COST-BENEFIT ANALYSIS OF THE AFRICAN RISK CAPACITY FACILITY:

MALAWI COUNTRY CASE STUDY

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INTRODUCTION

Malawi has one of the most unpredictable rainfall patterns in Africa, and is exposed to the risk of severe droughts and floods. Between 1967 and 2003 the country experienced six major droughts, affecting over 21 million people in total, and 18 floods, killing at least 570 people and affecting a total of 1.8 million people (World Bank et al. 2010).

The agricultural sector, predominantly smallholder farming and rain-fed maize production, is large, comprising over a third of GDP, and large adverse shocks can significantly worsen national economic performance. World Bank et al. (2010) estimate that on average droughts and floods together reduce GDP by an estimated 1.7 percent. However the costs are much higher in unusually bad years, with a 1-in-25 year drought expected to decrease GDP by over 10 percent and 1-in-25 year floods expected to decrease GDP by 4 percent (Table 1). The country is also exposed to the risk of damage to infrastructure from earthquakes and floods/landslides.[1]

TABLE 1. ESTIMATED CHANGES IN PRODUCTION (PERCENTAGE OF GDP)

	Return Period of 5 years	Return Period of 10 years	Return Period of 15 years	Return Period of 25 years	Average Annual Loss
Droughts	-0.5	-3.5	-7.2	-10.4	-1.0
Floods	-1.7	-2.5	-3.2	-4.0	-0.7
Total	-2.2	-6.0	-10.4	-14.4	-1.7

Source: World Bank et al. (2010)

Around 80% of Malawi's total population is dependent on agriculture for a livelihood, and exposed to significant agriculture production risks. Urban households are exposed to the risk of higher food prices and lower nonfarm wages in the event of severe droughts or floods. As compared to a base poverty rate of

[1] The two largest earthquakes of the past 50 years were Karonga (2009) and Salima (1989).

52.4 percent in 2004 (World Bank 2004), a 1-in-25 year drought is estimated to increase the poverty rate by approximately 17 percentage points (World Bank et al. 2010).[2]

The Government of Malawi is continuing efforts to improve its response to drought and flooding. It has been trying many of the ideas that form elements of ARC over the last five years, and as such is an informative case study of how ARC might work in a country where some of the ground work has been set. In particular, Malawi is informative for the development of ARC because it has:

1. A safety-net program, currently operational in selected districts;
2. A weather index microinsurance program for smallholder farmers, linked to loans; and
3. A National Drought Insurance mechanism, similar in some features to the national weather indexed cover ARC could offer.

In the following sections we discuss lessons from these schemes.

THE NATIONAL SOCIAL SUPPORT PROGRAM

The Malawi National Social Support Programme (NSSP) provides an umbrella for all social protection activities in Malawi, and includes:

1. **A social cash transfers program** for families in extreme poverty, where no family member is able to work, initially piloted in 2006 in one district, and now expanded to over 30,000 households over 7 of Malawi's 28 districts. Led by the Ministry of Development, Planning and Cooperation with support from UNICEF;
2. **A public works program** for the ultra poor, currently in place for the pre-planting period and linked to the input subsidy and led by the Ministry of Development, Planning and Cooperation; and
3. **A school meals program** for primary school students, covering 642,000 pupils across 681 schools in 13 districts as at December 2011. Led by the Ministry of Education, Science and Technology with support from the World Food Program,

as well as other components such as a village savings and loans theme and a microcredit theme (Government of Malawi, 2011). The NSSP is financed by a combination of government revenue, long term donor budget support, and private foundation contributions. Over the coming years these programs have potential to scale up both within existing districts and to new districts, and could in time form the basis for a program that could scale up in the event of a national disaster. However, at present the programs would most likely be unable to scale up quickly in the event of a large national shock.

The Government of Malawi also has in place a large fertilizer subsidy program and large strategic grain reserves. Although there is evidence of large positive impacts of the fertilizer subsidy program (Dorward and Chirwa 2011), the program is not designed to be able to scale up in the event of a national disaster, and we do not discuss it further in this note. Malawi's strategic grain reserves are currently very large, of the order of 132,000 metric tonnes (Jassi 2012) for a population of around 15 million, and could be used as part of a comprehensive solution to food security. However, it is unclear as to precisely when or how they would be used, how quickly they would be disbursed, how effective the targeting would be, and who would finance their replenishment, and therefore how the reserves could be used as a complement to ARC.

[2] The 2009 Welfare Monitoring Survey, conducted by the National Statistical Office of Malawi, suggests that the headcount poverty rate fell from 52.4 percent in 2004 to 39 percent in 2008/9.

WEATHER INDEX MICROINSURANCE IN MALAWI

Malawi has also experimented with unsubsidized weather indexed microinsurance, starting with a pilot in 2005/6 by the World Bank and the National Smallholder Farmers' Association of Malawi (Bryla and Syroka, 2009). Products made use of the Meteorological Office's network of weather stations for which there was a long history of reliable weather data available for design and pricing, and paid off part or all of the outstanding loan if the amount of rain at the contractual weather station was deficient in that the index hit the specified contract threshold at the end of the contract. The insurance was bundled as a compulsory part of a loan package, initially for high quality groundnut seeds, and later for inputs for tobacco. However, the program has remained in pilot phase since being launched, and for the most recent season there were no farmers insured under the program (Table 2). It remains to be seen whether this is the end of the program or whether it will be revived for the 2012/13 season.

