Reducing food price variability in Sub-Saharan Africa

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Reducing food price variability in Sub-Saharan Africa

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This study analyses the range of price risk management tools that can be implemented in countries in Sub-Saharan Africa. Only in very few countries, the market institutions as well as infrastructure are sufficiently developed to apply advanced risk management tools. In countries with ineffective market institutions and very little infrastructure, food safety nets and emergency aid are the most common tools used. To apply additional risk management tools, investments are needed in market institutions and infrastructure.

Dit onderzoek analyseert diverse prijs-risicomanagementinstrumenten die kunnen worden toegepast in de landen van Sub-Sahara Afrika. Alleen in een zeer beperkt aantal landen zijn zowel de marktinstituties als de infrastructuur voldoende ontwikkeld om geavanceerde risicomanagementinstrumenten toe te passen. In landen met ineffectieve marktinstituties en heel weinig infrastructuur, zijn sociale vangnetten en noodhulp de meest voorkomende instrumenten. Voor additionele risicomanagementinstrumenten zijn er investeringen in marktinstituties en infrastructuur nodig.

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Preface

The number of undernourished people in the developing world has increased by 20% to 1,020 million mainly because of the food crisis and the world economic recession. These two major events have shaped thinking about agricultural markets and have functioned as a 'wake up call'. First, food security has become an important issue in policy debates. Second, the vulnerability of poor people to price fluctuations has highlighted the need for risk management tools.

The question of future global food security has been accompanied by a rising concern about global climatic change, which will add a new dimension to production risks. Price volatility is therefore likely to remain or even increase in the future. Therefore, there is a need for risk management tools that 'fit the challenges of the 21st century'.

The range of possible intervention tools, however, is wide. This report presents various instruments that reduce the risk linked to price variability and discusses to what extent these can be successfully implemented in Sub-Saharan Africa.

We would like to thank Siemen van Berkum (LEI) for his comments on an earlier draft.

Prof. Dr R.B.M. Huirne
Managing Director LEI

Summary

Introduction

Two major events in 2008 have shaped thinking about agricultural markets.

- First, the global food crisis put agriculture on top of the policy agenda. In Sub-Saharan Africa, prices of locally produced staples became 2 to 3 times more variable than the prices of imported grains in 2007-2008 (Galtier et al., 2009). Cereal prices remained high throughout 2008/2009 in several African countries (Meijerink et al., 2009).
- Second, the collapse of financial markets at the end of 2008 severely tainted the faith in the self-correcting nature of markets and put into question the belief in market-based solutions.

The FAO has projected the number of undernourished people in the developing world to have increased with 20% to 1,020 million mainly because of the food crisis and the world economic recession. The combination of the two crises has functioned as a 'wake up call'. Food security has become an important issue in policy debates. The need for intervention in agricultural markets is widely felt, as has been outlined in the LNV-DGIS Policy Note *Agriculture, rural entrepreneurship and food security* (Ministry of Foreign Affairs, 2008). However, the subject economic infrastructure and services as well as productive sectors (especially agriculture) have received only little support in Dutch development cooperation (WRR, 2010).

Vulnerability can be defined as the likelihood that a risk will result in a significant decline in well-being, or (lack of) resilience against a given adversity (OECD, 2009). Many poor are vulnerable with respect to high price fluctuations. Increasing prices makes food (much) more expensive; when prices decrease, the income of farmers is jeopardised. Ways to decrease price fluctuations are therefore important in poverty reduction. The concern over food price fluctuations has been accompanied by a rising concern about global climatic change, which will add a new dimension to production risks (UNCTAD, 2009). Weather will become more extreme and weather uncertainty will increase rather than decline in the future, augmenting the number of risks related to agriculture, thus increasing the vulnerability of poor producers.

Therefore, there is a need for risk management tools that 'fit the challenges of the 21st century'. Current traditional measures that reduce risks are no

longer able to sufficiently stabilise food prices or increase the incomes and food security of the poor. The reason is that much of the current food price variability is closely related to international dynamics of demand, supply and resulting policy reactions.

The range of possible intervention tools, however, is wide. This report presents various instruments that reduce the risk linked to price variability. It first discusses the causes and results of food price variability. It then presents different types of instruments (from government policies to market-based instruments) after which an analysis is made which instruments are most suitable for different groups of Sub-Saharan Africa countries. It concludes with a discussion and recommendations.

Food price variability in Sub-Saharan Africa

Generally, food prices in African markets fluctuate more than world market prices, affecting the vulnerability of Africa's poor. The food crisis of 2008 has had a negative impact on Africa. It resulted in the reversal of the encouraging trend in the eradication of hunger since the early 1990s according to the 2009 Millennium Development Report of the UN.

Price instability also has several adverse effects on economic development. It may for instance lead to underinvestment by farmers in profitable cash crops. Further, because many African countries depend on food imports, they are hurt disproportionally by high prices. The effects are often not restricted to the agricultural sector only, but affect other sectors in the economy as well, occasionally leading to social unrest and political instability.

The range of policy responses of African governments to the (effects of) food price variability has varied not only in nature but also in effectiveness. Although in theory, intervention to stabilise prices can be effective in the short run, in the long run they are generally costly because of their market distortive effects. Export bans and taxes, especially implemented by important players on the world market, can further increase market prices ('beggar thy neighbour' policies).

In practice also, some of the measures implemented by African governments appeared to have had adverse results and have not led to strengthening markets. For instance, release of grain stocks has pushed down prices, benefiting consumers, but reducing producers' incentives, leading to a decrease in production and more pressure on prices.

Types of instruments

We distinguish four categories of instruments: either government-run or market-based and either aimed at stabilising prices or managing risks that are related to price variability (stabilising consumption and income). Although this makes a distinction between markets and governments, generally however, private actors and governments need to join forces in order for the instruments to be effective and efficient. It is therefore not always possible to make a clear-cut distinction between the various types of instruments.

Price stabilising market instruments include more advanced market institutions such as Warehouse Receipt Systems and futures and options contracts that can be traded in commodity exchange systems. Other instruments in this category are farmers' cooperatives and contract farming mechanisms, which are widely applied throughout many countries in Sub-Saharan Africa.

Income stabilising market instruments include forward and pooling contracts, insurances and index-based products such as weather insurances, and credit and micro-finance provision. Although these also require certain market institutions, their requirements are not as demanding as for futures or options.

Government policy instruments aimed at reduction of price variability are varied. They consist of price stabilisation policies, taxes, tax exemptions and subsidies on trade, subsidies on inputs, buffer stocks and regional trade agreements.

Government policy instruments that aim to stabilise income and smooth consumption usually include various types of safety nets. Ex-ante transfers are made before a crisis occurs and include subsidies on consumption and food-for-work programmes. Education and school feeding programmes are other examples of ex-ante transfers, specifically aimed at sustaining and enhancing human capital. Ex-post transfers are made after the occurrence of a shock, usually in the form of emergency aid. Often international donors are involved in this type of aid.

The report provides a classification of countries according to three market types: weak, emerging, and solid markets, based on the quality of market infrastructure and institutions. Various indicators of infrastructure and institutions are combined to calculate proxies for the three categories. We argue that before an instrument is implemented, the necessary infrastructure and institutions should be in place. Effort should also be made to couple new institutions with existing traditional systems.

Conclusions

In our classification, a little over 50% of the countries fell into the weak markets category. In this category, governments should invest in market infrastructure and institutions before implementing various (market-based) risk management instruments. In addition, poor consumers and producers should not only be protected (e.g. through safety nets) but also supported in dealing with risk and uncertainty. Apart from investments in markets, investments in human capital are of central importance here.

Over 40% falls into the emerging markets category. Also in this category, the government still needs to invest in infrastructure and institutions. However, in this case there is also potential for extending the use of market-based instruments such as credit systems, simple commodity exchanges, and index based insurances. For more advanced risk management tools such as Warehouse Receipt Systems, the government might need to make specific investments into infrastructure and institution (e.g. warehouses, electronic systems, financial institutions).

Only three countries in our classification fall into the 'solid markets' category (South Africa, Botswana and Mauritius). These markets are comparable to markets in developed countries with respect to infrastructure and institutions. They usually already have in place advanced market instruments. However, such instruments are only accessible to large producers, meaning that poor producers (and consumers) still need support from the government policies and market institutions.

Donor policy recommendations

The increasing globalisation will make crises spread quickly, as we have seen with the high food prices, but also with the economic recessions caused by the financial meltdown in the US. These also affect African economies, possibly at greater cost because these economies are not able to withstand such shocks. Risk management will therefore remain an important subject in development cooperation.

Dutch development cooperation has long emphasised social infrastructure and services, which includes emergency aid. In light of the expectation of increased risks, emergency aid will continue to be important. However, if Dutch development cooperation is to focus on a more systemic reduction of risks, it needs to invest more in economic infrastructure and services (such as market institutions).

Samenvatting

Twee belangrijke gebeurtenissen in 2008 hebben het denken over de werking van agrarische markten beïnvloed.

- Ten eerste, de mondiale voedselcrisis heeft landbouw bovenaan de beleidsagenda gezet. In Sub-Sahara Afrika schommelden de prijzen van lokaal geproduceerde voedselgewassen 2 tot 3 keer meer dan de prijzen van geïmporteerd graan in 2007-2008 (Galtier et al., 2009). Graanprijzen bleven tot in 2009 hoog in verschillende Afrikaanse landen (Meijerink, 2009a).
- Ten tweede, de val van financiële markten aan het einde van 2008 heeft het geloof in zelf-corrigerende markten aangetast en daardoor ook het geloof in marktgerichte oplossingen.

De FAO schat dat het aantal ondervoede mensen in ontwikkelingslanden is gestegen met 20% tot 1.020 miljoen, grotendeels veroorzaakt door de voedselcrisis en de mondiale economische recessie. De combinatie van de twee crises hebben de publieke opinie wakker geschud. Voedselzekerheid is een belangrijk punt geworden op beleidsagenda's. De noodzaak om in agrarische markten in te grijpen wordt algemeen gevoeld en is een centraal thema in de LNV-DGIS beleidsnota *Landbouw, rurale bedrijvigheid en voedselzekerheid* (ministerie van Buitenlandse Zaken, 2008). Toch heeft Nederlandse ontwikkelingssamenwerking relatief weinig aandacht geschonken aan het opbouwen van economische infrastructuur en diensten of productieve sectoren (zoals landbouw) (WRR, 2010).

Kwetsbaarheid is de kans dat een risico leidt tot een aanzienlijke afname in welzijn (OECD, 2009). Arme mensen zijn kwetsbaar als prijzen sterk fluctueren. Oplopende prijzen maakt voedsel (veel) duurder; zakken de prijzen dan komt het inkomen van boeren in de knel. Manieren om het risico te beperken van hevige prijsschommelingen zijn daarom belangrijk in armoedebestrijding. De zorg over hevige prijsschommelingen is samengegaan met een groeiende bezorgdheid over mondiale klimaatsverandering, dat een nieuwe dimensie zal toevoegen aan productierisico's (UNCTAD, 2009). Door klimaatsverandering zal het weer (zoals regenval) extremer worden en weersonzekerheid zal toenemen in de toekomst. Dit zal het aantal risico's gerelateerd aan landbouw doen vermeerderen en zal de kwetsbaarheid van arme producenten doen toenemen.

Er is daarom een behoefte aan instrumenten die risico's kunnen beheersen. Deze instrumenten zullen moeten voldoen aan 'de uitdagingen van de 21e eeuw'. De huidige traditionele manieren om risico's beheersen, kunnen in onvoldoende mate voedselprijzen stabiliseren of inkomen en voedselzekerheid van de arme bevolking doen toenemen. De reden is dat een groot deel van de huidige voedselprijs fluctuaties nauw gerelateerd is aan de internationale dynamiek van vraag, aanbod en de daaruit voortvloeien beleidsmaatregelen.

Het arsenaal aan mogelijke interventiemiddelen is echter breed. Dit rapport presenteert verschillende instrumenten die risico's gerelateerd aan prijsfluctuaties verlagen. Het beschrijft eerst de oorzaken en gevolgen van voedselprijsfluctuaties. Het introduceert daarna verschillende types van instrumenten (van overheidsgeleide tot marktgerichte instrumenten), waarna er een analyse wordt gemaakt welke instrumenten het meest geschikt zijn voor verschillende landen in Sub-Sahara Afrika. Het rapport eindigt met conclusies en aanbevelingen.

Voedselprijsfluctuaties in Sub-Sahara Afrika

In het algemeen fluctueren voedselprijzen in Afrika meer dan wereldmarktprijzen, wat vooral de kwetsbare arme groeperingen in Afrika treft. De voedselcrisis van 2008 heeft daardoor een negatief effect gehad op Afrika. Het heeft geleid tot een ommekeer in de bemoedigende trend van hongerbestrijding sinds het begin van de jaren negentig, volgens het 2009 *Millennium Development* rapport van de VN.

Prijsinstabiliteit heeft ook verschillende negatieve effecten op economische groei. Het kan leiden, bijvoorbeeld, tot onderinvesteringen door boeren in winstgevende gewassen. Omdat veel landen in Sub-Sahara Afrika afhankelijk zijn van voedselimporten, worden ze hard getroffen door hoge prijzen. Deze effecten zijn niet alleen beperkt tot de agrarische sector maar treffen ook andere economische sectoren en leiden incidenteel tot sociale onlusten en politieke instabiliteit.

Het scala aan beleidsmaatregelen die Afrikaanse overheden hebben genomen naar aanleiding van de (effecten van) voedselprijsfluctuaties waren niet alleen verschillend in aard maar ook in effectiviteit. Hoewel deze maatregelen in theorie op de korte termijn effectief kunnen zijn, zijn ze op de lange termijn kostbaar. Vooral als grote spelers op de wereldmarkt een verbod op export of exportheffingen instellen, kan dit leiden tot een verdere stijging van wereldmarktprijzen ('beggar thy neighbour'-beleid).

In de praktijk blijken de maatregelen genomen door Afrikaanse overheden zo nu en dan averechts te hebben gewerkt. Ze hebben daarnaast ook niet geleid

tot het versterken van markten. Veel Afrikaanse landen hebben behoefte aan investeringen in een slecht functionerende marktinfrastructuur en instituties. Bijvoorbeeld, het vrijgeven van graanvoorraden zal de prijzen doen dalen, wat consumenten bevoordeelt, maar zal de prikkels voor producenten verminderen en kunnen leiden tot minder productie en hogere prijzen.

Types van instrumenten

Wij onderscheiden vier categorieën van instrumenten: uitgevoerd door de overheid of marktgericht en gericht op het stabiliseren van prijzen of het verminderen van de effecten van prijsfluctuaties (stabiliseren van consumptie en inkomen). Doorgaans echter is het nodig dat markten en overheden de krachten bundelen zodat de instrumenten effectief en efficiënt kunnen worden ingezet. Een zeer strikte scheiding tussen de categorieën is dus niet altijd mogelijk.

Prijsstabiliserende marktinstrumenten bevatten moderne marktinstituties, zoals het Opslagplaats Ontvangstbewijs Systeem *(Warehouse Receipt System)* en optie- en termijnzaken die op een goederenbeurs kunnen worden verhandeld. Andere instrumenten in deze categorie zijn boerencoöperaties en contractteelt. Beide komen veelvuldig voor in Sub-Sahara Afrika.

Inkomensstabiliserende marktinstrumenten bevatten *forward* en *pooling* contracten, verzekeringen en indexgebaseerde producten, zoals weersverzekeringen, krediet en microfinanciering. Hoewel deze ook een goed functionerende marktomgeving nodig hebben, zijn hun eisen niet zo hoog als voor optie- en termijnmarkten.

Overheidsmaatregelen die gericht zijn op het verminderen van prijsfluctuaties bestaan uit handelsheffingen of vrijstellingen, handelssubsidies, buffervoorraden en regionale handelsovereenkomsten.

