Discussion Note

Financing Agriculture in the Context of Climate Change
Introduction
Agriculture is at a critical juncture marked by a confluence of concurrent challenges – food insecurity, volatility of prices, freshwater scarcity, and climate change. Financing agriculture has always been a daunting task due to the inherent risks of this sector. Climate change threatens to further compound these risks thereby creating an urgent need for strong adaptation measures, and stronger financing to support these measures. Without adequate financing, the agricultural sector will not be able to withstand the impact of climate change let alone feed a growing planet. A renewed focus on agricultural finance and risk management is critical to upsurge financing to this sector.

The Challenges
The combination of an expanding global population and changing dietary preferences (due to rising incomes) toward a higher protein diet will see demand for food increase by seventy percent. With new agricultural land unavailable this rising demand necessitates substantial increases in agricultural productivity and efficiency. Unfortunately, rates of agricultural productivity in both developed and developing countries have stagnated since 1990. The burgeoning demand for food coupled with stagnant supply translates into price volatility and food insecurity. Additional freshwater usage for agricultural production is untenable in several parts of the world, as agriculture currently consumes more than 80 percent of freshwater supplies. It is expected that by 2025, two-thirds of the world’s population will live in water-constrained areas.

Climate change will further exacerbate these challenges by raising average temperatures, causing irregular rainfall patterns, and increasing the frequency and severity of extreme weather events. A warmer planet will also promote the spread of new diseases and pests and contribute to the extinction of some species. Each of these consequences of climate change will have an adverse effect on agricultural yields and create greater production volatility.

Measures to Address Climate Change
Measures to deal with climate change fall into two main categories: mitigation and adaptation. Mitigation is focused on efforts to reduce the rate and magnitude of climate change by minimizing the human causes of climate change. Mitigation strategies are concerned with abating the emission of greenhouse gases. Mitigation, although important, is beyond the scope of this paper.

Adaptation is an “adjustment in ecological, social, or economic systems…to alleviate adverse impacts of change or take advantage of new opportunities.” It is based on the premise that climate change is inevitable. Adaptation implies a broad set of concerted actions directed to moderating the effects of climate change, building resiliency in the environment, and conserving the integrity of the ecosystem.

Some adaptation measures that should be taken by farmers and agribusinesses to improve agricultural productivity and mitigate risks of climate change include agro-forestry, restoration and maintenance

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1 Climate Change and Agriculture: Impacts, Adaptation and Mitigation, OECD (2009).
of soil health, the use of low energy water efficient irrigation systems, organic fertilizers, greenhouses, integrated pest management, and certified organic production. Implementing these measures is both knowledge and capital intensive and thus requires significant financing. However, the current models of agricultural finance and risk management employed by financial institutions are inadequate to take into account the effects of climate change upon agriculture.

Models of Agricultural Finance
Currently, there are six common models of agricultural finance in emerging markets: asset-backed lending; cash-flow based lending; member-based lending; public sector partial guarantees; targeted, subsidized lines of credit operations and credit quotas; and value chain financing. These models and their limitations are described as follows:

1. **Asset-backed lending** generally requires significant collateral-to-loan-value ratios and therefore favors large-scale agribusinesses and producers.
2. **Cash-flow based lending** takes into account both the farm and non-farm activities engaged in by rural households. The cash-flow of the entire household is estimated and evaluated to determine loan size and repayment schedule. Movable collateral may be required in some cases. This financing implies small loan sizes and high interest rates, and is only suitable for short-term needs.
3. **Member-based lending model** is essentially lending to an organized group with rigid loan scales, a fixed schedule of group meetings, forced savings, and joint liability. One of the major weaknesses in this model is that the maximum allowed loan size is typically inadequate to encourage agricultural modernization.
4. **Public sector partial guarantee schemes** and subsidized lines of credit are usually supported by governments and donors to increase access to finance for a targeted group. However, once the public assistance dries up, so does the lending from these institutions.
5. **Value chain financing** is a more integrated approach to financing agriculture. Instead of merely relying on the creditworthiness of a single actor within a value chain, financial institutions leverage the relationships between value chain actors and evaluate the strength of the chain as a whole. Many banks struggle to implement this methodology because it requires more robust client assessment procedures, different staffing profile, and additional risk management tools.

Risk Management Approaches to Agricultural Finance
As the above models show, financial institutions typically manage agricultural risks by practicing overcollateralization, charging higher interest rates to serve as a risk premium, assuring positive cash-flows, requiring crop and/or livestock insurance, or by under-lending to the sector. These risk management techniques have left many without access to finance, thus creating an agricultural financing gap which has hampered improvements in productivity.
Furthermore, risk management practices employed by financial institutions are insufficient for addressing the challenges posed by climate change. Impacts from climate change will make a volatile sector even more volatile and banks will need to identify a way of better assessing the riskiness of their agricultural clients.

At present, a “bankable” client typically means one with positive cash flows and sufficient collateral. However, as climate change increases volatility, it is in the bank’s best interest to examine not only the client’s cash flow and assets but also his farming practices. Clients that farm sustainably will be less at risk from weather related events that disrupt production and reduce yields, and hence much more likely to be able to repay their loans. Financial institutions that are able to recognize the importance of financing clients who have adopted adaptation measures will reduce their credit risks while at the same time increase their profitability. Understanding the importance of mainstreaming climate change into credit assessment and risk management is only the first step. Developing the internal capacity that is necessary to meet these financing needs requires much greater effort.

