



Introduction to Disaster Risk Financing for Agriculture

This knowledge series aims to bridge the knowledge gap for government officials and practitioners about the development and use of disaster-responsive financing mechanisms and instruments for the agriculture sector. Completion of the series will provide a grounding for Ministries of Finance (MoFs) and related ministries to establish, evaluate, and implement Disaster Risk Financing Agriculture (DRFA) programs as part of an overarching risk-

financing strategy. The content builds on the Fundamentals of Disaster Risk Financing (FDRF) training series, which provides an overview of the principles of disaster risk financing and their application in different contexts. Familiarity with the FDRF content is assumed as a basis for this DRFA webinar and fact sheet series, and further resources and information can be found [here](#).

**Disaster Risk Financing
& Insurance Program**





Module 2: Integrated Agriculture Risk Management

This is the second module of the Disaster Risk Financing for Agriculture knowledge series.

The objective of this module is to bridge the knowledge gap for government officials and practitioners on assessing the risks in agriculture as a basis for developing suitable risk management strategies.

The module presents the Agriculture Sector Risk Assessment (ASRA), an agriculture risk

assessment approach developed by the World Bank used in many countries around the world. The module also gives an overview of potential risk management instruments and approaches that countries can employ to address some of the thus identified agriculture risks. The module concludes by presenting the practical example of Zambia, where the ASRA methodology was applied and implemented.

Why do agriculture risks matter?

In low and middle income countries, the agriculture sector is often an important pillar of the economy and is key for creating jobs and ensuring food security. It has proven to be more effective than any other sector in reducing poverty. It is also an important sector in the fight against climate change and can contribute to achieving nutrition objectives. Some important facts to keep in mind on why improving the management of risks to reduce agriculture sector losses are important:

- Agriculture generates 29% of GDP and employs 65% of the workforce in agriculture-based economies.
- The agriculture sector often concentrates many of the poorest and most vulnerable members of society who tend to be disproportionately negatively affected by agriculture risks.
- There is often a strong correlation between GDP growth and agriculture sector growth.
- The agriculture sector is a particularly risky economic sector due to the vagaries of weather, prices, pests/disease, and public policies.
- Climate change and a dynamic and highly competitive global trading system are exacerbating agriculture sector risks globally.
- Risk management strategies to reduce adverse impacts on farm incomes and livelihoods (most of the poor in low-income countries are in the rural areas and depend on agriculture) must accompany agriculture investments for agriculture productivity and sector growth.



¹ The guide for applying ASRA can be found here: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/586561467994685817/agricultural-sector-risk-assessment-methodological-guidance-for-practitioners>

² To access various studies on agriculture risk management, the Platform for Agriculture Risk Management (PARM) can be accessed at: www.p4arm.org

Key agriculture risk management concepts



Definition of risk: Uncertain events that lead to losses. The uncertainty can arise from when the events will occur and/or the impact they may have.



Symptoms of risks: Some of the common impacts (symptoms) of risks in the agriculture sector are yield volatility, price volatility, food supply variations, etc.



Hazards that affect agriculture: Some of the common hazards that produce such risks include weather phenomena (drought, excess rainfall, high temperatures, frosts, hail, high winds, etc.), animal and/or plant pests and/or disease outbreaks, as well as international commodity price variations (for countries that are price takers).



Exposure is the likelihood of a risk occurring in the context in which an actor (i.e. a farmer or agribusiness) is operating in. So if a farmer is using a regular seed or a drought resistant seed, the likelihood of drought risk would be different (although the hazard is the same).



Vulnerability is an actor's ability to manage a risk, given its exposure to that risk. Some farmers may be more vulnerable than others if they lack access to financial services, such as savings, credit or insurance. Linked to the concept of vulnerability, is the concept of resilience described below.



Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner.

Distinction between risks and other development challenges: The above definition of risk for the agriculture sector is often confused with other issues affecting agriculture, such as constraints and trends. It is, therefore, important to differentiate the concept of risk from:



Sector constraints: Constraints refer to certain contextual conditions that lead to sub-optimal performance in a structured (permanent) way. An example is the lack of access to quality inputs, technologies and financing. This causes low yields often cited as an important structural constraint to agriculture development. Access to inputs or permanent low yields is not a risk, but a constraint.



