



Managing Agricultural Risk for Growth and Food Security in Malawi

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Risks are ever-present for Malawi's nearly 3 million farming households. National food security is largely dependent on the performance of rain-fed agriculture, which is vulnerable to a range of production, market, and enabling environmental risks. Annual losses from production risks for major crops amounted to US\$149 million, on average, between 1980 and 2012. Approximately 80 percent of Malawians live in rural areas and 51 percent of the population lives below the national poverty line. In this context, effectively managing agricultural risks is critical to ensuring food security, reducing poverty, and boosting economic growth and development.

BACKGROUND

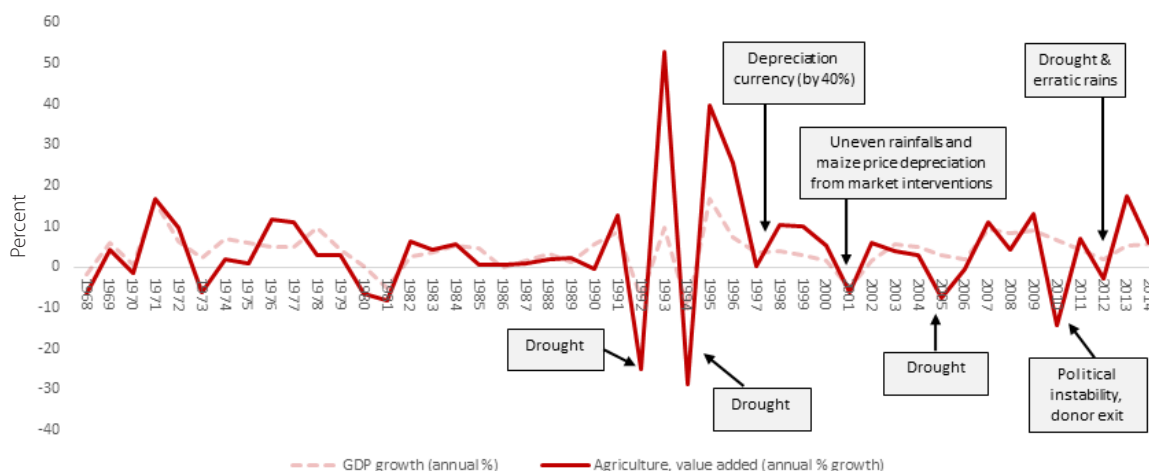
Agriculture is the backbone of Malawi's economy, contributing 30 percent of total GDP (2011) and 76 percent of total national exports (2012). With 78 percent employed in the sector in 2013, agriculture is also a principal source of employment and income. Increasing food security is one of the main objectives of Malawi's Agricultural Sector Wide Approach (ASWAp 2010) and a strong focus on increasing maize productivity since the mid-2000 has resulted in rapidly increasing production. However, production risks continue to result in high losses to the sector, including for maize. Further, price interventions in the sector over the past year have implied greater price risks for producers, traders, and consumers.

As evident in Malawi, risks can have potentially significant implications on stakeholders, investments, and development in the agricultural sector. Adverse movements in agricultural commodity and input prices together with production-related shocks (e.g., from weather, pests,

diseases) not only impact farmers and firms active in particular supply chains, but may also put severe strains on the Government of Malawi's finances. Rapid or significant declines in production and/or trade reduce Government tax revenues, affect balance of payments, necessitate compensatory (or recovery) expenditures, and adversely impact the Government's fiscal position. The prevalence of "shock-recovery-shock" cycles vastly reduces Malawi's ability to plan for and concentrate on long-term development issues.

Over the past decades, Malawi has been struck by many severe droughts that have resulted in spikes in food insecurity and prompted the need for humanitarian aid. During the last major drought in 2005, 40 percent of the population was in immediate need of food aid as a result of a poor harvest. Due to the size of the sector in the economy and the importance of agricultural products for export, agricultural growth correlates closely with GDP growth. This means that drops in agricultural growth affect the entire economy, as depicted in Figure 1—agricultural

FIGURE 1: GDP and agricultural value added (percent growth) in Malawi, 1968–2014



Source: World Development Indicators 2014.

GDP growth was negative in the five years between 1992 and 2010. Further, any drop in agricultural growth in a given year will impact Malawi's 6 percent annual sector growth target, which the Government committed to under CAADP (Comprehensive Africa Agriculture Development Programme). For individual actors in the sector, these risks reinforce poverty traps through cycles of shock-recovery-shock and result in lower returns on investments in productive assets.

