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WORLD BANK GROUP

Niger Agricultural Sector Risk Assessment

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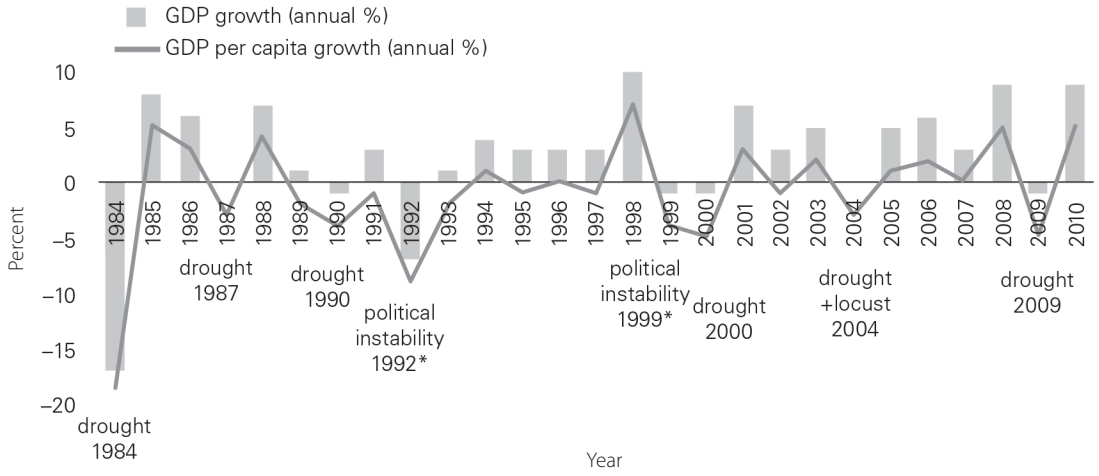
Niger, owing to its climatic, institutional, livelihood, economic, and environmental context, is one of the most vulnerable countries in the world. Poverty is pervasive in Niger and it ranks low on almost all the human development indicators. Agriculture is the most important sector of Niger's economy and accounts for over 40 percent of national gross domestic product (GDP) and is the principal source of livelihood for over 80 percent of the country's population. The performance of the agricultural sector is very volatile, however, due to its high exposure to risks. Niger has experienced multiple shocks, largely induced by agricultural risks over the past 30 years, which impose high welfare cost in terms of food availability, food affordability, and malnutrition. It also adversely affects household incomes, performance of the agricultural sector, the government's fiscal balance, and the growth rate of Niger's economy (see figure 1).

FIGURE 1: Annual GDP growth (percent) and GDP per capita (percent), 1984–2010



Sources: World Development Indicators Database, 2012; and Authors' calculations.
**1992 political instability (transitional government November 1991–April 1993) and 1999 political instability (assassination of President Ibrahim Baré Mainassare).*

METHODOLOGY

Recognizing the need to explicitly and comprehensively address agricultural risks, the Government of Niger, through 3N high commissioner, requested the World Bank to conduct an agricultural sector risk assessment of Niger. This risk assessment enriches the existing knowledge base of the agricultural sector in Niger and provides the following contributions: (1) systematically analyzes a whole range of agricultural risks and impact over a longer time period (1980–2012); (2) helps situate drought in the context of other agricultural risks; (3) prioritizes the most important agricultural risks for the country based on objective criteria; (4) provides a framework of mitigation-transfer-coping to manage priority risks; and (5) offers a filtering mechanism to select high-return interventions for agricultural risk management.