Trends: These refer to longer term patterns (reversible or irreversible) that provide context to the development of the agriculture sector. The patterns are known and therefore are not considered risks. An example of such trends could be changes in climate, like the gradual rise in temperatures and rainfall patterns. These trends tend to also produce gradual decline in yields or the production of specific crops that are more sensitive to increases in temperature or other weather variables.

Types of Risks: For the purpose of this module and following the ASRA methodology, the risks faced by the agriculture sector are divided into the three groups as described below:



Production Risks

- Droughts, floods, hurricanes, heavy storms and excessive rainfall/hail, and severe freeze
- Fire, lightning, earthquakes, volcanoes, landslides, etc., or other extreme heat events
- Agricultural pests and diseases

Examples: (i) The 2014/15 El Niño Southern Oscillation (ENSO) event diminished crop stocks in Southern Africa due to abnormally high rainfall and flooding, affecting more than 135,000 people in Malawi, Mozambique, Madagascar, and Zimbabwe; and (ii) the Avian Flu (2003 – 2004) caused the death or culling of 140 million birds and more than US\$10 billion losses to the poultry industry in South East Asia.



Market Risks

- Market price risk (price volatility for agricultural inputs & outputs/products)

Examples: (i) During the international coffee crisis (2000 – 2003) international real coffee prices fell below any level recorded until then and resulted in the uprooting and abandonment of coffee plantations in West and Eastern Africa; and (ii) during the food price crisis (2008) prices soared, leading not only to food insecurity and social unrest around the world, but also to the realignment of global rice trade, with the Thai export business losing its market position to Vietnam.



Institutional Risks (enabling environment)

- Conflict, macroeconomic shocks, political and institutional risks.

Example: During the Kenyan Elections (2007), violence erupted, reducing flower exports across the country by 25 – 40%.

Key takeaway messages



- The adoption of integrated risk management strategies is critical for minimizing negative impacts on poverty, particularly for those who live in rural areas and work mainly in farming.
- Investments are needed to improve value chain businesses and strengthen household resilience.
- The definition of strategies cannot be implemented without first identifying risks and assessing the impact caused on different stakeholders given their own levels of vulnerability and exposure.

Assessing agriculture risks using the Agriculture Sector Wide Risk Assessment approach

The starting point to address agriculture risks is to understand them well. The Agriculture Sector Wide Risk Assessment (ASRA) is a tool to help decision makers understand agricultural risk exposure and to provide the basis for developing appropriate risk management solutions. ASRA is a consultative, time-bound process that provides an orderly way to analyze, identify, and prioritize risks. The process facilitates risk management policy and program design by providing a framework and tools for decision making. The ASRA's target audience includes country-level stakeholders involved in selected agricultural commodity systems, development agency decision makers, and developing country policy makers.

The ASRA is devised as a consultative and time-bound process to be carried out over an estimated 12-month period. The assessment draws upon available data and qualitative and quantitative information collected through stakeholder interviews and dialogue. This information covers input supply from farm production, assembly, processing, and logistics through to the final consumer.

The ASRA process is a dynamic one that requires careful planning given the participation of a variety of stakeholders and the degree of analytical skills and experience needed from the assessment team. Figure 2 summarizes the step-by-step ASRA process.

Figure 1. The ASRA flow



The initial risk assessment helps to determine the agriculture priority risks for the country. Based on the resulting risk prioritization, a short list of potential risk management solutions can be identified. This outcome is the basis for designing a risk management strategy that in turn has various steps, ending in an action plan for implementation. The shortlisted solutions can be evaluated using decision filters, such as feasibility and affordability, either in a consultative stakeholder setting or individually. These lists are thus not exhaustive, but provide a starting point for discussion. The different activities of the ASRA flow can thus be described as follows:



1. Assessing systemic agricultural risks quantitatively and qualitatively

- Measuring frequency and impacts of the 3 types of agricultural risks
- Determining the root causes of these risks – exogenous or endogenous?
- Identifying the stakeholders most vulnerable to these risks
- Prioritizing the risks according to impacts (costs, no of people affected in terms of food security, etc)



