The impact of droughts and floods on food security and policy options to alleviate negative effects

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Abstract

This article introduces an analytical framework for understanding the impacts of droughts and floods on rural livelihoods, based on Sen's "entitlement approach," and applies the framework to the recent food crises in Malawi. Weather shocks trigger a sequence of "entitlement failures," which can result in a famine unless public action intervenes to mitigate these impacts. Policy responses can compensate for failures of production-based entitlement (free or subsidized input distribution); labor-based entitlement (public works programs or "employment-based safety nets"); trade-based entitlement (grain reserve management or food pricing policies); and transfer-based entitlement (food aid or cash transfers).

JEL classification: Q18, Q54, Q58, R2

Keywords: Agriculture; Cash transfers; Entitlement; Food security; Malawi; Vulnerability

1. Introduction

In rainfed agricultural systems, erratic rainfall can have comprehensive and devastating impacts on affected livelihoods and local economies. This article makes the argument that food crises triggered by droughts or floods can be modeled as a sequence of "entitlement failures," and that effective intervention to address any one of these entitlement failures can prevent the drought or flood event from evolving into a food crisis. Conversely, contemporary food crises or famines can be attributed to failures of public action (or to successful public action, in cases where the food crisis is a product of malevolent intent).

The first part of this article sets out the "food crises as entitlement failures" framework, while the second part examines remedial interventions for each of these entitlement failures. Empirical support for both the argument and the policy responses comes from the author's work on the recent food crises in Malawi. The framework for the argument is summarized in Figure 1.

In Figure 1, entitlement failures are depicted as occurring sequentially—first production fails, then labor markets fail, then commodity markets (trade-based entitlements) fail, and finally transfers fail. This is schematic: in reality, entitlements collapse during food crises in complex, iterative, and interacting ways. But Figure 1 does illustrate two important points: first, weather shocks (droughts and floods) trigger not only harvest failures but a sequence of knock-on shocks to local economies and societies, and second, there are several points in this sequence where effective intervention could mitigate the shock and prevent a production shock from evolving into a full-blown famine. With sophisticated early-warning systems and humanitarian response capabilities, and given that most droughts and floods are slow-onset disasters (allowing lengthy lead times for external intervention), what needs to be explained in contemporary food crises is not what triggered the production shock (this is "old famine" thinking) but why there was no response. "New famine" thinking shifts the burden of explanation from analysis of production failures and entitlement failures to understanding response failures (Devereux, 2007). This article considers both sides of the story.

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Entitlement category	Impacts of drought & flood	Policy response
Production-based	• Harvest failure	• 'Productivity-enhancing safety nets' (Starter Packs)
Labour-based	• Employment opportunities decline • Real wage rates fall	• Public works programmes
Trade-based	• Market failure • 'Failure of exchange entitlements' (terms of trade decline)	• Open market operations • Food price subsidies • Pricing policies
Transfer-based	• Failure of informal safety nets • Food aid failure • "Priority regimes"	• Food aid • Cash transfers • Weather insurance

Figure 1. Droughts, floods, and entitlement failures.

2. Impacts of droughts and floods

Following Sen's categorization of four sources of entitlement to food, this section considers the impacts of weather shocks on production, labor, trade, and transfers, both in a general sense and in the particular context of Malawi.

2.1. Failures of production-based entitlement

The most immediate impact of erratic rainfall on rural livelihoods is on crop production. Droughts and floods undermine farm yields and the national harvest, reducing household and national food availability, and agricultural income derived from crop sales. Poor harvests threaten food security and livelihoods from household to national level, to varying degrees according to the extent that the family or nation depends on agriculture for its food and income. Households and economies that are more diversified are less vulnerable to these direct impacts of droughts and floods, provided that their alternative income sources are neither correlated with rainfall nor directly or indirectly dependent on agriculture (i.e., vulnerability falls to the extent that complementary sources of income and food are non-covariate).

In the longer term, Dorward and Kydd (2002) note that the presence of risk lowers the productivity of rural economies in three ways: (1) reducing returns to investment, (2) distorting investments away from income-maximizing toward risk-reducing activities, and (3) discouraging investment altogether, because returns are low and investors are risk averse. In these ways, weather risks contribute to underinvestment and hence to long-run agricultural stagnation and rural poverty in countries that are dependent on rainfed agriculture.

Livelihoods in Malawi are dominated by agriculture. Less than 15% of the national population is urbanized, 89% of the labor force works on smallholder farms or commercial estates (tobacco, tea, sugar), and 72% of Malawi's exports are agricultural (Wobst et al., 2004). Agriculture in Malawi is predominantly rainfed, but rainfall is variable and unpredictable. This combination of high dependence on rainfed agriculture, while rainfall is highly—possibly increasingly—erratic, leaves household livelihoods and the national economy highly vulnerable to weather shocks.