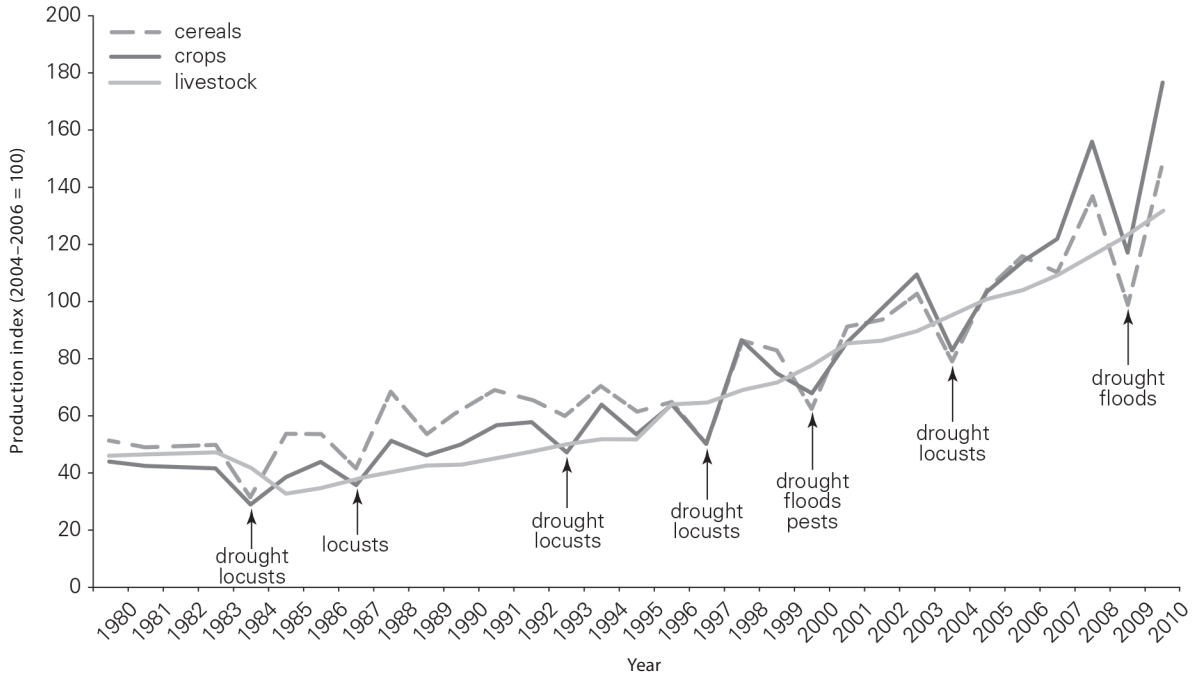
PRODUCTION RISKS

Drought, locusts, livestock diseases, crop pests and diseases, floods, windstorms and bushfires are the main sources of production risk. Farmers also complain of the risks to crop production from livestock herds, although the incidence and severity of these events is difficult to determine. The impact of some of these events on crop production for the period 1980–2011 is indicated in figure 2 below, using indices of agricultural production.

Drought is the principal risk in Niger and the country has experienced seven droughts between 1980–2010, with adverse impact on national agricultural production. Over the past 12 years, Niger has witnessed four years (2001, 2005, 2010, and 2012) of severe food insecurity that resulted in appeal for international humanitarian assistance and food relief. Drought is also the principle trigger for spikes in food prices and conflicts over pasture and water; it is highly correlated with some crop pests and diseases, and it aggravates mortality and morbidity due to livestock diseases.

Locust outbreak is another high-frequency, high-severity risk in Niger. Almost one-third of losses during the 2004–05 crises were due to locusts, with adverse impact, on both the crop and livestock sectors. Considering the significance of livestock for Niger's economy, livestock diseases, especially pasteurellose, anthrax, peste de petits ruminants, and Newcastle disease (for poultry), are another principal risk for the country.

FIGURE 2: Major shocks to crop and livestock production



Source: Authors' calculations.

Photo credit: Stevie Mann / International Livestock Research Institute

Flood incidences are increasing in Niger; however, they do not pose a serious risk to the broader agricultural sector, due to localized nature of flooding. Furthermore, most of the flood years are usually associated with bumper harvest because of higher than average rainfall at an aggregate level for the country.

Crop pests and diseases, like striga and fungal diseases, are a perennial problem among most crops; however, overall losses from a majority of these pests and diseases, barring the exception of grasshoppers, grain eating bird, and millet borer, are frequent but relatively low.

Bush fire is often a problem for pastoral areas and windstorms damage young plants at the beginning of copping season. Nonetheless, the overall impact of these two risks on the agricultural sector is negligible.