This *Note* is based on two studies on agricultural risk conducted jointly with the Government of Malawi in 2014 and 2015. For the purpose of these studies, risk is defined as the possibility that an event will occur and will have a negative impact on a farm or firm's performance.

The first study assessed and prioritized agricultural risks according to their frequency and severity of impact, and identified target areas for risk management solutions. The risk assessment examined three levels of risk: production risks, market risks, and enabling environmental risks. The assessment focused on the most significant supply chains in the sector that jointly account for 80 percent of Malawi's agricultural production value (maize, cassava, potato, peas and beans, rice, groundnuts, bananas, tobacco, and sugar), plus tea and cotton, due to their export potential. Maize is by far the most important staple crop, accounting for more than 50 percent of the daily calorie intake in Malawi. Tobacco, tea, cotton, and sugar accounted for 67 percent of the total value of national exports of goods in 2012.

The second study proposed specific recommendations to strengthen risk management in three solutions areas that were selected based on findings from the risk assessment and feedback from the consultative stakeholder meetings. A broad spectrum of stakeholders was consulted throughout this process, including officials from the Government of Malawi, farmers, traders, processors, agricultural institutions, and academia.

MAJOR RISKS

Annual losses from production risks for major crops amounted to US\$149 million, on average, between 1980 and 2012. Droughts and pests and diseases are cited by stakeholders as the most damaging production risks, especially for food crops. Drought is probably the most visible risk to the sector. Malawi has suffered very bad droughts in the past that had strong fiscal impact and required help from the international community. The damaging impact of pests and diseases is significant but depends on agricultural practices and mitigation activities. The impacts of pests and diseases are at times also exacerbated by adverse weather events. Erratic rainfall and hailstorms are frequent but of moderate or low impact. In 2015, floods caused major crop and livestock losses.

Price volatility is an important market risk in Malawi, particularly in key crops such as maize, tobacco, and cotton. The causes of volatility depend on the crop; cotton prices fluctuate according to world prices while tobacco and maize prices are mainly determined by the domestic

market. Maize price volatility is largely a result of enabling environmental risks due to unpredictable domestic market interventions and export policies. Regardless of the cause, sudden fluctuations in prices negatively affect farmers, the segment of the supply chain with the least risk management capacity. Exchange rate volatility and unreliable input markets add to these uncertainties for actors in the export crop sector.

ADVERSE IMPACTS

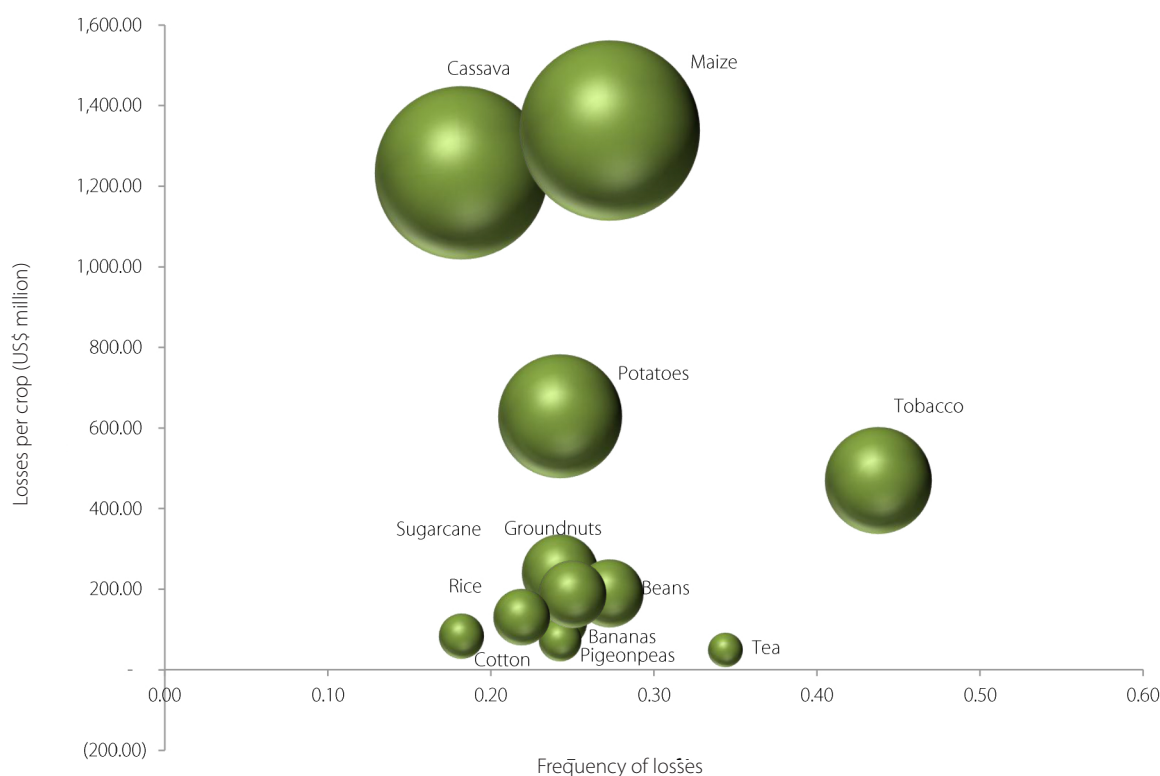
The impacts of individual shocks can be devastating. Average figures are useful to understand the aggregate costs of production risk yet tend to conceal the catastrophic impact that some shocks have on individuals at the time they occur. Shocks impact household and national food security, have important fiscal repercussions, reduce the availability of foreign exchange, and generally have an overall destabilizing effect on the macroeconomy. For instance, during the 2001 drought, losses amounted to US\$161 million, or 4.3 percent of total agricultural production value; and in 2005, losses were nearly US\$900 million,