Figure 2 tracks the national maize harvest in Malawi in the 20 years preceding the 2001/2002 food crisis. The high interannual variability in maize production is mainly attributable to erratic rainfall. Although the trend is generally rising, maize production per capita has been falling since the 1970s (Wobst et al., 2004). Moreover, the coefficient of variation has visibly increased since the early 1990s. The food crisis

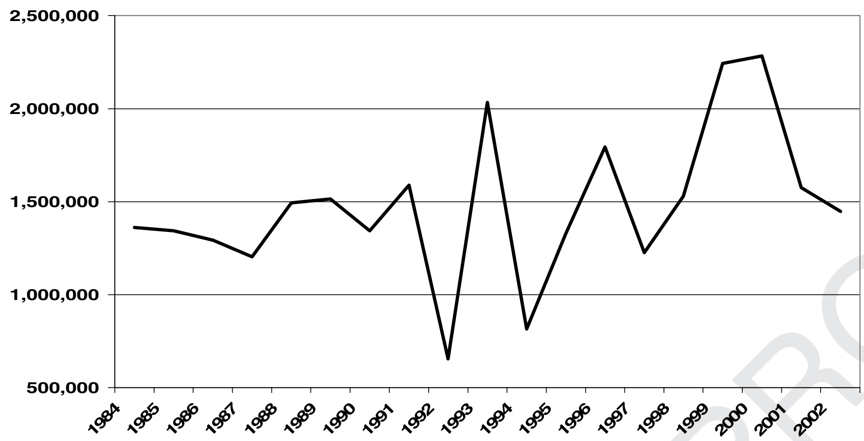

Figure 2. Maize production in Malawi, 1984–2002 (metric tonnes). *Source:* Phiri (2005b).

of 2001/2002 followed two bumper harvests, and the "failed harvest" of 2001 was actually 6% above the 10-year average (Devereux and Tiba, 2007).

Following the food crisis of 2001/2002 in Malawi, a survey of 1,200 households and 99 focus group discussions were conducted in 11 rural districts (Devereux et al., 2003). Survey respondents were asked to recall the month in which their granaries were depleted for the previous three years: 2000/2001 (the year before the crisis, a bumper season), 2001/2002 (the famine year), and 2002/2003 (another poor harvest, which instigated a second emergency appeal). Given the self-sufficiency ambitions of most Malawian farmers, the responses largely reflect the impact of rainfall variability on household food security outcomes. In cumulative terms, 19% of households surveyed harvested less than three months of maize in 2000/2001, while 37% had less than six months, 63% had less than nine months, 77% had less than 12 months of maize, and 23% were self-sufficient or had a surplus. Since this was a bumper year for maize production in Malawi, the implication is that less than one rural Malawian in four is self-sufficient even in a good year, while three in four are chronically food insecure—they never achieve self-sufficiency in maize.

In the food crisis year of 2001/2002, by contrast, only 2.6% of households in our survey were self-sufficient in maize, while 37% had less than three months, 70% had less than six months, and 92% had emptied their granaries after nine months. The impact of drought and flooding on agriculture in Malawi was dramatic: not only was the national harvest cut by 32%, at household level the food gap lengthened by several months. Instead of looking for alternative sources of food for 3–4 months, affected households had to find food from off-farm sources for 6–8 months, or even longer.

The impacts of transitory weather shocks are compounded by longer-term processes such as falling landholdings and declining access to inputs. Between 1977 and 1998, population growth rates above 2% per annum resulted in a doubling of the Malawi population and of population density, from 59 to 112 people/km^2, and a halving of cropland per capita, from 0.42 to 0.23 hectares (Government of Malawi, 2000). Declining farm sizes have not been offset by agricultural intensification or livelihood diversification. Instead, yields of staple crops have remained low, soil fertility has declined, cultivation of high-yielding varieties of maize remains limited, and per capita food availability declined throughout the 1980s and 1990s.

Under the Banda regime, smallholders accessed input credit through the Smallholder Agricultural Credit Association (SACA), while fertilizer was sold at subsidized prices by ADMARC, the agricultural marketing parastatal. But SACA collapsed in 1992 and fertilizer subsidies were phased out under structural adjustment conditionalities between 1987 and 1995, which resulted in access to inputs being confined to wealthier farmers who could afford to pay commercial interest rates for credit and full market prices for fertilizer. Since 1995, fertilizer prices have risen rapidly to unaffordable levels for most Malawian farmers, fuelled by repeated devaluations of the Malawi Kwacha—by 62% on one occasion in 1998. A survey found that households whose access to fertilizer has declined because of these price hikes have average consumption levels that are 13% lower than other households (Hoddinott, 2005).