Overheidsmaatregelen die inkomens en consumptie trachten te stabiliseren bevatten meestal het beschikbaar maken van verschillende types van sociale vangnetten. Maatregelen om een scherpe daling van inkomens te voorkomen omvatten bijvoorbeeld het geven van subsidie op consumptie en voedselvoorwerkprogramma's. Ook zijn educatie en schoolvoedingsprogramma's voorbeelden van maatregelen die tot doel hebben om menselijk kapitaal te behouden en te verbeteren. Noodhulp is een maatregel die na een crisis wordt genomen. Meestal houden internationale donoren zich bezig met dit soort hulp.

Het rapport geeft een classificatie van landen in drie markttypes: zwak, opkomend en solide markten, gebaseerd op de kwaliteit van marktinfrastructuur en instituties. Verschillende indicatoren van infrastructuur en instituties zijn gecombineerd om een maatstaf te berekenen voor de drie categorieën. We bepleiten dat, voordat een instrument wordt geïmplementeerd, de benodigde infrastructuur en marktinstituties aanwezig moeten zijn. Er moet ook geprobeerd worden om voort te bouwen op traditionele instrumenten die risico's beheersen en consumptie stabiliseren.

Conclusies

In landen die worden gekarakteriseerd door zwakke markten, zouden overheden moeten investeren in marktinfrastructuur en instituties. Daarnaast zouden arme consumenten en producenten niet alleen moeten worden beschermd, maar ook ondersteund in het omgaan met risico's en onzekerheid. Naast investeringen in markten, zijn investeringen in menselijk kapitaal hier van belang.

Voor opkomende markten blijft er ook nog steeds de noodzaak om te investeren in infrastructuur en instituties, maar in dit geval is er ook nog de mogelijkheid om de inzet van marktinstrumenten uit te breiden met bijvoorbeeld kredietsystemen, simpele goederenbeurzen en indexverzekeringen.

Slechts drie landen in onze classificatie vallen in de 'solide markten'-categorie (Zuid-Afrika, Botswana en Mauritius). Deze markten zijn vergelijkbaar met markten in ontwikkelde landen wat betreft infrastructuur en instituties. Meer geavanceerde marktinstrumenten worden meestal al gebruikt. Er moet wel gezegd worden dat deze instrumenten meestal alleen beschikbaar zijn voor grote producenten, en dat arme producenten (en consumenten) nog steeds behoefte hebben aan overheidsbeleid en marktinstituties.

Aanbevelingen voor donoren

De voortschrijdende globalisatie maakt dat crisissituaties zich snel verspreiden, zoals we gezien hebben bij de hoge voedselprijzen, maar ook bij de economische recessie, zoals die voortvloeiend uit de financiële ineenstorting in the VS. Deze treffen ook Afrikaanse economieën, wellicht met nog grotere gevolgen omdat deze economieën vaak niet in staat zijn dit soort klappen op te vangen. Risicobeheersing zal daarom de komende jaren een centraal thema blijven in ontwikkelingsvraagstukken.

De Nederlandse ontwikkelingssamenwerking heeft lange tijd de nadruk gelegd op sociale infrastructuur en diensten, waaronder ook noodhulp valt. Ten aanzien van de verwachting van vergrote risico's, zal noodhulp belangrijk blijven in de toekomst. Echter, als de Nederlandse ontwikkelingssamenwerking nadruk wil leggen op een meer systematische aanpak van het terugbrengen van risico's, is het nodig dat er meer geïnvesteerd wordt in economische infrastructuur en diensten (zoals marktinstituties).

1 Introduction

Two major events in 2008 have shaped thinking about agricultural markets. First, the global food crisis put agriculture on the front page. The effects of high food prices have hit millions of people, and particularly the most vulnerable populations that are situated mostly in Sub-Saharan Africa. In Sub-Saharan Africa, prices of locally produced staples became 2 to 3 times more variable than the prices of imported grains in 2007-2008 (Galtier et al., 2009). Cereal prices remained high throughout 2008/2009 in several African countries (Meijerink et al., 2009). Second, the collapse of financial markets at the end of 2008 severely tainted the faith in the self-correcting nature of markets and put into question the belief in market-based solutions.

The FAO projected the number of undernourished people in the developing world to have increased with 20% to 1,020 million mainly because of the food crisis and the world economic recession (FAO, 2009c). The combination of the two crises has functioned as a 'wake up call': food security has become an important issue in recent policy debates. The central question during the 2009 FAO World Summit on Food Security in Rome was: 'How to feed 9 billion people in 2050?' The Dutch minister of agriculture, Gerda Verburg, called for a second Green Revolution in Africa. According to the minister,[1] 'old solutions no longer fit the challenges of the 21st century'.

For an African Green Revolution to succeed, agricultural innovations should be combined with (and preceded by) investments in market infrastructure and institutions. The need for intervention in agricultural markets is widely felt, as has been outlined in the LNV-DGIS Policy Note *Agriculture, rural entrepreneurship and food security* (Ministry of Foreign Affairs, 2008). This needs taking a fresh look at trade mechanisms and market institutions that have contributed to the current food crisis (UNCTAD, 2008a).

A recent report of the WRR has signalled that official development assistance (ODA) has been allocated mostly to social infrastructure and services (around 70%), instead of to economic infrastructure and services (around 23%) or production sectors (7%). Especially the agricultural sector has lost out. From 1987 to 2007, ODA on agriculture decreased with 83% from 398 to 71 million

[1] Available at http://tinyurl.com/yfuku95. Accessed 19-11-2009.

(WRR, 2010). Agricultural market institutions and infrastructure have thus long been neglected.

High prices and price fluctuations especially affect vulnerable people. Vulnerability is the likelihood that a risk will result in a significant decline in well-being (OECD, 2009). Increasing prices makes food (much) more expensive; when prices decrease, the incomes of farm households are jeopardised. Fluctuating prices increase the uncertainty of producers and consequently their production decisions. Vulnerability or risk linked to high price fluctuations is thus one of the defining characteristics of poverty. The questions of vulnerability and food security have been accompanied by a rising concern about global climatic change which will add a new dimension to production risks (UNCTAD, 2009). Weather uncertainty will increase rather than decline in the future, augmenting the risks related to agriculture.

Price volatility is likely to remain or even increase in the future (Jodock, 2009). Therefore, besides rethinking markets and trade, there is a need for risk management tools that 'fit the challenges of the 21st century'. Current individual, household and community responses to risk are often no longer able to stabilise food prices or increase income and food security. The reason is that much of the current food price variability is closely related to international dynamics of demand, supply and resulting policy reactions.

The range of possible intervention tools, however, is wide. Risk management tools can be implemented either on a national scale or on the level of households, with short, intermediate, or long term effects. Tools can be implemented by national and international governments but also by private donor organisations and enterprises using market mechanisms. Tools can address either price variability, or its effects. Yet, although effective mechanisms can support price and income stabilisation, ill designed policy interventions have been partly responsible for the surge in food prices and price variability (Meijerink et al., 2009). Hence, 'the point is not to do something, the point is to do the right thing' (IFPRI, 2008).

The focus of this report is on instruments that are able to deal with food price variability and its effects in Sub-Saharan Africa. Chapter 2 provides a framework for understanding price variability and the concept of risk. It lays out a brief historical overview of food price variability globally and in Sub-Saharan Africa. Chapter 3 presents an overview of various instruments that deal with price risk. Chapter 4 discusses to what extent these instruments can be successfully implemented in Sub-Saharan Africa. Chapter 5 gives the conclusions and recommendations.

2 Food price variability

2.1 Concepts: price variability, risk, uncertainty and vulnerability

2.1.1 Price variability

Food price variability is generally larger than the price variability of other goods. The reason is the relative inelastic demand for food, while supply is much more variable. Only in extreme cases, people will reduce their basic food demand. In order to bridge the disproportion between demand and supply, it is thus the price that needs to vary. Since global commodity stocks are lower than ever, sudden shifts in supply and demand patterns can only be facilitated by steep and sudden price movements (IFPRI, 2008). Galtier et al. (2009) distinguish three general reasons for price variability:

- *Natural instability*
  Food prices are naturally unstable because production varies as result of sometimes unpredictable weather conditions and the incidence of natural shocks. We have seen that adverse weather conditions in many parts of the world significantly contributed to the increase of food commodity prices.
- *Imported variability*
  Through trade and global prices, the effects of the changing patterns of demand and supply in certain parts of the world, are also felt in other parts of the world. Countries that rely on imports will thus bring in price variability in their domestic markets. Alternatively, domestic policy interventions can influence world market prices, when the market is large. For example, global rice prices further increased because rice exporting countries restricted their rice exports in order to safeguard domestic supply, while rice importing countries built up their strategic rice stock. Both interventions led to an even lower supply of rice, and further increasing prices (UNCTAD, 2008b). Even when countries are self-sufficient for food commodities, food prices can be affected indirectly because of raising input prices, and because of exchange rate shifts. The global financial and energy crises increased the price of fuel and other inputs, which then raised the costs of agricultural production.
- *Endogenous instability*
  This occurs when buyers and sellers anticipate further price rises or falls

and act in a way that pushes prices further up or down. Such speculation further increases price variability.

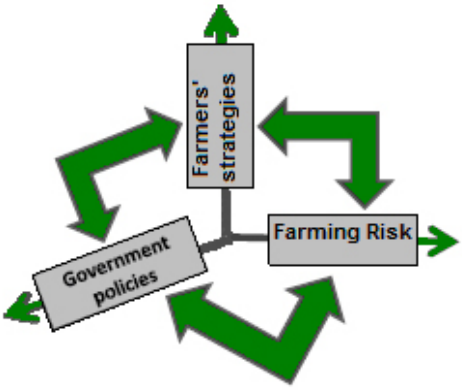
2.1.2 Risk, uncertainty and vulnerability

In understanding risk management instruments, we use the holistic approach as proposed by OECD (2009). This includes shifting the focus from a single instrument to a risk management system, which can be represented by three dimensions: farmers' own strategies, farming risk and government policies (Figure 2.1). The OECD (ibid) states:

> 'Focusing risk management policies on a single source of risk and a single instrument considered in isolation from other relevant sources of risk may induce unintended results in terms of revenue variability and welfare.'

Farmers' strategies are an important source of risk reduction, especially in Africa, which we will discuss in section 4.1. We discuss the role of the government in section 5.3.

Figure 2.1 **Holistic approach to risk management: a 'system' with three axes**



Source: OECD (2009).

The OECD (2009) distinguishes risk, uncertainty and the associated vulnerability to risk and uncertainty. *Uncertainty* can be defined as imperfect knowledge about an event (e.g. fluctuating prices) while risk can be defined as uncertain and mainly unfavourable consequences of an event. *Risk* is therefore not value-free or objective and indicates an aversion for some of the possible consequences (see also Hardaker et al., 2004). *Vulnerability* can be defined as the likelihood that a risk will result in a significant decline in well-being, or resilience against a given adversity.[1]

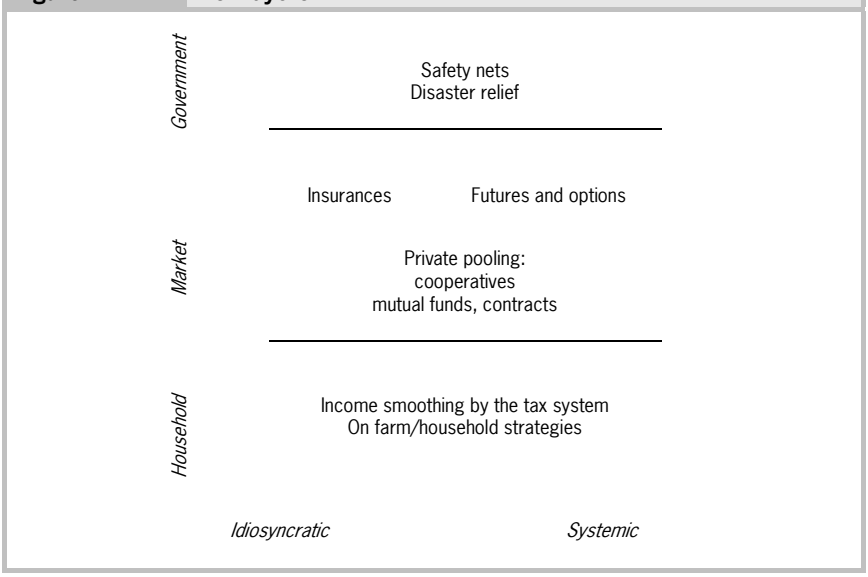
Agricultural risks can be roughly divided into three categories (see Figure 2.2) (OECD, 2009).

- *'Normal risk' or the 'risk retention layer'*
  This first risk layer refers to frequent but small losses (or gains) that are part of the normal business environment. Farmers should be able to manage this type of risk on the household or community level, through traditional risk coping strategies.
- '*Market insurance layer*'
  This risk layer refers to risks that have a more significant impact, but that occur at a lower frequency. This layer offers scope for additional market mechanisms such as weather insurances to cope with these risks.
- '*Market failure layer*'
  In case of true catastrophes, such as major natural disasters and other large shocks with large consequences but low incidences, market instruments will likely fall short. Catastrophes usually affect large numbers of people over large areas, which lead to high costs for insurance companies. In this case there is a role for government action, in the form of food relief programmes and other forms of emergency aid.

In this report, we focus on the market insurance and the market failure layers, and explore the potential role of market and government instruments in risk management related to food price variability.

[1] This corresponds with the definition of the World Bank: 'Vulnerability is the probability or risk today of being in poverty or to fall into deeper poverty in the future' (World Bank, 2010).

Figure 2.2 **Risk layers**



Price fluctuations constitute an uncertainty in the lives of farmers, and the unfavourable consequences of price fluctuations (e.g. on income) constitute a risk. The vulnerability of farmers to unfavourable consequences on income is an important aspect when considering Sub-Saharan Africa, where fluctuations in income will usually lead to a significant decline in well-being. Poor households are usually more vulnerable and tend to be more risk-averse. Thus, they may respond to price volatility by restraining from risky activities such as coffee planting, and move into income diversification, and the production of relatively low-risk (and low profit) food commodities.

Therefore, in this context, the uncertainty aspect of *price* fluctuations is not the most important element; it is fluctuations in income that matter. Newbery and Stiglitz (1981) put forward that producers are not concerned so much about the variability of prices, but with variability of income and, therefore, potential consumption. Prices and production are usually negatively correlated which results in some of the variability of prices offset by the variability in production. This effect may, in fact, contribute to stabilising revenues. This negative correlation is observed empirically, and is stronger at the aggregate level while smaller at farm level (OECD, 2009).

2.2 Overview of food price fluctuations

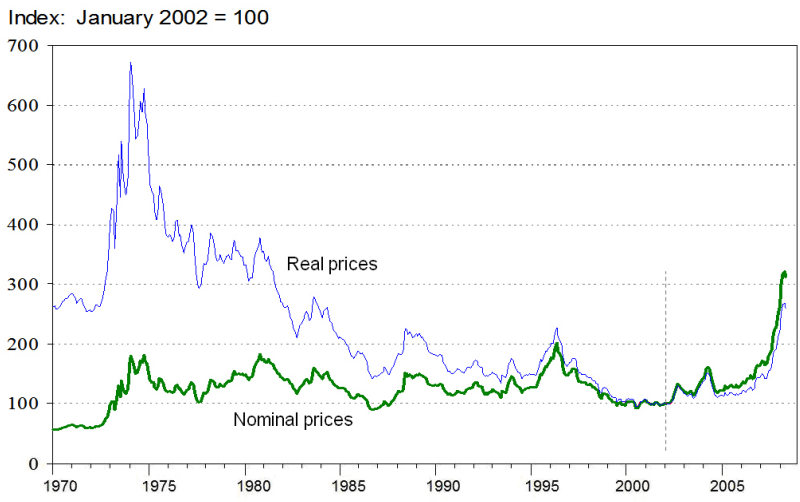
The world has been experiencing food price instability since the opening to international trade in the 18th century. With the scope of globalisation, price instability increased, and in the early 20th century price management for the first time became an issue in political debate (Galtier et al., 2009). The belief that price stabilisation is an important condition for economic development started to change by the end of the 20th century, and economists and policy makers gradually shifted towards trade liberalisation and the self-regulating power of market mechanisms, an idea that would become central in the international trade and development policies of the late 20th century.

