otherwise satisfactory balance of payments position. CFF funding is non-concessional, and over time the CFF was modified to increase conditionality (requiring accompanying reforms through a specific IMF arrangement). These changes combined with the introduction of the ESAF and its successor, the PRGF (which could be augmented in response to a shock), the CFF’s usefulness for LICs was outgrown and the CFF has not been accessed since 1999.

The CFF has been criticized for having only a minimal impact on export earnings instability. The possible reasons for this result may be that some payments were not sufficiently timely or sufficiently large, possibly as a result of forecast errors regarding export earnings (Hermann 1983, Lim, 1991). The CFF could also have destabilizing effects because of the pro-cyclical nature of transfers and repayments (Brun et al. 2001).

The EU Stabex and Sysmin programs aimed to protect governments from revenue losses, and complemented domestic stabilization schemes that protected farmers. As most domestic stabilization schemes broke down or were abandoned in the period 1985-1995, the Stabex program increased conditionality requirements in order to ensure that benefits also accrued to the farmers, and not just the government. This increased conditionality significantly slowed down disbursements under the program. An important characteristic of Stabex was its commodity-by-commodity stabilization focus, whereby compensatory payments were triggered by a reduction in exports caused by that commodity, regardless of the overall exports revenue situation (See Hewitt 1993, and Brun 2001). As a result, the program had a negligible impact on reducing the volatility in total export revenues (Aiello 1999, Brun et al, 2001). Sysmin, which was aimed at mineral production, had similar problems to Stabex.

The EU FLEX program launched in 2000 aimed to address the problems of Stabex, through fast disbursements, triggered by two criteria: (1) losses of overall export earnings from goods by more than 10 percent (2 percent in LDCs, landlocked or island states); and (2) 2 percent worsening in the programmed public deficit. Once eligibility criteria are met, countries need to agree on the use of funds for budgetary support or for contributions to sectoral programs as identified in the Country Strategy Paper and national Indicative Program. The amount of support was limited to the worsening of the deficit, and the national allocation for unforeseen events (the so-called B envelope). Originally, the amount of assistance depended only on the size of this B envelope, but post-2005, disbursements under the program require waiting until year-end data are available for all countries applying for assistance, with the amount of assistance to depend on the number of countries ultimately eligible in a given year. The program doesn’t take into account the impact of imports, except indirectly through the criterion of at least a 2 percent worsening in the public deficit. Tougher criteria were relaxed in 2004 and with this relaxation many more countries have been eligible for FLEX funding. Although it is relatively new, FLEX has been criticized for the complex procedures to establish eligibility which may have slowed the disbursement of funds (Tabova, 2005).

prices in Benin in 2002.²⁸ Supplemental DPOs can also be used in IDA to respond to other types of shocks, an example being the supplemental grant approved for Mali in 2003 to help address the cost of the crisis in neighboring Cote d'Ivoire.

47. **IDA can also provide assistance for managing terms of trade shocks or crises in neighboring countries through new development policy operations, either by changing the size or changing the focus of an operation.** This is done on a regular basis, and provides a response to a slow-onset shock that takes into account the overall circumstances of a country. An example is PRSCII in Burkina Faso, which was augmented from the planned \$40 million to \$50 million in response to the impact of the neighboring Ivorian crisis. However, there is no systematic reporting to capture these instances. For example, while Benin received support for the sharp decline in cotton prices in 2002 through a supplemental DPO, Mali's new 2001 DPO incorporated measures to address the impact of the cotton sector crisis within the overall scope of a new operation.

48. **Since the identification of a slow-onset shock is not always obvious, case by case responses can lack timeliness and reduce effectiveness.** In considering its response, the Bank would provide financial assistance only if it determines that there are particular financing needs as a result of the terms of trade shock and that there are no offsetting developments in other commodities or in the macroeconomic environment in general and no other forms of financing to address the shock. However it is difficult to know *ex ante* whether a shock is likely to be temporary or permanent, and if temporary, how long with the shock last and whether it will revert to a previous mean. This makes decisions on whether financing is needed for a slow-onset shock quite difficult, which can make the financing provided ineffective.

D. MARKET-BASED MECHANISMS

49. **A promising area for the Bank to increase its assistance is through enhanced access for IDA countries to market-based risk management mechanisms.** There are a number of areas where the Bank has pursued innovative projects to increase the resilience of IDA countries through such mechanisms. The earliest of such projects at a macro and more micro level were developed to deal with droughts and food shortages in vulnerable countries, while further projects under preparation address other natural disaster risks (such as catastrophic risk insurance in the Caribbean). Examples of projects to date include a Malawi Government Hedge of Maize Imports, an Ethiopia Drought Insurance Pilot, an Index-Based Livestock Insurance Project in Mongolia and a possible Weather Risk Hedge in Malawi.

50. **Commodity price stabilization funds have often been proposed as a mode of self-insurance to help manage commodity price fluctuations.** The issue of fungibility has been highlighted as one reason those interventions by the public sector rarely work -

²⁸ The seven countries are Madagascar, Mali, Mauritania, Niger, Rwanda, Uganda, and Zambia. See World Bank (2000). *Proposed Supplemental Credits Relating to the Impact of Oil Prices in Africa*. November 28, 2000.

even when there are clear rules on the use of the resources, the scheme is unlikely to change spending behavior unless there are limits on total public spending.²⁹ Many governments have attempted to stabilize prices, especially in agriculture either through physical buffer stock schemes, stabilization funds, or variable tariffs. However, such schemes have generally failed because of either lack of financial capacity, distortions introduced in the market by such schemes which reduced competition, or the unrealistic price levels set without reference to market prices. One study concludes that such price stabilization interventions simply do not work outside the market.³⁰ More recent stabilization-type proposals being considered tend to include an element of market-based risk management combined with subsidies for extremely low probability shocks. Some interventions to reduce the incidence of famine, however, do appear to be working. For instance food grain buffer stocks may have been the single most important factor which has prevented famines in India since 1971.³¹

51. Market-based risk management may be the most efficient way for countries to reduce their vulnerability to exogenous shocks. Market based mechanisms can also be more timely than instruments provided by the international community which are often cumbersome and prone to incentive issues and delays. Market based risk management reduces the volatility of tax revenues, which helps protect priority spending during a shock. In this way market-based risk management also helps protect IDA's development programs and projects from exposure to exogenous shocks.

