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**FARMERS AND FARMERS' ASSOCIATIONS IN DEVELOPING COUNTRIES
AND THEIR USE OF MODERN FINANCIAL INSTRUMENTS**

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INTRODUCTION

1. Since the beginning of the 1990s, with the liberalization of commodity trading and pricing in developing countries and countries with economies in transition, the burden of risks has been shifted from Governments to farmers. In most of these countries, farmers, previously largely insulated from the day-to-day vagaries of the world market, now bear most of the brunt of volatile and unpredictable prices. In addition, they have often lost access to their earlier sources of subsidized and commercial formal-sector credit. Admittedly, the former state monopolies were often grossly inefficient, subsidized agricultural credit schemes only reached a minority of (generally, larger) farmers, and government price stabilization often was only a way of taxing the agricultural sector, but liberalization has nevertheless left farmers in an environment with considerable gaps in support structures.

2. When farmers receive prices that are unstable and uncertain, they run price risks from the moment that they decide to plant a crop, and every time that they buy and apply inputs such as fertilizers or pesticides, or use paid labour. They never know for sure whether the price that they receive at the end will cover their costs and be worth their efforts. Farmers' associations too may run price risks: if they advance their members credits which are to be reimbursed through future deliveries of crops, they run the risk that, at the moment that the crop is sold, prices have fallen to levels too low to enable loan reimbursement. Risk management markets, where risks can be transferred by those who cannot afford to shoulder them to those who are interested in taking on price risks,¹ can help farmers to get more certainty about their future, at least as far as the prices that they will receive are concerned. These markets are not a panacea for farmers' problems - they do not exist and are never likely to exist for all commodities, and can give only temporary reprieve from a secular fall of prices. Nevertheless, enabling access to these markets could greatly help developing country farmers to improve their lives, particularly as the vast majority of them can now cope with these price risks only by avoiding "risky" investment decisions, relying on their meager savings and adjusting their consumption – at the best, inefficient solutions, and often locking them in a vicious cycle of poverty.²

3. For many commodities, markets for the exchange of risks exist. However, except for a privileged few, developing country farmers have no access to these markets. At first sight, these markets would seem very far away from farmers. Nevertheless, the world's futures markets are where the prices of many commodities are determined. World maize and wheat prices are determined in Chicago, arabica coffee prices in New York, robusta coffee prices in London, cocoa prices in both of these cities together, palm

¹ The use of these markets to counterbalance the effects of unfavourable price movements on one's anticipated income, in other words to transfer unwanted risk, is called hedging. This is the opposite of speculation – for a commodity producer or buyer, speculation consists of doing nothing to hedge one's price risk.

² These traditional risk management strategies are a historical result of situations where farmers have no access to alternative strategies, and "traditional systems might persist well after they are the best means for addressing problems. (...) In these cases, risk-mitigating mechanisms that are part of a household's own poverty alleviation strategy can turn out to be part of the problem.(...) There is a role for policy in fostering movement towards situations where poor households use more flexible mechanisms to address risk." (J.J. Morduch, "Issues on risk and poverty", mimeo, Stiglitz Summer Research Workshop on Poverty, The World Bank, Washington D.C., July 6-July 8, 1999). There are also some indications that increased exposure of households to macro-economic risks makes traditional risk management tools, such as savings, ineffective – for example, from a study on Zimbabwe: "The prolonged period of drought and macroeconomic changes of the early 1990s has limited households' long-term ability to mitigate risk. Household risk management strategies are unable to successfully address covariant risks such as drought and economy wide structural changes." Lire Ersado, Jeffrey Alwang and Harold Alderman, *Changes in Consumption and Saving Behavior before and after Economic Shocks: Evidence from Zimbabwe*, IAMA 2000 Agribusiness Forum, Chicago, USA).

oil prices in Kuala Lumpur, and so on for many other commodities. The function of these exchanges is not only to provide price discovery, but also to provide the facilities to manage price risk.³