MARKET RISKS

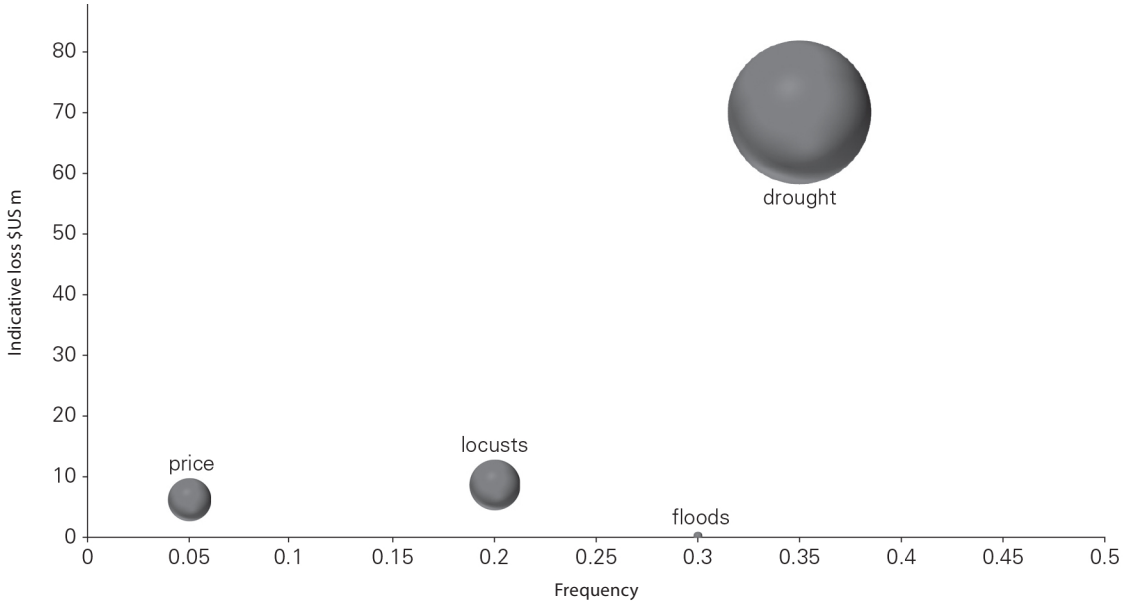
Food price volatility is a big concern for consumers and major spikes in nominal prices occurred in 1998, 2001, 2002, 2005, 2009, and 2010. These spikes are also observed for real prices, although they were much less pronounced in 2009 and 2010. There is a strong association between seasonal price movements and the incidence of drought and other adverse events. The hardship endured during these periods of adversity seem to confirm the growing consensus that reduced access to food (high prices), along with reduced food availability, may be the most critical impact of drought and locust attacks in Niger. High seasonal price spikes appear to be more closely and systematically associated with these events than inter-annual changes in production or prices.

Due to Niger's heavy reliance on trade with Nigeria, adverse movements in the West African CFA Franc (FCFA)/ naira exchange rate could also be a potential source of risk. However, market data shows that the FCFA/naira exchange rate is relatively stable, with low adjusted coefficients of variation (.06–0.08) for monthly exchange rates for the period January 2003 to October 2011.

ENABLING ENVIRONMENT RISKS

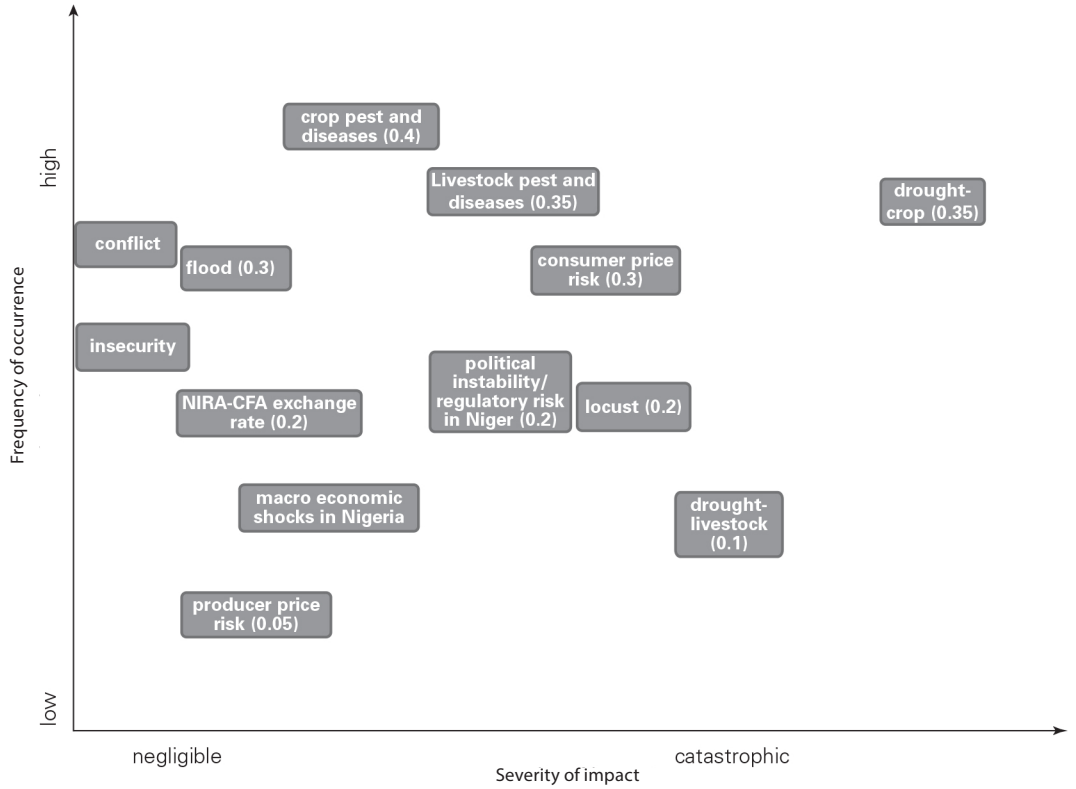
Political instability is a major risk in Niger, which has had a tumultuous political history with four *coups d'état* since independence (1974, 1996, 1999, 2010). Niger has witnessed