**Capacity Development to Address Climate Change**

Climate change necessitates a dramatic adjustment in the way that credit risk is assessed and financing decisions are made. First, financial institutions must have well-developed and clear strategies on how to promote and finance adaptation measures. It is also in their best interest to develop an appropriate mix of financial products and risk transfer mechanisms. Bundling of financial and non-financial services, including savings, credit, insurance, and technical assistance, is necessary to help agricultural clients manage various risks and thrive in the new agricultural landscape. At the same time, financial institutions will need to build internal capacity by reassessing their risk management systems, hiring staff with relevant knowledge of agriculture, and building strategic alliances with external partners to deliver complementary non-financial services, among other things. The development of new metrics, pedagogic materials, and training courses for loan officers working in this sector is essential for the future of global agriculture. Systematic monitoring and evaluation of the efficacy, profitability, and scalability of clients’ investments need to be a part of the new strategy.

**Partnerships for Product Development**

The majority of climate change adaptation measures are robust in the sense that they will cope well in a wide range of weather-related scenarios and can be considered as high return investments. Unfortunately, most of these investments also have significant upfront costs while the benefits generally lag. This means that financial institutions must be ready to extend the terms of financing to cover medium and long-term investments that these measures often require. This is one area where public-private partnership is appropriate. Governments and donors can use lines of credit, partial guarantees, and participation in equity investment funds to strengthen the capital structure of financial institutions, allowing them to disburse medium and long-
long-term loans at reasonable interest rates directly to producers. Another area for cooperation will be through the development of reinsurance markets backed by public money, thus allowing insurance companies to transfer some of the risk to a third party at realistic costs. The following case studies illustrate initial responses taken by financial institutions in Sri Lanka and Uganda to lessen the adverse impacts of climate change. Areas for expansion and improvement are also highlighted for both cases.

Case Study: Sri Lanka – Hatton National Bank
Hatton National Bank (HNB) is a licensed commercial bank with the third largest agricultural and rural lending portfolio in Sri Lanka. Due to the effects of climate change, Sri Lanka is experiencing an increase in average temperatures, irregular rainfall patterns, and increased frequency and severity of floods and droughts. HNB has responded by requiring livestock insurance for loans involving animal husbandry and promoting credit life insurance policies for its clients. Credit life insurance policies will pay off the outstanding loan amounts in the event of death or disability. HNB also supports the adoption of drip and sprinkler irrigation, promotes the use of organic fertilizer, encourages the use of solar panels and other means of conserving electricity, supports methane biogas generation and gray water recycling in rice mills to deal with wastewater disposal, and encourages clients to adopt intercropped and integrated farm management systems and off-farm activities to generate multiple sources of income.

To prepare for the future, HNB needs to develop more tailored financial products that will help farmers reduce their exposure to climatic risks. Current financial offerings tend to be generic and thus need to be customized to cover production, marketing, and consumption needs as well as to address demand for medium- and long-term financing. HNB also needs to link farmers to technical assistance providers in a more systematic way and consider piloting a crop insurance scheme with HNB Assurance, its subsidiary insurance company.

Case Study: Uganda – Centenary Rural Development Bank Ltd
Centenary Bank is a well-established microfinance institution in Uganda that is expanding its business lines into the agriculture sector. Centenary aims to increase agriculture to 20 percent (from 14 percent in 2011) of its total loan portfolio. Since Uganda is primarily rain fed and only 0.1 percent of arable cropland is irrigated, agricultural performance consequently fluctuates with climatic changes. Climate change threatens to make Uganda more vulnerable to droughts, floods, and the ill effects of higher temperature on livestock.

In response to climate change, Centenary has cooperated with two insurance companies in developing crop insurance products and forged an alliance with an Indian firm to import drip irrigation technology. The bank is also developing its internal capacity to lend for the long-term in support of agroforestry and commercial scale forestry plantations.

Looking towards the future, there are a few key challenges for Centenary to surmount.
First of all, the bank, along with others, needs to develop a greater awareness of the implications of climate change among farmers. Centenary will also need to develop strong collaborations with other partners, both public and private, to improve extension services, early weather warning systems, risk mapping and modeling, organization of farmers into groups, and the use of efficient irrigation systems. Centenary will be better positioned to mitigate the effects of climate change if it can pursue the development of intermediate-level insurance that will permit the institution to transfer risk to other parties. Meanwhile, the bank needs to continue building its capacity by hiring loan officers with agricultural background, develop better agricultural loan evaluation systems, improve its risk management capabilities, and develop a new suite of agricultural lending products, to include commercial forestry, agroforestry, and financing drip irrigation systems.

Conclusion
Banks struggle to finance agriculture even in the best of times. Climate change threatens to make this sector an even riskier venture than it already is. Providing greater and more effective financing to the agriculture sector is a timely move for financial institutions that are ready to turn challenges into opportunities.

To harness these opportunities, banks must begin considering how best to adapt their product set, staff skills, risk assessment procedures to account for the impacts of climate change upon agriculture. This will involve a greater understanding of agricultural production and climate change adaption measures. Banks that invest in this understanding and make the necessary changes to address these issues will be well placed to develop a sustainable and profitable agricultural lending business line in the long run.

This note was written based on research conducted by Mark Wenner, Lead Financial Specialist, Inter-American Development Bank.