4. The transfer of price risk is not the only facility that financial mechanisms and techniques can offer to farmers. Financial techniques can also be used to reduce farmers' counterparty risk. In many developing countries, past efforts to enhance farmers' access to credit through administrative means (special rural credit institutions, credit allocations, instructions to banks to lend part of their credit portfolio to agriculture) have been discontinued or have fallen in disarray. Without such administrative guidance, banks in developing countries are generally averse to providing credit to farmers. Legal systems in many countries make it difficult to use land or real estate as collateral for agricultural loans, and even where this is possible, a bank may have difficulty enforcing its rights in case of default (e.g., homestead provisions in many countries' laws make it impossible for a bank to take possession of a farmer's principal home). Financial engineering techniques can help by shifting the risk of lending from the farmer (a credit risk: will the farmer pay?) to the crop (a performance risk: will the crop be produced?).

5. The trends in world commodity industry and market structures, what these imply for farmers in terms of greater risk exposure and reduced access to credit, and recommendations on how to deal with the resulting problems have been discussed in several earlier UNCTAD papers.⁴ This paper concentrates on practical applications of "new" financial techniques for enabling farmers to manage price risk and facilitating their access to credit.⁵ The first chapter gives an overview of farmers' attitude towards risk, and the possible roles of farmers' associations in helping farmers cope with price risk and in facilitating agricultural financing. The second chapter describes various applications of financial techniques for price risk management and agricultural finance. The third chapter focuses on possibilities for farmers and farmers' associations to enhance their use of these techniques, including through the use of modern communication and information technologies.

³ In principle, the prices of a commodity on a futures exchange and its prices in physical trade run more or less in parallel, so farmers can take a position on the exchange that offsets the price risk they take in their physical business. If one buys protection against price declines on the exchange, for example, and physical market prices decline, the loss on physical sales will be compensated by the financial profit on the futures or options bought on the exchange.

⁴ See, in particular, *National institution building to facilitate access to risk management markets for small producers and traders particularly from developing countries and countries in transition: Issues involved and possible ways to overcome them*, TD/B/CN.1/GE.1/2, 1994; *An integrated approach to the management of production and marketing risks in the primary sector of the developing countries*, UNCTAD/COM/8, 1997; and *Examination of the effectiveness and usefulness for commodity-dependent countries of the new tools in commodity markets: risk management and collateralized finance*, TD/B/COM.1/EM.5/2, 1999.

⁵ These techniques are "new" in the sense that in the developing world, they are used relatively little and in only a few countries. Commodity price risk management markets have been in existence in the USA for over 150 years (and in a few developing countries, for over a century), while one particular agricultural financing technique (warehouse receipt finance) was very important in the development of US agro-industry in the first half of the 20th century. However, the vast majority of developing country farmers have never had access to price risk management markets. As concerns warehouse receipt finance, this became less relevant with the institutionalization of US farming. With better record-keeping, it became much easier for banks to evaluate individual farmers' credit risks, and the need for financing techniques which avoid credit risk consequently disappeared – and with it, much of the relevant skills in the banking community.

Chapter I

THE IMPORTANCE OF RISK FOR FARMERS, AND THE POTENTIAL ROLES OF FARMERS' ASSOCIATIONS IN RISK INTERMEDIATION

6. During the 1990s, agricultural markets in most countries, and in particular in the developing world, went through a process of liberalization. Although the exact reasons were different from country to country, a number of factors often played a role: the realization that traditional pricing policies discouraged agricultural production; the deterioration of public financing, making it necessary to restructure or abolish expensive interventionist organizations; and pressure from donor organizations to liberalize agricultural policies.

7. The way that the liberalization process has been managed has not always been in the best interest of farmers. It is true that the, at best, paternalistic policies of the past often had rather negative effects on the agricultural sector, while the subsidies given to inputs and credits in no way compensated for the large amounts of money extracted by government marketing agencies. But nowadays, while farmers have often benefited by receiving a larger part of the final price of their products, at the same time they are no longer protected against volatile world market conditions and have often lost the only type of formal sector credit to which they had access. This forces farmers to look for new ways to manage price risk⁶ and for new ways to obtain affordable credit.