2.2. *Failures of labor-based entitlement*

Farmers who produce inadequate food to achieve production self-sufficiency must resort to other sources of entitlement to feed their families. The first of these is off-farm employment, to generate income or food that will cover part or all of the gap between the household's crop production and household food needs. The impact of droughts and floods on rural labor markets is also likely to be negative, however, because weather shocks undermine not just agricultural production but the entire rural economy. Sen (1981) introduced the concept of "derived destitution" to explain how a shock such as drought reduces the demand for goods and services in affected communities, threatening the livelihoods of those whose incomes depend indirectly on agriculture, such as traders and rural barbers.

Because most smallholders in Malawi are no longer self-sufficient in maize, and with limited nonagricultural employment options, rural Malawians depend heavily on casual employment (*ganyu*) for cash or food to fill their annual production deficit. In the past, *ganyu* was readily available and provided the main source of off-farm income for smallholder households. In recent years, though, *ganyu* has become increasingly scarce, and real wage rates are stagnant or falling. Many households that previously hired labor are now looking for work themselves, and there is a surplus of labor in most rural communities in most years.

Weather shocks compound the imbalance between labor supply and demand in rural Malawi. Following a poor harvest, the proportion of production deficit households rises, and the length of the food gap in each farming household increases. As a consequence, the supply of labor rises sharply, while the number of households offering work on their farms falls. By the time of the 2001/2002 food crisis, the number of people looking for work far exceeded the availability of casual work, and this is one reason why the rural economy was unable to absorb the impact of the weather shock that reduced the harvest that year. A comparable harvest shock in 1991/1992, also triggered by erratic rainfall, generated less severe outcomes, partly because those affected were able to find work. Wealthier farmers reportedly provided employment on their farms as a kind of social safety net for their poorer neighbors in 1991/1992. By 2001/2002, fewer farmers could afford to offer this kind of labor-based safety net.

The antidote to "derived destitution" is to find sources of income that are not correlated with agriculture or rainfall. Because of Malawi's low level of urbanization, rural–urban linkages are limited and relatively few households have relatives working in town who can offer employment or remit income to the rural communities. Until the 1970s, Malawians migrated in large numbers to the mines in South Africa, but this source of employment and income ceased in the early 1980s and migration no longer provides employment and income on the same scale as before.

2.3. *Failures of trade-based entitlement*

People who do not produce enough food and cannot raise income through employment are forced onto the market to buy food, where their access to food is determined by the price of food and the value of assets that they can exchange or sell for food. Droughts and floods have a strongly negative effect on commodity markets. First, as noted, weather shocks that reduce harvests cause food availability decline (FAD). Since the demand for food is highly price inelastic (food being a basic necessity), a relatively small shortfall in marketed supplies can cause a major increase in food prices. Second, as people come to the market with assets to exchange for cash or food, excess supply of these commodities causes their prices to collapse, so the terms of trade of assets to grain falls dramatically. This effect has been described as a terms of trade scissors movement—rising grain prices and falling asset prices result in a collapse in trade-based entitlement to food. Pastoralists are particularly badly affected by such effects: livestock that they sell or exchange for grain are worth only a fraction of their pre-crisis value after a weather shock disrupts demand and supply patterns on local commodity markets (Swift and Hamilton, 2001).

In Malawi, erratic weather events have had the predicted effects on both food and asset prices. Figure 3 graphs the price trajectory of two staple foods—white maize, and dried cassava—in the year before the famine of 2001/2002, and during the crisis period itself.

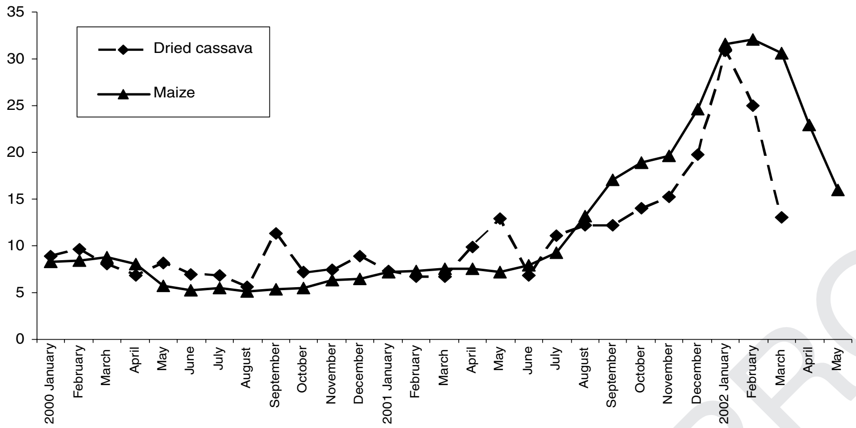

Figure 3. Average maize and cassava prices in Malawi, 2000–2002 (MK/kg). *Source:* Tiba (2005).