24 percent of total agricultural production value (2006–08 average).

The losses in normal production value can be extreme for important smallholder crops like maize and tobacco (e.g., 50 percent of maize value was lost in 2005), leading to disastrous impacts on household incomes, food security, and well-being. The magnitude of the losses when shocks occur is much greater for some crops than for others: maize, cassava, potato, and tobacco have the highest average annual losses (figure 3). However, tobacco and tea incur losses more frequently, meaning that farmers involved in these crops are highly exposed to shocks.

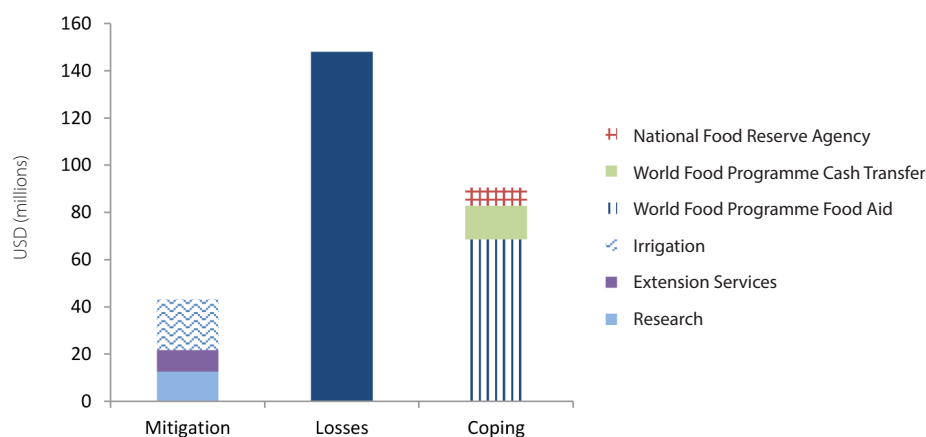
Understanding how risks affect different parts of the country is a prerequisite for designing a well-targeted risk management strategy. Maize-yield volatilities are fairly even across Malawi's eight Agricultural Development Divisions (ADDs), with Blantyre experiencing the highest volatility and Kasungu the lowest. The ADDs of Lilongwe and Kasungu, which have the largest areas of land under maize cultivation (almost 50 percent of the country's total),

FIGURE 3: Value and frequency of losses per crop in Malawi, 1980–2012



Note: Cassava losses were calculated based on national crop yield data, however, the accuracy of cassava yield data is currently being debated within the MoAIWD.

FIGURE 4: Costs and government budgetary expenses for activities associated with risk mitigation and risk coping versus losses from risks in Malawi, 2008-12



Source: World Bank Agriculture Public Expenditure Review 2014; National Food Reserve Agency; Authors' calculations.