52. Encouraging countries to use a small share of their IDA allocation to undertake market-based hedging transactions will help reduce country risk, and complement other ongoing activities to reduce vulnerability. Involvement of IDA in both financing the cost of derivatives and providing technical assistance will help countries to take on risk management strategies and help develop relationships and the ability to do business with the market. These types of tools can be especially valid in dealing with agricultural risk, but also with risk stemming from high export concentration. For most instruments that have been considered, the share of the IDA allocation that would be used to purchase derivative instruments would be small. Annex 1 explores the costs of a few potential structures and Annex 2 provides details about the Malawi Government hedge of maize imports.

53. Capacity building at the country level is needed so that countries can begin to interact with the market. It has been pointed out that the complexity of market-based risk management instruments, the lack of sufficiently customized products for low income countries and the lack of incentives for risk management have led to a limited reliance on market-based mechanisms in the past.³² Market reluctance to work with low

²⁹ Gilbert (1999). A noteworthy exception is the case of the Chile's Copper Stabilization Fund.

³⁰ Mahul et al. (2005) "Maize Production and Price Risk Financing in Uganda and Tanzania: The Feasibility of Market-Based Instruments" AFT Private Sector, World Bank. July.

³¹ R. Radhakrishna and K. Venkata Reddy (2004). "Food Security and Nutrition: Vision 2020", India Planning Commission.

³² Claessens (2005) points out that a factor in limiting the use of risk management tools may be the impression of easy access to cheap international financial assistance to smooth shocks, although this has mostly proved insufficient and inefficient.

income countries has also been a factor, even though some instruments bear little credit exposure risk as they are paid for by the IDA country up-front.

54. **IDA has been facilitating greater country access to risk management instruments through technical assistance and, in a few cases, the use of IDA resources for the purchase of market-based derivatives on highly concessional terms.** In addition, the concessional terms of IDA's assistance already provides a strong financial incentive for poor countries to purchase hedges. At times, limited access to market instruments can be addressed by IDA technical assistance to help design customized products that closely reflect country risks and help bridge the market gap (Dana et al, 2006). The technical assistance needed can, however, be extensive. As such the use of market-based risk management instruments can extend to a broader group of IDA countries only gradually.

55. **Technical assistance and facilitation from IDA has been identified by market providers as a key to increasing access to market-based risk management instruments in Ethiopia and Malawi.** The facilitation role of IDA can help with the establishment of market instruments where they do not exist, for instance through encouraging countries to pool risks and through the development of independent indices. In Africa, two recent projects (Ethiopia weather derivative purchased on behalf of Ethiopia by the World Food Program (UNWFP), and Malawi Maize hedge) pioneered market-based tools to manage macro level risks. Both contracts relied on technical assistance provided by the World Bank. In the case of the Malawi Maize hedge, this enabled Malawi to access the South African Futures Exchange (SAFEX) and to develop a call option to cap the potential cost of expensive Maize imports. In the case of the Ethiopia weather derivative, any payout triggered by the rainfall index would be channeled through WFP to extend Ethiopia's existing social safety net program for poor farmers whose assets are threatened by the drought.

V. ARE ALTERNATIVE MECHANISMS NEEDED TO ADDRESS EXOGENOUS SHOCKS IN IDA?

56. **The mixed evidence on the ability of exogenous shocks to explain GDP volatility, issues related to the heterogeneity of the shocks impact, and the poverty impact of shocks raise questions on whether additional financing can help address shocks.** The research shows that while one cannot expect to reduce macroeconomic volatility in IDA countries in a major way as long as internal factors stay the same, donors can still help developing countries reduce their vulnerability to shocks through aid. A case-by-case approach currently employed by most development institutions allows for careful consideration of the appropriate design of an *ex post* assistance strategy in the country affected, but can result in a delay in assistance, and redirection of development assistance away from other investments. Is additional financing needed to avoid diversion of assistance away from other investments, to help address the poverty impact of shocks, or to reduce the "debt risk" of shocks?

57. **The evolution in IDA to a forward looking grant-allocation system will be an important step towards helping to mitigate a country's "debt risk" to exogenous**

shocks. For countries with narrow and more volatile export bases, a shock can have a stronger impact on debt sustainability ratios than on a country with a broad and stable export base. Exogenous shocks, as measured by GDP volatility were shown to be a key variable (in addition to policy and debt levels) in predicting a country's risk of debt distress.³³ The backward looking "traffic light" system used in the first year of IDA14 for most countries³⁴, however, assigned a risk of debt-distress based on matrix of historical debt ratios and policies, and hence did not have a clear link to the debt risk of exogenous shocks.

58. By switching to a forward-looking approach, the IDA grant-allocation system can anticipate the potential for a country's debt distress risk to increase as a result of a possible shock, and accordingly provide financing increasingly on grant terms.

The use of rigorous stress tests including a historical growth scenario as well as a shock scenario, combined with well-disciplined projections, introduces a conservative bias to new borrowing that is meant to counterbalance the tendency towards overly optimistic growth assumptions.³⁵ The purpose of the stress tests is to examine the implications of shocks on the projected debt path, based on the historical volatility experienced by a country thus countries with greater susceptibility to shocks will have a greater deterioration in their debt ratios.³⁶ In addition to the stress tests, the annual DSF outcome would determine whether there is a need to adjust IDA's financing terms in subsequent allocation cycles should the shock increase the risk of debt distress, hence a shock response need not always be on grant terms.

