CHAPTER 8

The Potential of Structured Finance to Foster Agricultural Lending in Developing Countries

Peter Hartig[1]*, Michael Jainzik*[2]*, and Klaus Pfeiffer*[3]

1 Introduction

Three out of every four poor people in developing countries live in rural areas; 2.1 billion of them live on less than two U.S. dollars a day and 880 million on less than one dollar a day. Most of these people depend on agriculture for their livelihoods.[4] One of the major bottlenecks of agricultural development and rural growth is the lack of access to finance, a result of perceived high risks and costs involved in agricultural lending, among other financial services. Banks and other financial institutions in developing countries are still very reluctant to finance agricultural producers and, in particular, small farmers.

As a consequence, for example in various African countries, less than one percent of the available domestic private sector financing typically goes to agriculture, while agriculture accounts for up to 70 percent of the labor force in these countries.[5]

The aim of this chapter is to explore whether structured finance (SF) has the potential to overcome some of the impediments of agricultural lending in developing countries by mitigating specific risks associated with lending to agriculture. Such risk mitigation is possible by sharing, pooling, transferring, and diversifying the various risks.

We start with a broad definition of the term SF, and definitions of agricultural lending and agricultural value chain finance. Then we present typical agricultural risks and risk management strategies including the potential role of SF. Afterwards, we analyse various SF products that foster agricultural lending. The chapter closes with the limitations and important pre-conditions of SF in agriculture in developing countries.

---

1 Consultant.

2 Director KfW Office Windhoek.

3 Director KfW Office Addis Abeba.

4 World Bank (2008).

5 http://www.agra-alliance.org/section/work/finance.

D. Köhn (ed.), *Finance for Food: Towards New Agricultural and Rural Finance*,
DOI 10.1007/978-3-642-54034-9_8, © The Author(s) 2014

2 Concept of Structured Finance

SF is not a concise term nor is there a universal definition. Depending on where it is applied, the term covers a wide range of financial market activities and instruments. Typically, SF is understood as a flexible financial engineering tool that can be "employed whenever the requirements of the originator or the owner of an asset, be they concerned with funding liquidity, risk transfer, or other need, cannot be met by an existing off-the-shelf product or instrument. Hence to meet these requirements, existing products and techniques must be engineered into a tailor-made product or process."[6]

Discussion and practice in development finance, for example in the context of providing refinancing to microfinance institutions (MFIs), is primarily focused on securitization and structured funds. Both apply the principle of pooling, diversifying, and tranching assets into different asset classes according to their respective (presumed) risk profile.[7]

In agricultural finance literature, SF is customarily defined broadly: "Structured finance for agriculture and agribusiness is the advance of funds to enterprises to finance inputs, production and the accompanying support operations, using certain types of security that are not normally accepted by banks or investors and which are more dependent on the structure and performance of the transaction, rather than the characteristics (e.g. creditworthiness) of the borrower."[8] Thus, in agricultural finance literature, there is a focus on securities (i.e. collateral) in order to reduce credit risk, rather than on other aspects like risk transfer, liquidity, etc.

As far as the authors' understanding of SF is concerned, the application of SF in whatever form follows one major goal: the financial risk of an investment in a pool of diversified assets (e.g. loans), or the set of different unseparated risks connected with such an investment are decomposed into different types of risks or classes of risk (probability of occurrence). This is done by using special technical and legal tools in order to allow different investors (or risk carriers) to invest precisely in a certain type of risk, which they are best prepared or willing to invest in.

Following this definition, the different forms of SF can be analysed by asking three questions (see Figure 2 below). We will use these questions later as a grid for filtering out suitable SF approaches for agriculture finance.

---

6 Fabozzi et al. (2006), p. 1. See also Fender and Mitchell (2005, pp. 69-71) and Fabozzi (2005).

7 For the motives and advantages of securitization as instrument for MFI refinance see for example Glaubitt, et al. (2008), p. 354, or Basu (2005). Risks involved in the securitization process are analyzed in Fender and Mitchell (2005). See also below in this article.

8 Winn et al. (2009), p. 2.

Structuring Process	Outcome
Segmentation of various investment risks	Segmented types of risk
	Defined levels and classes of risk
Allocation and placement of risks	Investment in a specific risk or risk tranche by the most appropriate party based on its • Understanding and assessing of the risks • Capacity to influence probability of occurrence of certain types of risk • Risk carrying capacity

Fig. 1. The Essence of Structured Finance

Core questions for analysing Structured Finance approaches

i. **Information asymmetries:** Which party or investor is most suited for understanding and assessing a certain type of risk?

ii. **Incentives:** Which party or investor is most suitable for influencing the probability of occurrence of a certain risk or the severity of the event?[9]

iii. **Risk carrying capability:** Which party or investor has the financial or organizational means to efficiently and effectively carry a certain risk?

Fig. 2. Analytical Grid of Structured Finance

Since agricultural lending is carrying sector-specific risk and is perceived to carry higher risks than lending to other sectors, the risk segmenting and transferring approach of SF makes it, in principle, appropriate and promising for agricultural lending.

[9] The question of the right incentives cannot be underestimated. As Ananth and Sahasranaman (2011) argue: "Good financial structuring isolates the various risks involved in a project and allocates them to the parties best equipped to handle them. All the fallout from the recent credit crisis has shown, it is critical that any robust financial structure ensures that all parties in a transaction are incentivized appropriately. In a situation where all risks in a transaction are passed on to end investors, asset originators and financial intermediaries have little incentive to perform the requisite due diligence at the time of originating and buying asset portfolios."

3 Risk-Based Differentiation Between Agricultural and Rural Finance

Agricultural finance refers to financial services used throughout the agricultural sector for farming and farm-related activities including input supply, processing, wholesale trade, and marketing. Whereas agricultural finance refers to all kinds of services (including deposit services, money transfers, etc.) for such businesses, discussion in development finance traditionally focuses on agricultural credit, predominantly on credit for primary agricultural production.[10]

Since SF typically targets at credit risks, this article is focusing on agricultural credit, too.[11] But we include the above mentioned agro-related value chain activities under the headline of agricultural credit. Both farming activities and non-farm activities in the agricultural value chain have two relevant features in common and which are reflected in SF and risk-management approaches:

- Both farming and related economic activities in the value chain[12] are often characterised by seasonalities, and
- They are often exposed to the same specific agricultural risks.[13]

In contrast, the concept of rural finance is not defined referring to a business sector, but instead to a geographical definition. It refers to financial services in rural areas that result in a somehow broader category than agricultural finance as it includes financial services to rural businesses that are not directly linked to farming including production and service activities like restaurants, retail shops or manufacturers, as well as financial services to rural households. These customers are not necessarily directly or only indirectly linked to seasonalities and specific risks of agriculture. On the other hand, rural finance does not include urban-based processing facilities or other agri-businesses which are subject to agricultural risk. Thus, from a risk-perspective, the concept of rural finance is fuzzy. However, serving both non-farm and farm clients in rural areas is a way for financial institutions to diversify credit risks and increase scale.[14]

---

10 See for instance Meyer (2013), about the historical development of agricultural finance ("the old paradigm").

11 Agricultural credit to farmers is normally provided in cash. But in some structures (involving non-financial intermediaries – see below in the article) in-kind loans are provided for seed, fertilizer, and other farm production inputs.

12 See below.

13 As an example: When detrimental weather conditions reduce the quality and/or quantity of the tomato harvest, not only the tomato farmer is hit in his or her sales income. Also the local factory, which is canning tomatoes, is likely to suffer in terms of sales and income since its input is scarcer and possibly more expensive than usual.

14 See for instance Meyer (2010) or Christen and Pearce (2005).

3.1 Investors' Channels to Finance Agriculture

From the investor perspective, there are three ways of financing agricultural activities.[15] Firstly, direct financing of agricultural producers, for example via agricultural investment funds that target farms directly.[16] Secondly and most obvious, indirect financing through rural financial institutions, and, thirdly, using non-financial intermediaries such as traders or processors as financiers. The involvement of processors or wholesalers in the process of providing finance is particularly common in approaches described as "value chain finance".[17]

3.2 Agricultural Value Chain Finance

Value chain and value chain finance have a range of meanings and connotations, and seem to be an evolving terms. Value chain in agriculture can be defined as a set of actors who conduct a linked sequence of value-adding activities starting from the agricultural producer or produce to processing and to the final consumer or product.