2. Assessing solutions and developing a risk management strategy/plan

- Mapping current interventions
- Identifying risk management solutions according to the prioritized risks and their respective layer
- Identifying barriers to scale and gap analysis
- Defining an action plan



3. Implementation and risk monitoring

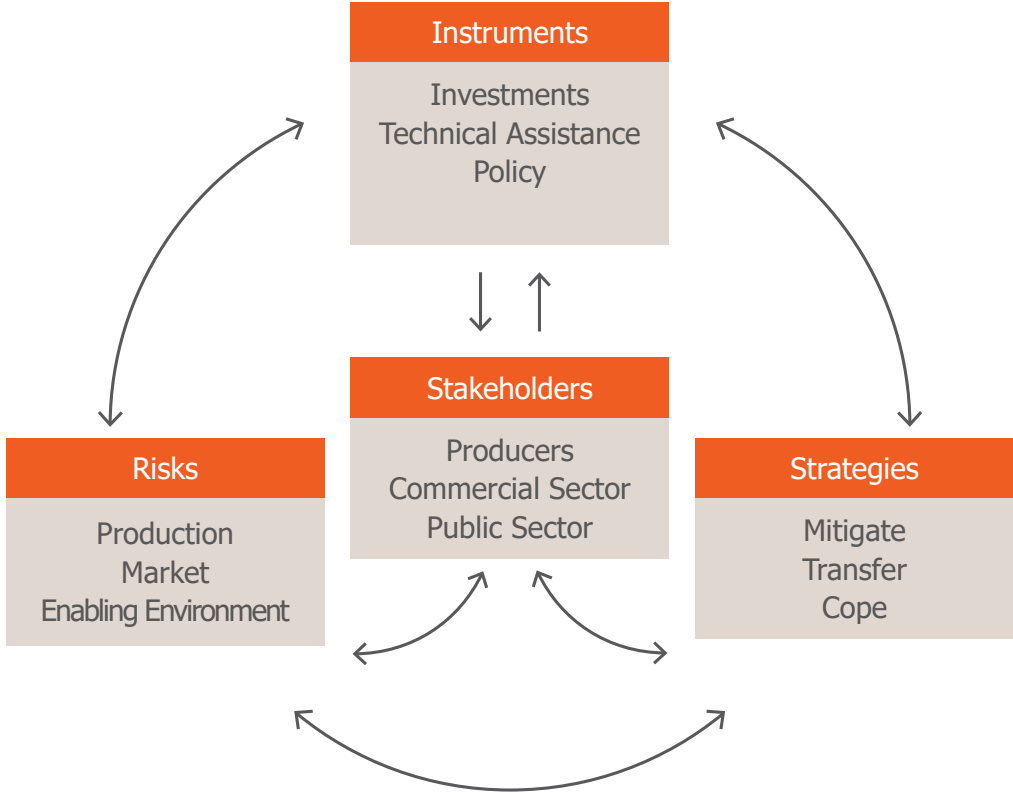
- Implementing the proposed action plan
- Monitoring impacts
- Reassessing risks and revising solutions continuously



Managing Agriculture Risks

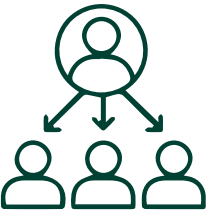
Building on the ASRA prioritization of risks, subsequently a strategy for managing these risks can be developed. The World Bank developed an integrated framework for the management of agriculture risks at the sector level. The framework is represented in Figure 2 below.

FIGURE 2. AGRICULTURE RISK MANAGEMENT FRAMEWORK



Risk Classification: The risk management framework for agriculture is not necessarily limited to the management of disasters. It includes the management of more frequent and less severe risks. It also differentiates between systemic (correlated) vs idiosyncratic risks.