The current food crisis seems to be of an unprecedented order. Prices are more unstable than ever, with an inelastic demand pattern while supply varies, leading to high price instability. Between January 2006 and May 2008, world food prices doubled, and at the peak of the food crisis, between 2007 and 2008, world food prices increased as much as 80% (UNCTAD, 2008b). Prices have fallen again in 2009, but are still well above their longer term level of before the crisis (see Figure 2.3).

However, Figure 2.3 shows that food price hikes are nothing new. While food prices have been steadily decreasing in the past century, this trend was interrupted by periods of sudden price surges, often related to political and economic developments. Prices soared after the two world wars, and during the subsequent economic crises in the 1930s and the 1970s (Galtier et al., 2009; FAO, 2008c). In fact, real prices were much higher in the 1970s than those in the past years. Nonetheless, according to the FAO report on *The state of agricultural commodity markets 2009*, the price hike differs from former price increases:

> 'the price boom [of 2008] was also accompanied by much higher price variability than in the past, especially in the cereals and oilseeds sectors, highlighting the greater uncertainty in the markets' (FAO, 2009a, p. 11).

Figure 2.3 **Evolution of world cereal prices, USD (1994-2008)**



Source: Trostle, 2008; based on IMF International Financial Statistics.

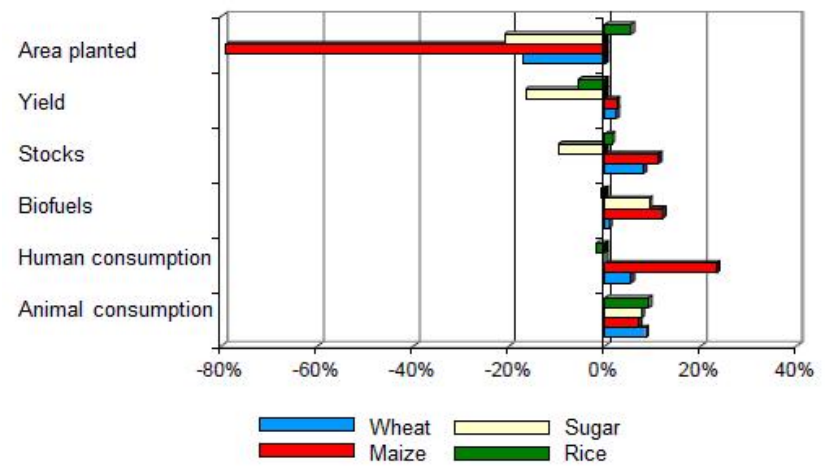
A large number of reports on the causes of the food crisis have been issued since the start of the food crisis, and among the most important contributors mentioned are the weather related production shortfalls, income growth and population growth, increasing global demand for bio-fuels, export bans and other restrictive trade policies, the devaluation of the dollar, and speculation in the global food market (Trostle, 2008; Mitchell, 2008; Carter et al., 2009; Stoeckel, 2008). Banse et al. (2008) point out that the high prices reflect a 'perfect storm' in which different factors have come together almost simultaneously, resulting in a peak in prices. They also put forward that the role of bio-fuels has been relatively small, while other authors (e.g. FAO, 2009a) have pointed to biofuels as one of the major factors.

Most authors have pointed out the role of declining stocks in contributing to the 2007 price hike. Many countries sold their stocks or grainstocks prior to the price rises. Stocks typically incur high costs of maintenance and risks of loss (of perishable commodities). With the trend of increasing trade liberalisation and growing global trade in relatively cheap food commodities, the rationale for maintaining large stocks had gradually eroded. As a result, global cereal stocks are at their lowest level in 30 years (FAO, 2009a). The combination of high prices and a tight food market led to restrictive export policies by food produc-

ing countries, aggressive purchasing of food on the world market by food deficit countries and a further reduction of global food stocks. This mechanism made prices spiral upwards.

Dronne and Gohin (2008) find that the factors differ per year and per crop. For instance, during 2005/06 there was an increase in maize stocks, which contributed to a decrease in world maize prices (Figure 2.4). Although there is still some important or less important variation left unexplained,[1] the authors conclude that there has been a major effect of supply factors (area and yield), demand factors (as growing population and increasingly demand for animal fodder) and an important effect of stocks. They find a moderate effect of biofuels relative to other factors.

Figure 2.4 **Effect of supply and demand factors on world prices of wheat, maize, sugar and rice (in %) in 2007-2008 a)**



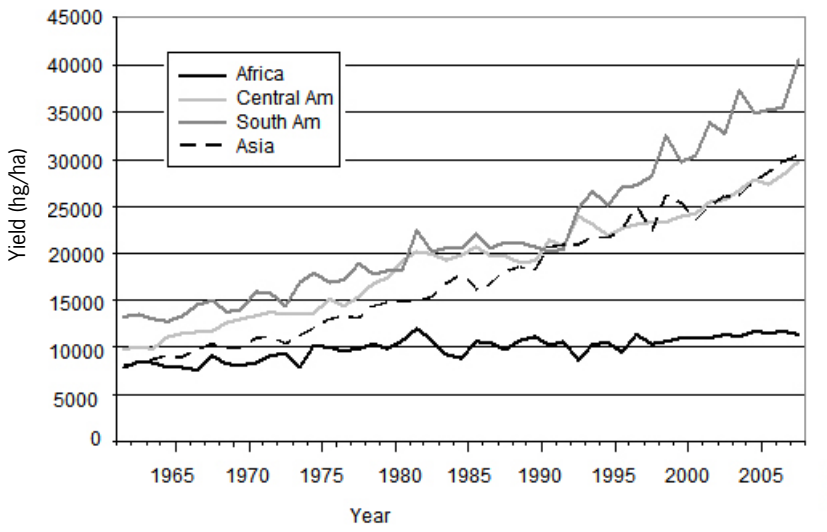
a) Dronne and Gohin have results for 2005-2008; we only present those for 2007/2008.
Source: Dronne and Gohin (2008).

A general concern is that demand for food will not keep up with production: the question of how to feed 9 billion people by 2050 has been discussed in various high level meetings.[2] Although population *growth* has been decreasing

[1] The authors mention fuel prices, price expectations of farmers and other market agents (including speculation), specific domestic (agricultural) policies pursued by different countries.
[2] E.g. during the High-Level Expert Forum in Rome on 12-13 October 2009, organised by the UN.

over the past decades, the total world population is still growing, with largest growth rates typically found in the poorest countries (FAOstat, 2009). The rising demand for food commodities has been combined with stagnating growth of general agricultural production. Because the agricultural sector has been neglected for decades, both by governments and international bodies, investments in agriculture are minimal in large parts of Sub-Saharan Africa, while a facilitating market environment is largely lacking. Africa is the only continent where food production per capita has fallen in the last four decades. Cereal yields per hectare in Sub-Saharan Africa are the lowest in the world, and have barely increased since the 1960 (see Figure 2.5).

Figure 2.5 **Cereal yield in selected global regions (1961-2007)**



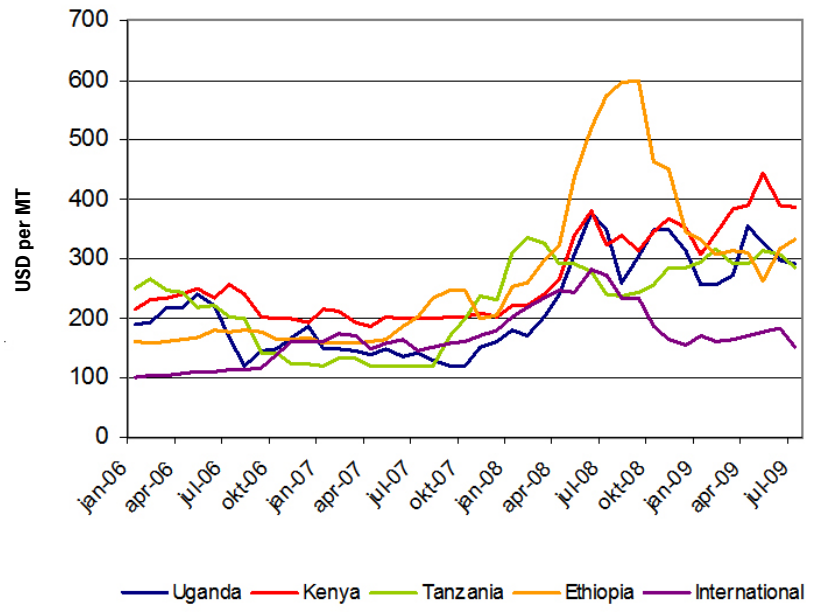
Source: FAOSTAT (2009).

2.3 Sub-Saharan Africa

Prices in Africa fluctuate often more than world market prices (Galtier et al., 2009; see also Figure 2.6 for maize in East Africa). Domestic prices are only partly influenced by world market prices and are highly influenced by domestic supply (during bimodal harvest seasons) and regional trade. A study by Dembélé

et al. (2008) shows that prices of certain cereals in several West African markets were completely isolated from world prices. First, many are essentially 'non-tradables': they are produced and consumed domestically and do not enter international markets.

Figure 2.6 **Maize prices in East Africa and world price 2006-2009**



Source: FAO (2009b) based on national statistical databases.

Trade can actually have a stabilising effect, contrary to popular wisdom. Two publications (Daviron et al., 2008; Diarra, 2008) investigated how often fluctuating international prices were transmitted to African and West African markets. The studies find that between 1994 and 2007, import of cereals had a 'stabilising effect' on the domestic cereal prices: without imports, domestic prices fluctuated much more. The sharp increase of cereal prices in 2007/2008 was transmitted mostly to consumer prices, but in a diminished manner.

2.4 Consequences of food price variability

The UN reported in its 2009 *Millennium Development Report* that the encouraging trend in the eradication of hunger since the early 1990s was reversed in 2008, largely due to higher food prices and the financial crisis of 2008. The prevalence of hunger in the developing regions has increased, from 16% in 2006 to 17% in 2008. In Sub-Saharan Africa, the proportion of undernourished population increased from 28% to 29% between 2004-2006 and 2008. Different categories of the population experience different levels of food deprivation and this may again differ per country (United Nations, 2009).

Urban consumers are hurt by higher food prices because they are net buyers and because prices in urban areas are more quickly transmitted than in rural areas because of better market integration. Urban consumers may also be greater consumers of imported food stuffs and be affected more by world food price fluctuations. However, Zezza et al. (2009) find that some urban consumers are also engaged in urban agriculture, and therefore manage to at least shield some of the negative impacts of the higher food prices by producing some food staples themselves.

Higher food prices will have aggravated the situation for those who are already disproportionally food deprived. Zezza et al. (2009) find that, in the short term, poorer households and households with limited asset endowments and access to agricultural inputs will be hit hardest by the price shock. The share of food in poor households' budget is higher than that of wealthier households and therefore higher prices will have a more severe effect. Because poor consumers are usually also the ones that are most undernourished, greater food deprivation will affect their productivity, thus negatively impacting their income generating activities.

Many farmers in Sub-Saharan Africa have not profited from the higher prices because they are in fact net food buyers (Meijerink et al., 2009a; FAO, 2009a). Farmers did not only face higher food prices, but also higher fertiliser prices. The higher input prices lowered their net income from farming. Because most producers in Sub-Saharan Africa are not fully integrated in the market, higher prices were often not fully transmitted to them or with a substantial lag (FAO, 2009d). Price differences between markets are high, because market infrastructure and institutions function poorly.

The consequences for developing countries of the food crisis have been serious and may result in a downward spiral of underdevelopment. Food demand is generally relatively inelastic, but in the case of the poorest consumers, or the

'bottom billion', consumers have been forced to decrease consumption when prices rise (Hossain et al., 2009). This can lead to under-consumption in the short run, to malnutrition and underinvestment in education in the medium run, and in the long run to structural losses of human capital and eventually to underdevelopment.

The food crisis can also result in a decreased productivity of the agricultural sector. As price instability leads to an increase in uncertainty among producers they will diversify into less profitable but reliable staple food crops and will decrease investment in high-value but risky production.

Similarly, price instability leads to inefficiencies on a national scale. When nations protect their economies to stimulate domestic consumption this may lead to domestic price stabilisation, but may further aggravate price variability on the world market. Price instability may further lead to underinvestment, resulting in poor quality of market infrastructure and institutions. The effects are often not restricted to the agricultural sector only, but affect other sectors in the economy as well. In addition, while conflict may trigger food insecurity, food insecurity among the majority of the population in developing countries has also led to political instability and violent conflict in turn (Box 2.1, Food wars).

Box 2.1 Food wars

From the beginning of 2007 until the summer of 2008 at the peak of the food crisis, the world's poor and food deficit countries formed a stage for street riots. In violent outbreaks in over 50 developing countries, people protested against the high cost of living (IFPRI, 2008). Among these countries were African countries such as Burkina Faso, Cameroon, Cote d'Ivoire, Egypt, Guinea, Mauretania, Mozambique, Senegal, Somalia, and Yemen.

The most extreme case was Haiti, where in the spring of 2008 the attack by demonstrators on the presidential palace lead to the deaths of 4 people, tens of wounded people, and finally, the resignation of the prime minister (Bello and Baviera, 2009). In Vietnam, crop fields were protected 24/7 by armed farmers while agricultural machines were banned from the roads after sunset, in order to secure the harvest from raiders, who would strip the fields at night (McKie and Stewart, 2008).

2.5 The role of governments

The policy responses of various governments to high food prices have been varied in nature and effectiveness (ODI, 2010). The FAO distinguishes three broad categories of responses:

1. targeting consumption;
2. trade;
3. production (FAO, 2009a).

Governments appear to have implemented relatively few longer-term measures and mostly short term measures to safeguard food consumption (Figure 2.7; see also Meijerink et al. (2009a) for East Africa). Such short term measures included:

- distribution of basic food commodities;
- providing cash to buy food;
- consumer price subsidies;
- reduction of consumption taxes.

Price controls or consumer subsidies are effective on the short term, but are expensive on the longer term. They usually lead to market distortions because producers' initiatives are suppressed. Targeted income measures are less distortive and usually are focused on the most poor and vulnerable.

Governments have also implemented trade policies to regulate the import and export of basic food products (mostly cereals). These consisted of:

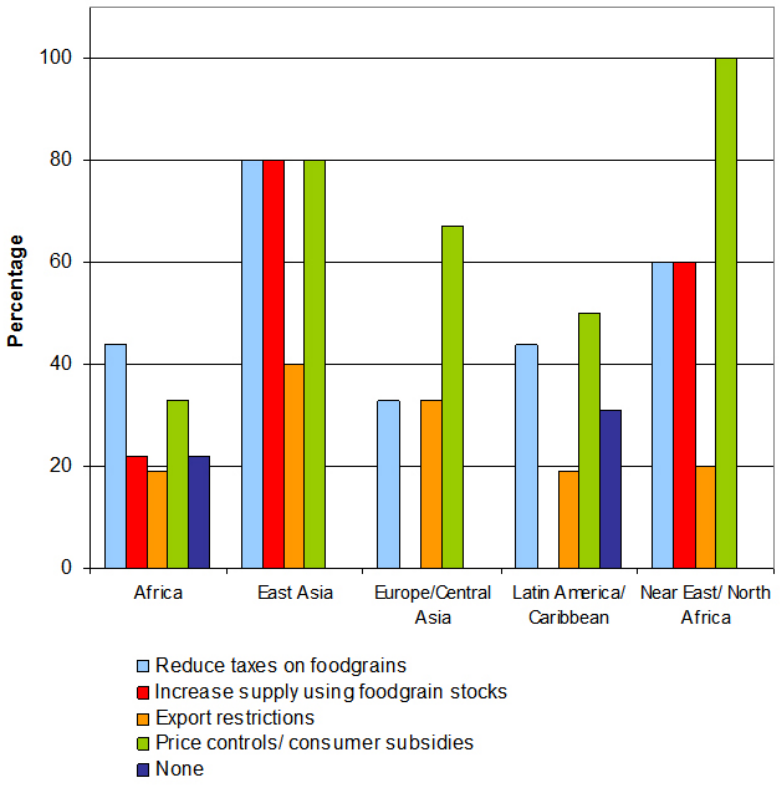
- tariff reductions (to facilitate imports);
- export bans and taxes.