FIGURE 3: Expected average losses for adverse crop production events



Source: Authors' calculations.

FIGURE 4: Risk prioritization



Source: Author's calculations.

two transitional governments that were associated with rapid deterioration of the economy (figure 1) and a sharp decline in GDP growth rates. The impact on the agricultural sector, however, was much less pronounced and more indirect and might include: (1) reduced access to particular regions, which means that rural markets are more restricted, food prices rise, and aid can't get through; (2) reduced public and private investment in response to higher levels of uncertainty; (3) the diversion of public expenditure to military purposes to the detriment of other public services; and (4) loss of donor support. Political instability may have a bigger impact on the agricultural sector when it coincides with other shocks like drought, such as in 1995–1997. Political instability induces changes in government priorities and contributes to volatility in agricultural sector funding.

Rising pressure on common property resources, or on resources used within the bounds of customary law, have led to frequent, but localized, conflicts affecting herders and farmers. Insecurity has always been an issue for herders practicing transhumance, but of late, the situation has deteriorated, especially in the border areas of Mali, Libya, and Nigeria (Chad is an endemic problem). Despite their significance for herders in some locations, from a macroperspective, the impact of insecurity and conflict on the broader agricultural sector is relatively small.

Macroeconomic shocks in Nigeria, as the largest trading partner of Niger, can have potentially serious repercussions on the agricultural sector; however, so far, past impacts of such shocks have been moderate and short-lived. The assessment team analyzed downside deviation from the trend and correlated them with adverse events to calculate frequency and indicative losses from major production risks for crops. Figure 3 highlights the result of that analysis.

A combination of qualitative and quantitative measures, based on the assessment team's evaluation, was used to prioritize major risks for the entire agricultural sector, both livestock and crops (figure 4). This analysis highlights six priority risks, namely 1) drought (crop), 2) drought (livestock), 3) locust outbreaks, 4) consumer price risk, 5) livestock diseases and 6) political instability.

POTENTIAL SOLUTIONS

To address the priority risks, the assessment deployed a holistic agricultural risk management framework, comprised of mitigation (action taken to reduce the likelihood of events, exposure, and/or potential losses), transfer (risk transfer to a willing party, at a fee or premium), and coping (activities geared to help cope with losses) solutions to identify a list of potential interventions. Risk transfer solutions (insurance and hedging), owing to Niger's specific context, have limited applicability

TABLE 1: Decision filters and intervention classification

	SCALABILITY	RELATIVE COST	EASE OF IMPLEMENTATION	RETURN TIME	ADVERSE IMPACT ON ENVIRONMENT	POTENTIAL IMPACT ON POVERTY ALLEVIATION
Drought tolerant/improved seed varieties (M)	High	Medium	Medium	Short	Low	High
Soil and water conservation (M)	High	Medium	Medium	Medium	Low	High
Irrigation (M)	Low	High	Low	Short–medium	Moderate	High
Early detection and destruction of locusts (M)	High	Medium	High	Short	Moderate	Low
Community-level food and fodder banks (M, C)	High	Medium	Medium	Short	Low	High
Vaccination programs (M)	High	Medium	Medium	Medium	Low	High
Contingent financing (C)	High	Low	High	Short	Low	Low
Shortening emergency response time (C)	Medium	Low	Medium	Short	Low	Low
Strategic de-stocking (C)	Low	Medium	Low	Medium	Low	Low
Insurance (T)	Low	Low	Medium	Medium	Low	Low