Every year, food prices follow a predictable seasonal pattern: starting off low after the main annual harvest in April–May, rising steadily through the calendar year and peaking during the "hungry season" months of January–March. In 2001/2002, retail prices of maize and cassava started rising rapidly soon after the poor harvest and reached unprecedented heights in January 2002, more than 300% above the average post-harvest prices. It is clear from Figure 3 that private trade and public interventions failed to stabilize food supplies and prices, and it was high prices that undermined access to food and converted a relatively minor production decline into a famine. One expert witness to the UK Parliamentary Inquiry into the humanitarian crisis in Southern Africa argued that "if you had stabilized the price of maize in 2001 in Malawi, no crisis would have occurred" (IDC, 2003: EV67).

According to Dorward and Kydd (2002), failures of agricultural markets in Malawi are explained by high transactions costs—low volumes, small margins, weak transport and communications infrastructure—and coordination failures, because high-risk premiums and margins are needed to make trade profitable in this context. Even unusually high food prices (as in early 2002) send insufficient signals of demand to attract traders, because these markets are thin and temporary.

2.4. *Failures of transfer-based entitlement*

The coping-strategies literature has shown that informal transfers—assistance from relatives and neighbors—is more reliable following idiosyncratic shocks (e.g., illness or death of a family member) than following a covariate shock such as a drought or flood, which undermines food production and livelihoods at the community or regional level. The more severe or protracted the resulting food crisis, the more informal transfers are likely to contract, as the ability of affected households to respond to requests for assistance from others steadily erodes.

In Malawi and other African countries, several factors have combined in recent years to reduce the capacity of communities to support their members through livelihood crises. First among these is social change. Malawians characterize each other as more individualistic and less community-oriented now than in the past, and the famine of 2001/2002 was accompanied by a breakdown of law and order and a rise in vigilante justice unparalleled in Malawi's history (Devereux, 2002). A second factor is the high prevalence of HIV/AIDS, which has raised vulnerability levels and undermined coping capacity within communities. A third factor, unique to Malawi, is an unusually low level of urbanization (under 20%), which means that rural–urban linkages are more restricted than in other countries, so that fewer rural families have relatives employed in towns who can be called on to remit income or food in times of crisis. Taken together, these factors mean that informal transfers in Malawi are low and probably declining as an insurance mechanism against livelihood shocks triggered by erratic weather.

3. Policy responses to droughts and floods

The discussion below follows the same format as the previous section, and considers responses to weather shocks in terms of addressing failures of production, labor, trade and transfers. Once again, the case of Malawi is used to ground these policy responses in a real-world context.

3.1. Responses to production-based entitlement failure

Some efforts to mitigate the potentially devastating impacts of droughts and floods on agriculture are pre-emptive rather than reactive, and involve enhancing farmers' access to inputs (improved seeds, chemical fertilizers, tools) that will boost production and/or minimize crop losses following a weather shock. In Malawi a range of interventions has been implemented since smallholder access to inputs was undermined in the early 1990s, under the generic heading of "productivity-enhancing safety nets" (Devereux, 1999). The most significant of these is the free distribution of agricultural inputs.

Seeds and fertilizers have been given out free of charge to farmers in Malawi almost every year since 1992, first as a rehabilitation intervention following the 1992 southern African drought, but later as a response to rapid fertilizer price inflation in the mid 1990s. In 1998 the Government of Malawi launched the "Starter Pack" program, which gave all 2.8 million farmers a package comprising enough fertilizer and maize and legume seeds to plant 0.1 hectares. The rationale for the Starter Pack initiative was that subsidizing food production is more cost-effective and sustainable than subsidizing food consumption with food aid. Levy (2005) estimates that the universal Starter Pack cost approximately the same as general fertilizer subsidies (US$ 20 million per annum), but considerably less than equivalent volumes of food aid (US$100 million per annum), commercial food imports (US$ 70–100 million per annum) or unconditional cash transfers (US$ 107 million per annum). Starter Packs added 100–150 kg of maize to each farmer's harvest and up to 400,000 tonnes to the national harvest (Levy, 2005). At a time when the national maize deficit often exceeded 500,000 tonnes per annum, the Starter Pack substantially narrowed the food gap, reducing import requirements and emergency appeals.

After 2000 the universal Starter Pack program was scaled down by two-thirds, becoming the Targeted Inputs Programme (TIP) that was delivered to about 1 million poor smallholders—though mistargeting, elite capture, and dilution within communities who resisted community selection meant that beneficiaries were almost evenly distributed across the income quantiles (Chinsinga et al., 2002). In 2001, the TIP added only 3–4% to smallholder maize production, whereas the universal Starter Pack had added 16% in 1999. Many critics blamed the scaling down of the Starter Pack for exacerbating the food crisis of 2001/2002, though it remains unclear whether the Starter Pack would have protected the national harvest against the weather shocks of the 2001 agricultural season.