Such trade policies are feasible and cheap on the short term, but distortive on the longer term. Export bans and taxes especially, implemented by important players on the world market can further increase market prices ('beggar thy neighbour' policies).

Several policies were also implemented to increase agricultural production:

- reduction of producer taxes;
- production subsidies;
- input subsidies (fertiliser and seeds).

Figure 2.7 **Government responses to high food prices per region a)**



a) Sample of 77 countries by region.
Source: FAO (2009a).

Although such policies can provide a short or medium-term stimulus to production, they tend to be costly on the long term because they are a suboptimal use of resources. Some policies work against each other. For instance, release of grain stocks pushes down prices, benefiting consumers, but reducing producers' incentives.

3 Instruments to reduce price risk

3.1 Four dimensions of intervention strategies

A wide range of instruments can address food price variability and its effects, depending on the nature of the problem that is to be addressed, and the purpose of the intervention. Following Galtier et al. (2009), we distinguish four different types of instruments.[1] Figure 3.1 schematically depicts the intervention categories.

Figure 3.1 Four types of intervention tools

	Price stabilisation	**Income stabilisation**
Private	*A* Facilitate spatial and temporal arbitrage	*B* Minimise the effects of price instability on revenues
Public	*C* Keep prices within a fixed margin	*D* Resource transfers to households

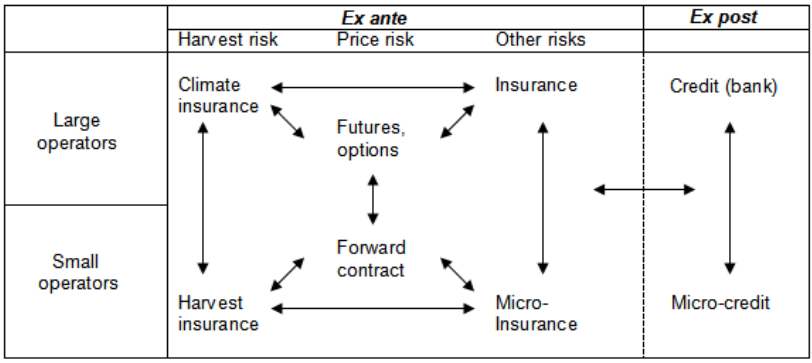
For simplicity's sake, we order the range of possible policy instruments along two major lines. First, interventions are either public (governments, donor organisations) or private (businesses sector, including farmers, markets). Second, interventions can be directed at price stabilisation itself, or seek to cushion *the effects* of price shocks, and are thus in the sphere of risk management. Of course, in addition to these two major lines, one could distinguish the level of intervention: that of nations, regions, enterprises and households, and individuals, the time horizon of interventions. Where important, we will also discuss these issues.

Galtier et al. (2009) further divides the possible policy instruments into two categories, where the first category seeks to reduce risks ex ante, and the second category reduces the impacts of risks (ex post). The first category includes instruments that address price risks. These include futures and options, as well as forward and pooling contracts. The second category includes instruments that seek to decrease production risks, including insurances and index-

[1] The background information of the policy instruments in this chapter is largely based on Galtier et al. (2009).

based products. It also includes credit provision. Various instruments are not really substitutes, but rather function as complements. For example, more insurance possibilities can lead to an increased demand for futures contracts (OECD, 2009). This is made visible in Figure 3.2.

Figure 3.2 **Complementarities of market based instruments**



Source: Galtier et al. (2009).

In practice, many instruments are coordinated by a combination of market and government forces, as markets cannot function without regulation by governments, and vice versa. In addition, instruments that stabilise prices often also have a stabilising effect on incomes. Therefore, one should realise that the four categories are not mutually exclusive. In many cases, the instruments are complementary and a combination of instruments is preferred.

In the following sections, we will discuss each category and instruments belonging to that category in turn.

3.2 Private mechanisms for price stabilisation

Markets in developing countries are often characterised by lacking infrastructure and weak market institutions. This leads to large gaps between farm-gate prices and market price. Information about prices moves only slowly between markets and opportunities for spatial and temporal arbitrage cannot be seized. Spatial arbitrage refers to market clearing between areas, while temporal arbitrage refers to market clearing over time (between seasons). When supply var-

ies over seasons prices also become variable. Right after harvests prices typically tend to drop, climbing again later in the season when supply is scarce. Sufficient storage could cushion the price variability by providing more stable supply, but adequate storage capacity is often lacking in Sub-Saharan Africa.

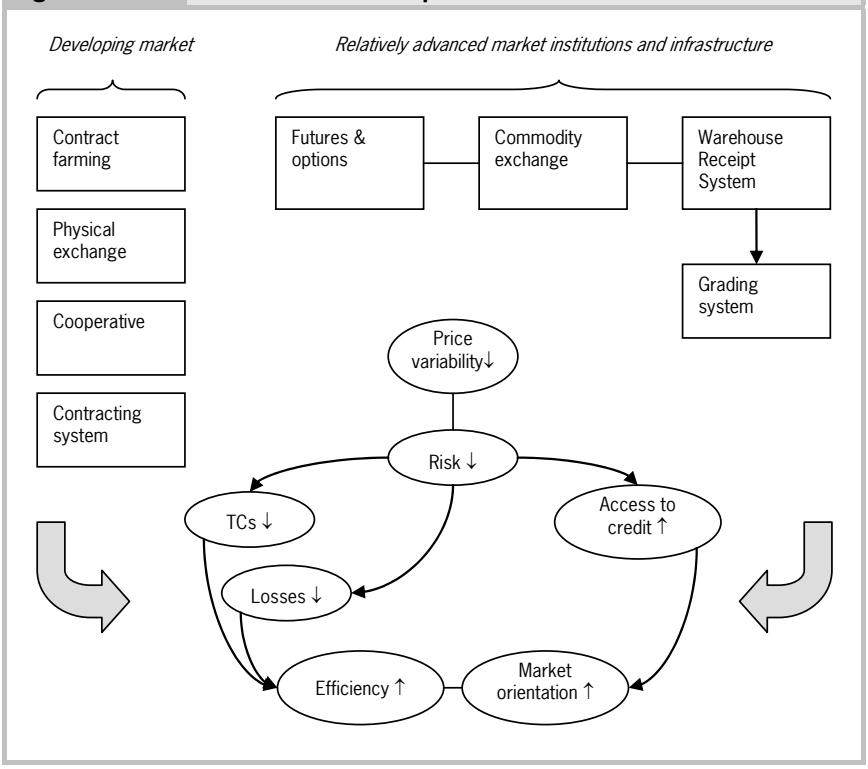
The mechanisms discussed in this section may facilitate spatial and temporal arbitrage. In addition, physical infrastructure should be improved such as roads to allow for transportation of goods between regions and to lower transportation costs, and information infrastructure to let price information flow freely and to provide more insight in the size of supply and demand.

Note that even though we discuss interventions by private operators here, the role of the government is of importance for all intervention mechanisms. Without appropriate government institutions (i.e. rule based and predictable) and a well-functioning market infrastructure (that facilitates transport of goods and information, access to credit, at relatively low transaction costs) the interventions mentioned below will have a low chance of success.

Figure 3.3 gives a schematic overview of the market instruments that lead to price stabilisation. Some of the market instruments demand relatively advanced market institutions in order to function well. These include financial contracts such as futures and options markets, commodity exchanges, and warehouse receipt systems. Other market instruments can also be viable in developing markets. Examples are contract farming, physical exchanges, rural cooperatives, and contracting systems between producers and buyers.

Market instruments that aim at lowering price variability bring along other effects that increase overall market efficiency. As prices are less volatile, producers' risks are reduced, leading to lower transaction costs, better access to credit, and reduced loss. As result, production efficiency increases and the market orientation of producers increases.

Figure 3.3 Market mechanisms: price stabilisation



3.2.1 Warehouse Receipt Systems

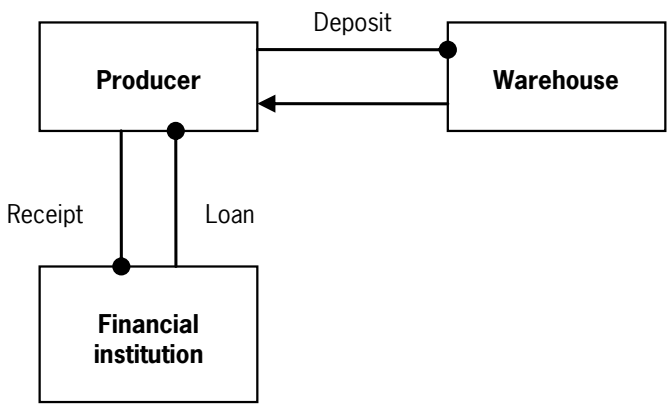
Warehouse Receipt Systems (WRSs) have great potential in developing countries with a relatively advanced level of market infrastructure and institutions. The system enables depositors to bring in storable goods (mainly grains and coffee; goods which are not perishable and can be kept in warehouses), in exchange for a warehouse receipt (WR). WRs are:

> 'documents issued by warehouse operators as evidence that specified commodities of stated quantity and quality, have been deposited at particular locations by named depositors.' (Coulter and Onumah, 2002:323)

Depending on the type of goods, and the services the warehouse delivers, the goods are cleaned, dried, graded, and temporally stored, all against a fee. The depositor then can decide to sell the good at any time he or she wishes, and in the meantime accumulate a number of potential buyers, enter contracts with parties in the commodity chain, get the necessary quality grades, and wait for prices to recover after the usual post-harvest price drop.

WRSs offer storage capacity and stocks for private depositors such as farmers and traders, for public parties (e.g. national food agencies), and can also hold stock of their own. The quality of the stock is assured by internal quality assurance controls. Goods are traded among the members of the WRS by simply exchanging WRs in a commodity exchange (see below). Transaction costs involved in the trade of WRs are much lower as WRs allow trade to take place with electronic or paper receipts, which makes the system efficient compared to a physical market. Figure 3.4 schematically depicts the functioning of a WRS: producers store their deposit in a warehouse and obtain a receipt (WR) in return. The WR then can function as a collateral, when the producer wants to apply for a loan, or can be sold to a trader.

Figure 3.4 **The WRS financing process**[1]



[1] Adapted from Bass and Henderson (2000:1).

A distinction can be made between regulated and unregulated WRSs. The involvement of an independent regulatory agency is what distinguishes the regulated WRS from the unregulated model. The regulatory agency may be government-based (e.g. in the US or Tanzania) or private-sector-based (e.g. in South Africa). An unregulated WRS is a legal/formal system of inventory collateralisation, in that the provision of services as well as the rights and obligations of counterparties are based on existing contract laws (Law et al., 2007).

Unlike regulated WRSs, unregulated WRSs are not controlled by an external regulatory authority, which increases the risk of fraud and theft. Because unregulated warehouses are privately run, the fees are high, and the customers are typically large operators. WRs are non-transferable, and the system can thus not be linked to commodity exchange (Coulter and Onumah, 2002).

WRSs substantially reduce natural and endogenous price instability, and arguably also have a stabilising effect on imported price variability. Grading systems offer a quality guarantee, which makes it possible to determine prices more easily. If a reliable grading system is in place, there is no need to control each individual good, which considerably reduces transaction costs throughout the whole commodity chain. In addition, price transparency in increased, which empowers smallholder farmers, and enables them to become price setters, instead of price takers (Bass and Henderson, 2000). Furthermore, WRSs give farmers access to credit, and this increases the profitability of trade, as farmers are allowed to wait for rising prices after the harvest.

A WRS has effects on several levels. First, on the producers' level, production and trading risks are reduced, providing producers an incentive to specialise and to innovate and produce marketable surpluses. Second, WRSs do not only increase efficiency among individual producers, but offer a platform for innovation and development throughout the entire commodity chain, linking farmers to buyers and other related institutions such as quality assurance organisations and banks. WRSs can also be linked to producers' associations. They can ease access of producers' organisation to credit and markets. Finally, on the macro-level, WRSs offer more efficient management of national food reserves, and can help out in case of food shortages, for example in the form of food relief programmes.

A more advanced type of WRS is the Electronic Warehouse Receipt System (EWRS). Electronic receipts lower transaction costs, and increase speed and security of transactions, reducing the possibility of fraud. Banks and other institutions will therefore be more willing to link up to EWRS than to WRS. Through EWRS, warehouses can be linked to commodity exchanges that sell the com-

modities in the form of futures and options contracts. We discuss this system later in this section.

Limitations

Experience from Zambia and other African countries has shown that setting up a WRS in the current market environment of many African countries is a highly demanding task, and the success of the system depends on a number of conditions (see Box 3.1).

- First, in order to be viable, the WRS needs to be linked to a transparent market that delivers certain services. For example, the information infrastructure needs to be in an advanced stage, especially in the case of EWRS. Also, in order to gain trust among stakeholders, the WRS should deliver trustworthy grading and inspection services, as only then WRs can be tradable and serve as collaterals.
- Second, the market needs to be large enough in order to meet the commercial demand for the WRS. This also means that smallholders cannot be involved in the system as long the credibility of the WRS is not yet established among larger agricultural and financial players, as illustrated by the development of a WRS in Zambia (Andrews et al., 2007). Supply volumes need to be large and the system should be commercially oriented, especially in the start-up phase of the warehouses, to attract industrial and financial partners. However, as soon as per unit prices for services have decreased, and a reliable system has been set up, smallholders are likely to be the largest beneficiaries of the WRS.
- Finally, WRSs are not appropriate for small quantities because of the high fixed costs, not for perishable goods. This means that only a limited number of crops can be stored in a warehouse. Farmers thus need to find other price stabilisation mechanisms for non-bulk and perishable goods.

Box 3.1 Building a regulated WR programme in Zambia

Under the Common Fund for Commodities grain inventory project, Zambia is in the process of developing a regulated WR approach. The system aims at developing a national network of privately managed warehouses that issues electronic transferable WRs. The warehouses apply grading and weight standards. The system is controlled by an external private certification and inspection system. The network initially focuses on maize, wheat and soybeans in urban areas, and will gradually be expanded to more remote areas that produce a marketable surplus.

The programme initially explicitly focused on smallholders, but this failed to be successful:

- due to the lack of a coherent transparent and volumes-driven commercial market for commodities, there was no incentive to warehouse services to develop;
- there was limited commercial confidence in and demand for WRs. Hence, there was little support from the financial sector to adopt WRs as a financial product;
- WRs were never accepted as legal documents of title;
- as ZACA was supported by donors, the WRS was obliged to focus on smallholders, who could not deliver the volumes needed to shift market-wide behaviour towards an efficient and transparent market system;
- poor management led to a series of market interventions by the government that compromised the independent position of the WRS.

The supervision of the system has now been taken over by the Zambia Agricultural Commodity Exchange (ZAMACE), which has a greater commercial focus than its predecessor (Zambian Agricultural Commodity Agency Ltd or ZACA).