8. Liberalization is not the only factor which has caused a change in the way that agricultural marketing is organized. The key developments (demographic changes, technological progress, changing domestic and international market structures, and the changing nature of consumer demand) affecting commodity markets were extensively discussed in an UNCTAD report published in 1999.⁷ That report also discussed the implications of these developments for the process of commodity price formation and the benefits that developing countries can draw from their commodity sectors. One of the conclusions is that farmers, if they wish to avoid becoming marginalized, need to organize themselves in such a way that they are able to take a proactive role in marketing – which requires them to get access to relevant market information and to efficient marketing and financing tools. Market-based price risk management tools and collateralized finance are among such tools.

9. This chapter gives a brief description of the relation between risk and farmers' behaviour, and then discusses the potential roles of farmers' associations in helping farmers mitigate risks through use of market-based instruments and in improving farmers' risk profile in order to obtain easier access to credit.

A. Farmers' risk exposure and attitude towards price risk

10. Agricultural production is subject to various risks. The main ones are production or yield risk caused by uncontrollable events related to weather, diseases, etc.; institutional risk resulting from changes in policies and regulations that affect agriculture; human or personal risks (accidents etc.); and financial

⁶ When Governments operate minimum price programmes or give price subsidies, farmers are naturally less inclined to manage price risks. For example, in a 1997 survey in Minnesota, USA, about 47% of the surveyed farmers indicated that the government support programmes that prevailed until 1996 replaced their need for futures and options hedging strategies, and about 72% indicated that direct and indirect use of futures and option markets would become necessary with diminishing government support. (Darin K. Hanson and Glenn Pederson, "Price Risk Management by Minnesota Farmers", *Agricultural Economist*, No. 691, Winter 1998)

⁷ *The impact of changing supply-and-demand market structures on commodity prices and exports of major interest to developing countries*, TD/B/COM.1/EM.10/2, 1999.

risks associated with fluctuations in prices of inputs (including credit) and outputs.⁸ Most of the time, planting decisions have to be made without knowing the price of the final product the producers can get at the time of harvest. Individual farmers must deal with price fluctuations to make ends meet. Uncertainty about future incomes makes it difficult for farmers to make commitments with respect to future payment obligations (eg. debt repayment, investments in land, machines, equipment and school fees for children).

11. But whereas the risks that farmers face are clear, their behaviour towards risk exposure is still under discussion. Research gives the following indications:⁹

- Within the group of farmers and even within each sub-group, there are significant differences in the degree of risk aversion. While many farmers are willing to give up part of their income to reduce their risk exposure, a significant proportion is not.
- Farmers' concerns about risks have two aspects: concerns about the unpredictability and variability of income that are the result of risks; and concerns about downside risk. These two "types" of risks are perceived and handled differently.¹⁰
- Developing country farmers, who have little choice about their career, are likely to be more risk averse than developed country farmers.
- Smaller, poorer farmers are more risk-averse than larger, richer ones.¹¹
- Even risk-averse farmers make deliberate decisions that expose them to risks, in search of higher earnings.
- Imperfect access to risk management markets has a cost for farmers.¹²
- Price risk is generally mentioned by farmers as the major or one of the major risks to which they are exposed, and generally as more important than yield risk. This is the case even in the United States of America (where the Government provides a significant safety net for farmers and intervenes in markets to keep prices above world market levels).¹³

12. Given the wide range of risks to which farmers are exposed, managing just price risks is an imperfect solution – a combination of price risk and crop risk management or even income risk management gives better protection. However, except in a few countries, tools for managing crop risks