59. While the IDA grant allocation system helps to reduce the debt risk of exogenous shocks, there is still the question of whether additional volumes of financing could be efficiently employed to help countries cope with shocks. In the case of natural disasters, there are cases where reallocations of IDA resources, including of undisbursed credit balances on existing projects, may not be viable. For instance IEG refers to the case of small island states and small countries with limited IDA allocations where few ongoing loans may be available, and the size of IDA lending is often small

³³ See Aart Kraay and Vikram Nehru, 2004 "When is Debt Sustainable?", World Bank Policy Research Working Paper No. 3200.

³⁴ See World Bank, 2004 "Debt Sustainability and Financing Terms in IDA14: Further Considerations on Issues and Options, IDA, November 2004. The snapshot approach looked at a country's historical NPV of debt-to-exports and NPV of debt-to-GDP ratios (these ratios are averaged); and the debt-service-to-exports ratios and compared these with the policy-dependent debt thresholds for that country. The distance from the threshold would determine the risk of debt distress. A "green light" country indicates a low risk (far from the threshold), a "red light" country a high risk, and a "yellow light" country a medium risk of debt distress.

³⁵ See "Debt Sustainability in Low-Income Countries – Proposal for an Operational Framework and Policy Implications", IMF and World Bank, February 2004.

³⁶ There are six standard bounds tests in the DSA, which test for impacts on the NPV of Debt-to-GDP, Debt-to-exports and debt service to exports ratios. These include real GDP growth at historical average minus one standard deviation, export value growth at historical average minus one standard deviation, US dollar GDP deflator at historic average minus one standard deviation, net non-debt creating flows at historic average minus one standard deviation, a combination of the first 4 bounds tests using half standard deviation shocks, and a one time 30 percent nominal depreciation relative to the baseline.

compared to the magnitude of damage caused by an exogenous shock. The special frontloading provisions in IDA for small countries may make a response possible, although another project may no longer move forward as a result. While reallocations can make sense, especially where the disaster has reduced the relevance of the original financing plans, there may be cases where reallocations to respond to a shock can undermine the original purpose of a project.

60. **The IDA performance-based country allocation system and the availability of funds in an individual country could constrain the ability of IDA to provide more assistance to a country facing a terms-of-trade shock or natural disaster.** IDA has built-in flexibility through frontloading allocations from outer years within a given replenishment, and IDA's resource allocation system has built-in exceptions to the per-country allocation limits for small island states in recognition of their vulnerability. However, even with additional flexibility, financing a shocks response within a country allocation still involves difficult tradeoffs with planned investments.

61. **Four approaches have been explored that could provide opportunities for IDA to further reduce the impact of shocks on poverty and growth, without diverting financing away from other development priorities.** First, in order to minimize the diversion of development financing in the event of a low-probability shock, a facility could be developed within IDA to provide additional case-by-case financing for countries that have made initial investments in prevention. A second option is to provide greater incentives for countries to undertake disaster prevention measures by leveraging their IDA allocations. The third option specifically links additional assistance to a country-specific index of primary commodity prices. A final option explored is to provide additional assistance to more vulnerable countries through the PBA system by including a vulnerability measure.

A. EX POST ASSISTANCE FOR RECOVERY AND RECONSTRUCTION

62. **The IDA14 replenishment report includes a clause that allows for additional allocations to be provided to IDA countries in the aftermath of major natural disasters.** This addition to the IDA14 Arrangement helps formalize a mechanism that was used on occasion in the past. It enables management to re-program underused IDA allocations to help respond to an exogenous shock, although it may be that such flexibility is becoming limited with the strong demand in recent years for IDA resources. In rare cases, additional financing from the World Bank Group was provided where a shock was extreme or highly visible. For instance in the case of the Tsunami response, financing from IBRD surplus into trust funds provided exceptional grant support for Indonesia (\$25 million) and India (\$2.5 million).

63. **The reduction in degrees-of-freedom for countries to be able to respond to exogenous shocks within the PBA system and the high demand for IDA resources opens the question of whether additional financing for natural disasters should be considered.** And if so, how would such assistance be structured? The IDA14 Arrangement itself includes an exception to the performance-based allocation system that enables countries to receive additional allocations if their IDA allocations are insufficient

to deal with a large natural disaster, but to do so would reduce overall allocations for other countries. This diversion of resources, either from within a country's allocation or from within the overall IDA resource pool has large long-term development implications in terms of the opportunity costs of *inter alia* schools not built and infrastructure not built.

64. **Additional financing to help fund the recovery and reconstruction phase after a natural disaster could be provided where the IDA allocation is insufficient, although such a fund could lead to allocation issues.** For instance, IDA13 provided a grant window through which a natural disaster response could be funded. This experience pointed to the difficulties in managing a finite fund to respond to natural disasters, in particular the inability to forecast the needs. This led to a first-come first-served problem and an inevitable dilemma towards the end of a replenishment period about whether to reprogram the resources, or have them on hand to deal with a potential disaster.

65. **Eligibility for additional funding for countries that are identified at risk could be contingent on the affected country developing disaster prevention and preparedness plans.** Structured in this way, the facility would be a strong complement to the Global Facility for Disaster Reduction and Recovery, and a strong incentive for preventative measures. While there are issues with the set-aside of resources for an eventuality, this could be minimized in IDA if the resources are truly additional and would not reduce resources needed for infrastructure and improving human capital. For countries not identified as high risk but that experience a low-probability natural disaster, an exception could be made to ensure that additional funding would not be withheld in such a case (if IDA allocations are insufficient to help fund a needed shock response).

B. DEVELOPING A DISASTER PREVENTION FACILITY IN IDA

66. **A key message from the 2006 IEG report on natural disasters is that disasters are treated as an interruption to development rather than viewed as a risk to development.** They point out that "Effective activities that address root causes of vulnerability and mitigate the potential for future damage are key to reducing the steady erosion of development gains that natural disasters represent". Shifting the focus away from a responsive mode to a preventative mode is also the impetus behind the GFDRR.