A number of large processors, traders, and other players initially resisted the concept of a WRS, but since the system is functioning, most of these players have become a member. Now, also small farmers and farmer groups have access to the WRS, and hence to a greater variety of trading options, including storage to sell the commodities at a later date, and credit facilities.

The system still faces several challenges. To date, the WRs are not recognised as legal documents of title, creating difficulties with respect to access to credit from financial institutions. Furthermore, the government of Zambia often intervenes in the market - especially in prices of maize - and this undermines the functioning of the WRS. Hopefully, the stabilising effects of the new WRS on commodity prices will take away this need for government intervention in the near future.

Source: Coulter and Onumah (2002); Andrews et al. (2007).

African experience to date

Although WRSs are being piloted in several countries in Africa (amongst others in Kenya, Zambia, Ethiopia, Tanzania, Malawi and Uganda), the most successful regulated WRS runs in Southern Africa. One of the most promising WRSs is the Kenya's Eastern African Grain Council (EAGC), based on broadly based membership and providing an accreditation system that includes several countries. In other African countries, market institutions are not yet able to facilitate advanced WRSs. Yet, there are two variants of the regulated WRS that was described above, which are more common in other parts of Sub-Saharan Africa: the unregulated commercial WRS, and the inventory credit system supported by donors or NGOs.

At present, most WRSs in Sub-Saharan Africa are unregulated collateral management services that are run by local or international inspection companies. The inspection companies hence provide a secure investment environment for banks.

An alternative institutional arrangement that offers access for small operators is the inventory based credit system linked to microfinance institutions (MFIs). This construction not only gives smallholders access to credit and storage, but also reduces the risks of MFIs, as 'the system has a built-in use of collateral that can retain a high commercial value and be liquidated quickly' (Bass and Henderson, 2000:1). These schemes have been first implemented in Ghana in 1989 (Box 3.2) and have spread to other countries such as Niger and Madagascar in the 1990s.

Box 3.2 Inventory Credit Model in Ghana

In 1989, TechnoServe, an INGO that provides technical assistance in developing countries, launched the Ghana Inventory Credit Project for small-scale grain farmers. The project aimed to allow the farmers to profit from seasonal price swings. These profits are taken by intermediary traders when farmers are forced to sell right after harvest when prices are typically low.

> 'The Ghana Inventory Credit Project works in the following way. Farmers form groups, typically of 20-50 members, to store their produce. The technical service provider operates the warehouse, and a lending institution provides credit based on the warehouse receipt. Upon arrival of the goods at the warehouse, the products are graded according to moisture content and non-product materials. The farmers then receive a receipt stating the quantity and quality of the goods deposited. Loans are given to groups on behalf of their members, which then disburse them individually. Once the grain is warehoused, the goods are the collective property of the group, which is jointly responsible for treatment, storage, and sale. Nevertheless, each farmer's account is tracked separately by the group. Throughout this process, the technical service provider gives market advice.' (World Bank, 2005)

The scheme has proven successful: by the end of the 1990s, over 100 farmers' groups were given loans, with nearly a 100% repayment rate. Based on this success, the Agricultural Development Bank of Ghana has promoted further development of large scale commercial inventory credit, and the schemes were extended into cowpeas, groundnuts and rice. The schemes have substantially reduced inter-seasonal price variability in Ghana. Besides lower price risks and larger profitability, farmers also benefiting from enhanced negotiation capacity due to the organisation into farmers' groups. As a result, efficiency in the agricultural sector increased.

Source: Bass and Henderson (2000); World Bank (2005); Hicks (1998).

3.2.2 Futures and options contracts (commodity exchange)

In standardised futures contracts, farmers and buyers agree on the terms of delivery of a certain commodity, including the price, quantity, and quality of the commodity. The price that is set in the contract is based on the market equilibrium at the moment the contract is issued. Contractors are bound to the terms of delivery.

Options markets in contrast, offer the possibility but not the obligation to trade a commodity at a guaranteed price. Instead of fixing a price, options guar-

antee a minimum price for farmers, or a maximum price for buyers. Options are hence more flexible than futures. However, the effects of options on reducing farming risks are not unambiguous. Options markets have been pointed out as one of the reasons for excessive price variability during the Great Depression, and were banned in the US between 1936 and 1981 (OECD, 2009).

In theory, futures exchanges are able to manage part of domestic food price risks (Dana et al., 2006). Dana et al. (ibid) used simulation methods to measure the potential effects of price hedging through futures and options contracts in Malawi and Zambia, in order to spread import costs over time and hence reduce price variability. The researchers conclude that the use of either futures or options can be of modest support for the grain markets in Zambia and Malawi, but are insufficient to guarantee food security alone. Hence, the researchers stress the importance of a combination of price hedging, import strategies, and safety nets.

Limitations

These instruments demand well-established market institutions and infrastructure. For example, the enforceability of contracts and readily available price information are of major importance. Credit markets are of great importance too, because without access to credit, the ability to trade futures and options contracts is severely constrained (Byerlee et al., 2006). The credit that is needed in international futures markets is often beyond reach for small actors in developing markets. In addition, trust of farmers and traders in the system is necessary for futures and options market to function.

Futures and options markets are therefore likely not viable in many parts of Sub-Saharan Africa. Even though they have a long history in the US and to a limited extent Europe (Dismukes et al., 2004), they are not widely adopted in developed countries either (Morales et al., 2008).

African experience to date

Examples of the use of futures and options at a commodity exchanges in Sub-Saharan Africa are limited to the JSE in South Africa, which is the largest and most active commodity exchange on the continent (see Box 3.3). Other commodity exchange initiatives are being piloted. An example is the 'hub-and-spoke' Pan-African Commodities and Derivatives Exchange (PACDEX), building a hub in Botswana that aims to link various national exchanges and warehouses in order to facilitate regional trade. Various strong commodity markets in the region will be linked to PACDEX, as for example Kenya for coffee and tea, and Cote d'Ivoire

for cotton and cocoa (UNCTAD, 2008d). Table 3.1 gives an overview of the Sub-Saharan African commodity exchanges in Southern and Eastern Africa, and some countries in Western Africa.

Box 3.3 Johannesburg Stock Exchange (JSE) and SAFEX futures

Established in Johannesburg in 1887, the JSE is currently among the 16th largest stock exchanges in the world, 'and since its absorption of the South African Futures Exchange (SAFEX) in 2001, South Africa's JSE Exchange has been the continent's largest and most active commodity and derivatives exchange' (UNCTAD, 2006:9). Under the SAFEX Agricultural Markets Division that was set up in 1995, a range of agricultural futures and options contracts for commodities was introduced.

> 'SAFEX is widely recognised as the price discovery mechanism for maize in the Southern African region and has also proved an efficient and effective price risk management facility for the grain industry. SAFEX prices are quoted in several neighbouring countries.' (*ibid:9*)

SAFEX offers contracts for white and yellow maize, bread milling wheat, sunflower seeds and soybeans. In 2009 a new JSE cash-settled maize futures contract system was created.

The contracts will be listed, traded and settled by the JSE's SAFEX alongside the current successful South African grain contracts. In a press statement, CME and JSE outlined the expected benefits of a maize futures market:

- effectively manage the price risk with a view either on the domestic market or to more easily access the international market via the maize contract which will be traded in the local currency;
- hedge or gain exposure based on expectations of directional price, spread movement or variability in corn either as an outright position or versus the domestic market;
- realise arbitrage and spread opportunities between USA maize and South African white maize and/or yellow maize through its dynamic electronic trading platform;
- more effectively evaluate both the current and future world supply and demand for maize;
- identify short- and long-term cyclical price and variability patterns for maize.

Meijerink et al. (2009b:67).

Table 3.1	Commodity Exchange initiatives in Sub-Saharan Africa
National CE initiatives	**Description/current status**
Ethiopia Ethiopia Commodity Exchange (ECX)	Established by the ministry of Agriculture and Rural Development. ECX offers physical trade in some commodities, including grains and oilseeds. The ECX plans to issue WRs and futures at a later stage. Under development.
Ghana	Initiatives to introduce commodity exchanges failed.
Kenya Agricultural Commodity Exchange (KACE)	Set up in 1994 to provide basic CE services for grain, dairy and cotton. Minimal trade due to fragmented markets and poor infrastructure and market institutions. Focus on information dissemination.
Malawi Malawi Agricultural Commodity Exchange (MACE)	Commenced in 2004 as price information hub for 45 commodities from trading centres. Later also started to facilitate trade between centres.
Nigeria Abuja Securities and Commodity Exchange (ASCE)	Agricultural spot trading started in 2006, with a focus on maize and soybean.
South Africa South African Futures Exchange (SAFEX)	See Box 3.3.
Uganda Ugandan Commodity Exchange (UCE)	Currently only regulates commodity warehouses on behalf of the government. In the process of developing an EWRS.
Zambia Agricultural Commodity Exchange (ZAMACE)	The Zambia Agricultural Commodity Exchange (ZAMACE), launched in 2009 supervises national network of privately managed warehouses and trades in maize, wheat, soya and fertiliser.
Zimbabwe Agricultural Commodity Exchange (ZIMACE)	Exchange was lounged in the mid-1990s by farmers in response to liberalisation of agricultural market. Effects limited due to many government interventions. Operations have recently been stopped.
Malawi Agricultural Commodity Exchange (ACE) in Malawi	Established in 2006, linking Malawi, South Africa, Zambia, and Zimbabwe. Offers market information and a grading system.

Table 3.1	Commodity Exchange initiatives in Sub-Saharan Africa (continued)
Regional CE initiatives	**Description/current status**
East Africa African Lion	Web-based coffee exchange. Has not built up volumes yet.
Pan-African Commodities and Derivatives Exchange (PACDEX)	'Hub-and-spoke' Pan-African Commodities and Derivatives Exchange (PACDEX). A hub in Botswana linking various commodity markets in the region (e.g. Kenya for coffee and tea, and Cote d'Ivoire for cotton and cocoa).
African Multi Commodity Exchange (MCX Africa Ltd.)	To be hosted in Botswana, and intends to spread services to 53 African countries, in order to address market fragmentation. Aims to introduce modern financial services to the partner countries, following the example of MCX India.

Source: UNCTAD (2006) and UNCTAD (2008d).

3.2.3 Producers' organisations

Producers' organisations or farmers' (marketing) associations can provide farmers more control over the production process and the marketing of their commodities. In contrast to a farmers' union, which is a lobby organisation, producers' organisations are commercially oriented, and aim at a reduction in transaction costs and increasing revenues. Producers' organisations often both undertake physical trade and economic bargaining activities (see Eaton et al., 2008).

There are various reasons why it is interesting for farmers to link up with other farmers in an organisation, but a central reason is the reduction of transaction costs. This is effected through a set of five mechanisms (ibid). First, by organising themselves, producers acquire more bargaining power and therefore better market access. By collectively marketing their products, farmers may be able to demand better prices for their products. Second, producers' organisations function as a information sharing medium, and hence organised farmers stand stronger against traders, who generally have an information advantage over producers. Third, producers' organisations can buy inputs and tools which farmers would not be able to buy individually, and barriers to achieve economies of scale are reduced. This way, producers are better able to meet the quality demands of the buyers. Fourth, producers' organisations have a risk sharing function, as the profits of the marketing activities are shared among the mem-

bers of the organisation. Producers' organisations can also apply risk sharing mechanisms that deal with for example weather risks.

African experience to date

There are many examples of farmers' unions in Africa, although the number of producer organisations that are actively involved in marketing is much lower. Some of the reasons for this are put forward in Eaton et al. (2008). The major bottleneck is the lack of effective and transparent management systems in place in most producers' organisation. Farmers often are reluctant to hand over decision power to those in charge. In many African countries there has been a long history of government-run cooperatives in which farmers had little say and influence (for instance in Tanzania). There are, however, some successful examples such as the dairy cooperatives in Ethiopia that enable farmers to preserve their milk longer by processing it into butter and cheese, and to enter marketing contracts (see Box 3.4).

Box 3.4 The Ada'a Dairy Cooperative in Ethiopia

The Ada'a dairy cooperative was established in September 1998 with 34 founding members who purchased a single share of ETB100 each and an additional ETB10 for registration fee. The initial capital of the cooperative was only ETB3,400 (USD400). The first two years were devoted to establishing organisational arrangements to make the cooperative operational.

The main objectives of the cooperative during its formation were to:

- minimise the high transaction cost for the sale of milk and reduce price fluctuations throughout the season, particularly during fasting (i.e. periods when Ethiopian Christians do not consume dairy products);
- reduce wastage of products due to poor handling procedures and lack of processing facilities;
- increase production and productivity of dairy farms and improve the overall incomes of member farmers;
- supply inputs such as feed, health services, et cetera to member farmers at reasonable prices;
- provide training in dairy cattle management, milk hygiene and milk handling and milk processing to member farmers;
- ensure urban rural linkage for dairy development in the community;
- assist farmers to form milk units and establish milk union at community level;

Box 3.4	The Ada'a Dairy Cooperative in Ethiopia (continued)

- introduce saving and credit system to member farmers;
- collaborate with other dairy cooperatives (nationally, regionally and internationally) to enhance dairy development.

The cooperative has now become one of the major suppliers of milk and milk products to Addis Ababa city, and fulfils an example function for other cooperatives in the country.

Source: Tegegne et al. (2007).

3.3 Private income stabilisation mechanisms

Traditionally, African households and communities have managed risks to smooth fluctuations in income via informal networks based on values such as trust and reciprocity (often referred to as social capital). Such traditional (informal) risk management strategies can be seen as part of the private income stabilisation mechanisms. This is discussed in section 4.1 on page 72. In this part we will focus on market-based instruments.

3.3.1 Forward contracts: contract farming

Forward contracts are based on forward delivery contracts between sellers and buyers. They resemble future contracts (or futures). However, futures are traded on an exchange, while forwards are traded 'over-the-counter', i.e. directly with another buyer or seller. With forward contracts, crops usually need to be stored until they are sold and therefore this arrangement is only suitable for storable crops. Contract farming is a type of forward contract that is used extensively in Sub-Saharan Africa.

Contract farming is based on the reduction of risks and transaction costs by means of a forward agreement between a producer and a buyer (often a processing industry or a trader). Farmers who participate in contract farming often receive support in the form of technical assistance or input supply. In return for this support as well as a guaranteed price, farmers provide a certain amount of product, at a predetermined quality (Eaton et al., 2008).

Contract farming is thus based on a risk-sharing principle: the farmer knows beforehand that she will be able to sell her crops, and knows the price. As a result, farmers can become more efficient, and acquire higher incomes. Buyers

have certainty about the quantity and quality of the good they will purchase. The system is widely applied in case of either perishable high value commodities, or bulky cash products. Both types of products are characterised by high producer risks on the one hand, and large potential efficiency gains through improved storage, processing and marketing possibilities on the other.

There are a number of different types of contracts (see Bijman (2008) for an overview). Market specification contracts are pre-harvest contracts between producers and buyers, setting the broad conditions (time and place of sale, quality and quantity of the product) of the future sale. Prices are determined on the actual moment of sale. In production-management contracts, buyers have more influence on the production process because the contract also specifies input usage. Under this type of contract, more production risks are transferred to the buyer. Often, the contract also sets a price (range). Finally, resource providing contracts are most binding for the producer, as the buyer delivers the production inputs. Under some resource providing contracts, production decisions and risks are even entirely shifted to the buyer (Mighel and Jones, 1963).

Contract farming shifts part of the risk to the buyer, as producers and buyers arrange to trade a certain amount of produce at a predetermined price. Farmers work in partnership with a buyer (e.g. a company) which supplies technical assistance and inputs, and markets the output. Contracting systems can provide access to input and technical assistance to farmers in addition to functioning as a vehicle that links smallholder farmers to the market (Eaton et al., 2008). Apart from lowering risks and transaction costs, farmers also benefit by the lower production costs (cheaper inputs).