Agricultural value chain finance comprises the financial flows to these different actors from within the chain (internal finance) and from outside institutions (outside finance) as a result of their being a member of the value chain.[18] The importance of value chains in agriculture and its financing mechanisms has grown in many developing and transition countries as a result of globalization and the integration of local and regional markets into global agri-business value chains.

For the small farmer, value chain finance offers a mechanism to obtain financing that may otherwise not be available due to a lack of traditional collateral and high transaction cost of securing a loan.[19] This can be achieved either through members of the value chain, such as suppliers and traders, who are less confronted

---

[15] Please note that we focus on formal financial services. Provision of capital by family or money lenders is widely used in rural economies in developing countries, but is not discussed here. Also, internal and self-financing – the financing by the cash-generating capacity of the enterprise or by the entrepreneur him-/herself – are not discussed.

[16] Typically this requires financing volumes of significant size, i.e. investments of smallholders will not be financed directly by outside investors. An example for this approach is the African Agriculture Fund. The minimum investment by the AAF is USD five million. See http://www.phatisa.com/The_Fund_Manager/AAF/.

[17] For value chain finance see the chapter by Swinnen and Maertens (2013) in this volume and in the following chapter of this article.

[18] Compare Miller and Jones (2010), p. 9. Although rarely made explicit in the analysis and discussions of value chain development and value chain finance, authors typically refer to *organized* value chains, i.e. such value chains that are characterized by a specific and defined governance structure, typically arranged and structured via a set of longer-term contracts in order to facilitate the exchange process in the market. Such structure for the exchange of goods along a value chain is somehow the middle alternative in the span between a goods exchange in pure spot markets on the one end, and a vertically integrated firm on the other.

[19] Though empirical evidence on how much small farmers have benefited from agricultural value chains is mixed. See Swinnen and Maertens (2012), in this volume.

with information asymmetries and transaction cost compared to financial institutions (internal finance). Or it can be achieved by outsiders like banks that substitute traditional collateral and screening techniques for the strength and reputation of the strongest partners in the value chain and for predictable cash-flows due to secure markets in organised value chains. Therefore, agricultural value chain finance offers the principal opportunity to reduce cost and risk in agricultural finance, thus increasing access of small farmers to credit.[20]

There are different classifications of value chain finance mechanisms in agriculture ranging from very old and traditional instruments like trader and supplier credit to more complex products such as factoring or warehouse receipt finance. Some authors see a close relation between agricultural value chain finance and SF,[21] and indeed some mechanisms used in agricultural value chain finance apply elements of SF according to our definition above: "The main purpose [of agricultural value chain finance] is sharing risks among various actors, transferring defined risks to those parties that are best equipped to manage them, and as far as possible, reducing costs through direct linkages and payments."[22] Additionally, warehouse receipts – collateral substitutes used in warehouse receipt finance schemes – can be pooled and securitized in future-flow securitizations.[23]

We will describe and assess some of these instruments with elements of SF in the next section.

4 Agricultural Risks and Risk Management Strategies

Financial institutions are typically reluctant to finance agricultural activities, especially small and medium-sized farmers because of their perceived high costs[24] and risks.[25] In order to discuss whether risks issues of agricultural finance can be tack-

---

[20] However, successful agricultural value chain finance needs some minimum enabling environment, e.g. quality standards, effective contract enforcement to avoid the common problem of side selling and other forms of contract breaking as well as regulatory and legal provisions in the banking sector to allow traditional collateral substitutes. These framework conditions are not always in place.

[21] For example, Winn, et al. (2009) and Miller and Jones (2010).

[22] Miller and Jones (2010), p. 15.

[23] See Ananth and Sahasranaman (2011), p. 114.

[24] Some case studies suggest that a distribution reaching out to rural credit customers is not necessarily more costly than in urban areas. See Jainzik and Pospielovsky (2013) in this volume.

[25] Actually Meyer (2011) has not found any empirical evidence in the literature which can prove that lending to the agricultural segments is indeed more risky than lending to other sectors. From the authors' experience, it is often misleading to state that banks *assess* risk of farming businesses and lending to agriculture as high risk. Unfortunately, many banks and other financial institutions have no clear understanding about farm economics and markets for agricultural produce and they are lacking appropriate approaches to analyze the related risks so that there is actually no base for a professional

led with help of SF, we will take a look at risks involved in agricultural finance, as well as at the common approaches of financial institutions to handle these risks.

4.1 Classification of Agricultural Risks

Maurer (2013)[26] classifies risks in agricultural lending into three categories: principal credit risks, specific agricultural credit risks and political risks (Figure 3).

Segmentation of Specific Agricultural Risks			
Level of risk	**Micro**	**Meso**	**Macro**
Affected groups	Individual farm household	Groups of households or communities	Regions or entire country
Degree of correlation	Idiosyncratic risk (independent)	Covariant risk	Catastrophic or systemic risk
Probability of occurrence	Very frequent	Less frequent	Low frequency
Magnitude of losses	Small losses	Significant losses	Very large losses
Incidence and Examples	Regular variation in production: • smaller weather shocks, e.g. hail, frost • non-contagious diseases • Independent events, e.g. fire	Large negative production shocks: • severe weather conditions, e.g. flood • pest infestation	Highly systemic, shocks affecting a large region and leading to catastrophic losses in production: • hurricanes, widespread flooding, drought • epidemic diseases
Risk Layer	Risk retention	Market solutions (Insurance)	Market failure
Risk carrier	Farmers	Private (re-)insurance companies	Government/donors
Risk management strategy	Risk reduction and coping	Risk pooling (insurance) and risk transfer	Risk transfer

Fig. 3. Segmentation of specific agricultural risks. Source: Maurer (2013)

credit risk assessment by the banks. Thus, the reference to high risks in agriculture by banks is often only uninformed perception based on prejudices.

[26] Maurer (2013) in this volume; see also OECD (2009).

The **principal credit risks of agricultural lending** (or "normal credit risks") are quite similar to those of micro and small enterprises, and are related to the high degree of informality of the potential borrowers and the lack of traditional loan collateral. These result in severe information asymmetries (particularly regarding the capacity and the willingness of the borrower to repay loans) and, thus, high screening and monitoring cost for the lender typically combined with relatively small loan sizes due to world-wide predominance of smallholder agriculture.

Specific agricultural credit risks comprise production and price risks. Production risks in agriculture stem from the high variability of production output as a result of external factors like weather (temperature, floods, drought, etc.), pests and diseases. Market price risks are more pronounced in agriculture than in other economic activities due to output price uncertainty and volatility in local as well as international markets. Both risk categories exist at different levels and scale, and are often correlated (see Figure 3). Such covariant risks are more difficult to manage since a diversification of these risks does not help to mitigate them – as it is the case with non-covariant risks. That is why they may hit a significant number of loans of a given loan portfolio at the same time. Hence these portfolios need special agricultural risk management strategies.

Additionally, the agricultural sector in developing countries is more prone to **political risk** in the form of political interference than other sectors of the economy because of its strategic importance for food security, employment, and poverty reduction. Politically motivated interventions in the form of sudden impositions of interest rate ceilings and the implementation or only the announcing debt relief are still common and constitute a major risk for agricultural lending institutions.[27] Since frequency of occurrence and severity of that type of risk cannot be assessed and predicted, it cannot be transferred and can hardly be managed.[28] In many countries, it may qualify as the type of risk which is considered so high that it prohibits financial institutions from lending to farmers.

[27] Existing interest rate caps as such (in contrast to their introduction) are not a risk for agricultural lending – interest rate ceilings are "only" preventing lending to smallholders – since costs for doing this lending business cannot be recovered by the banks. As a consequence of interest rate caps, banks steer their credit activities towards medium-sized and large farms. This credit-rationing necessity due to the cap has been found and proven in many studies. Agricultural economist Gonzalez-Vega (1984) has termed it "the Iron Law of Interest-Rate Restrictions". While interest rate interventions might be well-intentioned and socially motivated or rational from the political point of view, in fact they always lead to negative effects with regard to sustainable financing in the agricultural and rural sector. For a synopsis of the effects of government interventions in agriculture lending see Conning and Udry (2007), pp. 2864 et sqq.