⁸ See Joy Harwood, Richard Heifner, Keith Coble, Janet Perry and Agapi Somwaru, *Managing Risk in Farming: Concepts, Research and Analysis*, Economic Research Service, United States Department of Agriculture, Washington DC, March 1999. For a systematic description of risks in the commodity chain, see UNCTAD, *An integrated approach to the management of production and marketing risks in the primary sector of the developing countries*, UNCTAD/COM/8, 1997

⁹ See Karen Brooks, "How do Risk and Uncertainty Affect Adoption of Technology by Small Farmers", Paper presented at the XXIV Congress of International Association of Agricultural Economists, Berlin, August 2000; William G. Tomek and Hikaru Hanawa Peterson, "Risk Management in Agricultural Markets: A Survey", Conference on Producer Marketing and Risk Management: Frontiers for the 21st Century, Orlando, January 2000; Kevin McNew and Wesley Musser, "Evidence of Farmer Forward Pricing Behaviour", Department of Agricultural and Resource Economics, University of Maryland, Working Paper No. 00-02, February 2000; Saurabh Sinha and Michael Lipton, "Damaging fluctuations, risk and poverty: a review", background paper for the World Development Report 2000/2001, The World Bank, October 1999.

¹⁰ J.B. Hardaker, R.B.M. Huirne and J.R. Anderson, *Coping with Risk in Agriculture*, CAB International, Wallingford, UK, 1997.

¹¹ "For resource-poor farmers, ... planning and management might generally be characterized as prudent, circumspect and cautious", *Planning and managing farm systems under uncertainty*, FAO, <http://www.fao.org/docrep/w7365e/w7365e0e.htm>

¹² "In economic theory, there are market solutions enabling agents to neutralize risks. (..) In reality, such contingency markets are not always available and they have a cost. In their absence or incompleteness, uncertainties affect producers' decisions (...) and lead them to produce below the profit maximising level of output." (OECD, *Approaches to income risk management in OECD countries*, May 2000).

¹³ See, for example, J. Harwood et al., *op.cit.*, 1999, and Keith H. Coble et al., Crop Producer Risk Management Survey, Mississippi State University, Information Report 99-001, September 1999.

are largely absent, and even if they are available, tend to provide a means to protect against catastrophe risks (major falls in a farmer's production, with the farmer carrying a large part of the downside risk himself before the crop insurance starts paying out) rather than a day-to-day risk management tool. And although the market in developed countries is evolving fast, tools for income risk management for farmers are even rarer. On the other hand, for a large number of crops, price risk management tools are readily available to those with the required skills and capital. Even if just managing price risks is not ideal, it is at least possible in today's world.

13. Research on the actual use of price risk management markets done in the United States generally finds that such use is below the optimal level.¹⁴ Nevertheless, use is significant: e.g., in a recent survey in four states (covering producers of cotton, maize, soyabeans and wheat), it was found that 30 to 44 % of farmers (depending on the commodity) made direct use of futures and options, and, except in the case of cotton, 79 to 87 % made indirect use of futures and options markets (through the pricing clauses in their sales contracts – for cotton, the figure was 38%).¹⁵ Significantly, large farmers made more use of these markets than small ones. Large US farmers are much more dependent on their crop than small farmers, who generally have other sources of income.

14. There is much literature on the benefits of price risk management for large corporates – for these firms, managing risk is not a “zero-sum” game, but rather improves their net worth. There is much less literature on the benefits of price risk management for farmers' wealth. What would be the impact of enabling farmers to lay off part of their risks through the use of market-based instruments? It has been suggested that, irrespective of whether farmers are risk-averse or not, they may have an “optimal risk level”. As expressed by one US writer: “Consider tractor accidents. Twenty years ago farmers often died or suffered serious injury when pinned beneath wayward tractors. After examining the problem, engineers found a straightforward solution—a steel-reinforced bar over the driver's seat would prevent the tractor from crushing the driver. A few years after mandated roll bars on tractors were in place, the death rate and rate of serious injury remained roughly the same. People with roll bar-equipped tractors were driving harder, faster, and on steeper slopes, resulting in the same rate of fatal accidents as before the engineered response. Analogously, farmers with subsidized risk management will push harder and faster and take on more risk.”¹⁶ More likely, farmers optimize a combination of risks and rewards.¹⁷ Ultimately, however, even if farmers were to have such a “risk optimum”, this would not reduce the validity of promoting access to risk management markets – if such promotion does not reduce individual farmers' risk exposure, at least it helps them to improve their expected incomes.