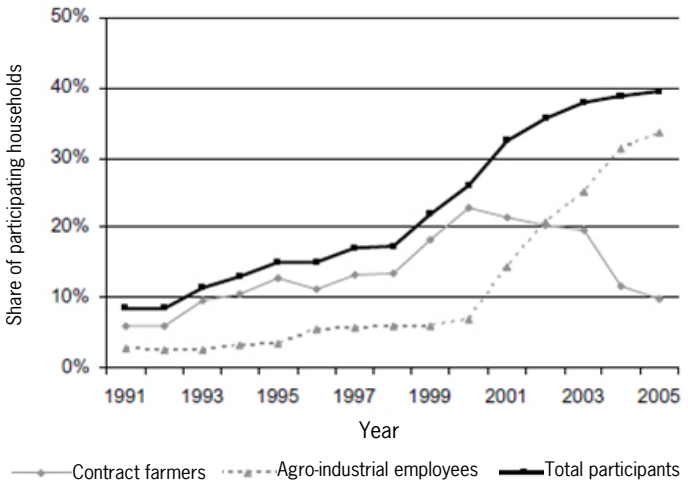
Limitations

Despite the benefits that are linked to contract farming, it has a number of limitations. First, trust is an important prerequisite for the functioning of contracting systems. If one of the parties does not trust the construction, the system will not work. Related to this, contract enforcement sometimes proves to be problematic. Second, contract farming systems generally only include a small number of farmers. Third, smallholder farmers have a dependency relationship with the buyer. Especially in the case of large market players there will be an unequal relationship. Farmers can be forced to bear high risks, while the risks for the buyer are limited, depending on contract terms.

African experience to date

In Sub-Saharan Africa, contract farming, especially for high value (horticulture) crops has been increasing in the past decades. However, the number of smallholder farmers that enter into contract farming has been decreasing because large buyers (for example supermarkets or international market players) increasingly demand high quality standards that smallholder farmers often cannot meet. For example, in Senegal, the number of smallholders being contracted has been reduced in favour of large-scale estate production, because of increasing quality demands (Maertens and Swinnen, 2009; see Figure 3.5). Hence, small farmers tend to be excluded in contracting schemes designed for larger (international) markets. Another reason is that buyers will face high transaction costs when entering a contract with a myriad of partners, which 'is a complex task, requiring investments in personnel, in controls and in monitoring systems' (Eaton et al., 2008:25).

Figure 3.5 **Contract farming in Senegal (1991-2005)[1]**



Source: Maertens and Swinnen (2009).

[1] Household participation in French bean export production, 1991-2005. Contract farmers are households where one of the members (usually the household head) holds a contract for the production of French beans with an agro-industrial exporter. Agro-industrial employees are households where one or more members work as employees in the French bean export agro-business (Maertens and Swinnen, 2009:165).

3.3.2 Pooling contracts

In a pooling-contract system, the produce of individuals farmers is 'pooled' and sold throughout the season (e.g. by a wholesaler). The resulting gross returns from these staggered sales, minus the wholesalers' expenses, are distributed across the producers, proportional to the amount of produce delivered. Producers pool thus (price) risks among a group.

Limitations
Pooling contracts are only viable when the producers all face the same risks. Contracts should be enforceable, and well-functioning monitoring mechanisms should be in place in order to avoid free-riding behaviour. A high level of trust among participating farmers is therefore required.

African experience to date
The experience with pooling contract has been limited. We have not been able to find any information on this in Sub-Saharan Africa. However, this does not mean no (informal) arrangements exist that resemble a pooling contract in SSA. In fact, in combination with producers' organisations, this mechanisms could be effective to reduce income risks to farmers.

3.3.3 Insurance

Insurances are based on the idea of risk sharing between the insurer and the insured, where the insured person runs a small and predictable loss in the form of the insurance premium, to prevent a large and unpredictable loss, e.g. a failed harvest. The insurer is willing to bear this risk in exchange for the insurance premiums of a large number of individuals that are collected in a fund which is used to cover occurred loss. Risks are thus pooled among the population. Agricultural insurances either pay premiums when specified incidences occur, i.e. single peril insurance, or when yields fall below a certain threshold: multi-peril insurance (OECD, 2009).

We can distinguish two broad types of insurance: conventional insurance and index-based insurance.

1. Conventional insurance: Within a well-functioning administrative system, area yield insurance can be viable, based on the average yield of a large area of land. Individual farmers will generally not be able to largely affect their overall yields, while risks can be pooled over regions as weather conditions are

often bound to relatively small areas. An alternative with more potential, however, is index-based insurance.

2. Index-based insurance: Index-based weather insurance has been relatively wide-spread in developing countries. The insurance only pays insurance premiums when a certain weather shock has occurred (e.g. excess rainfall or drought), and when this has had a negative effect on crop performance. A limitation of index-based insurances is that the insured farmers must be located in the vicinity of a reliable weather station, and that good historical weather data are available, in order to determine the chance of the incidence of adverse weather conditions. The insurance is now also proposed as a way to manage climate change for farmers who will face an increase in extreme weather conditions.

Besides these two types of formal insurance, we can also distinguish micro-insurance which refers to insurance that has low premiums and low caps or low coverage limits. It includes risk-pooling and marketing arrangements designed to service low-income people and businesses not served by typical social or commercial insurance schemes. Micro-insurance is often used by poor communities, as it pools risks over all members of the insurance group. Many micro-insurance schemes in developing are informal and organised by community members. But micro-insurance may also be provided by insurance companies. We focus on these in this report.

An example of a micro-insurance scheme is a life annuities savings scheme. In this scheme, participants pay annual premiums up to a certain date after which the insurance company issues annual payments until the death of the client (or in case of reversionary annuities, the remittance is sent to the spouse of the client). In case of premature illness or death, the saving account is insured. If the insurer has accurate data on life expectancy, life annuities can be based on a risk pooling principle (Churchill, 2006).

Limitations

Insurances are subject to two major problems. First, in case of asymmetric information,[1] insurances will easily evoke moral hazard and adverse selection. In the case of moral hazard, people change their behaviours after having obtained the insurance. They take more risk, making it more likely that the insurer has to pay. Especially multi-peril insurances tend to evoke moral hazard, as they are

[1] i.e. the insurance company and the insured individual do not have the same information.

more difficult to monitor. In the case of adverse selection only those with more risk than others will apply for the insurance, while the insurer does not know this. The result is that insurance funds may not be sufficient to cover losses, and that premiums will increase over time. Second, certain risks are not independent but correlated to certain external variables (systemic risks). For example, floods affect large regions at once, and insurance funds may be insufficient to cover the losses of each individual within these regions. Hence, for insurances to be viable, they need to meet a number of conditions:

1. Both the insured and the insuring party need to have full access to information, in order to minimise the potential for moral hazard and adverse selection bias;
2. Risks should be independent or idiosyncratic across insured individuals. If risks are highly correlated, it is difficult to pool risks among individuals, causing high risks for the insurer. Hence, in case of systemic risk, insurers need insurance (termed re-insurance);
3. In order to set the premium rate, the risk needs to be calculable, in other words, the distribution of the risk has to be estimated;
4. Premiums have to be affordable. This means that the probability of the occurrence should be medium, i.e. not too high, as premiums will not be affordable in that case, and not too low as that makes it difficult to calculate the risk occurrence.

There are hardly any agricultural risks that meet all four conditions (OECD, 2009). Because many agricultural risks are weather related and hence systemic, the government is often involved in agricultural insurance. As agricultural prices are therefore also not independent, they are practically uninsurable, and futures markets are better suitable for price stabilisation.

African experience to date

Although conventional agricultural insurances are not widespread in Sub-Saharan Africa, there are examples such as the Nigerian Agricultural Insurance Company (see Box 3.5).

Box 3.5 Public agricultural insurance in Nigeria

Established in 1987, the Nigerian Agricultural Insurance Corporation (NAIC) provides risk cover to Nigerian farmers. The Nigerian government has established and fully owns the NAIC, as conventional insurers considered agricultural risks too high.

Its primary mandate is to provide insurance cover to all categories of farmers, namely small, medium and large scale holders, either in groups or as individuals. The NAIC aims to protect the Nigerian farmer from the effects of natural hazards by introducing measures that ensure a prompt payment of appropriate indemnity (compensation), sufficient to keep the farmer in business after suffering a loss.

NAIC insures crops (commodity crops such as rice and maize, and cash crops including cocoa, tea and coffee, cotton and rubber), livestock (cattle and poultry), and commercial business. Insurance of other agricultural activities (e.g. fisheries and horticultural crops) are currently being undertaken on pilot basis.

The insurance scheme, however, does not directly cover agricultural production, but the loans issued by banks for investments in agriculture. Hence, the coverage of NAIC is limited. In the occurrence of a disaster, NAIC pays out the bank and not the farmers. The banks in turn will cancel the farmer's debt, but farmers are not compensated for loss of income. NAIC insurances are obligatory for all farmers who receive an agricultural loan from banks and other approved lending institutions.

Recently, the World Bank announced plans for the establishment of index-based crop insurances in cooperation with NAIC, in order to support agricultural productivity.

Source: World Bank (2008b), NAIC (2009).

There is a growing number of project that are piloting index-based weather insurance in Sub-Saharan Africa.[1] An example is the index based weather insurance in Malawi in Box 3.6.

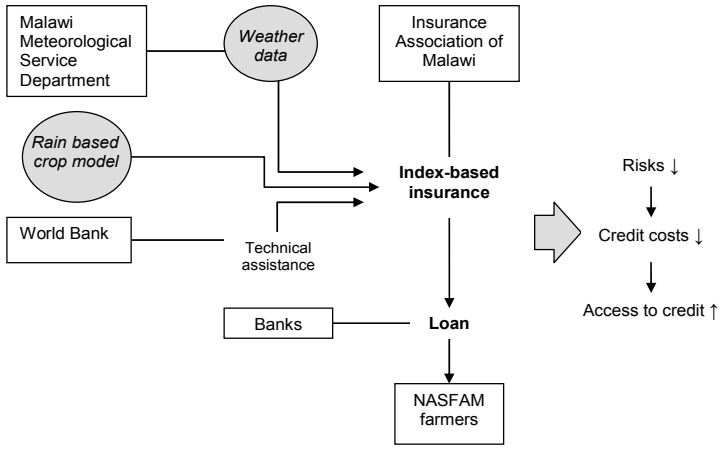
[1] See for instance IFAD and WFP. See http://tinyurl.com/yffrhvx accessed on 24-12-2009.

Box 3.6 Index-based weather insurance in Malawi

Agriculture in Malawi typically deals with large rainfall related risks. In the years 2004/5, severe droughts made 40% of the smallholder farmers rely on food aid. In 2005, the Insurance Association of Malawi (IAM) introduced a pilot for an index-based weather insurance in order to mitigate weather related production and income risks related to groundnut production. The insurance helps farmers to obtain financing for inputs such as seeds that are needed to enhance productivity. Two banks were found willing to provide loans to members of the National Association of Small Farmers of Malawi (NASFAM), which are backed up by the IAM insurance scheme. The insurance pays off the farmers' loans in the bank, if rainfall is insufficient for groundnut production.

The index has been based on two major inputs: the rainfall index, and the needs of the concerned crop. Malawi has well-documented and high quality weather and climate data, and for some weather stations, historical rainfall data date back to 1981. The Malawi Meteorological Service Department has provided historical data on regional rainfall patterns, and is in charge of ongoing rainfall data delivery. In addition, a rainfall-based groundnut production model provides information on crop growing patterns, and the required amounts of rain. The World Bank has provided technical assistance in the design of the insurance contracts.

The insurance covers the costs of the loans, but not the loss of crops. However, as the risks that are related to loans decrease - both for banks and for farmers - credit costs fall, and eventually banks will become more willing to provide loans to a larger group of smallholders, who, in turn, will become less risk averse and less vulnerable in the occurrence of adverse weather conditions.



The scheme should be improved in some aspects. The number of weather stations should be increased, as the current number does not adequately cover all agricultural land. Furthermore, agricultural insurance is new to most farmers, so there is need for more training and capacity building to allow for further adaptation and improvement of the contracts.

Source: Dana and Gilbert (2008); Galtier et al. (2009).

Box 3.7 provides an overview of different formal micro insurance schemes in South Africa. Examples of micro insurance groups are life, disability, and funeral insurances, but up till now, examples that involve an insurance company in Sub-Saharan Africa are rather scarce. Often, micro-insurances are linked to micro-finance and long-term saving schemes. There are several examples of traditional and community-run schemes (see Dercon et al., 2006a; Dercon et al., 2006b; Calvo, 2009; Dercon, 2005).

Box 3.7 Micro-insurance in South Africa

The insurance industry in South Africa is well-established and dynamic, but to date mainly focuses on non-poor and larger enterprises. Micro-insurance is scarcely available for the poor, with the exception of funeral insurance. However, many of the funeral insurances in South Africa are technically illegal, and the present regulatory framework needs revision. Micro-insurances in South Africa are provided through different channels:

- *Independent parlour-based insurers*
  These insurance schemes are often rather informal, based on community responsibility, and benefits are often in kind instead of in cash.
- *Insurance agents and brokers*
  The agents and brokers serve as the link between official insurance companies and poor communities, and hence function in a similar way as the independent operators. The largest difference with the former insurance type, is that agents and brokers are linked to large insurance companies, who undertake the actual work.
- *Micro-finance institutions*
  A small number of MFIs in South Africa is undertaking credit-life insurance, insuring borrowers (and their families) for the disability of replaying loans in the event of death. In turn, these insurances offer more financial stability for MFIs.

Source: Aliber (2001).

3.3.4 Credit and micro-finance

Variability in income can also be managed by credit. Credit smoothens consumption when farm household incomes decrease (e.g. because of low prices) and is paid back once incomes recover. There is an extensive body of literature on credit and micro-finance for the poor (see Chavan and Ramakumar, 2002).

Micro-finance opens credit possibilities to poor entrepreneurs. It lends small amounts of money, often to small associations (mostly women's' groups) to set up a small business. The members are responsible for the repayment of the is-

sued loans together. The Grameen bank is a well known example of a microfinance institutions:

> 'Grameen Bank has reversed conventional banking practice by removing the need for collateral and created a banking system based on mutual trust, accountability, participation and creativity.'
> (Grameen Bank, 2008)

A relatively new and rather advanced arrangement is the combination between credit and insurance which 'insures the lender'. Micro-finance institutions (MFIs) can pool risk among them. A higher level of (re)insurance may offer more scope than credit schemes that are focused on the farmer level (Van Asseldonk et al., 2009).

Limitations
In most rural areas in Sub-Saharan Africa, market institutions such as banks are often absent. Moreover, households often have no access to credit because they lack collateral for the loan. Usually the collateral demanded by the lending institution consists of property rights over land, which are often lacking or poorly functioning. This requirement means that landless households are not able to obtain credit at all.

African experience to date
There are multiple microfinance projects throughout the whole world, including countries in Sub-Saharan Africa. Although micro-finance projects are not the only solution to poverty, there is consensus that they can form an important contribution to development in Sub-Saharan Africa (OSCAL, 2002). See Box 3.8 for an example in Nigeria.

Box 3.8	African Traditional Responsive Banking (ATRB) in Nigeria
The Country Women's Association of Nigeria (COWAN) was established by merging traditional with modern practices. At its core are the traditional practices, combined with a community based institutional structure, training and advisory services, and a 'social banking' model that is traditional and responsive. The Nigerian African Traditional Responsive Banking (ATRB) has been established under the OWAN, and is a loan scheme that combines traditional micro-credit practices with knowledge on modern markets. ATRB has succeeded on a number of fronts in its first five years: savings mobilisation has doubled, the loan fund portfolio increased by 50%, and loan repayments remain stable at 98%. ATRB successfully empowers poor and rural women economically, socially and politically, while creating a sense of belonging and ownership.	
Source: OSCAL (002).	