[28] See Maurer (2013) in this volume.

4.2 Risk Management Strategies and the Role of Structured Finance

Approaches to **manage the principal credit risk** in agricultural lending can benefit from the experience of microfinance in coping with the challenges of asymmetric information in credit analysis, of client monitoring, and of ensuring good repayment morale. However, two common characteristics of microfinance credit offers may limit service provision in agricultural lending. First, there are the relatively high administrative costs due to assessment and monitoring of clients (i.e. smallholders), which as a consequence require a corresponding level of interest rates for enabling the bank to maintain the business. The second critical feature is the extension of predominantly shorter-term standardized loan products with regular weekly or monthly equal repayments, which is quite common in microfinance. Both features are adequate and useful for trading and service sector activities but might be difficult to be shouldered by certain agricultural producers.[29]

Specific agricultural risks are difficult to manage and constitute the major constraint for financial institutions to lend to agriculture (apart from political risk). As shown in Figure 2, specific risks can be segmented according to level, degree of correlation, probability of occurrence, and the magnitude of losses.

The **independent risk at the farm level** is best assumed by the farmer him/herself, applying measures as risk reduction or prevention, mitigation and coping with the "normal" risk, including measures like crop rotation or application of pesticides. In addition, small farmers reduce risks by income diversification (non-farm income).[30]

In contrast to the independent risks, there is a **group of co-variant risks** that affect larger groups of farmers at the same time (as well as processors and other actors in the value chain dependent on the farmer). These co-variant risks may put

[29] See Maurer (2013). The argument that microcredit is generally not suitable for agricultural activities – because returns on investment are lower for agricultural investments than for investments in urban trading business – is quite common. See for instance Harper (2007), p. 91. Empirical studies, however, suggest that return on investment does differ with the different types of agricultural activity. This is not surprising since it can be generally expected for any economic sector that some investments return more than others, making some entrepreneurs more likely to receive credit financing than others. Return on investment in agriculture as well as non-farm investments of rural households can indeed be substantial. See the different sources named by Meyer (2011), pp. 20-23, and Harper (2007), pp. 87-90. How microfinance banks can be innovative in order to apply less rigid repayment terms is for instance described in Jainzik and Pospielovsky (2013), in this volume.

[30] While the risk management at the "retention layer" is the responsibility of the individual farmer, in particular, risk reduction measures can be supported from outside, e.g. through technical advice or provision of irrigation water. Such support can reduce the credit risk of the lender.

a financial institution's agricultural loan portfolio under pressure because of a synchronised failure of a larger number of credit clients. Examples for such co-variant risks are droughts or veterinary diseases preventing sale of stock, like for instance foot and mouth disease. Thus, well-managed banks only assume such risk to a limited extent.[31] Figure 3 recommends "risk pooling" (insurance) and "risk transfer" as risk management strategies in order to allow financial institutions to build up and manage agricultural portfolios.

Catastrophic risks like natural disasters and extreme weather events, which occur not frequently but create huge and highly correlated damage and losses, are difficult to pool and transfer through market instruments. Thus they create the **typical market failure case and call for government and donor action.**

Structured finance solutions for agriculture, offering risk transfer mechanisms to suitable risk-takers, thus need to be explored in their potential to provide adequate risk transfer for co-variant agro-specific risks. Crop or index-based insurances are very much en vogue in the current discussion, albeit most schemes are still in the pilot-testing stage and potential for up-scaling and sustainability is still quite unclear. In contrast, the potential of segmenting and transferring risk with the methods of structured finance appears to be a less prominent idea.

In the following, we will present and evaluate potentially suitable SF products and give some practical examples in the following section. The examples will also show that in many cases different structured finance products and instruments can be combined to tackle risk and cost issues.

5 Application of Structured Finance in Agricultural Lending

Figure 4 shows some examples of practical arrangements applying the different products of SF.

The examples indicate some preference of donors, DFIs, and IFIs for portfolio guarantees and structured funds. While this might paint a realistic picture of activities in the field of development cooperation, we emphasize that the majority of SF products are used in commercial-value-chain financing arrangements. We estimate that these purely commercial, private sector-based activities are not as present in literature as programmes supported by development agencies.

While in many cases different SF products are combined in order to maximize their risk-mitigation potential, we discuss them first individually.

[31] Christen and Pearce (2005), p. 14, note that successful agricultural lenders typically limit their exposure to the farming sector at between 10 and 25 percent.

SF products	Selected examples of application	Parties involved (Donors, FIs, IFIs, private sector	Remarks
Agricultural (partial) Portfolio Guarantees	Sustainable Agriculture Guarantee Fund (SAGF); IFC – Financiera Compartamos (Mexico); USAID – Standard Chartered Bank / PRIDE (Tanzania); Union Progreso (Mexico); SAID / CAFERWA / Rwanda (coffee); van Oers (Senegal); AGRA / IFAD /Standard Chartered;	Rabobank; IFC; USAID / Development Credit Authority (DCA); Standard Chartered;	
	AgroAfrica Programme	DEG, Standard Chartered	
Structured Funds	Rural Impulse Fund I and Rural Impulse Fund II	BIO, FMO, EIB, IFC, KfW, Incofin and private investors	
Securitization	Drokasa Peru;	IFC	Portfolios of commercial agri-business
	Livestock in Colombia	National Agriculture and Livestock Exchange; Trust as SPV	No agricultural loan portfolio securitization in developing and transition countries could be identified
Receivables-Backed Finance	Cedula Produto Rural in Brazil	Private sector	
Warehouse Receipt Finance	Cedula Produto Rural in Brazil;	Government, Private sector	Relevant for more developed countries and for storable export commodities
	Warehouse Receipts Program Advisory Services (Ethiopia)	IFC	
Contract Farming and Outgrower Schemes	Various projects in rubber and palm oil sector	DEG; private sector (rubber company; palm oil company)	
	Many private-sector driven schemes, e.g. Konzum in Croatia		
Forward Contracting, Futures and Options	AgroAfrica Programme	DEG	Standard Chartered Bank
	MSX Commodity Exchange in India Commercial projects	Private sector	Larger companies world wide

Fig. 4. Examples of Applied Structured Finance products

5.1 Agricultural Portfolio Guarantees

Agricultural portfolio guarantees are usually provided by DFIs and IFIs as vertical partial guarantees with the objective to transfer risks of agricultural lending from the originator of the loan to another party. The authors were not able to identify any program with a second loss guarantee, although this appears much more suitable (see below).

The concept of portfolio guarantees assumes that the guarantee encourages financial institutions to make financing available to agriculture by reducing a lender's perceived level of risk for agricultural loans. The guarantee should lower the lender's potential loss from defaults. In addition, assumed advantages of a portfolio loan guarantee are:

- More favorable loan terms and conditions for the farmer;
- Reduced collateral requirements;
- Longer repayment period for the agricultural loan, which enables borrowers to finance agricultural investments.

Additionally, portfolio guarantees are regarded as an instrument to bring banks closer to agricultural lending so that they gain experience and recognize that agricultural lending might not be as risky as perceived. Therefore, such schemes are typically designed as temporary arrangement, not as permanent structures.

Portfolio guarantees in agricultural finance are a preferred instrument of USAID and are also used by DFIs, as well as IFIs like IFC and AfD.

In principle, the portfolio guarantee reduces the risk of agricultural lenders, thus, potentially increases agricultural lending. The impact on the farmer is access to finance, while there is no direct impact on the farmer's specific agricultural production, market and price risks.

Box 1: USAID Agricultural Portfolio Guarantees

USAID uses credit guarantees from the Development Credit Authority (DCA) to foster lending to the agricultural sector in developing countries. DCA offers four main guarantee products: Loan Portfolio Guarantee, Loan Guarantee, Bond Guarantee, or Portable Guarantee. While each of these mechanisms varies in structure, all retain risk with the private sector, typically the originator of the credit. Only a maximum of 50 percent of the lender's risk are guaranteed.