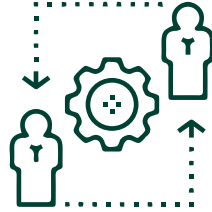
Stakeholders : identifying the different actors of the sector and the role they play in managing risks or being affected by them is critical. Some of the private and public sector actors include:



- Ministries of Agriculture
- Processors
- Financial Institutions
- Other value chain stakeholders

Strategies

In the management of risks, there can be different ways of approaching the management of risks to reduce losses or to be better prepared to respond. The classification of risk management strategies include the following three strategies:



• Mitigation Risk (ex ante):

Mitigation strategies are actions taken prior to a risk event to reduce the likelihood of risk or the severity of losses. They are particularly useful for risks that occur with relatively high frequency but with lower impact intensity. Risk mitigation options are numerous and varied. Examples include adoption of improved agronomic practices such as soil drainage and mulching, conservation farming, and the use of short-duration and disease- and stress-resistant cultivars; irrigation and flood control infrastructure; soil and water conservation measures; changes in cropping patterns; crop and livestock diversification; income diversification; improved early warning systems; and modern information and decision support systems.

• Risk transfer (ex ante):

As not all effects of realized risks can be mitigated, risk transfer tools and mechanisms transfer the potential financial consequences of particular risks from one party to a willing third party, usually for a fee or premium. These mechanisms usually trigger compensation in the case of a risk-generated loss (for example, purchasing insurance, reinsurance, financial hedging tools). Although insurance and hedging are well-known forms of risk transfer, in developing countries the use of informal risk transfer within families and communities is also extremely important. These agriculture risk management tools will be further discussed in the subsequent modules of the Disaster Risk Financing for Agriculture series.

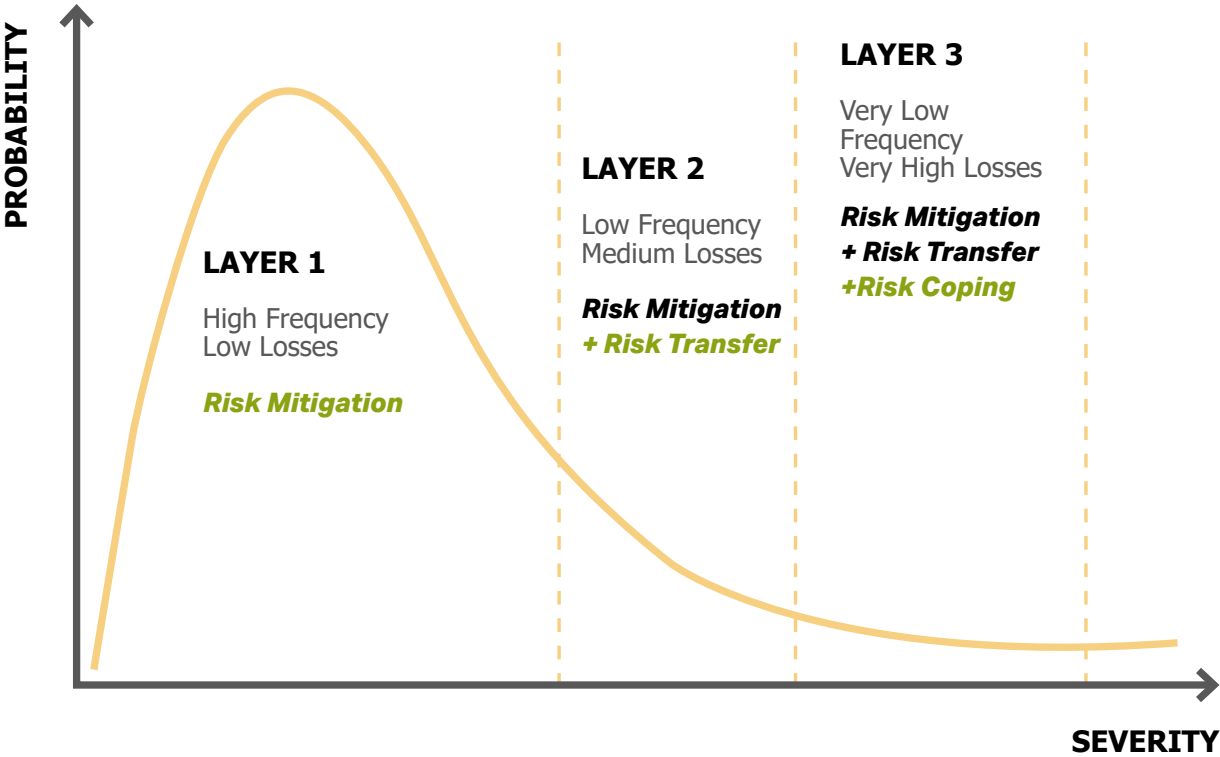
• Risk coping (ex post):