Note: Losses reflect average annual production losses from 1980–2012 according to the above calculations. Total losses would amount to US\$103.5 million if cassava was excluded from the analysis.

exhibit relatively similar yield volatilities, significantly lower than that of Blantyre. Cassava shows similar differences in losses between ADDs, although its coefficient of variation (CV) of yield is high in all ADDs (likely due to the discrete jump in cassava yield in early 2000).

Because of the different level of outputs between ADDs, these variations in yield have different impacts on total production. The eight ADDs produce a total of 2 million metric tons of maize annually, but 70 percent of Malawi's maize production is grown in three ADDs (Blantyre, Lilongwe, and Kasungu), and 90 percent in five ADDs if Machinga and Muzuzu are included. Losses as a share of national production are largest in Kasungu, Lilongwe, Blantyre, and Michnga, which together account for 80 percent of total maize losses in Malawi. Similarly, two regions account for half of Malawi's cassava losses: Blantyre and Mzuzu. If Salima and Machinga are included, these four regions jointly account for over 80 percent of total annual cassava losses in Malawi.

Risks are costly for Malawi, not just for the private sector but also for the government. Malawi is one of the few countries in Sub-Saharan Africa that adheres to CAADP's goal of allocating 10 percent of the national budget to agriculture, and the country spends about US\$250 million on agriculture annually. Although there have been fewer

production declines since the mid-2000s, any losses in subsectors supported by the government reflect lost public investments. And although the losses are smaller, the government and donors spend large amounts on emergency aid and other coping mechanisms in response to shocks, diverting funds that would otherwise be allocated to long-term development investments.

Figure 4 gives an overview of the cost of risks and risk management in Malawi. On the mitigation side are expenditures on activities that could potentially reduce the impacts of identified risks (even though research and extension are currently geared toward general productivity-enhancing practices rather than risk mitigation). The figure does not include off-budget donor spending on mitigation and coping. Nevertheless, the figure clearly shows that risk-management expenditures are skewed toward coping mechanisms for ex-post risks rather than ex-ante risk-mitigating interventions that would decrease losses from risks. Reallocating funds to risk-mitigating activities thus represents potentially large savings in terms of losses and coping activities.

POTENTIAL SOLUTIONS

In order to close the gap in resources devoted to risk mitigation, interventions in three broad solutions areas are recommended. The solutions areas were selected together with the Government of Malawi based on feedback from a broad group of agricultural sector stakeholders.

1. Address the root causes behind low farmer adoption of better practices and technologies, particularly practices that would improve water and pest & disease management. Given the impacts of production risk events, especially drought, increasing producers' capacity to mitigate risks at the farm-level is crucial to reducing losses and increasing resilience in the sector. The Government of Malawi and donors have made substantial investments in risk mitigation activities, such as, irrigation, conservation agriculture, research and extension services. Despite this, on-farm uptake of improved agricultural practices for drought and disease mitigation is low, and losses in the sector from production shocks remain high. To date, efforts to promote use of improved practices and technologies have failed to produce broad, sustained results. Adoption of new technologies and practices ultimately depends on appropriate knowledge transfer, individual preferences, and farmers' ability to profit from increased investments. In Malawi, many of the obstacles to sustained adoption arise from policy and structural factors that distort farmer investment incentives.

Farmers' inability to market crops is one of the root causes behind the obstacles to risk mitigation in Malawi. While some farmers have benefited from investments in risk mitigation technology, many poor households struggle to transition from subsistence-level production to treating farming as a business. Limited access to organized markets decreases their ability to earn a profit and leaves them vulnerable to vendor exploitation. Poor coordination between relief programs and development programs can also distort the market for improved inputs for risk mitigation. For instance, when emergency inputs are distributed for free in communities with ongoing seed multiplication schemes, farmer incentives to participate in the schemes decrease. This reduces the viability of an independent market for improved seed varieties, and lowers the effectiveness of development aid.

Analysis of farm budgets reveals some of these challenges. Since 2008, nominal prices for beans and groundnuts increased significantly, tripling for both crops. While maize prices also increased, they did not keep up with the increased nominal price of inputs and, hence, gross income declined in this period. This equation changes significantly when taking into account the Government's Farm Input Subsidy Program (FISP): Gross income from maize production increases for farms receiving the subsidy for fertilizer and improved seed varieties.