DCA guarantees are primarily offered in local currency to avoid the issue of foreign exchange rate risk and to redirect local capital to investments in the agricultural sector.

From 1999 until mid-2012, USAID/DCA has mobilized around USD 446 million of credit (maximum cumulated disbursement). It was made available

by financial institutions for the agricultural sector. This was reached by extending 82 guarantees, 79 of them loan portfolio guarantees. These guarantees for agricultural activities accounts for around 26 percent of the total 315 guarantees extended by DCA.[32]

5.2 Are Agricultural Portfolio Guarantees an Appropriate Tool?

Let us apply the three dimensions of assessment grid (see Figure 2) which we developed in the beginning of the article and discuss the handling of information asymmetries,[33] incentives,[34] and risk carrying capacity[35] of loan portfolio guarantee structures.

While donors, DFIs, and IFIs definitely have the capability to carry the risks arising out of the guarantees, partial guarantee schemes carry a major weakness in the lack of segmentation between specific agricultural and principal credit risks. A (partial) portfolio guarantee is like firing pellets with a shotgun instead of using a precision-rifle: It does not filter out and target the risks specific for agricultural lending. Instead, it also covers the principal credit risk – a risk that a financial institution should be able to deal with on its own by applying microfinance best practice (i.e. by adequate underwriting and monitoring techniques). Structured like this, a portfolio guarantee may even set wrong incentives: It reduces the originators financial risk, which is primarily born out of principal credit risk, and as a consequence may contribute to lowering the lender's efforts to overcome information asymmetries by a thorough credit client analysis. Thus, standard partial guarantees do not appear first choice in order to stimulate agro-lending.

Typically, guarantee schemes were meant to help to overcome entry hurdles for financial institutions entering a new market. It is assumed that financial institutions will learn and understand that the newly targeted segment is not as risky as previously perceived. And, thus, the guarantee schemes would not be required furthermore. This hope seems to be largely without grounding.[36]

---

[32] Own calculations based on https://explore.data.gov/, dataset for "USAID Development Credit Authority Guarantee Data: Utilization and Claims USAID Development Credit Authority Guarantee Data: Utilization and Claims." For a review of the USAID guarantee schemes see Meyer (2011), pp. 42 et sqq.

[33] The party or investor is most suited for understanding and assessing a certain type of risk.

[34] The party or investor is most suitable for influencing the probability of occurrence of a certain risk or the severity of the event.

[35] The party or investor has the financial or organizational means to efficiently and effectively carry a certain risk.

[36] See Meyer (2011), pp. 33 et sqq. for an overview.

Although an empirical assessment of the usefulness of guarantee schemes for agricultural lending is still lacking, it appears likely that guarantee schemes for agricultural finance will end up with the same shady results as guarantee facilities for lending to SMEs. Several studies in the 1990s analyzing these widely used schemes were cautious about advocating guarantees to stimulate lending or expecting significant impacts from credit guarantee projects. There was no consensus that such schemes widened access to formal bank credits for SMEs, and there was little clear evidence of additionality, i.e. evidence that the guarantee-backed loans would not have been made without such backing.[37]

Agricultural economist Richard L. Meyer has reviewed the extensive literature on guarantee funds: "The case for expecting major impacts from guarantee schemes continues to be unclear. […] It is possible that guarantees may provide an additional bit of comfort for financial institutions that are interested in testing the feasibility of lending to a new client group. It is unlikely, however, that a guarantee alone will induce much additional lending by lenders who do not have such an interest."[38] We would add that traditional partial guarantee schemes do not even help lenders who have this interest: Banks that understand their credit business do not require risk coverage for the principal credit risk (unless for instance they reach portfolio limits and want to grow beyond this limit). They do not pay the fee for a guarantee when the expected costs for write-offs for the bad loans (expected loss) are likely to be lower than the price for the guarantee.

Box 2: AGRA's Innovative Financing Initiative

Recent enthusiasm for agricultural loan guarantees and for its impacts was raised by the Alliance for a Green Revolution in Africa (AGRA), despite the mixed results of guarantee programs of previous decades. As part of its Innovative Financing Initiative it has reportedly extended several guarantees to several benefitting financial institutions (see AGRA Website and Meyer, 2011, p. 34). Since no concrete details are provided on the design of the guarantees schemes, their adequacy and success remain unclear.

Based on these experiences, AGRA had planned to set up a multi-faceted investment fund designed for supporting agricultural development (see AGRA, 2010) termed Impact Investing Fund for African Agriculture. Among the various activities, AGRA planned this fund to provide first-loss arrangements for banks that want to lend to the smallholder agricultural sector (see AGRA, 2010, p. 28). Such first-loss guarantees would be an entirely defect design for tackling the actual risk exposure created through agricultural lending: They are

[37] See Meyer (2011), pp. 33-37. Meyer lists the several studies upon which he based his summary.

[38] Meyer (2011), p. 37.

primarily covering the principal credit risk that a financial institution can perfectly handle on its own. A first-loss barely addresses the specific agricultural credit risks, which a financial institution cannot influence and which is the main brain-racker for banks active in agro-lending. Handing over the first loss to a third party is, additionally, a perfect disincentive for the originator to learn and apply a rigid credit analysis of a farmer borrower, and for monitoring and recovering properly.

5.3 How Innovative Agriculture-Specific Guarantees Could Look

However, the authors belief that portfolio guarantees can make sense if they are designed appropriately to capture the agro-specific risks. What banks are in need of is a more intelligent design that enables them to reduce their exposure to such co-variant specific risk, which they cannot influence. Particularly financial institutions that already have some significant agricultural exposure could greatly benefit, since such risk transfer could enable them to increase their lending which they otherwise would limit due to risk management considerations.

In the following we sketch how such an adapted guarantee scheme could look.

Specific agricultural risks guarantee schemes need to alleviate banks from specific agricultural risks. Thus, they need to be tailored differently from usual partial guarantees. Traditional vertical guarantees cover all credit default risks from principal (or normal) credit risk, over specific agricultural risk to political risks in a fuzzy manner without delivering a differentiation. In contrast to such design, for targeting agricultural risks a horizontal segmentation delivers a segmentation of risk that can filter out agro-specific risk with some accuracy.

A horizontal segmentation or tranching of an agricultural loan portfolio can differentiate the three main sorts of credit default risk in agricultural lending. Techniques for pooling and tranching originated loans are known from securitization operations. For instance, credit defaults of 3 percent or 5 percent of a pool of loans (i.e. what could be considered "normal" default rate due to principal risks) are retained and written-off by the loan-originating bank. This isolates the principal credit risks that can be avoided and reduced by competent financial institutions. Defaults beyond this threshold are then likely to be caused by co-variant risks specific to agriculture. They could then be (partially) guaranteed in order to release the financial institution from this risk category and transfer it to parties that are better equipped and are willing to assume such risk. A third tranche can be included to cover defaults above another threshold like for instance 50 percent. Such losses are likely to be due to catastrophic events. The adequate risk carrier for such catastrophic risk is the state.[39] However, for making horizontal guarantees work, this risk tranche may be retained by the originating bank again: Banks fac-

[39] See Maurer (2012).

ing such exposure may hope to receive some support from their governments, for political reasons, as the state as the only capable risk carrier may be likely to support the risk-taking banks.

Isolating political risk is likely to be a precondition for making the second tranche (the agro-risk specific tranche) interesting for commercially calculating investors. In any case, the risk profile of such a second tranche needs to be carefully analysed in terms of its actual exposure to the different risks as well as the probability and severity of occurrence. Only after such analyses would one know how to design such scheme, which might be suitable for investing parties, and what a sustainable and commercially viable pricing would look like.

Because of its potential to help manage agriculture-specific risks, it appears advisable to investigate the viability of such structures. Tranching a portfolio as described above may be more cost-effective than tackling agro-specific risks by crop or other agricultural insurance.