Source: Authors.
Note: M is Mitigation, C is coping, and T is Transfer.

and will be quite challenging to implement. Coping solutions (social safety net programs) are required and quite important in Niger; however, they do not address fundamental risk issues in the agricultural sector and have limited applicability as a long-term solution. Risk mitigation is perhaps the most required, but much ignored, with the highest returns in addressing short- and long-term issues in Niger's agricultural sector. It is important to highlight that most of these potential interventions are complementary in nature and most of them are required to effectively address agricultural risks in Niger. Nonetheless, considering the resource-constrained environment of Niger, decision filters (table 1) were used to help prioritize the interventions.

Using these filters, the following types of interventions were recommended with the potential to generate sizable risk management benefits:

- **Drought-tolerant, high-yielding crop varieties.** Despite its importance, less than six percent of farming households in Niger have access to drought-tolerant cereal varieties. Early warning about the impending weather season coupled with ready availability of drought-tolerant varieties could help mitigate the risk of crop failure. This will necessitate development of a "sustainable seed system," consisting of seed research, seed multiplication, and seed delivery on a large scale.
- **Soil and water conservation; natural resource management (NRM) techniques.** Effective soil and water conservation techniques in Niger have successfully contributed to (1) conserving rain water, (2) increasing its infi ltration, and (3) enhancing plant growth, which improves the resilience of crops during water stress and serves as a useful drought mitigation intervention. Further expansion and consolidation of water conservation and NRM interventions will contribute to greater integration of the agriculture-livestock sector, yield improvements, and drought risk management.
- **Irrigation.** Expansion of irrigation facilities can serve as an important drought risk management tool, considering that uneven rainfall distribution is one of the principal causes of crop failure in Niger. Despite the desert conditions, there is considerable potential to increase the area under irrigation in Niger, which could contribute to improved nutrition, access to diversified food, and improved household income, thereby reducing food affordability issues and improving household food security.

Photo credit: Fatoumata Diabate/Oxfam

These half-moon structures on barren soil are a risk mitigation tool designed to preserve water when it rains, refilling the water table and encouraging the regrowth of vegetation.

- **Continuous support to early detection and eradication of desert locusts.** Ex-ante preventive action reliant on monitoring of seasonal reproductive areas, localization, and destruction of first locust populations has been effective so far by successfully controlling a potential locust outbreak in 2009, largely through use of biopesticides. Therefore, this approach should be supported and strengthened.
- **Supporting community-level interventions for food and fodder banks.** To ensure availability of food and fodder at the local level, support for community food and fodder banks, on an as-needed basis, should be provided in areas known to be suffering, or are likely to, suffer from food shortages or food price spikes. Targeting could be based on indicators of food access and food availability, using price data. The aim should be to intervene earlier in the seasonal cycle, well before prices reach their seasonal peak. Besides ensuring food and fodder availability for vulnerable populations, such interventions will also help stabilize food and fodder prices for wider populations and can help respond to local-level market failures without creating major distortions.
- **Livestock vaccination.** Vaccination is perhaps one of the most significant measures to reduce the risk of livestock diseases. With limited resources, the

government of Niger could focus on preventive vaccination campaigns against the biggest threats and respond to some of the worst outbreaks.

Niger is a case of living perpetually with risk, thus more emphasis on long-term structural solutions, rather than short-term quick fixes, is required to improve the resilience of the agricultural sector. Designing and implementing a comprehensive agricultural risk management strategy will require sustained and substantial financial investments, shifting the focus from short-term crisis response to long-term risk management, streamlining disparate donor investments and isolated interventions toward the core problem, supporting decentralized community- and farm-level decision making, integrating agricultural risk management into the existing development frameworks, prioritizing agricultural risks into government and donor strategies, and focusing on implementation.