Other observers argue that the significance of the Starter Pack was more in terms of its impacts on food prices, and hence on access to food, than on food production. As noted above, the price of maize is a crucial determinant of food (in)security in Malawi, and Levy (2005) argues that the Starter Pack contributed to keeping maize prices relatively low, by reducing the market demand for maize from smallholders in the hungry season months, after their granaries are depleted. In 2001/2002, however, the reduced food availability following weather shocks and the scaled-down TIP precipitated sharp rises in maize prices—from MK10/kg in October 2001 to MK44/kg five months later—and it was this that triggered the food crisis in early 2002.

3.2. Responses to labor-based entitlement failure

Public works programs are labor market interventions that are often introduced to provide alternative employment opportunities, in contexts of widespread poverty where labor markets are thin. As an employment-based safety net, public works serve the purpose of offering farmers an additional source of food (food-for-work) or income (cash-for-work) for consumption-smoothing purposes when their harvests have failed. Public works are popular with policy makers because they are self-targeting (the heavy work requirement and payment of subsistence food rations or submarket wages discourages the nonneedy from benefiting), and they offer the potential of creating useful assets (e.g., community infrastructure) while simultaneously transferring food or income to the poor.

The best known employment-based safety net is Maharashtra's Employment Guarantee Scheme, which was recently expanded to all of rural India, under the National Rural Employment Guarantee Act (NREGA) of 2005, which extends the right to 100 days of employment at the local average agricultural wage to every rural Indian household. A key principle is the guarantee of employment, which assures any household affected by a livelihood shock, such as drought, of access to an alternative source of income. This has the immediate effect of smoothing food consumption through the period of shortage, and the long-run effect of increasing risk-taking behavior by farmers. The countercyclical benefits are highly significant—one study found that income variability halved in villages where EGS employment was available compared with villages without guaranteed employment (Ravallion, 1990). Even more strikingly, a famine was prevented following flooding in Bangladesh in 1988 to a significant extent because the Rural Works Programme and the Food-For-Work Programme increased their employment by 90% and 20%, respectively (Ravallion, 1990).

Apart from transferring food or income directly, the works undertaken on employment-based safety nets or labor-intensive public works are also intended to ameliorate the impacts of future weather shocks, for instance by drought-proofing the local economy through soil and water conservation activities such as terracing, earth dams, and microirrigation. This approach has been followed for decades in Ethiopia, although the returns in terms of reduced food insecurity have been limited, owing to poor quality of construction and inadequate maintenance.

Some design features of public works undermine their effectiveness in terms of achieving certain objectives. First, setting the wage rate below local market rates, or paying workers subsistence rations, encourages self-targeting but reduces the value of the transfer to such as extent that the consumption-smoothing objective is compromised—especially if manual labor is involved that requires high energy expenditure, reducing the net calorie transfer to the worker. Second, the heavy work requirement disqualifies many of the most vulnerable individuals from participating, especially the labor-constrained—people with physical disabilities, older people, chronically ill.

Finally, public works often have gender-equity objectives. In Malawi, the World Food Programme (WFP) selects food-for-work projects that either attract women workers or create assets that benefit women directly—such as community woodlots and water-points that reduce women's firewood- and water-collection time—while the Malawi Social Action Fund (MASAF) targets women and female-headed households on its public works projects, "since female-headed households make up a disproportionate share of the poorest" (MASAF, 2006: 16). Critics have questioned the implications **Q2** for women's workloads of requiring them to undertake heavy manual labor, given their double burden of domestic duties and income-generating responsibilities. Instead of labor market interventions, other forms of emergency relief might be preferable for the labor-constrained and the time-poor.

3.3. Responses to trade-based entitlement failure

Numerous interventions and instruments are available to policy makers concerned to mitigate the effects of food price inflation following a disruption to food supplies, or to protect consumers against regular food price seasonality. These include open market operations such as buffer stock management, and pricing policies such as food price subsidies or legislated price banding. Many governments have used parastatal marketing agencies to intervene in weak markets—buying grain after harvest when prices are low and supplies are high, storing for 6–8 months until prices start rising and market supplies are dwindling, then releasing this onto local markets at cost, to boost supplies and dampen prices.

Malawi has operated a Strategic Grain Reserve (SGR) for decades. In early 2001, the SGR was fully stocked with maize that was rotting following two bumper harvests. The IMF advised the Government of Malawi to sell off this stock (preferably by exporting it to avoid disincentive effects on local producers) and to replenish it to a lower level—reducing the SGR from 180,000 tonnes to 60,000 tonnes. Unfortunately, this advice was abused by powerful individuals in government, who purchased SGR grain cheaply and stored it, realizing that the harvest was inadequate in 2001 and that prices could rise to record levels, then selling it locally and making large profits. Also, because the harvest was poor in 2001, the parastatal marketing agency (ADMARC) was unable to purchase maize locally, and the national grain reserve was depleted precisely when it was most needed. If the SGR had been properly managed as intended, it could have prevented the unprecedented maize price rises that were blamed for magnifying the food crisis in 2001/2002 (Devereux, 2002).