TABLE 2. WEATHER INDEX INSURANCE PORTFOLIO IN MALAWI, 2005/6 TO PRESENT

Crop season	Number of farmers	Crop
2005/06	892	Groundnut
2006/07	1,800	Groundnut & Maize
2007/08	605	Tobacco
2008/09	2,606	Tobacco
2009/10	766	Tobacco
2010/11	~1,000	Tobacco
2011/12	0	N/A

Source: Rohrbach (2010) and author.

The experience of Malawi's pilot weather index insurance program is similar to that of other unsubsidized weather index microinsurance programs. Of all the weather index microinsurance pilot programs described in Hess et al. (2005), the only program that has achieved scale is India's, which enjoys heavy subsidies from the Government of India as a tool for supporting agricultural productivity and farmer livelihoods, and mandatory for farmers who take out formal sector loans (Clarke et al. 2012).

THE NATIONAL DROUGHT INSURANCE

In October 2008 the Government of Malawi, with support from the World Bank's Agricultural and Rural Development Department and Treasury, and the UK Department for International Development (DfID), purchased a weather derivative, the *National Drought Insurance*, designed to pay up to US$4.41mn of budget support to government in the event of a severe national drought (Syroka and Nucifora 2010).

The weather index is based on a Water Requirement Satisfaction Index (WRSI) constructed using rainfall data from 23 weather stations throughout the country, and designed to correlate with maize production at the national level based on the Government's own national maize yield assessment model. The index is currently designed to trigger a claim for a 1-in-10 year or worse drought, and has been designed so that it would have paid claims in the 1991/2 and 2004/5 droughts. It has not triggered a claim payment yet (since 2008).

The point estimate of the correlation between the index and national maize production over the period 2000/1 and 2007/8 (excluding year 2004/5, a large drought year, for which no official maize production figure was reported) is good, but this is not particularly informative as to the level of correlation between

the index and need for two reasons. First, data for the drought year 2004/5, the most useful recent datapoint that could be used to assess the goodness of fit of the model, is missing. This censoring of the yield dataset makes it difficult to conduct any credible correlation analysis using the other seven years of matched data without appealing to an inappropriate assumption that this datapoint is missing at random. Second, even if this datapoint were available, there would be only 8 datapoints and so statistical analysis is of little use; it is difficult to estimate how well the fit would be in a 1-in-20 year event with only seven years of data using an (frequentist or empirical Bayesian) approach.

The initial transaction was the culmination of a long program of technical work (Hess and Syroka 2005), and has since been renewed annually. For the first three years of its operation the premium was paid by DfID, in 2011/12 the Government of Malawi paid the premium financed by an International Development Association (IDA) loan, and for the 2012/13 year it is intended that the European Union and government will share the cost of the premium.

There are no contractual restrictions on what the government could spend a claim payment on and there appears to be some degree of ambiguity over what precisely a claim payment would be spent on, partly driven by the uncertainty in claim payment timing; depending on the index the claim payment could be early or late in the season and the use of the claim payment would most likely be sensitive to this timing issue. Options seem to include using it to replenish the government's substantial strategic grain reserves, to purchase a put option on the price of maize to cap the import price early, or to purchase seeds.

Malawi is unique among ARC candidate countries in having experience of a macro weather derivative. Moreover, since the National Drought Insurance has been in place for five years and the Government is set to pay part of the premium in the 2012/13 season, feedback from government on the experience of the weather derivative may be informative for ARC.

First, although there has not been a drought with national impact similar to the droughts of 1991/2 and 2004/5, there is some concern that the weather derivative has not yet paid a claim. This may loosely be split into three separate concerns. First, for many of the stakeholders in the National Drought Insurance this is their first experience with a national insurance policy and there might be concerns that a lack of a claim payment is indicative that the product would not pay a claim in a catastrophic year. This concern could be substantially alleviated through a multi-country program such as ARC, since countries would most likely see the facility pay claims to at least one drought hit country within a year or two, without having to wait ten years (Clarke and Hill 2012).

Second, there is a concern that although the government has in place a National Drought Insurance policy to provide a claim payment in the most extreme years, there are not mechanisms in place to finance 1-in-3 or 1-in-5 year events. In most years at least one district in Malawi is hit by flooding, drought, or pestilence/disease outbreak, and a 1-in-10 year drought insurance policy does nothing to offer protection for these events. Loosely speaking, at present the marginal cost to the government around the 1-in-3 year mark is larger than the marginal cost around the 1-in-10 year mark, as donors are expected to bear a large part of the marginal cost of 1-in-10 year events. The National Drought Insurance cover may therefore not match government's fiscal liability particularly well, but rather act primarily as a commitment device for donors.

Finally, and linked to the second concern, whilst the National Drought Insurance is designed to hedge total maize production the response cost need is linked not only to total production, but also the variability of production within the country; if production is extremely good in half of the country but terrible in the remaining half of the country the response cost need could be very large despite the total production across

the country being good. There are suggestions that the index be redesigned to capture the response cost need, not only the total production.

CONCLUSION

The experience of Malawi suggests the following lessons for ARC:

1. By offering cover to multiple countries, ARC may hasten the building of trust relative to a standalone policy for one country, as a member country is likely to see claim payments within a few years. (However, if a large basis risk event is observed in an early year, where a country has a large response cost need for drought but the ARC claim payment is small or zero, this could work against ARC.)
2. By targeting response cost needs, Africa RiskView may offer a better hedge to government against response cost needs than an index that targets total production.
3. ARC is likely to be of highest value to countries if it is part of a complete disaster risk financing and insurance strategy, which provides financing for recurrent and catastrophic events. In isolation, a catastrophic indexed insurance policy is only a very small part of a comprehensive solution.

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