Some risks cannot be mitigated or transferred, so risk coping strategies are needed to help stakeholders better absorb and recover from their impacts. These instruments improve the affected population's resilience to withstand and cope with events through ex ante preparation to sustain production and livelihoods following an event. Examples include some form of compensation (cash or in-kind), social safety net programs, buffer funds, savings, strategic reserves, and livelihood recovery programs (for example, government assistance to farmers, debt restructuring, contingent financing). Such interventions are often financially beneficial and the ability to quickly respond to events often reduces losses.

Risk Layering

There are different risk management options depending on the frequency and impacts of a specific risk. The figure below illustrates these risk management strategies in the context of increasing layers of risk depending on the probability of occurrence (frequency) and the intensity or potential to cause losses (severity).

FIGURE 3. Risk Layering



Interventions

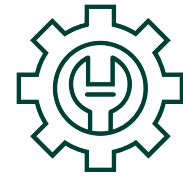
Risk management strategies are operationalized by interventions that can be planned, budgeted, and implemented for. These instruments fall into three main categories:



- Policy reform:** Improved risk management often entails policy reforms (for example, legal or regulatory reforms to improve access to agricultural inputs; changes in information policy to make agricultural information easily accessible to all; changes in government policy related to price formation, government procurement, or strategic grain reserves).



- Agricultural investment:** Although policy reforms mainly require political will, other risk mitigation measures can be costly. Examples are financial investments in irrigation infrastructure, research into drought- and disease-resistant and pest-tolerant cultivars, soil and water conservation, weather infrastructure, or updated agricultural services (for example, agricultural extension systems or disease surveillance systems). Some of these measures may already be part of a government program, with the ASRA simply calling for additional investments to strengthen capacity in those areas more vulnerable to external shocks.



- Technical assistance (TA):** TA is geared toward building local stakeholders' capacity (for example, training in price risk management; feasibility studies for various instruments; flood risk modeling work; development of early warning systems). Recent developments in information systems addressing agricultural risks can be easily transferred to public and private institutions that can adapt the instruments to a country's specific conditions.

Case Study: Zambia

The objective of this case is to show how to analyze the principal risks the agricultural sector faces, using the Republic of Zambia as an example. The case study concludes identifying pathways for how these risks are to be managed. Risk events were a major factor contributing to the decline in agriculture's share of Zambia's gross domestic product (GDP), which fell from 8.2 percent during the period between 2011 and 2015, to 5.3 percent in 2015 itself—a year that saw a variety of such events, including El Niño and attacks of fall army worms. In terms of the severity and frequency of adverse impacts, and how they affected food security, rural livelihoods, and the broader economy, these varied somewhat between agricultural subsectors and between different regions in Zambia. Drought, floods, and price volatility were identified as the principal risks affecting crop agriculture in the country. Drought and outbreaks of animal disease are the principal risks affecting livestock.

RESULTS OF AGRICULTURE SECTOR RISK PRIORITIZATION (FOR CROPS)