3.4 Government intervention: price stabilisation

Price stabilisation by the government has several benefits. Reduced price variability as well as guaranteed minimum prices lead to a reduction in uncertainty for agricultural producers. This may result in a higher willingness to invest in high-value crops and new technologies. On the consumers' side, when peaks in consumption prices are levelled, this can lead to a reduction in vulnerability and therefore reduce poverty and undernourishment. Price stabilisation can form a key aspect of safety net programmes for poor consumers, which is more efficient than ex post food distribution in reaction to high food prices.

Price stabilisation policies can also have significant macro-economic benefits, in addition to its micro-economic advantages. Reduced uncertainty will lead to increased investment incentives (Dawe, 2001; Cummings et al., 2006). In this section we will review several instruments that governments can use to reduce price fluctuations.

3.4.1 Direct price control

Price control comes in many different forms, from strict and fixed prices, to price bands with wide margins. In the case of total price stabilisation, the government completely fixes prices, and decouples prices from world market prices and mechanisms of supply and demand. Partial price stabilisation fixes prices at

certain moments in time in order to stabilise inter- or intra-seasonal price variability.

'Neutral' price stabilisation (setting a price band with a certain minimum and maximum price), is more flexible than rigid price control because prices are allowed to vary within this symmetric price band. Either prices can be kept around a certain average, which is referred to as mean price preserving, or quantities, referred to as mean quantity preserving. Pure price stabilisation refers to price stabilisation around the world price average. It leads thus to a reduction of price variability only and does not imply any structural taxation (when prices are set below world prices over a longer period of time) or subsidy which would result in protection (Dawe, 2001). When the price band is set wide enough, prices are still affected by market mechanisms and world market prices. An alternative is asymmetric price stabilisation, where either a minimum or a maximum price is defined.

The most well-known examples of government intervention in agricultural markets are found in Asia, and this is why we discuss the Asian experience here. Price policies formed an important part of the Green Revolution package that started in the 1960s. In most of the Asian countries, both market infrastructure and institutions were weak, while many poor depended on agricultural production, either as consumer, producer, or both. Price policies were implemented to circumvent the poorly functioning market and to attain more food security, both through self-sufficiency and low food prices. Many Asian countries stabilised food prices within price bands, either above (India), around (Philippines), or below world market prices (Pakistan) (Cummings, Rashid et al., 2006). In addition, the Asian governments hugely invested in the adoption of new technologies and agricultural protection, and as a result, the agricultural sector experienced an unprecedented production increase during the in the 1980s.

Limitations

Food price stabilisation can support market developments on the short term, but involves high costs and market inefficiencies if sustained on the long term. Many market interventions are implemented by government parastatals that gain a monopoly position, and are reluctant to give up that position once markets have started to function better. While market interventions are officially implemented for reasons of development and efficiency, in reality policy makers have multiple objectives, and (the sustenance of) interventions is often rather politically than economically motivated. Furthermore, the shadow costs are large:

if the money spent on price stabilisation would have been spent on for instance agricultural extension or education, the returns may have been larger, and more sustainable on the long term.

In general, we can conclude that price stabilisation strategies can be implemented successfully, but only if a set of strict conditions is met. First, interventions should aim at providing market infrastructure and institutions. As the market becomes stronger and starts functioning independently, the government should start retreating and limit itself to a facilitating role. Second, price intervention should be combined with a broader policy package, including agricultural extension programmes and access to rural credit. This demands serious commitment of the government to the implemented policies. The focus should be on getting markets rights, instead of only on getting prices right (Cummings et al., 2006).

African experience to date

After independence in the 1960s, African governments were actively involved in markets. In order to protect emerging industries, quantitative trade restrictions and tariffs were put in place on a large scale. The global economic crisis of the 1970s, however, also heavily affected African nations, and the costs of trade regulation became a heavy burden on the governmental budget. Under the Structural Adjustment Programmes (SAPs) of the IMF in the 1980s and 90s, African states were obliged to dismantle protectionist policies in order to receive loans. The result was not only widespread trade liberalisation, but also an accumulation of debts in many African states in this period. It is now widely believed that the market reforms under SAPs have contributed to the vulnerability of African markets and the resulting food price variability (UNCTAD, 2008c).

While African and Latin American governments generally failed, the Indonesian rice price stabilisation programme (BULOG), discussed in Box 3.9, is an example of successful government price intervention, as the government managed to stabilise prices without structurally protecting the agricultural sector. Although the institutional and economical situation in most of Sub-Saharan Africa largely differs from the Indonesian context, a BULOG model could probably succeed in some regions in Sub-Saharan Africa.

Box 3.9 Rice price stabilisation in Indonesia: the case of BULOG

Rice is the most important crop in Asia. Even in relatively wealthy Indonesia, it accounts for more than half of the daily caloric intake with most rice consumers being among the poor (Dawe, 2001). When Indonesia faced significant food shortages in 1972, the government imposed rice price controls combined with assistance for rice farmers including credit, irrigation, extension training, and fertiliser subsidies.

BULOG (Badan Urusan Logistik) is the Indonesian food logistics agency that was established for two major goals: the first was rice self-sufficiency, and the second was rice price stabilisation. BULOG set floor prices for producers and ceiling prices for consumers, allowing for some fluctuation of prices within the price band. The prices were kept at long term world price averages, while ignoring short term price fluctuations on the world market. The involvement of private traders has been central to the BULOG price policies.

The policies that were implemented by BULOG led to high domestic price stability, especially in the 1980s (Kajisa and Akiyama, 2005), as well as the economic growth, investments in human capital, and widespread poverty alleviation (Timmer, 1997). In 1984, Indonesia managed to reach rice self-sufficiency, and the performance of BULOG from the mid-1970s until the late 1980s has been widely considered as a major success.

In the 1990s, the costs of price stabilisation increased, as the share of rice in the economy increased. Not only the running of BULOG was expensive, but there was also an efficiency loss as farmers were encouraged to grow rice instead of other crops, because of stable prices. However, the overall gain of price stabilisation in Indonesia has exceeded its costs, which makes a case in favour of well-designed price intervention by the government.

3.4.2 Subsidies and taxes on agricultural trade

Export taxes are raised because of two main reasons. In times of food scarcity, export taxes may be imposed in order to safeguard domestic food availability and to encourage the domestic processing industries. Protection of domestic production can enhance domestic development without the constant pressure of international competition. In addition, export taxes form a source of income for the government, which could in turn be used to finance import subsidies.

Import subsidies keep domestic prices below import parity levels, and by cutting the direct link with world prices they can reduce imported price instability, which supports consumers.

Taxes and subsidies on agricultural trade come in different forms: in contrast to fixed taxes (or subsidies), variable taxes respond to the world market. In case of internal production deficits, import taxes are reduced and the world

market can compensate for the deficit. Similarly, when internal production leads to a surplus, export subsidies may become higher. These policies lead to more elasticity of demand and supply and decouple these mechanisms of movements on the world market.

Export taxes and subsidies are not specifically regulated under WTO agreements, as long as the regulations imposed are based on the Most Favored Nation principle. In order to protect poor consumers, export taxes are even explicitly allowed:

> 'Article XI of GATT 1994 allows for the temporary application of export prohibitions or restrictions to prevent or relieve critical shortages of foodstuffs.' (UNCTAD, 2008a:28)

Many countries have lowered export taxes during the SAP liberalisation policies in the 1990s and under numerous bilateral agreements to let farmers benefit and to promote trade relations. This has also evoked strong opposition from governmental interest groups that benefited from the tax revenues. In many developing countries, these policies still are a major policy tool (FAO, 2009), and during the most recent food crisis, many developing countries all over the world have re-introduced export taxes (e.g. China, Argentina, Russia, Malaysia) and import tariffs (e.g. India, Indonesia, Thailand, Korea) (Trostle, 2008).

Limitations

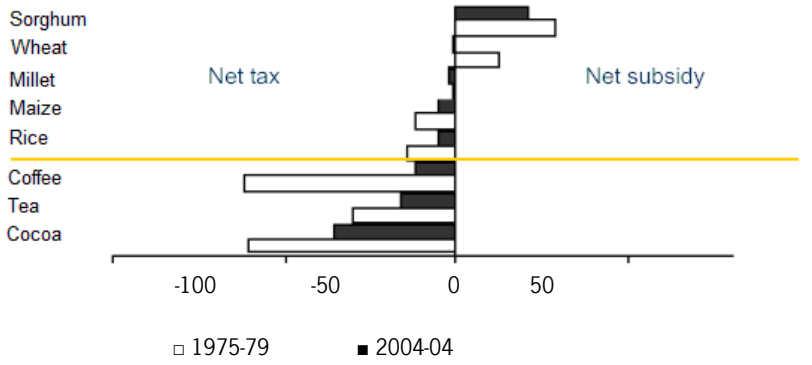
There are some important disadvantages linked to import subsidies and export taxes. Market signals are distorted because the link between demand and supply mechanisms is disconnected. Both import subsidies and export taxes increase food shortages on the international market, limiting import possibilities for food deficit countries and thus contributing to even more food price variability (referred to as 'beggar thy neighbour' policies).

In addition, lower prices lower incentives to producers, who might therefore shift to the production of other, more profitable commodities, instead of investing in the food-shortage crop. When the production of food-shortage crops decreases, prices will increase again, thereby undoing the effects of the protection policy. In a recent report, FAO (2009a) reports that low output prices coupled with high input prices have indeed led to decreased planting of cereals. Finally, when import subsidies increase the level of imports, government costs also grow.

African experience to date

Figure 3.6 gives an overview of taxes and subsidies on trade in selected agricultural products in Sub-Saharan Africa.

Figure 3.6 **Nominal assistance rate to cereals and export commodities in Sub-Saharan Africa[1]**



Adapted from World Bank (2008a)

Agricultural taxing or subsidising in Sub-Saharan Africa happens for different reasons. While subsidies may be aimed at supporting the agricultural sector, taxes are often collected for different, political reasons, such as rent-seeking motives. According to Anderson et al. (2010) countries with more control on the exercise of political power have fewer distortions. Most African developing countries have a small nonfarm tax base, and therefore may have a stronger motive to tax agricultural imports and exports. The authors conclude that while taxes and subsidies may achieve stability on the short term, on average these policies are not sustainable, and will lead to large price jumps when policies change.

3.4.3 Input subsidies

Input subsidies have been much debated, and were abolished in many developing countries under structural adjustment programmes (SAPs). Currently however, input subsidies are tolerated by international bodies as the IMF and World

[10] Weighted average across 21 countries, based on gross value of agricultural production at undistorted price.

Bank, as long they are targeted on poor producers with limited accessibility to resources.

Input subsidies were widely used by Asian governments as policy instruments during the Green Revolution, and have contributed to increased productivity in a large number of Asian countries. The subsidies have been used in response to policies that decrease output prices, which of course benefits consumers, but rather harms producers. Asian agricultural policies were hence putting 'one foot on the accelerator and one on the brake'; at the same time stimulating and discouraging large productivity (Cummings et al., 2006:305). Especially in an early stage of development, input subsidies tend to take away investment risks and hence encourage higher input use.

Input subsidies are an effective policy if targeted well if abolished when the producers become sufficiently competitive. Abolishing input subsidies, however, has proven to be a difficult political decision, and targeting input subsidies can lead to political problems. For example in India, input subsidies account for nearly 10% of the total Indian agricultural output, which is five times larger than the level of public investments in agriculture (see Gulati and Narayanan, 2003).

In early stages of development of the agricultural sector, the costs of input subsidies are limited because use of inputs is limited. However, the costs of the input subsidy 'soar with success' (Mellor and Ahmed, 1988:280). Hence, in more advanced rural economies with high input adaptation rates, input subsidies form a serious pressure on the governmental budget.

Another limitation is that input subsidies usually benefit farmers who use inputs, and not poor and landless farmers. In order to circumvent this problem, the subsidies can be targeted, although this may imply new political difficulties: whom to target, and whom not to? For this reason, the government can subsidise the institutional distribution structure of the inputs through public financing, instead of directly subsidising the inputs. Subsidies then will decline when the input volumes increase (Mellor and Ahmed, 1988).

African experience to date

Various Africa countries have implemented input subsidies, although during the SAPs in the 1990s many of these policies have been abolished. In response of the high food prices in 2007-8, a number of African countries has re-implemented input subsidies for major food crops to enhance food self-sufficiency. These include Kenya (government loan on agricultural production), Madagascar (subsidy for rice production), Niger (considers subsidy for food grains), Nigeria (offering free seeds and fertilisers for rice production), and Zambia (considering

input subsidies for food grains) (FAO, 2009a). Malawi provides fertiliser subsidies up to 70% (see Box 3.10) while Kenya recently announced fertiliser subsidies up to 30% (Meijerink et al., 2009).

Box 3.10 Fertiliser subsidies in Malawi

Malawi's economy heavily depends on the agricultural sector, hosting nearly 80% of the national labour force, of which 97% produces maize. Most of the farmland is non-irrigated, and hence depends on rainfall. Malawi has been suffering from severe famines in recent years; the famine during the years 2004-5 due to lack of rain in large parts of the country has been the worst in decades. However, Malawi now is one of Africa's success stories with a steep increase in maize production. The sudden transition from Malawi being a food deficit country, to a country with food surpluses is mainly due to government policies that have specifically targeted agricultural producers.

Risking reprisals of international pro-liberalisation bodies such as the World Bank, IMF and USAID, Malawi re-introduced the Fertiliser Subsidy Policy in 2006 after having abandoned these policies during the SAP in the 1990s. The government distributes coupons to low-income farmers in order to purchase fertiliser at a price around one-fifth of the market price. The government also gave them coupons to buy seeds for planting half an acre. As a result, the average farmer's maize yields doubled from less than one tons per hectare, to two tons. After the success in 2005, the input subsidy programme for fertiliser and seeds was repeated in 2006-7 and 2007-8. From a 43% national food deficit in 2005, Malawi achieved a 53% surplus in 2007. The production increase not only led to enhanced domestic food security, but also an increase in government revenues due to maize exports to Zimbabwe.

Source: Banerjee (2007) and Denning et al. (2009).

3.4.4 Buffer stocks

The principle of price buffering through stocks is simple. The government sets a minimum or bottom price and when prices reach this bottom price, the government buys stock. Hence, by forcing demand to increase, prices rise too. Alternatively, when prices become higher than a maximum price, the government releases part of the buffer stock, pushing prices down. This way, the government can keep prices for central food commodities within a pre-determined price range. Strategic food reserves can reduce some of the natural price variability which is due to variability of supply. Buffer stocks can also be of help when price instability is imported.

Limitations

Although strategic buffer stocks can offer important benefits, especially for land-locked countries that are nearly self-sufficient for a major food commodities, there is also evidence that buffer stocks can aggravate food price variability (Byerlee et al., 2006). In the first place, public buffer stocks tend to reduce private stockholding incentives. When public buffer stocks are merely replacing private stockholding, this crowding out effect limits, or even completely annihilates the stabilising effect of public food stocks on prices. In the second place, public buffer stocks are expensive to maintain and hence a costly manner of price stabilisation. In the third place, it is difficult to predict the 'average risks' level, and hence the needed size of the buffer stock as well as and the moments of centralised buying and selling of stocks.

Furthermore, buffer stocks tend to evoke speculation, which can lead to more instead of to less endogenous price variability. To avoid excessive speculation, it is important that the size of the buffer stock is large enough, while the exact size is kept unknown. Stocks may also lead to corruption when there is no capable management. This situation may lead to stocks being be only accessible to a limited circle of people, while inaccessible for the people who are in need most. It may also lead to the financial collapse of the system.

For buffer stocks to function well, a number of conditions needs to be in place:

- autonomy of the central bank managing buffer stocks. The bank should be independent from political dynamics and have clear and well-defined objectives;
- professional and capable management that has access to a good informational system and analytical capacity;
- management should have flexibility of choosing to hold or sell a combination of food and financial reserves in order to keep risks at an acceptable level;
- market interventions should be transparent and rule based (Byerlee et al., 2006).