¹⁴ A considerable amount of research is devoted to determining optimal hedging rules. See, for example, V. Gaspar, C. Gatete and J. Vercammen, J. "Optimal hedging under alternative capital structures and risk aversion: Comment", *Canadian Journal of Agricultural Economics* 40(4), 1992; and H. Lapan and G. Moschini "Futures hedging under price, bias, and production risk", *American Journal of Agricultural Economics* 76(3), 1994. “Much of this research suggests that farmers should forward price a relatively high proportion of their crop (usually over 70 percent). However, surveys show significantly less hedging among farmers.” Kevin McNew and Wesley Musser, “Evidence of Farmer Forward Pricing Behavior”, Working Paper No. 00-02, University of Maryland, February 2000.

¹⁵ Keith H. Coble et al., *op.cit.*, 1999. Significantly, this is in an environment where 50 to 60 % of the farmers (depending on the state) say they feel they are not sufficiently well-informed about futures and options.

¹⁶ Jerry Skees, “Agricultural Risk Management or Income Enhancement”, *Regulation*, Vol. 22 No. 1, <http://www.cato.org/pubs/regulation/regv22n1/agrisk.pdf>

¹⁷ See, for example, National Grain and Feed Foundation, *Optimal Grain Marketing: Balancing Risks and Revenue*, 1999.

B. Farmers' associations as risk management and finance intermediaries

14. If, as has been argued above, farmers could improve their welfare when given access to price risk management markets, then the question arises as to how they can obtain access to these markets. Individually, they are generally too small (making it not worthwhile for them to learn about the markets, and not profitable for brokers on risk management markets to work with them). Their risk management needs therefore need to be accumulated by an "intermediary". There are several possible "intermediation mechanisms" – the major ones are farmers' associations, banks, local commodity exchanges, processors, traders. This paper is focused on the potential role of farmers' associations.

15. Over the past decade, farmers' associations in developing countries (and countries with economies in transition) have largely changed from being extensions of government power to representative organizations.¹⁸ In developing countries, the pressure for change in the structure of farmers' organizations generally came from the grassroots level – in many cases through protests against corrupt and mismanaged government-led cooperatives, in others because farmers noticed that the only way they could procure inputs or market their products in an effective manner,¹⁹ after the abolition of government marketing organizations, was through self-organization.

16. Efficient associations – and these are still in a minority – could use price risk management and facilitate members' access to finance. At the international level, apex organizations are exploring this possibility keenly.²⁰ Risk management markets and structured finance markets offer few remedies for the many weak, poorly managed or even corrupt farmers' associations that still abound. But taking into account the fact that in many countries farmers have only been given the chance to organize themselves since, at best, the mid-1980s, and given the continuing efforts of international organizations to support the strengthening of farmers' associations, it can be expected that the number of strong, well-managed associations will grow rapidly. The risk management and financing functions described in this report will thus continue becoming more relevant.

17. Do farmers' associations have a role to play in managing price risks on behalf of their members? In effect, they must play a key role. Even if a government agency or a bank offers price insurance instruments, it will be difficult for the individual upcountry farmer to make use of this.

18. One may ask whether farmers' associations should provide this type of services to their members – why not rely on traders? If traders are highly competitive, it would be feasible for farmers' associations to concentrate on facilitation – explaining the instruments and their use to their members. But in many countries, competition is still far from perfect. One may even argue that risk management services are a natural part of a farmers' association's functions. In the United States of America, the country where farmers have the longest experience in exposure to price risks, most farmers' associations consider this as

¹⁸ Broadly defined as organizations that meet the following criteria:

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