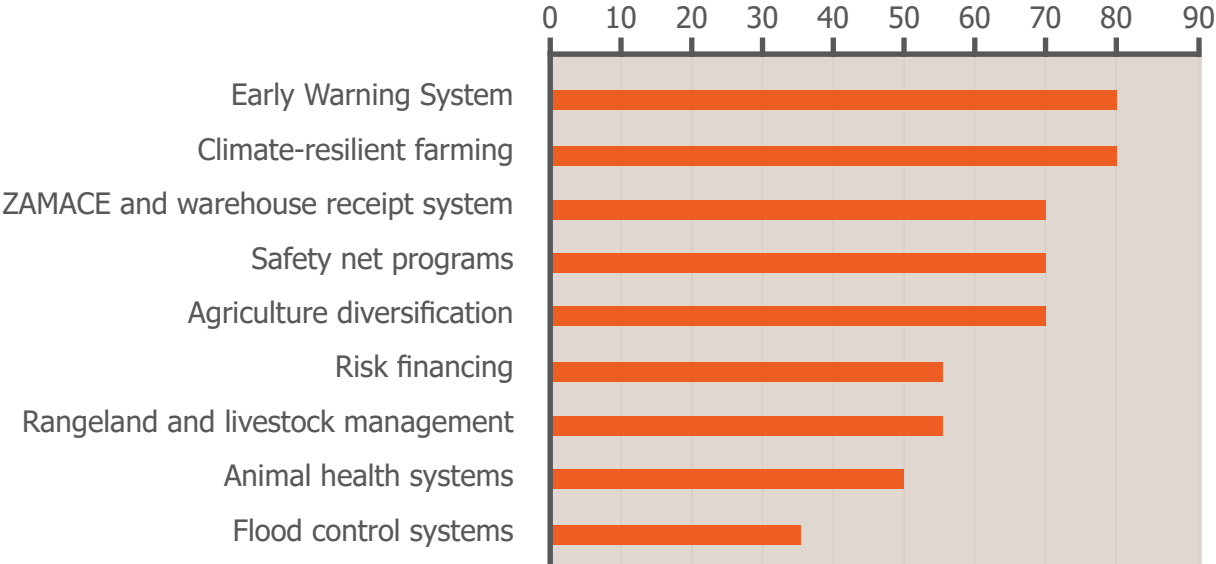
IMPACT (LOSSES)					
PROBABILITY OF EVENT	CROPS	LOW (<10%)	MODERATELY HIGH (10%-30%)	HIGH (30%-50%)	CRITICAL (>50%)
	Highly probable (1 year in 3)	<ul style="list-style-type: none"> Crop levies ad hoc 	-	<ul style="list-style-type: none"> Price volatility 	-
	Probable (1 year in 5)	-	-	<ul style="list-style-type: none"> Localized drought and dry spells 	-
	Occasional (1 year in 10)	-	<ul style="list-style-type: none"> Inflation Exchange rate fluctuation Macroeconomic changes Trade restrictions 	<ul style="list-style-type: none"> Floods 	-
	Remote (1 year in 20)	<ul style="list-style-type: none"> Input distribution delays 	<ul style="list-style-type: none"> Political instability Pests Disease 	<ul style="list-style-type: none"> Post harvest losses 	<ul style="list-style-type: none"> Severe drought

NOTE: - STANDS FOR NOT AVAILABLE

Exposure to the consequences of these and other risks can be effectively limited through risk management systems tailored to the conditions prevailing in a country’s agricultural sector. The following three areas of risk management are found to warrant priority for public policy in Zambia, with significant potential for synergizing actions undertaken across them:

- Strengthen early warning system to detect threats to food security.
- Develop climate-smart agriculture and increase resilience to climate related shocks through diversification.
- Develop the Zambian Commodity Exchange (ZAMACE) and build a shock-responsive safety net.

RESULTS OF SUPPORT FOR VARIOUS STRATEGIES AND INSTRUMENTS TO BE IMPLEMENTED
FIGURE 4: PRIORITY SCORES (%) FOR THE RISK MANAGEMENT OPTIONS



Key Takeaways from Fact Sheet 2

- An adequate risk assessment is essential and the natural starting point for effective risk management. The development of an integrated risk management strategy must begin by recognizing the underlying risks, existing capacities and potential areas for improvement. The World Bank Agriculture Sector Risk Assessment (ASRA) is a proven methodology to assess and prioritize agriculture risks.
- Agricultural risk management should not focus solely on productive risks. Market risks and institutional risks are likewise important risks for the agriculture sector that should not be disregarded.
- Based on an ASRA assessment, potential risk management approaches can be identified. In order to decide on their implementation, respective costs and benefits need to be weighed carefully to then decide whether to implement the strategy.
- The World Bank supports countries in developing an integrated agriculture risk management approach which combines the use of different risk management instruments for different risks, including risk mitigation, risk transfer and risk coping instruments.
- An efficient agriculture risk management plan is grounded in the knowledge of the stakeholders and achieving consensus and participation.
- The application of risk management tools is an integral part of a comprehensive risk management strategy.
- Sustained investments are required to reduce vulnerability and improve resilience.
- Finally, risk management is not static but a continuous process which requires constant review and adaptation.