67. **In response to the momentum towards disaster prevention and preparedness, IDA could develop a disaster prevention facility.** Such a facility could be helpful to provide incentives for countries to invest in disaster prevention, and ultimately help reduce the cost of recovery. Such a fund could be set up to function like the IDA regional projects pilot, whereby a given amount from a country allocation could leverage a pool of funds set aside by IDA to finance prevention activities. This would maintain a link to the PBA system, while providing an incentive to invest in prevention.

68. **An important challenge is to provide incentives to emphasize upstream measures to integrate risk reduction in all development programs and projects.** A number of vulnerability reduction measures can be identified that should be

mainstreamed in long term development planning processes, but are not often included in country CASs and PRSPs. In earthquake and hurricane prone areas, strengthening of critical infrastructure facilities are examples of disaster mitigation projects. *Ex post* action to ‘retrofit’ projects help in reducing accumulated vulnerabilities. Community awareness and preparedness, training and capacity building, strengthening emergency management capabilities are other examples of measures aimed at risk reduction.

69. **Such a facility would require an initial injection of funding for which pledges could be provided in IDA15.** We would estimate that a small facility could be used in the early years, and then the size of the facility may need to grow as more countries streamline disaster prevention into their country strategies and identify risk reduction activities. Given the need for additionality, the initial size of a facility would depend upon the size of the overall IDA15 replenishment.

70. **Such a facility within IDA could help encourage a country-driven and multi-sectoral approach to disaster risk reduction.** The facility could finance stand-alone prevention activities, or the marginal cost of fortifying existing projects to withstand known risks. The ongoing work of the Global Fund for Disaster Reduction and Recovery would complement the work of IDA and help identify opportunities for the Bank to invest in disaster risk reduction projects. Such a facility within IDA could build on the extensive experience of the Bank in reconstruction and mitigation activities and ensure that prevention covers all sectors. However, if additional *ex post* financing for natural disaster responses is provide by IDA (option A), linked to undertaking risk reduction activities, additional incentives through a prevention facility may not be necessary.

C. AUTOMATIC ASSISTANCE FOR COMMODITY PRICE SHOCKS

71. **During IDA14 negotiations, consideration was given to the possibility of creating a shocks facility to accompany the IDA14 grant allocation system.** Such a shocks facility would be financed by the incentive-related portion of the discount (11 percent) applied to IDA grant allocations.³⁷ At that time, given the uncertainty around the practical aspects of a systematic IDA facility to respond to shocks, it was recommended that a PBA-based reallocation mechanism be adopted for the use of the resources from the 11 percent volume discount, and that staff continue to explore options to use those resources to respond to shocks

72. **Such consideration took as its starting point the paper, entitled “Managing the Debt Risk of Exogenous Shocks in Low-Income Countries” (World Bank, 2005).**³⁸ This paper examined several possible financing structures that could automatically tailor IDA debt service to an instance of shocks. The instruments examined varied debt service payments linked to GDP levels, commodity prices, and real exchange rates. The paper concluded that while these types of instruments could offer opportunities for IDA to risk-share the impact of shocks with low income countries, they also presented serious operational challenges and potentially high risks. In addition, there

³⁷ World Bank, November, 2004.

³⁸ IDA SecM2005-0112/1, June 23, 2005.

is a shrinking universe of countries for which IDA debt service is an issue, given HIPC and MDRI, and the IDA14 grant allocation system.

73. **A number of design issues complicate the development of instruments that could help countries to mitigate the impact of price shocks.** As history has shown (see Box 4), such design issues may lead to a marginal or uneven impact across countries, or may provide disincentives for improved risk management or appropriate export strategies. Defining a shock for such an instrument is an additional complication: should a shock be based on export receipts, export prices, an index of exports and imports, and at what level should countries be compensated to minimize distorting incentives? Defining a shock in order to have a timely response is also a challenge since many data series come with a significant lag. An additional difficulty is determining the appropriate mix of adjustment and financing, and the relationship between the average terms-of-trade shock and overall financing needs in a particular case. The risk of moral hazard in the form of discouragement of self-insurance and export diversification is also a concern.

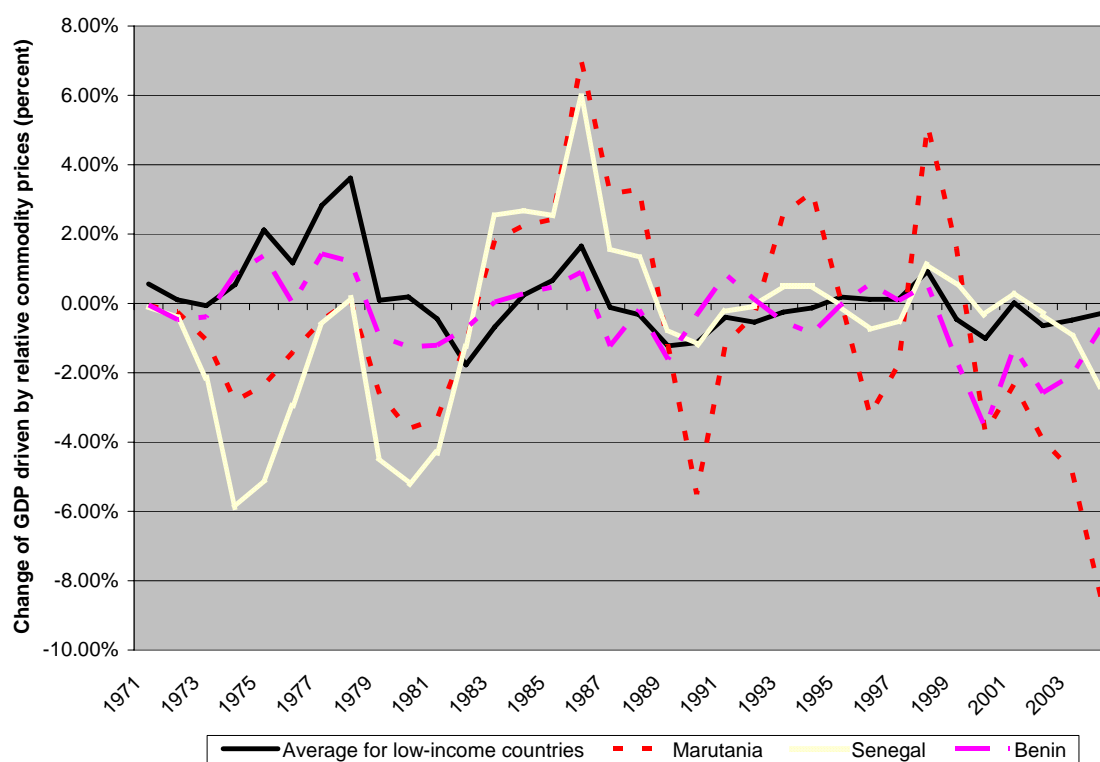
74. **Apart from design issues themselves, the costs and risks to creditors and hence the opportunity costs to borrowers of spending an additional aid dollar on a shocks facility vs regular development assistance needs to be considered.** Providing assistance within IDA can also lead to effects on the PBA system and equity issues. An important addition consideration is how to target the assistance so that it benefits the vulnerable populations most affected.