The results of the on-farm budgets are problematic for the Government's national food security targets. Farmers with a marketable maize production surplus are not the target group for FISP, but gross income calculations show that without subsidies, farmers have no incentives to invest in maize production for the market. Other crops are more profitable to invest in. However, given the priority of maize production for smallholders to cover household needs, especially in an environment of unpredictable markets and prices, maize productivity likely determines the allocation of land for other crops and thus the diversification of the sector and incomes of farmers.

Inadequate extension services exacerbates many of the obstacles to sustained adoption. Many smallholders in Malawi are introduced to new technologies and practices, begin implementing the new technology, and discontinue adoption after the project closes. There are various reasons for disadoption—cessation of direct incentives, lack of access to inputs, mechanical breakdowns, dissatisfaction with yield results, gender disparities in financial decision-making—however, limited farmer access to reliable extension services and advice exacerbates these issues. Focus group discussions with farmers revealed system-wide deficits in knowledge, resources, and intra-agency communication. One example is the inadequate response to pest and disease threats. In many cases, initial early detection practices appeared to function as planned, but follow-through steps to manage outbreaks and prevent full-blown epidemics were not carried out, due to inappropriate advice from extension officers, delays in obtaining needed inputs, and communication breakdowns.

To overcome the barriers to farmer adoption of better practices and technologies, the following is recommended:

Strengthen the capacity of extension services

- Develop a gender-sensitized GAPs manual to address knowledge and skills gaps in the extension services system in Malawi, a low-cost solution to increasing capacity in the system
- Improve access to extension services for smallholder farmers by developing a best practices guide for implementing the Lead Farmer extension approach, drawing on experiences from other countries, and piloting extension approaches that incorporate performance-based pay
- Disseminate agricultural extension messages developed with input from smallholder farmers on program format, timing, and accompanying entertainment via mass media

Strengthen pest and disease management capacity for crops and livestock

- Establish policy guidelines that embed best practices for disease prevention across all sectors
- Improve knowledge of prevention and treatment options within the Department of Agricultural Extension Services
- Implement surveillance and reporting systems to monitor livestock outbreaks
- Train frontline extension workers on how to respond to outbreaks

Improve market linkages

- Link projects promoting risk mitigation technologies with complimentary interventions connecting farmers to reliable buyers, new export partnerships, and on- and off-farm processing activities

2. Strengthen rules-based food security policies and improve coordination between agencies to support long-term sector development. Some of the existing food security policies are distortive rather than supportive, and lead to disincentives for investments in the sector that could mitigate risk and promote growth. Untimely market interventions lead to price volatilities and unpredictability for actors in the sector, re-enforcing farmers' dependency on subsidized inputs for profitability.

Trade restrictions on maize exacerbate output varia-

tion, leading to high intra-annual price volatility, and price changes in retail markets are transmitted back to farm-gate prices. Low elasticity of demand further perpetuates price instability from supply fluctuations, and even small changes in production generally lead to large price changes. Recent data show that maize prices at the retail level are very volatile, as measured by the coefficient of variation. The coefficient of variation (CV) of average monthly maize prices in Malawi was 62 percent in 2007-2014, compared to 36 percent in the Sub-Saharan Africa region, and only 24 percent in neighboring Zambia. In spite of the high maize price volatility observed in Malawi, the range of price volatility levels between different regions *within* the country is small. (The CV ranges from 52 percent in Lilongwe to 64 percent in Liwonde, including both surplus and deficit areas). This may indicate that the marketing system is able to efficiently move stocks from surplus to deficit areas in most months of the year.

Current agricultural policies, particularly input subsidies, export bans, and import taxations on inputs have distorted markets and reduced the private profitability of investing in inputs. Analysis of maize yields and market prices for inputs and outputs show that these policies are decreasing output revenues in the maize sector by 16 percent, and increasing the price of inputs by 34 percent, effectively taxing maize producers even after the FISP subsidy is taken into account.

To ensure sustainable program investments and uptake of improved practices among farmers, food security policies must be less interventionist and more transparent. Less restrictive internal marketing and foreign trade policies, together with appropriate marketing support services and production incentive policies, could make a major contribution to reduce price volatility, increase and stabilize domestic production, and to improve real income among the rural population.