Another mechanism for controlling food prices is through legislated floor and ceiling prices, or by implementing food price subsidies. Until the 1980s, many African governments implemented pan-seasonal and pan-territorial pricing policies—farmers received the same payment for their produce from marketing parastatals wherever they lived in the country, and consumers paid the same price for food at all times of year. These policies protected farmers from isolated regions against high transport costs (taking their produce to market), and protected consumers against the price seasonality that is characteristic of tropical countries with one or two harvests each year. Typically these policies required heavy subsidies to be paid by governments, but by the 1980s these subsidies were considered to be unaffordable, and were phased out under agricultural sector reform processes that aimed to remove the interventionist state and stimulate private traders to fulfil the roles that had been monopolized by marketing parastatals.

In Malawi the abolition of producer and consumer price subsidies was achieved over a period of time by gradually expanding the price band between a floor price (below which food would not be purchased from farmers) and a ceiling price (above which consumers would not have to pay for food). Since these are often the same people—deficit producers are forced to sell some of their produce at low post-harvest prices to meet nonfood expenses, and buy food back in the hungry season at high pre-harvest prices—the abolition of subsidies reintroduced this source of household food insecurity, which was magnified in years when weather shocks reduced harvests, lengthening the hungry season and raising food prices to unaffordable levels. While parastatal operations might have been inefficient and price subsidies might have been unsustainable, the removal of these pillars of food security in Malawi exposed the rural poor to the most severe consequences of predictable seasonality and unpredictable weather shocks. More than a decade after the phasing out of price subsidies, traders have yet to fill the gap left by ADMARC in grain marketing and deficit farmers and consumers are more food insecure than ever before.

3.4. Responses to transfer-based entitlement failure

Once informal social support systems fail, the case for external transfers becomes compelling. Humanitarian responses to droughts and floods have been dominated by food aid, on the assumption that affected households (especially farmers) have lost their access to food and need consumption support at least until the next harvest. Recently, however, cash transfers have been piloted as an alternative intervention in many emergencies (Creti and Jaspars, 2006; Harvey, 2005). This section considers the case for and against both food aid and cash aid.

3.4.1. Emergency food aid

Several arguments are made in support of food aid. Apart from saving lives during emergencies, food aid can help to address underlying vulnerability. Dercon and Krishnan (2004) and Quisumbing (2003) find that food aid has been effective in reducing household vulnerability in Ethiopia, and Hoddinott et al. (2003) note the importance of food aid in smoothing consumption and protecting assets among households facing food stress. One more general point often made in favor of food aid is that it can achieve improved nutrition better than cash because more food is consumed for equivalent values of transfer (Edirisinghe, 1998), which may partly be a consequence of women controlling food in the household (Haddad and Hoddinott, 1997).

One limitation of food transfers is their high transaction costs. Barrett and Maxwell (2005) estimate that more than half (53%) the value of U.S. food aid in 2000 was spent on shipping and handling costs. Clay et al. (1998) claim that whenever it is systematically analyzed, financial aid is more cost-effective than food aid. Both reviews conclude that food is preferable to cash transfers only where local markets are functioning extremely poorly and inelastic food supply means that cash injections would merely inflate commodity prices and harm the poorest.

Interestingly, popular perceptions that food aid causes disincentives and dependency have been challenged by recent empirical studies. A regression analysis of food aid in Ethiopia finds that disincentive effects are insignificant among the poor but increase with household wealth, which suggests that most observed disincentives are the result of mistargeting wealthier households (Dayton-Johnson and Hoddinott, 2004). Barrett and Maxwell's (2005) review of food aid concludes that (1) food aid rarely induces dependency because the amounts transferred are usually small; (2) the evidence of food crowding out other transfers is mixed; (3) well-targeted and well-timed food aid has minimal negative price effects in local markets, because it reaches households who are already priced out of the market; but (4) food aid can affect local production, labor markets and consumption patterns; and so (5) food aid should be locally sourced wherever possible.