75. **Taking these considerations into account, an IDA instrument that would provide budget support in response to relative movements of primary commodity prices has been explored (Tabova and Gilbert, 2006).** The objective of such a structure would be to help protect the development program from budget pressures resulting from adverse primary commodity price shocks. A shock is measured as a large negative deviation of a country-specific index of primary commodity prices (both exports and imports) from its previous four-year moving average.³⁹ The country-specific index consists of world prices of a country's major primary export commodities relative to prices of its imports of oil and grains, weighted by their importance in the country's GDP. In other words the index measures changes in GDP driven by a country's commodity price movements. The proposed index limits the scope of primary commodities to those with clear, well-defined world prices, and excludes oil exports.⁴⁰ Figure 4 illustrates the index for a few selected countries as well as for all low-income countries on average.

³⁹ The scheme would only respond to large shocks, and not to normal volatility, since countries should be able to cope with normal price movements.

⁴⁰ Metals exports are excluded from the scheme considered, since the structure of the mining industry in many countries means that they contribute very little to government revenues, and in countries where government revenues are highly dependent on minerals such as Chile, many have their own mechanisms.

Figure 4. Movement of the relative primary commodity price index



76. **In the event of a large negative shock, additional IDA resources could be automatically triggered, possibly using the resources from the 11 percent grants discount.**⁴¹ Simulations over the 25 year period tested indicate that of 77 IDA members, about 18 countries on average would have a large negative shock (with a maximum of 53 countries and a minimum of 2 countries). Average costs in the initial year of implementation⁴² would be about \$650 million per year, with a minimum level of about \$40 million and a maximum of \$1.9 billion per year, i.e. considerably larger than the resources available through the 11 percent grants discount.⁴³ The largest payouts occur in years where many countries are hit by the same shock, as is the case with the recent high oil import prices. However, final assistance amounts can vary depending on what proportion of costs IDA assistance would propose to target, subject to further discussion and analyses, and what type of pre-qualification criteria might be considered.

⁴¹ See Tabova and Gilbert (2006) for further information on methodology. A large shock is defined as a shock that induces a 0.5 percent loss of GDP.

⁴² Based on actual allocations from 1992-2005, and 1992 allocations data for all earlier years.

⁴³ Based on a response scheme that Tabova and Gilbert propose: an additional 10 percent of the country's allocation be provided with a shock that would result in a 0.5 percent loss of GDP, an additional 25 percent of the IDA allocation for a shock that would cause a loss of between .75 percent of GDP and 1.5 percent of GDP, and for shocks larger than 1.5 percent of GDP an additional 50 percent of the IDA allocation would be triggered.

77. **Given the asymmetry of the scheme, some pre-qualification criteria based on a certain level of performance could be called for.** The scheme considered here is asymmetric in that countries do not pay back in times of positive price shocks. However, the assistance provided would be linked to a country's normal IDA allocation, providing an increment relative to the original allocation when a shock is experienced, with the increment related to the severity of the shock. In this way a performance factor is built into the shocks mechanism that can help allay concerns about weakening the performance allocation system. Additional pre-qualification criteria based on good policies (such as a strong medium term expenditure framework and a poverty reduction strategy) would help to ensure that the funds could be used effectively, and would avoid delays. Major oil exporters are excluded from the scheme, since market-based hedging mechanisms are available to manage oil price volatility.⁴⁴

78. **The advantage of using commodity prices as a measurement of shocks is that these are less subject moral hazard concerns.** Given that IDA countries are almost always price takers, these prices are beyond the control of the government. Furthermore, international commodity prices are known with certainty on a regular basis, and GDP is known by the end of each year, and can be estimated mid-year to anticipate eligibility and availability of resources. Alternatively to enhance the speed of the scheme, a lag of GDP can be used, since the primary factor the index tries to capture is the impact of the prices.

79. **Any instrument that aims to provide assistance automatically across a number of countries cannot fully take into account the heterogeneous impacts of a given input shock on different countries.** For instance, while the country-specific index of commodity export and import prices measures price effects, volume effects may be equally important. And in many countries the international price differs greatly from the price that countries receive domestically for the same commodity. The overall impacts of price shocks are also highly dependent upon the overall macroeconomic and policy environment which differs greatly across countries. This can be illustrated by looking at the impact of the 2003-2005 oil shock:⁴⁵

- **The large increases in oil prices since 2002 seem to have had only a limited impact on low-income countries, as evidenced by their balance of payments and fiscal positions.** The IMF estimates that, on average, the balance of payments and fiscal positions of oil-importing LICs have actually improved during the 2003-2005 period, and thus far there have been no requests for support under the Exogenous Shocks Facility.⁴⁶ This has been explained by the positive reserve positions, the gradual increases that allowed countries time to adjust (the changes between 1998 and 2005 are similar to the one-year increase experienced in 1974), and the offsetting effect of higher exports.