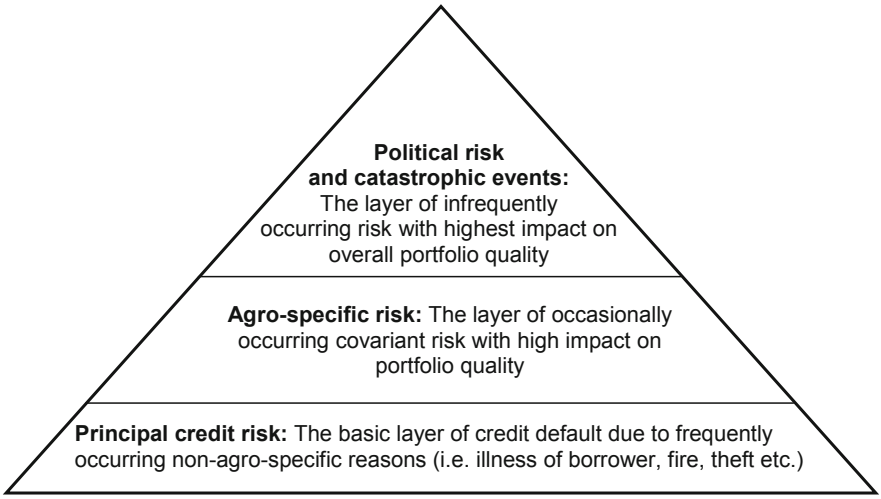

Fig. 5. Horizontal tranching of a portfolio in order to segment different risk types.

5.4 (No) Securitization in Agricultural Finance

Securitization is an operation through that homogenous illiquid financial assets are pooled and transformed into marketable securities.[40] In a securitization transaction, the securitized assets are transferred by the originator (typically a loan-extending financial institution) to a "bankruptcy remote" special purpose vehicle

[40] See for example Basu (2005), Hüttenrauch and Schneider (2008) or Fender and Mitchell (2009).

(SPV) as the asset purchaser.[41] This operation separates the credit risks of the assets from the corporate risk of the originator. The latter is typically the main concern of refinancing parties, i.e. other national or international banks that lend to a financial institution in order to enable it to build up or maintain credit portfolio. A further effect of a securitization can be the removal of the assets from the balance sheet of the financial institution. Such an operation in turn provides them with fresh money for new loans for the benefit of its clients. This may enable a financial institution to maintain a certain level of loan portfolio (for instance to the agricultural sector) without maximizing its exposure, or to maintain a solid capital adequacy for its credit operations.

The pool of assets transferred to the SPV and the resulting cash flows of this pool are arranged and structured in a way that allows the SPV the issuance of securities with different risk levels to investors in order to refinance the purchase of the pool from the originator.

Typically, a first-loss tranche (also called "junior tranche") takes the highest risk, followed by the mezzanine-tranche and the senior-tranche. The first-loss tranche and the mezzanine-tranche provide risk buffer for the senior tranche thus making the latter attractive for more risk-averse private investors. Payments follow the subordination structure ("cascade principle" or "waterfall payment structure"). Consequently, the assets are structured with different levels of seniority reflecting and accommodating the different risk appetite of different investors.

In agricultural finance, securitization could be an instrument that mitigates risks for private investors by creating a granular pool of loans to agricultural borrowers, separating the **credit risk of the agricultural loan portfolio from the corporate risk of the local financial institution, restructuring and tranching the related cash flows and buffering portfolio risks by subordinated tranches**. In principle, such securitization can lead to increased private financing for agriculture and improve refinancing of agricultural lending institutions by transferring most of the specific agricultural and principal credit risk from the financial institution to different type of investors (donors, DFI, private investors). Similar to traditional agricultural portfolio guarantees, there is no direct impact on the specific agricultural risks encountered by the farmer.

So far, securitization has not been widely used in agriculture finance in developing and transition countries.[42] The authors are not aware of any securitization of agricultural loan portfolios. We believe that the reason is the following: First, there is

---

[41] Holding the assets in a bankruptcy remote vehicle aims at giving the investors a first ranking right to those assets. The SPV may be a corporation, trust or another type of independent legal entity. The SPV issues securities to the investors, which are backed by the income flows generated by the securitized assets and sometimes also by the underlying assets themselves (true sale).

[42] See Winn et al. (2009), p. 29, and Calvin and Jones (2010), p. 91. Calvin and Jones (2010), p. 91, report one livestock securitization in Colombia through the local agricultural stock exchange (BNA) in the early 2000s.

hardly sufficient statistical data available on the default rates of agricultural loans of local financial institution active in agricultural finance. Second, due to the specific risk of agricultural lending – particularly the co-variant and political risks – there is little appetite of investors to separate just these assets from the lending institution and hence having, risk wise, a direct exposure to the end-borrower.

Instead, investors prefer to benefit from diversification effects within the financial institution's entire portfolio, which mitigates the particular risks of the agro-loans. Additionally, the equity of the financial institutions may be regarded as a reasonable risk buffer, or to put it in other terms, when a financial institution has a significant agricultural exposure it may appear more advisable to take the corporate risk rather than the portfolio risk.[43] Thus, we can see that investors who wish to invest in agriculture go for investments in rural financial institutions (debt or equity), rather than for investments in agricultural portfolios.

5.5 Structured Funds Investing in Rural Finance

Structured funds are investment vehicles, typically for refinancing financial institutions. Structured funds combine flexible fund management by private fund managers with elements of structured finance. They have the general objective to improve access of partner lending institutions to local and international capital markets.[44]

Box 3: Africa Agriculture and Trade Investment Fund

The Africa Agriculture and Trade Investment Fund (AATIF) is a public-private partnership dedicated to increase Africa's agricultural potential for the benefit of the poor. The fund started is operations in 2011.

Its investment instruments include senior debt, mezzanine instruments, and equity. Debt instruments can have a maturity of up to ten years and only in exceptional cases up to 12 years (infrastructure investments); equity (available for direct investments) can be adapted to the various needs of investment phases. The fund can co-invest as part of a consortium and participate through risk sharing with a local bank or an intermediary.

[43] This relates to the finding that diversification will remain one of the core approaches to mitigate risks in agricultural lending. See Maurer (2012).

[44] There is vast literature in particular on structured funds as MFI refinancing vehicle. See for example Glaubitt et al. (2008), Köhn and Jainzik (2005) or Goodman (2008). Well-known structured funds are the European Fund for Southeast Europe (EFSE) and the Rural Impulse Fund II. Miller et al. (2010) provide analysis and some cases studies on agricultural investments funds, but without specifically emphasizing the reasoning behind structured funds.

On its liability side, the fund is structured to allow investments at three different levels (A-, B- and C-shares), each offering a unique risk-return profile with dividends being paid following a cascade principle. It targets public investors (donor agencies, governments and international financial institutions) and professional private (institutional) investors

AATIF is accompanied by donor-funded Technical Assistance Facility of initially six million euros. The facility will provide investment-specific support to partner institutions (e. g. in the fields of best-practices farming techniques, agricultural risk management, or support of certification processes). It will also promote compliance with the fund's social and environmental safeguard guidelines and development policy, and shall facilitate impact assessments.

In its first 1.5 years of operation, AATIF concluded two direct investments in agribusiness: USD 10 million have been invested in Chobe Agrivision Company, a Zambian farm operator with a strong focus on improving local and regional food security with the production of wheat and soy in irrigation areas. A USD five million loan was negotiated with the Global Agri-Development Company (GADCO), a Ghanaian rice producer. Additionally, AATIF concluded two investments with financial institutions: PTA Bank received a USD 30 million facility. PTA is a multilateral financial institution, owned by eighteen East-African member states, the People's Republic of China, and the African Development Bank. The funding will be used to expand PTA's agricultural lending. Chase Bank (Kenya) Ltd, a privately owned Kenyan financial group, received funding under a five year senior loan facility of USD ten million. The loan is earmarked to support Chase Bank's roll-out of its agribusiness sector strategy.