Following the 2001/2002 food crisis in Malawi, the Joint Emergency Food Aid Programme (JEFAP) distributed 240,00 MT of food to over 3 million Malawians between July 2002 and June 2003, in the form of general food distribution (2.9 million beneficiaries each month), therapeutic and supplementary feeding, and school feeding. Available evidence suggests that the general food distribution was weakly targeted on the poorest and most drought-affected households, but well targeted by observable indicators of vulnerability such as households with orphans or chronically ill members and female-headed households (Sharma, 2005b). Impacts of food distribution were limited by the low levels of participation (only 38% of rural households), infrequent rather than monthly receipt of food, and transfers of less than full rations. In terms of food consumption levels and adoption of coping strategies like selling assets, no statistically significant differences in outcomes were recorded between food aid beneficiaries and nonbeneficiaries (Sharma, 2005a).

3.4.2. *Emergency cash transfers*

The case for cash transfers is often made by contrasting cash aid with food aid. Cash transfers are seen as preferable because they are cheaper to administer and avoid the risks associated with commodity transfers (such as dependency and disincentives); they are less paternalistic because they enable individual choice; and they contribute to pro-poor growth by being invested as well as consumed, and generating income- and employment-multiplier effects (Schubert et al., 2005). Cash transfers are also expected to stimulate markets by boosting purchasing power in contexts of demand failure, and there is some evidence of this positive effect from cash transfer programs in nonemergency contexts, such as social pensions in southern Africa (Devereux et al., 2005). Evaluations of cash-for-work and unconditional cash grants have found that cash transfers are invariably cheaper and more cost-effective to deliver than commodities (food-for-work or food aid) (Creti and Jaspars, 2006).

Many NGOs, including Oxfam GB, Novib, the Red Cross, and Save the Children, have used cash transfers in emergency contexts, including recent droughts in Ethiopia, Kenya, and Somalia; floods in Bangladesh, Haiti, and Mozambique; Hurricane Mitch in Guatemala and Nicaragua; and the Indian Ocean tsunami of 2004. In 2005/2006, the World Food Programme successfully piloted a cash transfer scheme in Sri Lanka as a post-tsunami recovery measure.

In 2005/2006, Concern Worldwide and Oxfam GB implemented unconditional cash transfers in Malawi as a complementary intervention to humanitarian food aid, following a combination of drought and flooding that reduced the national maize harvest by 25%. Oxfam delivered US$26/month to 6,000 households in one district for five months. Monitoring reports found that most of this money (80–85%) was spent on food (Oxfam, 2006).

Concern's Food And Cash Transfers (FACT) project differed from the Oxfam project in three innovative respects: (1) it provided a package of food (maize, beans, and oil) plus cash (enough to buy the same food basket); (2) transfers were adjusted by household size; (3) the cash transfer was adjusted each month to reflect food price movements in local markets. This last point was the most crucial advance on previous cash-based interventions in emergencies, as it ensured that beneficiaries maintained a constant entitlement to adequate food throughout the crisis period. Maize prices far exceeded predictions in late 2005 and early 2006, rising to unprecedented levels and undermining the purchasing power of Oxfam's cash transfer, which was fixed in nominal terms but fell in real terms during the food crisis. By contrast, Concern effectively underwrote the price risk facing market-dependent consumers. The budgetary implications of this decision were extremely onerous—Concern paid out almost twice as much cash to beneficiaries in March 2006 as in

January—but the benefits to vulnerable households were substantial.

Baseline and post-distribution monitoring surveys were conducted of several hundred FACT beneficiary and nonbeneficiary households. Before FACT started, households throughout rural Malawi were rationing their food consumption in response to the livelihood shock precipitated by the poor harvest of April 2005. After FACT was introduced in January 2006, meals per day in beneficiary households stabilized while this indicator continued to fall in nonbeneficiary households. As the new harvest started coming in (March–April), food consumption improved and meals per day recovered to pre-crisis levels, but at a faster rate in beneficiary households. Differences in average meals per day between beneficiary and nonbeneficiary households were statistically nonsignificant in the pre-project period, but significant (at the 0.01 level) in February and March 2006 (Devereux et al., 2006).

A comparison of beneficiary use of Concern's food packages and cash transfers reveals that the cash was used for a more diverse range of purposes than the food, which was mostly consumed at home, with relatively small amounts being shared with poorer relatives and neighbors who were excluded from the FACT project. Over the four months of the intervention, just under 60% of cash transfers were spent on buying food, while the remaining 40% was spent on grocery items (including costs of milling maize), health and education costs, debt repayment, and investment or asset accumulation (purchasing small stock, renting in land, buying fertilizer, petty trading). Clearly, the cash transfer enabled beneficiaries to meet a wide range of nonfood needs, and they exercised choice in allocating this cash, which suggests some tradeoff between immediate consumption smoothing and longer-term accumulation objectives. In this sense it appears that the FACT project achieved both "livelihood protection" and "livelihood promotion" outcomes.