⁴⁴ In some countries there is also lack of transparency in terms of reporting government oil receipts.

⁴⁵ Dudine et al, "Weathering the Storm So Far: The Impact of the 2003-05 Oil Shock on Low-Income Countries", IMF Working Paper WP/06/71.

⁴⁶ Ibid.

- **Beyond this muted effect on LICs in aggregate, macroeconomic policies and environment have led to heterogeneous impacts on the impact of the oil price increase on individual countries.** For instance, in a number of countries, the response to the shock was a sharp contraction in the volume of oil imports. For others, the shock was largely offset by improved exports, increased grants, and debt relief, which led to an actual improvement in their reserve position. For another group, the impact was substantially offset by improvements in the capital account. In one group of countries, the oil price shock has led to deterioration in their reserve position, although for most the reserve level is still comfortable.⁴⁷

80. **The greatly heterogeneous country response to the oil price shock points out the difficulties of an automatic *ex post* instrument to accurately target assistance.** It may be that this type of instrument is much less effective than *ex ante*, customized risk management strategies which are built on detailed risk assessments. Such assessments can take into account the unique characteristics of the market and policy environment in the country and then create a strategy to manage specific, hedgeable exposures in the sector.

81. **The automatic index scheme's response to the most recent oil price shock would have led to large payments.** Most problematic with including oil imports into the index, is that all oil-importing countries will be affected by oil price shocks simultaneously depending upon the movement of prices in other commodities. As discussed earlier, however, further refinements and feasibility of making such an index operational would still be needed.

82. **It is difficult for any automatic scheme to capture the overall strength of economies going into a shock and their accumulated reserve levels.** Such schemes could also not factor in the response of the country to the price shock, for instance whether the country reduced oil imports or implemented a change in the pass-through policy. Such considerations would influence a decision to provide additional assistance if it was done on a case by case basis. Indeed the IMF's preference for a case by case approach in its ESF arose because of the difficulties in assessing the duration of the shock, the balance of payments impact, and the appropriate mix of adjustment and financing.

83. **On the other hand, to make an aid response to a shock effective, research points out that it needs to be timely.** Assistance that is based on clear, objective, and readily available criteria and involves minimum conditionality may in some circumstances be speedier.⁴⁸ This suggests the potential tradeoff between timeliness and comprehensiveness.

⁴⁷ Ibid. For seven of the countries reserves are at low levels, including two cases which requested a PRGF augmentation from the IMF (Bangladesh and Madagascar). Three of these (Cambodia, Djibouti and Tajikistan) are moving towards a PRGF arrangement, and the other two have no PRGF prospect at this time.

⁴⁸ The assessment of the IMF in designing its ESF was that it was able to provide relief sufficiently quickly even given the judgmental factors built into the facility. This was partly based on its extensive

84. **Independently of its value in the development of a potential IDA facility for relative primary commodity price shocks, the index that was developed could also serve as an interesting gauge to indicate countries most vulnerable to primary commodity price movements.** Since the index is based on prices which are available in real time, such an index could play a dynamic role. Further work in developing and disseminating such an index, which could be a key indicator of terms of trade losses may prove useful in pinpointing vulnerability. It could also provide an objective metric for the need for additional short-term financing from other donors. Potentially, if such an index would become widely disseminated it could take on usefulness in country hedging instruments over the longer-term.

D. VULNERABILITY AND IDA'S ALLOCATION SYSTEM

85. **Alternative proposals have been put forward that IDA should include a vulnerability index in its allocation system to provide additional financing *ex ante* to countries with vulnerability to external shocks.** One line of thinking is that aid is more effective in vulnerable countries as it can help countries manage instability and adjust to exogenous shocks.⁴⁹ This finding is supported in part by Raddatz (2005) who argues that low vulnerability countries seem to be more resilient to shocks than high vulnerability ones. Guillaumont (2005) argues that as a result of the impact of vulnerability on growth and poverty reduction, a measure of vulnerability should be a feature of donors' aid allocation systems, in addition to the quality of policy and institutions. Thus far, the European Development Fund (EDF) of the European Commission and the Social Development Fund (SDF) of the Caribbean Development Bank are the only two multilaterals that have explicitly factored vulnerability into their allocation systems.

86. **The present UN Economic Vulnerability Index contains a number of components that measure both the structural exposure of countries to shocks and the historical size and frequency of shocks in the country.** Three measures in the EVI – population size, share of agriculture in GDP and export concentration – are included in the index to capture structural vulnerability. Another three components of the EVI – instability of exports, instability of agricultural production and share of population displaced by natural disasters, measures the historical exposure to shocks.

87. **Analysis shows that although there is not an explicit vulnerability variable in the performance-based allocation system, IDA disbursements are sensitive to vulnerability.** Tabova and Fitzpatrick, (2006) estimated the elasticity of IDA net aid disbursements from 1999-2004 to the 2003 EVI at 1.79, which implies that a 1 percent increase in the vulnerability index results in a 1.79 percent increase in disbursements. Although IDA's PBA system includes an income variable, income is not closely correlated with vulnerability. Rather, some important exceptions to the allocation norms help explain the sensitivity of the current allocation system to vulnerability, including the