Other Useful References (Links provided)



- The Platform for Agriculture Risk Management (PARM) – [Link here.](#)
- Agricultural risk management tools (Module 3 of PARM’s Agriculture Risk Management in Developing Countries: a learning course for practitioners) – [Link here.](#)
- Guide to Agriculture Sector Risk Assessments (ASRA) – [Link here.](#)
- OECD agriculture sector risk management website – [Link here.](#)
- Increasing Agricultural Resilience through Better Risk Management in Zambia – [Link here.](#)



Glossary

Agriculture Risk

Risk of uncertainties inherent in weather, yields, prices, government policies, global markets, and other factors that impact agriculture sector.

Agronomy

Agronomy is branch of agricultural science, which deals with principles, & practices of soil, water & crop management.

Contingency Fund

A fund held as a reserve to cover claims should an insured event occur.

Debt Restructuring

Changing the maturity and/or terms of a loan.

Ex ante

Action taken prior to a potential risk event. Making preparations before a disaster helps avoid inefficient, quick response coping decisions. If ex ante strategies are not in place, short-term coping strategies will be utilized that have no significant benefit in the long run.

Ex post

Risk management strategies that are developed in reaction to an event, without prior planning. While ex post strategies have a role to play in a risk management program, risk management mechanisms can be more effective when introduced ex ante.

Financial Hedging Tools

Hedging instruments that will enable reduction of or limiting the risk in an underlying asset.

Food Security

Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Institutional Risk

Institutional risk refers to unpredictable changes in the provision of services from institutions (formal and informal) that support the agriculture sector – i.e. banks, cooperatives, marketing organizations, input dealers and government extension services. Part of institutional risk can also be the uncertainty of government policy.

Market Risk

Risk related to fluctuations in the market that result in losses or gains of capital resulting from change in prices of assets and investments.

Production Risk

Any event that directly affects the quantity and/or quality of production or causes variation in expected yield.

Risk Management

Care of risk to maintain income and avoid/reduce loss or damage to a property resulting from undesirable events. Risk management therefore involves identifying, analyzing and quantifying risks and taking appropriate measures to prevent or minimize losses. Risk management may involve physical treatment, such as spraying a crop against aphids or planting windbreaks and/or financial treatment, e.g. hedging, insurance and self-insurance.

Social Safety Net Programs

Social safety net programs protect families from the impact of economic shocks, natural disasters, and other crises.

Strategic Reserves

A reserve of a commodity or items that is held back from normal use by governments, organizations, or businesses in pursuance of a particular strategy or to cope with unexpected events.

Work Sheet 2: Integrated Agriculture Risk Management

Test your knowledge and record your insights through this easy, DIY worksheet!

Activity 1: Identify if the following statements about agriculture sector and the different types of risks it faces are true or false.

#	Statement	True	False
1	Production risk refers to risk of diminished agriculture yield due to abnormal or extreme climate events.		
2	Highly competitive global trading systems are reducing agriculture sector risks globally.		
3	Agriculture sector has proven to be more effective than any other sector in reducing poverty.		
4	Market risk refers to price volatility for agriculture inputs and outputs.		
5	There is no real correlation between GDP growth and agriculture sector growth.		

Activity 2: Match the three risk management strategies in agriculture to their different tools and mechanisms.

#	Tool/Mechanisms	Mitigation Risk	Risk Transfer	Risk Coping
1	Changes in cropping pattern			
2	Strategic reserves			
3	Reinsurance			
4	Financial hedging tools			
5	Early warning systems			
6	Livelihood and recovery programs			

Activity 3: Based on the probability of occurrence (frequency) and intensity or potential to cause losses (severity) to agriculture sector, identify the different risk management strategies that can be implemented.

#	Frequency/Severity	Mitigation Risk	Risk Transfer	Risk Coping
1	High frequency, low losses			
2	Low frequency, medium losses			
3	Very low frequency, very high losses			

Activity 4: Reflections

(1) These are my top two take-aways from this fact sheet.

(2) Here are two concepts or ideas that I would like more information about.