In 2012, investors in the fund were the German government, KfW, and Deutsche Bank. The latter is also the investment manager of AATIF.[45]

The main characteristic of structured funds is to pool and tranche diversified assets (mostly loans to financial institutions) into different classes. The asset side of structured funds may be quite homogeneous (for instance exclusively debt investments). The structuring takes place at the liability-side: Payments to the fund originated from its assets follow the subordination structure ("cascade principle" or "waterfall payment structure"). The capital is structured with different levels of seniority reflecting the different risk appetite of the different investors, typically corresponding to distinct risk-return profiles. Similar to securitizations, the junior or equity tranche are often invested in by the asset originator, i.e. the fund manager in this case (who can influence the risk through thorough screening and other measures), and by donors or DFIs (that have the risk-bearing capacity and willingness).[46]

[45] See www.aatif.lu.

[46] Compare Figure 2.

Structured funds offer a broad range of financial products and instruments that allow their structures to be demand driven and quickly adaptable to changing market conditions. By applying structured finance elements they can attract private capital even for relatively risky countries or entities. This thus leverages limited donor funds and complements investments of DFIs and IFIs. Structured funds are established as legal entity and managed by professional private fund managers. They are governed by a board of directors or similar bodies according to the respective legal domicile chosen by the investors in the fund. Like securitizations, structured funds can provide attractive conditions for private investments by risk mitigation through diversification at the regional, country, and financial institution level, as well as through adequate tranching.

Thus, since diversification on the asset side is a core element of risk management of structured funds, investments of these funds target rural finance and do not concentrate on agricultural finance. In other words, they try to avoid investments in financial institutions that are excessively prone to specific agricultural risks. Rather, they invest in rural financial institutions that have a diversified portfolio themselves, i.e. in financial institutions that do not only invest in primary agriculture and processing but also in other rural businesses that are not directly linked to farming and its specific risks.

Box 4: Rural Impulse Fund I (RIF I)

Rural Impulse Fund I (RIF I) was set-up in 2007 as a global, closed-end fund licensed as specialized investment fund under Luxemburg law. The fund has a planned lifetime of ten years and carries an investment volume of USD 38 million. RIF I offers debt, equity, and guarantee investments for commercially viable rural MFIs with the objective to improve access of smallholders and rural micro and small enterprises to credit and other financial services. This strengthens the rural MFI's financial structure and improves its rural outreach, impact, and sustainability.

The fund's capital is structured with different levels of seniority reflecting the different risk appetites of the investors. The equity amounts to USD nine million, which is provided by DFIs and private investors at an equal share. The mezzanine tranche of USD ten million is provided by DFIs only. Senior debt of USD 19 million is provided by seven private institutional investors.

The fund is managed by Incofin and investors are BIO, FMO, EIB, IFC, KCB Private Equity, Incofin and others, including private institutional investors.

As of 12/2010 almost USD 31 million have been invested (mainly in debt) in 24 rural MFIs across 18 countries worldwide with a customer base of around 1.5 million clients. About 50 percent of the MFIs have invested 25 percent or more of their portfolio to borrowers active in agriculture, while about 25 percent

of the participating MFIs lend more than 50 percent of their loan portfolio to the agricultural sector.[47]

Because of RIF I's economic and developmental success, a second fund **RIF II** was promoted by Incofin and launched in 2010. RIF II has a size of EUR 120 million and adopts a similar business model to the predecessor fund and includes both private and public investors.[48]

6 Finance Structures in Value Chain Finance

As highlighted above, a joint characteristic of approaches in Agricultural Value Chain Finance (apart from tackling the issue of distribution costs of financial services) is that they intend to transfer defined risks to those parties in the chain that are best equipped to manage them. We will now e explore central approaches of value chain finance and discuss their designs from this risk-transfer perspective.

6.1 Receivables-Backed Finance

Receivable financing,[49] typically discussed as one approach in Agricultural Value Chain Finance, is a method to convert produce sales on credit terms into immediate cash flows thus providing the farmer with flexible working capital. The credit is determined by the financial strengths of the buyer of the agricultural produce and not the farmer or seller of the receivables. For the financial institution the address risk (in terms of moral hazard) is shifted from the farmer to the buyer.[50]

Although often tailor-made, the financing is in principle structured as follows: The lending bank advances funds to a farmer for working capital (sometimes also investment finance). As security, the bank is given an assignment of future receivables from the designated buyer of the agricultural produce. This assignment is acknowledged by the buyer who will make payments according to the schedule in his delivery contract with the producer. All payments will go to the bank (collection and debt service accounts) in line with the repayment obligations of the farmer. Any payments for the farmer beyond his debt service to the bank will be remitted back to the producer.

Receivables-backed financing is applied in agriculture using for example the contractual obligations between producer and buyer as a substitute for the bank's

47 See www.incofin.be/static/en/what_we_do/for_investors/rural_impulse.aspx.

48 See www.incofin.be/static/en/what_we_do/for_investors/rural-impulse-2.aspx.

49 Receivables-backed finance includes instruments such as trade receivable finance, supplier finance, factoring and forfaiting. See Winn et al. (2009), p. 7, and Miller and Jones (2010), p. 56.

50 See Winn et al. (2009), p.18.

assessment of the creditworthiness of the farmer borrower. **Risks are spread between the different parties with the buyer of the agricultural produce being the most important factor.** The buyer screens the reliability of the borrower, whom he probably knows from earlier transactions, so that the information asymmetry between buyer and farmer is smaller than between bank and farmer. Through the screening of the farmers, and support to them (for instance through agricultural extension), the buyer also has the opportunity and incentive to reduce the payment risk which he may have assumed towards the bank. The specific agricultural risk typically remains with the farmer as the agricultural produce have to be sold by the farmer first.

So far, receivables-backed SF is applied in agriculture mainly in international trade finance for export receivables (mainly to developed countries) because of the good credit standing of the buyer but to a much lesser extent in domestic finance.[51] A well-known example is the Ghana Cocoa Board (COCOBOD) that since 1992 signs international syndicated receivables-backed pre-export finance facilities. COCOBOD raises this short-term finance to support cocoa purchases from local growers during the crop season and sells them afterwards internationally.[52]

Box 5: Receivables-Backed Finance

Starbucks Coffee Company works with coffee-growers' associations and is aware of the importance of pre-financing the farmers' harvest and the local processing and preparation for export. To receive short-term loans from financial institutions the farmers associations can use their Starbucks sale contracts as reliable collateral. When the coffee is shipped, Starbucks pays the financial institution directly for interest and principal payments.[53]

6.2 Warehouse Receipts Finance

In warehouse receipt finance, a financier provides credit to a seller and relies on goods in an independently controlled warehouse to secure the credit. The warehouse operator issues warehouse receipts, in one form or another (depending on a

[51] See examples of the different forms of receivables-backed finance in Miller and Jones (2010), pp. 67 et seqq. and Winn et al. (2009), pp. 17 et seqq. Winn reports a successful programme in Brazil using domestic agricultural receivables in the form of Rural Product Notes and combined with warehouse-receipt finance.

[52] For the 2011/2012 season, COCOBOD has raised 2 billion USD via this facility which was oversubscribed by over 20 international and Ghanaian banks. KfW Ipex Bank was among the investors. See www.ghana.gov.gh: "Ghana Cocoa Board Signs USD 2 Billion for 2011/2012 Cocoa Purchase."

[53] See Miller and Jones (2010), p. 65.

country's legal and regulatory system), which then form the basis of financing since these receipts function as artificially created collateral. Rather than relying on the producers' (or exporters') promise that the goods exist and that the proceeds of their sale will be used to reimburse the credit provider, the goods are put under the control of an independent warehouse operator. However, the credit provider still needs to ensure himself that the goods have not been pledged previously. Proceeds of sales are then used for repayment of credits. Warehouse receipts are negotiable and facilitate the conversion of illiquid farm produce into cash since they allow the farmer to make use of previously non-existing bankable collateral.

The use of warehouse receipts as collateral provides the additional advantage that the commodities are no longer in the possession of the borrower, and hence if the borrower defaults the lender has easy recourse to the commodities. Banks or trading companies normally accept advancing funds against commodities that are being stored in reliable warehouses and have been assigned to the bank or trading company through warehouse receipts. **For the financial institution the credit risk is not in the farmer anymore but instead in the successful sale of the stored agricultural produce.** Consequently, the financier assumes some specific agricultural risks since the value of the collateral depends on the current market prices.