To reduce price distortions and improve coordination between the agencies responsible for both maize marketing and risk coping interventions, the following is recommended:

Promote freer trade

- Implement predictable and transparent policies aimed at promoting production and exports through fair prices at all levels of the supply chain



Photo credit: Stephen Morrison

- End unnecessary restrictions on trade, keeping only necessary phyto-sanitary measures
- Produce and disseminate reliable, timely information on production, stocks, and prices

Redefine the roles of the Agricultural Development and Marketing Corporation (ADMARC), the Department of Disaster Management Affairs (DODMA), and the Malawi Vulnerability Assessment Committee (MVAC)

- Enable the government maize marketing institutions to a) use a combination of virtual and physical grain reserves and b) strengthen ADMARC's role in providing marketing support services
- Strengthen coordination between the agencies
- Implement rules-based management and market interventions
- Align procurement with the agricultural year and make it predictable
- Strengthen DODMA's role in food distribution, assuring strict targeting in deficit areas and emergency situations and proper coordination with other food relief actors

- Guarantee resources to MVAC to continue full-scale operations
- Clearly differentiate between social safety net programs and disaster relief programs

3. Strengthen agricultural information systems for better policy development, monitoring, and evaluation. Agricultural policies are critical to incentivizing investment decisions at the farm level and enabling functioning markets. Given the maize price volatilities and the implicit taxation of the sector, there is an urgent need to better align policies and to target public spending in agriculture for risk mitigation and improved growth. However, there is a lack of institutional capacity to formulate and implement responsive agricultural policies.

Gaps and inconsistencies in agricultural policy must be addressed in order to implement an effective risk management strategy. The majority of existing agriculture sub-sector policies are based on outdated policy documents, and outdated regulations contribute to an uncertain investment climate.

Gaps in data collection, agricultural statistics, and information systems result in poor quality agricultural information and lower overall capacity for policy analysis and evaluation. Currently, agricultural information systems are incomplete, and there is no institutionalized process for evaluations and re-assessments of major programs. An M&E system for agricultural policy should be directly related to a clearly defined baseline and measurable program targets built on quantified indicators linked to program budgets.

Better policy formulation requires alignment with a long-term strategic framework and a robust M&E framework. These frameworks facilitate feedback between policy goals, program decisions, and results on the ground, creating an environment for dynamic, evidence-based policymaking.

To overcome gaps in the quality and consistency of agricultural policy, the following is recommended:

- Develop a guiding framework that creates a long-term vision for the agricultural sector
 - Harmonize policies with international agreements and commitments
 - Strengthen M&E by adopting integrated agricultural information management systems (AIS)
 - Mainstream gender indicators in project design, monitoring, and evaluation
 - Strengthen existing mechanisms to coordinate donors to avoid a) duplicating efforts and b) gaps between donors' plans and those of the MoAIWD
- Create a mechanism to capture information from the members of Malawi's Donor Committee on Agriculture and Food Security for the Joint Sector Review

MOVING FORWARD

Addressing these three highly interconnected areas simultaneously is an essential step to improving agricultural risk management in Malawi. Successfully implementing sustainable risk management measures requires providing incentives for the sector, which means implementing food security policies and productivity policies that are consistent and responsive to evidence from the field. Without comprehensive action at the institutional level to improve policy formulation and implementation, private sector stakeholders, particularly small-scale farmers, are unlikely to profit from or invest in the risk management measures necessary to decrease the impacts of production risks such as droughts and pests & diseases. While scaling up such risk management measures at the farm level is likely to also have positive effects on productivity and competitiveness in general, such initiatives will not be successful if an incentivizing environment is not in place.

The Government of Malawi has requested continued assistance from the World Bank to develop an agricultural risk management strategy and an action plan. The findings from the risk and solutions assessments will inform this plan and provide insight on how operationalizing risk management within government policies and programs can strengthen productivity and competitiveness.

This Note was based on two upcoming World Bank publications: *Malawi Agricultural Risk Assessment* and *Better Agricultural Risk Management for Growth and Food Security in Malawi*.

This work was funded by the World Bank, the United States Agency for International Development, and a Multi-Donor Trust Fund on Agricultural Risk Management financed by the Ministry of Foreign Affairs of the Government of the Netherlands and the State Secretariat for Economic Affairs (SECO) of the Government of Switzerland, and was conducted by the World Bank's Agricultural Risk Management Team.



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