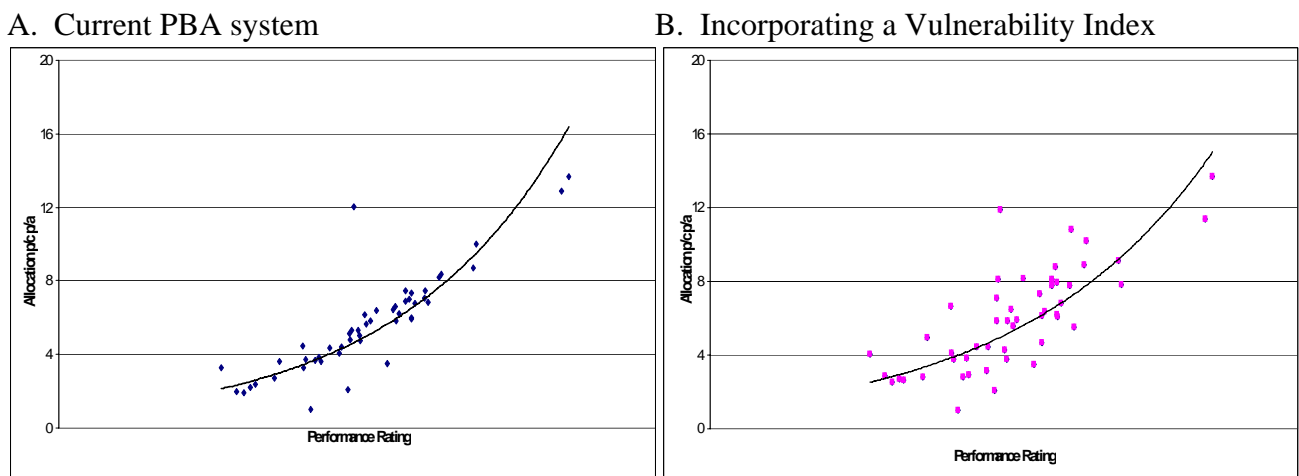
experience providing rapid balance of payments support in the context of Fund-supported programs, with consideration given to the fact that the complexities of automatic ex post facilities can create their own obstacles to rapidity of response (e.g. data requirements) (IMF 2005a).

⁴⁹ See Guillaumont and Chauvet 1999, Chauvet 2004, Guillaumont 2006. Guillaumont (2005), for instance argues that aggregate vulnerability lowers growth and slows down poverty reduction.

small states exception, post-conflict countries and capped blends. However, the flexible use of reallocations to respond to natural disasters seems to be the key contributor to this relationship. As such the sensitivity to vulnerability in IDA disbursements may actually be capturing the redeployment of countries' development lending programs into shocks responses.

88. **A proposal to include a vulnerability variable into the PBA system would further complicate IDA's PBA at a time when there is an emphasis on simplification.** Such a variable could take the form of an index similar to the UN Economic Vulnerability Index, or an index linked to vulnerability to natural disasters as highlighted by the World Bank's "Hotspots", and thus augment IDA's "vulnerability selectivity". Such a vulnerability variable assumes greater need for countries with structural barriers that make them more susceptible to shocks, but including this variable would come at the cost of a slight weakening of the performance basis of IDA's allocation system (see Figure 5).⁵⁰ An additional worry is that a country's vulnerability is delinked from a country's actual financing needs.

Figure 5: Impact of incorporating a vulnerability index into the IDA PBA system



89. **As with other proposals to increase aid to respond to shocks or vulnerability to shocks, the effectiveness of additional aid to those countries relative to additional aid under the PBA system would need to be demonstrated.** Would the additional aid be spent on risk reduction to reduce vulnerability? IEG (World Bank, 2006) points out that "disaster risks do not make it into the CAS or PRSP as often as the country exposure to such risks would seem to warrant".⁵¹

⁵⁰ The extent of this weakening would depend, in part, on the weight attached to vulnerability relative to the other weights in the allocation formula. As shown in the graphs the slope that maps the relationship between performance and allocations is somewhat less steep once vulnerability is incorporated, and there is more dispersion of countries around the curve.

⁵¹ World Bank (2006) "Hazards of Nature, Risks to Development, An Evaluation of World Bank Assistance for Natural Disasters", IEG Report, CODE2006-0020, March 7.

VI. CONCLUSIONS AND ISSUES FOR DISCUSSION

90. **This paper responds to Deputies request that IDA staff explore the feasibility of strengthening IDA countries' response to shocks.** This paper describes the impact of shocks on IDA countries, how IDA has responded to these shocks, new innovations in IDA and possible ways that IDA could play an even greater role in helping countries reduce their vulnerability.

91. **IDA addresses shocks through its country-driven and multi-sectoral approach to development financing that aims to reduce vulnerabilities.** Regular IDA development lending is aimed at reducing structural vulnerabilities over the long term and increasing resilience in the short and medium term. Improvements in public expenditure management, infrastructure, irrigation, land reforestation, shared power pools, shared resource management, and the development of targeted social safety nets are all ways through which vulnerability can be reduced.

92. **While the majority of GDP volatility is linked to domestic policies and domestic shocks, exogenous factors are still a significant, albeit smaller factor in explaining GDP volatility.** In addition, shocks have a disproportionate impact on the poorest segments of the population. As a result, mitigating the impact of such shocks presents a challenge especially in countries with weak delivery mechanisms.

93. **Market-based mechanisms within IDA are promising, in that they can help better target resources to those most affected by shocks.** Encouraging countries to use their IDA allocations to purchase market-based derivatives and insurance will help countries reduce the volatility of their revenues, and reduce the diversion of resources from other development priorities. It must be acknowledged however, that access to market instruments will require facilitation to establish such instruments where they do not exist (eg, through our ability to convene and get countries to pool risks and the development of indexation measures), and technical assistance to help customize products to the risk profiles of a given country and commodity. As such additional resources for technical assistance would be needed to scale up the early successes in market-based risk management in LICs, but it will take time before market-based risk management instruments become more widely used in IDA countries.

94. **While IDA can finance an *ex post* response to a shock – be it a natural disaster or a terms-of-trade shock – the overall strong demand for IDA's resources implies tradeoffs with other development needs.** While long-term development is the core role of IDA, IDA is often diverted to finance short-run alleviation, reducing funding for IDA's core mandate. The paper presents a number of potential ways that IDA could increase financing to either respond to a shock or help countries undertake measures to strengthen their resilience to a shock.