4. Conclusions

This article has adapted Sen's entitlement approach to the analysis of impacts of droughts and floods, and has characterized these impacts as a sequence of interacting "entitlement failures": weather shocks first disrupt production, then labor and commodity markets, so that labor-based entitlements and trade-based entitlements to food are undermined. Being covariate shocks, droughts and floods also constrain the capacity of community members to support each other through the livelihoods crisis that they induce in affected populations. The corollary of this analysis of impacts is that public intervention can address any or all of these entitlement failures—and, in fact, effective intervention at any point in the sequence should be sufficient to prevent the initial shock escalating toward a famine.

Despite endorsing a well-designed food and cash transfer program as an effective response to the humanitarian emergency precipitated by droughts and floods in Malawi in 2005/2006, this article concludes by arguing that unconditional cash transfers are little better than a "fourth best" solution to the risks to lives and livelihoods that droughts and floods bring in their wake.

The "first best" solution is to prevent subsistence crises from occurring at all, even after a drought or flood event—through strengthening production systems (e.g., introducing irrigation to reduce dependence on unreliable rainfall), strengthening markets (to minimize supply failures), and reducing chronic poverty (to minimize demand failures). This requires a range of pre-emptive measures, including investing in agricultural technology, building transport infrastructure to integrate markets, and building asset buffers at the household level to reduce their vulnerability.

A "second best" solution would be to strengthen insurance mechanisms against the impacts of weather shocks. India's Employment Guarantee Programme is one form of insurance. Another is weather-based insurance, whereby payouts to countries or individual farmers are triggered by rainfall below a specific volume or index value. Pilot projects using weather-based insurance are already underway in India, Mongolia, Mexico, Ethiopia, Kenya, and Malawi. One challenge these innovative projects face is high premia required to cover the likelihood of heavy payouts, given that a drought strikes these countries every few years. A second challenge arises from the reality that agricultural droughts can be very localized in time and space—in many cases, total rainfall across a farming season appears adequate, but poor distribution means that crops are first "burned" and later flooded, resulting in harvest failure. This happened in Malawi in 2005.

A "third best" solution is to intervene in commodity markets to correct for market failures, through open market operations. This need not imply a return to the days of government agencies buying food crops after harvest, storing and selling this food later at cost to stabilize supplies and prices interseasonally. Though interventions of this kind are less fashionable now than cash transfers, the case for some kind of interventionism is strong in contexts where markets are weak and liberalization has failed to engender a class of entrepreneurial traders who adequately meet the food security mandate that agricultural marketing parastatals in Africa once tried (and usually failed) to fulfil. Alternative models are to look to new institutional forms—such as new-generation producer cooperatives—to undertake this intertemporal arbitrage function, or to use call options on commodity exchanges to ensure access to imports and reduce price uncertainty. Malawi used a call option on the South African commodity exchange in 2005/2006, saving US\$60−90 on each ton of maize imported, at a cost of US\$25 per ton (Alderman and Haque, 2006: 18).

Handing out food or cash to people affected by droughts and floods is a "fourth best" solution. The purpose is to compensate individuals who have lost their access to food, but as a compensation mechanism this has a number of limitations. First, targeted transfers are always subject to numerous targeting errors, notably exclusion (failing to identify and reach some people who need assistance) and inclusion (giving transfers to some people who do not need assistance).

Second, compensating selected individuals for a structural problem—market failure—does little to address the structural problem. Food aid has long been criticized for causing dependency and disincentives to both farmers and traders. The case for providing cash transfers rather than food aid to cover a food gap is Sen's argument that droughts and floods cause collapses in purchasing power, and that this is best addressed by restoring purchasing power. This argument challenged previous conceptualizations of food crises as caused by collapses in food availability. It is also argued that predictable cash transfers might stimulate trade and contribute to strengthening markets, but the risk is that food supplies might indeed be constrained and injecting cash might not produce the desired supply response.

Cash transfer programs are currently fashionable in Africa, especially among international NGOs and donors, as a mechanism for reducing dependency on food aid and strengthening household and local economies. But decisions about optimal responses to mitigate the impacts of droughts and floods must be based on context-specific analysis. Cash transfers have many advantages over food aid, but they should not be promoted as a panacea, to the neglect of policies that strengthen agricultural production, build input and output markets and rural infrastructure, and provide effective insurance against livelihood shocks.

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Queries

Q1 Author: Please add reference “Hoddinott (2005)” to the list.

Q2 Author: The year “1996” has been changed to “2006” in the text citation “MASAF” to match with the entry in the list. Please check.

Q3 Author: The year “2000” has been changed to “2004” in the text citation “Dercon and Krishnan” to match with the entry in the list. Please check.

Q4 Author: Please provide the page ranges for reference “Dercon and Krishnan (2004),” “Devereux (2007),” “Devereux and Tiba (2007),” and “Swift and Hamilton (2001).”

Q5 Author: Please cite references “Devereux (1997),” “Kambewa (2005),” and “Phiri (2005a)” in the text or delete it from the list.