In principle, warehouse receipts are a strong form of security that can be combined with other structured finance instruments. It can be used for durable goods that can be stored and must be standardized by type, grade, and quality, e.g. cotton or grains. However, its use is restricted to post-harvest financing and cannot solve the working capital problems of small farmers.

While simple in concept, a warehouse-receipt system requires in practice the availability of safe warehouses and widely accepted commodity grades and standards. It needs a well-functioning and transparent warehouse management system and is largely limited to non-perishable goods with relatively predictable price developments (or forward markets). In addition, the system depends on additional legal and regulatory pre-conditions, e.g. the (regulatory) recognition of the receipt as legal document to be used as credit collateral and on fairly developed commodity markets to ensure the tradability and liquidity of the receipts. Due to these requirements and pre-conditions, the warehouse-receipt instrument is feasible in agricultural finance only in more advanced developing and transition countries.[54]

In addition, there is a lack of detailed and careful empirical assessments to conclude whether the receipt system has improved access to finance, in particular for small farmers. The fact that warehousing is common for export crops suggests that economic barriers may constrain expansion into grains and other commodities produced primarily for local markets.[55]

---

[54] Calvin and Jones (2010) and Miller et al. (2009) quote examples from India, the Philippines and Brazil.

[55] Meyer (2011b), p. 44.

In terms of suitable risk transfer, this form of structure does not allow for a transfer of all specific agricultural risks: Production risk remains with the farmer. The price risk becomes partly transferred to the financier since the value of the collateralised agricultural goods is subject to price risk. Maybe the up-to-now limited success of warehouse receipt finance also relates to unwillingness by the banks to take collateral with usually volatile values.

6.3 Forward Contracts, Futures and Options

A forward contract is a non-standardized contract between two parties to buy or sell an agricultural product at a specified future date at a price agreed today.[56] Forward contracts can be tailor-made to fit specific requirements of the underlying agricultural commodity, and they are often embedded in different forms of value chain finance (see above). As they are privately negotiated and not exchange-traded, they do not depend on well-established commodity exchanges. From the farmer's perspective, forward contracts have the advantage of protecting against price drops. This establishes a floor in the expected revenue (successful production given), which can facilitate access to finance.

Futures are agreements with highly standardized and closely specified contract terms obliging the involved parties to buy or sell a certain quantity of agricultural produce at a fixed price at a future date. They are traded on future exchange markets.

Options are risk management instruments that do not lock in prices but give protection against unfavorable price movements with the possibility of profiting from favorable ones. They trade on exchanges as well as on the over-the-counter market offered by banks or traders. They are hedging instruments and do not involve the trade and exchange of agricultural products. Both futures and options are not used that often used for the benefit smallholder agricultural finance. Typically, volumes are too low here and product qualities vary too much. However, a pooling of producers, for instance via farmer cooperatives, or in organised value chains, is in principle a way to make options available for smallholders and to overcome the issue of small ticket sizes. But such arrangements would need to be set up and developed by the supply side (i.e. exchanges, traders) and brought to the market by them since small-scale farmers in developing would rather not group together for the purposes of acquiring options.

Overall, forward contracts, futures, and options provide the farmer hedging against price volatilities but have no impact on the agricultural production risk.

---

[56] See Miller and Jones (2010), p. 85 and Winn (2009), p. 61. Miller and Jones (2010), pp. 86-87 report a successful programme in Brazil using forward contracting in the form of "rural financial notes" (cedula produto rural).

6.4 Contract Farming

Contract farming is not a SF product as such, but in contract farming often different SF elements are used in order to address agricultural and non-agricultural risks. Contract farming is usually defined as an outsourced production contract (supply contract), e.g. between a pool or a group of agricultural producers and a central processing facility, wholesaler or international retailer. The arrangement, also called outgrower scheme, often involves the advancement of inputs, funds and technical assistance from the off-taker and an obligation to deliver and take a specific quantity of agricultural produce at harvest time, at a specific price (product buy-back clause).[57] The financing of working or investment capital (often needed to allow the farmers for producing the required quantities and qualities) is provided by the agribusiness firm, the wholesaler/international retailer or by a financial institution. In many cases contract farming involves a lead firm that provides farmers with inputs, finance, technical assistance, and market access, and ensures quality and timely product delivery.[58]

Contract farming reduces the agricultural production risk for the farmer through technical assistance as well as secured and adequate input provision. This follows more a risk-prevention, rather than a risk-transfer approach. The forward contracting, which is often involved in such schemes, also reduces the marketing and price risks, both for producers and buyers. For the agricultural lender it may shift the credit risk from the farmer to the buyer of the produce, when guaranteed sales agreements can be used as collateral.

A major problem in contract farming for the agribusiness firm is side-selling: In case of increased prices for the produce, the farmers may sell to other buyers. Inversely from the perspective of the farmer, purchase commitments may be broken by agribusinesses when market prices are decreasing with the formerly agreed price in the scheme resulting much higher than current prices at the time of harvest. Thus, the address risk (in terms of moral hazard) to be taken into account by a financing institution is influenced by the contractual structure. In general, in financing contract farming structures the address risk is transferred from the farmer towards the off-taker. Thus, the risk the financiers have in their books moves from a diversified portfolio of smallholder farmers as credit clients to one or a low number of bigger corporate clients. From a risk perspective, a highly granular portfolio of comparatively (potentially) high individual default risk is exchanged with a big risk concentration with (potentially) lower default probability. Thus, it is not clear if this risk transfer will actually result positive or negative.

---

[57] See UNCTAD (2002), p. 10, and Winn et al. (2009), p. 7.

[58] The Starbucks example also applies the lead firm approach.

7 Summary

Figure 6 summarizes the analysis of the different SF products and shows which of the various agricultural lending risks are mitigated by the respective SF products. The figure also explains why in practice, especially in agricultural value chain finance arrangements, very often different SF products are combined in order to increase risk mitigation effects.

Risks	**Specific agricultural credit risk (farmer)**		**Principal credit risk** (lender and investor)	**Political risk** (farmer and lender/investor)
	Production risk	**Price risk**		
Agricultural portfolio guarantees	Partially carried by guarantor	Partially carried by guarantor	Partially carried by guarantor	
Securitization			Mitigated via risk-buffering and diversification	Mitigated via sector and country diversification
Structured Funds			Mitigated via risk-buffering and diversification	Mitigated via sector and country diversification
Receivables - backed finance			Risk shift from farmer to buyer	
Warehouse receipt finance		Collateral value of receipts subject to price risk	Risk shift from farmer to sale of stored produce	
Forward Contracts, Futures and Options		Hedging against price volatility		
Contract farming	Risk is mitigated via TA and supply of farming inputs	If combined with forward contract, there is price risk mitigation	Address risk is influenced by contractual structure	

Fig. 6. Transfer and mitigation of agricultural lending risks (simplified)

8 Concluding Remarks

There are no simple solutions for creating sustainable agricultural credit systems, and SF is certainly an instrument with potentials but also limitations. We find a quantitatively relevant application of SF instruments in agriculture so far concentrated on value chain finance approaches. In particular, these approaches show practical relevance when they include agro-processing and focus on high-value cash crops with already existing export markets and reliable export contracts.

However, one can state that other SF approaches are also in principle suitable to foster agricultural lending, if applied appropriately and considering its specific strengths and weaknesses in terms of risk-transfer abilities. Effects at the small-farmers level through improved access to credit at better terms, reduction of market and price risk and lowered production risk may be reached.

Direct reach of small farmers still remains a challenge because scale of operations remains important when applying SF approaches. The set-up of SF arrangements (e.g. securitization) is costly, complex and time-consuming and involves inter alia valuation, quality assurance, security assessment, legal analyses, and a lot of related paper work.

We assume that there are some factors that will contribute to an increased use of SF in agriculture:

- Commercially oriented agricultural sectors with competitive advantages in high-value cash crops will continue to make use of risk-transfer possibilities within organised value chains;
- Fairly well-developed commodity exchanges and future markets – also in developing economies – will allow for increased use of such instruments and for inclusion of such instruments in SF approaches, particularly value-chain related ones;
- The current increase of agricultural finance by at least some professional private banks in developing countries will increase the demand for SF instruments, in order to allow such institutions to better manage their risk on a portfolio level by transferring some of the risks to third parties willing to carry it.