OPERATIONALZING RISK MANAGEMENT

The World Bank conducted the risk assessment in Niger together with government officials from the 3N High Commission Initiative, Nigeriens Nourish Nigeriens, the food security and agriculture development strategy championed by President Mahamadou Issoufou. The

Photo credit: Mercy Corps

TABLE 2: Plan of Action for Agriculture Risk Management (PAGRA)

Component	Subcomponent	Types of Risk Management Measures
Component 1 – Capacity of agricultural and pastoral production systems to address risks	1.1 – Stabilization of plant production	Selection and use of high-yield and drought-tolerant seeds
		Application of water and soil conservation/ soil restoration and natural resource management in rain-fed systems
		Irrigation extension with full or partial water control
	1.2 – Stabilization of livestock production	Livestock health and safety – vaccination
		Pastoral development (application of water and soil conservation/ soil restoration and natural resource management in pastoral areas)
		Extension of forage crops
Component 2 – Emergency preparation, adaptation, and response of households, the government, and community leaders	2.1– Reducing vulnerability	Strengthening resilience and recovery capacity of pastoral communities to food and nutrition crises
	2.2 – Organization and effectiveness of emergency response	Strengthening the institutional mechanism (NACC DGPV) for the prevention and management of locusts
		Capacity building for the National Plan for Prevention and Management of Disasters and Food Crises
Component 3 – Coordination and dissemination of agriculture risk management	3.1 – Consideration of agriculture risk management in development initiatives	Advocacy for mainstreaming agriculture risk management with relevant public institutions and authorities
		Capacity building of agriculture risk management actors
		Advocacy for mainstreaming of agriculture risk management with development partners
	3.2 – Communication and coordination of PAGRA implementation	Information and multi-stakeholder consultations
		Collection, monitoring and evaluation of experiences

collaboration raised awareness of agricultural risk among local stakeholders, built local capacity to formulate risk management strategies, and created a platform for discussing and highlighting the agriculture risk management agenda. Niger's experience integrating and operationalizing risk management could help inform efforts in other countries.

Plan of Action for Agriculture Risk Management (PAGRA)

Due to the close collaboration between the World Bank Agriculture Risk Management Team and the 3N High Commission, findings from the risk assessment were integrated into the Plan of Action for Agriculture Risk Management in Niger 2014–2023. PAGRA is the result of a multi-stakeholder consultative process that included representatives from government, civil society, the private sector, research institutions, and the World Bank. In order to create a risk management action plan for Niger and make it compatible with the 3N investment plan, stakeholders gathered to deepen the solutions recommended by the risk assessment, prioritize risk management interventions, and to define specific targets for high-priority interventions.

The multi-stakeholder consultative process kicked off in January 2013 with a national workshop to examine agricultural risks in Niger. This workshop brought together over 100 stakeholders to discuss and validate PAGRA and initiate the process of moving from design to implementation. Subsequently, the 3N Initiative organized seven thematic working group to discuss different types of risk management actions. Each group considered the actions required to scale-up implementation of specific risk management interventions, identifying the need for targeted investments, technical assistance, and policy and regulatory changes.

PAGRA emerged from this interactive process containing short-, medium- and long-term goals for building resilience in the agricultural sector. The plan aims to minimize the financial and economic losses caused by shocks and emergency response spending, to build capacity of sector stakeholders to manage risks, and to target opportunities for sustainable development. PAGRA was officially launched in collaboration with the New Partnership for Africa's Development, the International Fund for Agricultural Development, and the Platform for Agricultural Risk Management, and will be implemented through three components (table 2).

Integrating risk management in World Bank operations

The analytical work carried out by ARMT led to refinement of the World Bank's Niger Country Partnership Strategy (CPS) 2013–2017. The refined strategy specifically recognizes the importance of ending the poverty trap of extreme vulnerability to weather shocks, and the need to address short-term concerns while maintaining long-term focus on risk managment.

In addition to the activities implemented under PAGRA, the World Bank structured a new $US 111 million lending operation in Niger based on ARMT's recommendations to the 3N High Commission. The Niger Climate Smart Agriculture Support Project is designed to increase agricultural productivity by enhancing the drought resilience of agro-pastoral systems in targeted communities. The project will support other agricultural productivity enhancing measures, including: support to seed value chains, provision of small-scale irrigation infrastructure, and on-farm NRM for environmental sustainability.

This Note was based on the World Bank publication: Choudhary, Vikas; D'Alessandro, Stephen; Ba, Amadou. 2013. *Agricultural sector risk assessment in Niger : moving from crisis response to long-term risk management - technical assistance.* Washington D.C. : The Worldbank.

This work was funded by the World Bank and a Multi-Donor Trust Fund on Agricultural Risk Management financed by the Ministry of Foreign Affairs of the Government of the Netherlands and by 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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