95. Deputies may wish to comment on the options and tradeoffs for increased funding to respond to exogenous shocks outlined in section VI:

- Do Deputies wish to explore additional *ex post* financing for natural disaster recovery and reconstruction for countries that have initiated investments in disaster prevention and preparedness?
 - Do Deputies agree that such financing should be additional to IDA's regular development lending to avoid diverting financing from already constrained country programs?
 - Do Deputies agree that such financing, targeted to countries that have initiated investments in disaster prevention and preparedness, would provide a strong incentive for upstream work?
- Do Deputies wish to explore the possibility of increasing the incentives for countries to undertake disaster prevention activities through a fund that would leverage IDA allocations for prevention?
 - Do Deputies agree that the financing for such a fund would need to be additional to current IDA financing?
- Is there interest in exploring the option of providing additional funding to help countries cope with relative primary commodity price shocks, or do Deputies consider that such financing is the comparative advantage of the IMF?
- Do Deputies agree that the potentially large financing needs of such a facility would need to be additional to the current level of IDA resources in order to avoid diverting resources away from IDA's core mandate?

Annex 1: Risk Management Strategies for Select Countries and Indicative Cost

Country	Risk	Exposure⁵²	Requirements for Risk Assessment	Risk Management Product	Indicative Cost to Hedge / Insure 60% of Exposure⁵³	Relative cost (as % of annual IDA allocation)
Tanzania	Cotton & Coffee Prices	\$200 million	Assessment of pricing policies implemented by cooperative unions and private sector ginners; Assessment of coffee marketing strategies through direct sales and the national auction	Put Option contracts based on NYBOT (cotton/arabica coffee) and LIFFE (robust coffee) to protect prices guaranteed to farmers.	\$3.3 million	0.9%
Burkina Faso	Cotton Prices	\$220 million	Assessment of producer pricing systems and marketing strategies of private sector and parastatal ginning companies; Currency risk	Put Option contracts to protect prices guaranteed to farmers (based on NYBOT, Cotlook A, or some combination, with currency hedge included)	\$4 million	2.9%
Ethiopia	Drought	\$ 7-8 million for initial pilot	Construction of indices to capture the relationship between weather variability and the financial impact on agricultural output.	Index-based weather derivative	\$1 million	0.3%
Malawi	Maize Prices	\$48 million	Assessment of consumer pricing systems, roles of private sector traders and ADMARC, and estimated imports for food security	Call option with alternative for physical settlement (i.e., actual maize deliveries)	\$1.2 million	1.2%
Honduras	Oil	\$1 billion	Assessment of market and supply chain structure, consumer pricing and regulations,	Call option or Collar	\$36 million	50%
Bangladesh	Flood	\$ 30 million	Assessment of the frequency and severity of flood events per loss adjustment zones; construction of indices to capture the relationship between the flood parameter and the financial impact on agricultural output	Index-based weather derivative/ Insurance	\$1.8-2.7 million	0.3-0.5%

⁵² Estimated production or exports/imports for 2005/6 x current market prices.

⁵³ Assuming at or below the money levels of protection.

Annex 2: Malawi Government Hedging of Maize Imports, 2005/6

Background. In 2005/6, Southern Africa experienced a severe drought-related food shortage. Affected countries included Malawi, Zambia, Mozambique, and Zimbabwe and it was estimated that the volumes of imports needed to supply these countries would range from 1.5 – 2 million metric tons. During a food shortage maize prices typically increase, thus exacerbating the risk of hunger. In the past, Governments have attempted to manage this problem by subsidizing the price of maize but such responses tend to have a large cost both financially and in terms of negative impact on local and regional trade.

Strategy and Request for Technical Assistance. In June of 2005, the Government of Malawi announced that it would take an innovative approach to management of the food shortage by using South Africa Exchange Market (SAFEX)-based instruments to help cap the cost. In response to a direct request from Government, the World Bank provided technical assistance to support this operation. This included education on the SAFEX market in general, training on futures and options and how the products could be used to manage specific exposures, risk assessment, exercises to structure prototype contracts, assistance in building consensus with stakeholders, discussions on funding for the approach, communication with potential market providers, comparison of proposals, negotiation of contracts, and overall implementation. This support was provided between September-November, 2005 and required the equivalent of one full time technical person allocated to the project, in addition to part time support from other team members and country office staff.

Customization Required. Because government was concerned not only about price increases but also about logistics constraints and delivery performance, the call option contract was customized as an OTC (“over-the-counter”) contract which would give more flexibility than a standard financial instrument. First, price protection was provided on a delivered basis, thus combining the price for white maize on the exchange in South Africa (SAFEX price) plus transport costs to Malawi. Second, the option contract carefully specified terms for physical settlement so that it could be used as a contingent import strategy if needed. Uncertainty about the extent of the food shortage, levels of commercial imports, transportation constraints, performance of local traders, the humanitarian response, and efficiency of procurement processes made the contingent import aspect of the contract very attractive to the Government.

Contract. In September, the Government of Malawi concluded an agreement with Standard Bank of South Africa to provide the risk management structure. The contract, an OTC call option, represented one of the first-ever instances of macro level hedging by an African government. It covered imports of 60,000 mt of white maize, had a total value of approximately \$17 million, and a premium payment of \$1.53 million. DFID provided budget support to the Government of Malawi for purchase of the contract.

Outcome. Throughout November and December as prices were increasing and the food shortage growing more severe, Government exercised the call option, elected for physical settlement, and allocated the majority of the maize to humanitarian operations. The maize purchased through the option contract had a better delivery performance than most other procurement procedures, and during the delivery period spot prices rose USD \$50-90/mt above the ceiling price of the contract following increases in the SAFEX white maize price and transport costs over the period October – January.

Implications. Within the region, traders and banks are supportive of this approach and believe it has a number of indirect advantages in addition to the hedging benefits. Contingent import strategies based on call option structures help in planning because they can be put in place well ahead of eventual crises, then triggered or “called” on an as-needed basis. Greater use of market-based risk management tools may eventually lead to a reduction in the need for non market-friendly government interventions which are often destructive to local and regional trade. For the Government of Malawi, which spent an estimated \$110 million on the humanitarian response, the call option was a success and a key priority now is to continue to test market-based approaches in an effort to replace traditional *ex post* reactions which can be costly, inefficient, and difficult to manage when the country is already in crisis.

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