However, important preconditions or bottlenecks for increased use of SF products remain. According to our understanding, these are particularly the following:

- Adequate basic rural infrastructure, e.g. transportation, communication and storage facilities such as warehouses (for warehouse-receipt finance);
- Standards and certification of agricultural products by type, size, and quality;
- Legal and regulatory system that ensures the enforcement of contracts;
- Banking regulations that recognize warehouse-receipts as legal documents.

Also, **policy issues** remain. Improving the framework conditions according to the bullet points above (most of them with public good character) is a task for governments. But there are also some specific interventions that may be suitable to overcome bottlenecks for the initial use of SF approaches in order to pave the way for a broader use of these instruments, and for a use without continuous involvement of the public sector. Both national governments and donors or other public investors may play an important role by:

- Providing technical assistance to promote and upgrade banks and to cover the up-front costs of agricultural SF transactions;
- Covering (temporarily maybe) the most risky part of agricultural SF transactions.[59]

Development finance institutions, both national and international ones, can be an important facilitator of adequate use of SF in agricultural finance. Such DFIs have detailed knowledge of the financial sectors in the respective developing and transition countries and its legal and regulatory environment on one hand, and they have a reputation in the commercial world on the other. They have different banking products in place, and they understand banking risks. From this position they can perform the following functions in agricultural SF transactions as a complement to government efforts:

- they take an active role in structuring risks as the lead or structuring investor by becoming involved in agricultural SF transaction at its inception; and
- because of their developmental orientation they can take higher risks compared to commercial investors, taking the mezzanine tranches, while offering senior tranches to more risk-sensitive investors.

Moreover, DFIs are well positioned to act as "honest brokers" with regulators to overcome legal and/or regulatory hurdles, permitting the introduction of agricultural SF products to a new market or asset class in developing and transition countries.

References

AGRA (2010) Innovative Finance Program and the Impact Investing Fund for African Agriculture (IIFFAA). Presentation, file produced 18 September 2010, www.ica.coop/africa/2010-ruralfinance/agra-innovativefinance.pdf.

Basu, S. (2005) Securitization and the Challenges Faced in Micro Finance. Center for Microfinance Research Working Paper Series, Institute for Financial Management and Research. www.ifmr.ac.in/pdf/workingpapers/2/Securitization.pdf.

[59] See Hartig (2011).

Bindu, A., Sahasranaman, A. (2011) Structured Finance Approaches to Livelihood Projects in India. In: Köhn, D. (ed.) Mobilising Capital for Emerging Markets. Heidelberg Dordrecht London New York: Springer, pp. 111–118.

Christen, R.P., Pearce, D. (2005) Managing Risks and Designing Products for Agricultural Microfinance: Features of an Emerging Model. GCAP Occasional Papers No. 11.

CGAP/IFAD (2006) Emerging lessons in agricultural microfinance – Selected case studies.

Chao-Beroff, R. (2013) Global Dynamics in Agricultural and Rural Economy, and its Effects on Rural Finance. In this volume.

Conning, J., Udry, C. (2007): Chapter 56. In: Evenson, R.E., Pingali, P. (eds.,) The Handbook of Agricultural Economics, vol. 3: Agricultural Development: Farmers, Farm Production and Farm Markets. Amsterdam: North Holland (Elsevier), pp. 2857–2909.

Doran, A., et al. (2009) The Missing Middle in Agricultural Finance. Oxfam Research Report.

Fabozzi, F. (2005) The Structured Finance Market: An Investor's Perspective. Financial Analysts Journal 61(3).

Fabozzi, F., et al. (2006) Introduction to Structured Finance Market. New Jersey.

Fender, I., Mitchell, J. (2005) Structured finance: complexity, risk and the use of ratings. BIS Quarterly Review. June 2005.

Freedman, P. (2004) Designing Loan Guarantees to Spur Growth in Developing Countries. USAID.

Glaubitt, K., et al. (2008) Reducing barriers to Microfinance Investments: The Role of Structured Finance. In: Matthäus-Meyer, I., von Pischke, J.D. (eds.): New Partnerships for Innovation in Microfinance. Berlin Heidelberg: Springer, pp. 349–379.

Gonzalez-Vega, C. (1984) Cheap Agricultural Credit: Redistribution in Reverse. In: Adams, D., Graham, D., von Pischke, J.D. (eds.) Undermining Rural Development with Cheap Credit. Boulder CO: Westview Press.

Goodman, P. (2008) Raising MFI Equity Through Microfinance Investment Funds. Chapter 2. In: Matthäus-Meyer, I., von Pischke, J.D. (eds.): New Partnerships for Innovation in Microfinance. Berlin Heidelberg: Springer.

Harper, M. (2007) Microfinance and farmers: Do they fit? In: Dichter, T., Harper, M. (eds.) What's Wrong with Microfinance. Bourton on Dunsmore: Practical Action Publishing, pp. 83–94.

Hartig, P. (2011) The Role of Public and Private Investors for Structured Finance in Emerging Markets. In: Köhn, D. (ed.) Mobilising Capital for Emerging Markets. Heidelberg Dordrecht London New York: Springer, pp. 29–40.

Hüttenrauch, H., Schneider, C. (2008) Securitization: A Funding Alternative for Microfinance Institutions. In: Matthäus-Meyer, I., von Pischke, J.D. (eds.): New Partnerships for Innovation in Microfinance. Berlin Heidelberg: Springer.

Jobst, A.A. (2006) Sovereign Securitization in Emerging Markets. Journal of Structured Finance 12(3). Available at SSRN: http://ssrn.com/abstract=929568.

Köhn, D., Jainzik, M. (2005) Microfinance Investment Funds – An Innovative Form of PPP to Foster the Commercialisation of Microfinance. In: Matthäus-Meyer, I., von Pischke, J.D. (eds.): EU Accession – Financial Sector Opportunities and Challenges for Southeast Europe.

Maurer, K. (2013) Where is the risk? Is agricultural banking really more difficult than other sectors? In this volume.

Meagan, A. (2006) Microcredit and Agriculture: How to make it work.

Meyer, R.L. (2013) Innovative Microfinance: Potential to serve rural markets sustainably. In this volume.

Meyer, R.L. (2011): Subsidies as an Instrument in Agricultural Finance: A Review, Joint Discussion Paper, World Bank, http://siteresources.worldbank.org/INTARD/Resources/Subsidies_as_Intrument_AgFin.pdf.

Miller, C., et al. (2010): Agricultural Investment Funds for Developing Countries. Rome: FAO.

Miller, C., Jones, L. (2010): Agricultural Value Chain Finance. Bourton on Dunsmore: Practical Action Publishing.

OECD (2009) Managing Risk in Agriculture: A Holistic Approach. Highlights.

Quiros, R. (ed.) (2006) Agricultural Value Chain Finance. Summary of the FAO/RUTA conference "Agricultural Value Chain Finance". Costa Rica.

UNCTAD (2002) Farmers and Farmers' Associations in Developing Countries and their Use of Modern Financial Instruments. UNCTAD Secretariat.

USAID (2008a) Finance in Value Chain Analysis –A Synthesis Paper. MicroReport No. 132.

USAID (2008b) Credit Guarantees. Promoting Private Investment in Development. Year in Review.

Winn, M., et al. (2009) The Use of Structured Finance instruments in Eastern Europe and Central Asia. FAO Agricultural Management, Marketing and Finance. Working Document 26. Rome.

World Bank (2005) Managing agricultural production risk. Washington DC.

World Bank (2008) World Development Report. Washington DC.

Websites

Africa Agriculture and Trade Investment Fund (AATIF): http://www.aatif.lu/.

African Agriculture Fund: http://www.phatisa.com/The_Fund_Manager/AAF/.

Alliance for a Green Revolution in Africa (AGRA): http://www.agra-alliance.org/.

Incofin: http://www.incofin.be/static/en/what_we_do/for_investors/index.aspx.

IFAD: http://www.ifad.org.

IFC: www.ifc.org/structuredfinance.

Rabobank: http://www.rabobank.com/guaranteefund.

USAID/DCA: http://www.usaid.gov.