African experience to date

Food buffer stocks used to be managed by parastatals in Africa, but many of these were closed during the structural adjustment programmes. There are many examples of mismanaged food buffer stocks (see Box 3.11).

Box 3.11	Famine and food stocks in the Ethiopian empire
In his book *The Emperor*, Ryszard Kapuściński describes the Ethiopian famine of 1973. Rural poor were starving while the governmental food storehouses were loaded, and only accessible to the urban elites. The incapacity of the government to handle the famine led to the fall of the Ethiopian empire in 1974.	
Source: Kapuściński (1995).	

However, several countries in Sub-Saharan Africa have maintained some buffer stocks in order to stabilise prices. Uganda for example stores maize surpluses, and sells it to food deficit countries while stabilising domestic maize prices (see Box 3.12).

Box 3.12	Uganda Grain Traders
Uganda Grain Traders Ltd. (UGTL) is a public-private partnership between a consortium of traders and the government of Uganda, which aims to deal with incidental post-harvest price drops (usually, Uganda is a grain-importing country). The government provides the storage infrastructure that is needed, while the private traders are owners of the grain (mainly maize), and eventually sell it. Apart from food deficit neighbouring countries, the World Food Programme (WFP) is a major buyer of the grain stocks. In addition to stabilising prices by setting floor prices for producers, the objectives of the UGLT are to improve international trade of grains, and to increase the quality of the grain through domestic channels, as for example by farm-gate controls and training to farmers. In addition, together with the government, the UGLT improves information infrastructure by announcing maize prices.	
Source: Poulton et al. (2006).	

3.4.5 Trade measures

Trade measures can consist of (temporary) export or import bans. Export bans avoid a reduction in domestic availability and a subsequent increase in prices. Import bans avoid 'flooding of the market' of a certain commodity (e.g. because another country is engaged in dumping). Export bans protect short term food security, and are hence beneficial for consumers, but the other side of the coin is that producers have to pay: food prices decrease, and hence the incomes of rural producers as well. A similar reasoning applies to import bans: this may be beneficial for domestic producers, but may disadvantage consumers who pay higher prices.

Limitations

Export bans may have unintended but harmful effects on neighbouring countries: export bans further curb food supply on the world market thereby raising prices and further aggravate food insecurity. Indeed, the export bans of major Asian rice exporters in 2008 have contributed to the increasing rice prices on the world market. Hence, apart from price control, export bans (and other trade measures) are the most disruptive to agricultural markets.

> 'One of the biggest impediments to large-scale private investment in cross-border trading capability, particularly in Southern and Eastern Africa, is the unpredictable behaviour of governments in imposing export bans whenever they fear food shortages in their own markets.' (Binswanger-Mkhize and McCalla, 2010:3666-7)

Export bans prevent markets from adjusting and, while providing an apparent short-term relief, may actually prolong and deepen the food crises (see Box 3.13; FAO, 2008b). In the long run, high levels of agricultural protection, the failure to diversify and modernise the agricultural sectors, can become side-effects of export bans (Timmer and Dawe, 2007).

Box 3.13 Rice export ban in Indonesia

Between early 2005 and early 2006 the Indonesian government banned rice imports in an attempt to increase rice production and secure self-sufficiency. However, one of the unintended results was that rice prices in Indonesia rose by more than 40%. This led to an increase in the number of people below the poverty line by 4 million, even though economic growth for the year was nearly 6%.

The net effect on poverty masked even larger effects though: the increase in rice prices pushed many farmers above the poverty line, at the same time that it pushed even larger numbers of others below.

Source: Timmer and Dawe (2007).

African experience to date

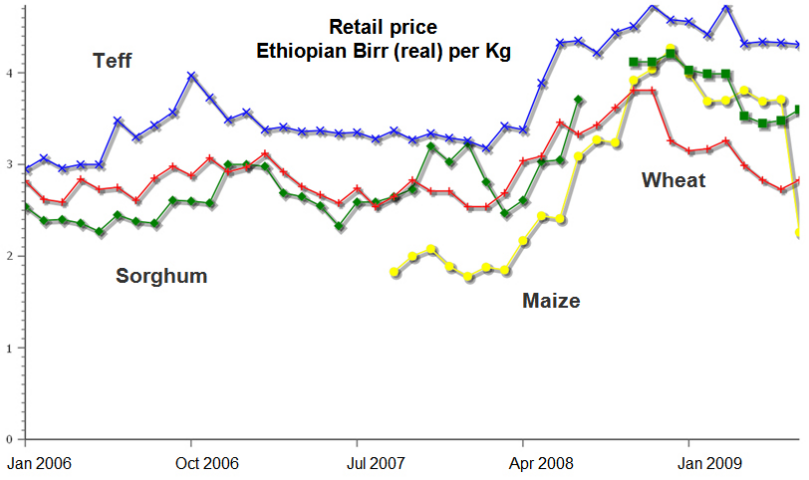
At the height of the food crisis in 2007/-8, export restrictions on rice and wheat were applied on a large scale by major Asian exporters, such as India, Indonesia, the Philippines, and Vietnam, but also by a number of countries in Sub-Saharan Africa. For example, Tanzania, Zambia and Malawi imposed export bans on maize, Madagascar banned rice exports, Ethiopia banned the export of

all cereals (see Box 3.14), and Guinea closed its borders for all agricultural commodity exports (FAO, 2009a).

Box 3.14 Bans on the grain exports in Ethiopia

Despite increased production in Ethiopia in recent years, food scarcity is an ongoing problem for Ethiopia. High price spikes have led to food insecurity for large numbers of people. Therefore, in February 2006, the Ethiopian government has imposed a definite ban on the exports of all major food crops, namely teff, wheat, maize, and sorghum.

The effectiveness of the export bans however is questionable, as prices remained high and still increased, even after imposing the export bans (see below).



Source: Getnet (2009) and FAO (2009a).

3.4.6 Regional trade agreements

Between the two extremes of direct price controls through taxes and subsidies or quantitative trade restrictions and complete trade liberalisation, there is some room to manoeuvre. In the previous section we have seen that global food price instability can be caused by protectionist behaviour by large players on the world market. Free trade may actually reduce price fluctuations when shortfalls in one region can be compensated by surpluses in another region. Free trade,

however, is often distorted by dumping practices or the subsidisation of exports, which reduced the effect of trade on stabilising prices.

African experience to date

The bulk of international trade in cereal of most African countries is with Western countries, while trade within African regions is limited due to protectionist measures. Nonetheless, Sub-Saharan Africa hosts a number of regional free trade agreements, of which the earliest initiatives date back to the early 1910s: the South African Customs Union (SACU) was established in 1910, and the East African Community (EAC) in 1919. After the 1970s, a large number of regional economic communities (RECs) was established, of which some ten regional initiatives remained, or re-emerged. Today, each African country is linked to at least one REC, but so far, the move towards economic integration of the member states of these various initiatives has been rather limited (Geda and Kebret, 2007). African RECs are generally characterised by very low level of intra-REC trade. Furthermore, the few trading activities are mostly dominated by a few members.

One of the most significant agreements is COMESA,[1] or the Common Market for Eastern and Southern Africa of 1993, which forms a preferential trading area with nineteen member states. COMESA takes part in multilateral trade forums with developed and developing countries worldwide, and is involved in negotiations on, amongst others, the EBA and EPA agreements with the EU. In general, Kenya, Mauritius, Zambia and Zimbabwe are exceptionally active participants in intra-COMESA trade (Geda and Kebret, 2007).

Other well-known regional trade agreements include ECOWAS, EAC and AFTZ. The Economic Community of West African States (ECOWAS) includes 15 member states.[2] In 2000, the EAC was re-established, forming an intergovernmental partnership between Burundi, Kenya, Rwanda, Tanzania, and Uganda. Late 2004, the EAC agreed on a customs union, which led to a common external tariff level for extra-regional imports and intra-regional trade. The Africa Free Trade Zone (AFTZ) was established in October 2008 by the heads of the Southern African Development Community (SADC), the COMESA, and the EAC and allows for free trade within the region (Meijerink et al., 2009).

[1] COMESA includes: Comoros, DRC, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia, and Zimbabwe.

[2] ECOWAS includes: Benin, Burkina Faso, Cape Verdi, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

Limitations

The objective of most regional groupings is to eventually form a common market among the member countries. However, according to Geda and Kebret (2007), none of these initiatives seem to have been able a well-functioning customs union, let alone a functional common market. One of the possible underlying reasons is a lack of governmental commitment in practice, although the treaties signed suggest differently. Other reasons are variation in initial condition, loss of revenue, compensation issues, lack of complementarities and problem of diversification.

Regional trade agreements need to be further improved and embedded in trade policy. Apart from free trade in goods, regional trade agreements could also facilitate flows of services, as for example regional insurance funds that could pool climatic risks over larger geographic areas and hence reduce the role of the government in shock-insurances.

3.5 Government intervention: income stabilisation

Large risks have indirect long-term effects on livelihoods that trigger households into a downward poverty spiral. When faced by income loss, households may decide to cut expenditures by reducing or even cancelling long term investments, withdrawing children from school, reducing food consumption, and selling productive assets such as land. This in turn leads to loss of human capital and reduces household opportunities for the future. In addition, income shocks may lead to the depletion of free-access community resources and hence lead to overall loss of efficiency and resilience (Morduch and Sharma, 2002).

Because market instruments sometimes fall short in reversing this downward spiral, governments and international donors can fulfil a significant role.[1] Different types of government interventions can be applied, depending on the type of shock and the group of households to be targeted. In case of sudden crises and catastrophes that lead to large scale food insecurity, there is need for ex-post instruments that help households to deal with the immediate (income) effects of shocks, as well as ex-ante instruments reducing households'

[1] Many households and communities also apply a wide array of informal or traditional ex-post risk coping arrangements that smoothen consumption. We will come back to these informal instruments in section 4.

vulnerability and strengthening their resilience. Below, we briefly discuss these two different risk strategies.

3.5.1 Transfers to vulnerable populations

The primary aim of transfers to vulnerable households by governments or donors is the provision of a social safety net, which prevents the poorest households to end up in a poverty trap after the occurrence of a shock. Social safety nets are provided in the form of targeted social protection and insurances. Other examples of such transfers are subsidies on consumption goods and farming inputs, the provision of labour intensive work in public goods (food or cash for work) and tax exemptions.

In addition to the conventional support programmes, government investments in education are invaluable, and in the long run might offer more revenues than any other government intervention. However, sending children to school means less labour force for the household, and hence less income. In addition, even in the cases where primary education is free, parents are often not able to pay for additional school costs (school uniform, books). School alimental programmes can offer a partial solution to this dilemma by offering school feeding (a meal or snack served at school), food for schooling (a ration of food that goes home to families that enrol children in school). Other options include cash for schooling, or a combination of these options.

African experience to date

Transfers to vulnerable populations are common in Sub-Saharan Africa and come in many forms. School feeding programmes are by far the most common of these programmes (see Box 3.16). Although the idea of school feeding programmes seems straightforward, in practice there can be various difficulties in implementation.

Box 3.15 Ghana School Feeding Programme

The Ghana School Feeding Programme (GSFP) was established in 2005 with the goal of reaching over one million children in primary schools in Ghana over a five-year period. The school feeding programme had three main goals:

1. to provide pupils in poor rural areas at least one nutritious meal a day based on locally produced food, and hence improve food security and performance;
2. to increase the number of children that come to school;
3. to support local food production and processing.

The UN Hunger Task Force brought the concept of school feeding to international attention. It called on national governments to implement school feeding programmes to fight hunger and contribute to economic growth. The Dutch ministry development cooperation has pledged 40 million euro to the GSFP, while the Ghanaian government was responsible for the implementation of the programme.

Although the aims of the programme seem coherent, the reality of implementation, however, turned out rather different. The main criticisms that were voiced were a lack of transparency in the selection of participating schools and uneven geographic distribution, low quality of food supply (one third of the participating schools have a kitchen, and only one in four has water) and overall low efficiency and effectiveness of providing meals (under usage of equipment, et cetera). Although participating schools had an increase of 20% of the pupils (goal 2), the schools were actually not able to handle these extra pupils, and therefore quality of education decreased. Finally, although the aim was to buy over 80% of the food locally, in reality less than 20% of the food was bought from local farmers. This is probably due to low trust of farmers in contracts.

Source: Roozenboom (2008) and Ubels et al. (2009).

3.5.2 Transfers to vulnerable populations: ex-post

One of the most straightforward government income stabilisation measures includes direct ex-post transfers to vulnerable populations: transfers of cash, food, medicines, and other household utensils to households that are affected by a shock. An example is emergency food aid, which is often provided by international donors such as the World Food Programme (WFP).

Limitations

Both ex-post and ex-ante government interventions deal with two important difficulties. In the first place, direct transfers are sensitive to fraud and corruption (see Box 3.15), and in many cases a large part of the aid flows does not reach the poor. Secondly, targeting the vulnerable populations is not always easy, which may lead to either people receiving support who do not need to, or people not receiving help who are in need. When the targeted characteristics are observable, targeting is easy, for example in women's programmes, or the targeting of malnourished children. In many cases however, characteristics are unobservable: poverty comes in many different forms.

A solution to the targeting problem are programmes geared towards self-selection of those who most need it. For instance, in food or cash for work programmes, people provide labour in return for food or cash, with a market value below the minimum wage. In this way, the programmes hope to select only the really poor who have no alternative options for income. Another example is the case of HIV-AIDS relief programmes, in which healthy people will likely not ask for support. In other cases, the community can monitor the process of self-targeting, and make sure that only the most vulnerable members of the community are benefiting from the aid programme.

Another way of targeting is based on geographic location (administrative targeting), and can be applied in the case of regionally bound adverse weather shocks or natural disasters leading to a failed harvest or immediate food insecurity.

African experience to date

Ex-post transfers to vulnerable population such as emergency aid are common in Sub-Saharan Africa. The WFP, for instance, is present in 44 countries in Africa. ReliefWeb (http://www.reliefweb.int/) maintains a website that details the latest news on relief operations and food security situation.

4 Viability of policy instruments in Sub-Saharan Africa

4.1 Traditional instruments

4.1.1 Income diversification and social networks

African households apply a number of instruments that aim to stabilise income and consumption.[1] Households apply a wide variety of strategies, most embedded in communities. We mention three income or consumption smoothening mechanisms here. In the first place, poor farmers diversify production and income in order to spread risks. Households are involved in off-farm (e.g. wage labour at another farm) and nonfarm activities, sometimes through seasonal or permanent rural-urban migration of one of the household members. Production risks are spread through sharecropping activities and diversification of production. Second, households keep private stockholding in order to smoothen consumption. Third, mutual assistance among kin and social networks (also referred to as social capital, as explained below) fulfils an important role in risk reduction and coping strategies, and functions as an informal insurance mechanism (Sarris, 2000).

Social capital plays an important role in households risk management strategies. Social capital is defined as 'the glue that holds society together' in the form of trust, reciprocity and exchanges, social networks and groups, and is an important condition for economic growth. For instance, trust relationships can offer a collateral for people who have no access to official forms of capital (Alesina and La Ferrara, 2000; Beekman et al., 2009). However, social capital also has drawbacks, such as tight social networks that may hold back growth and innovation because homogeneous groups tend to be reluctant to change. More diverse networks that can be facilitated by well-functioning physical and information infrastructure generally offer more knowledge exchange, leading to more efficient allocations of resources (e.g. see di Falco and Bulte, 2008).

Although traditional instruments play an important role in many communities, they often fail to offer sufficient price and consumption stability. For instance,

[1] Bhattamishra and Barrett (in press) provide a comprehensive overview of the most commonly-observed community-based arrangements.

diversification of production and income can lead to sub-optimal allocations of resources and can therefore slow down long-term development. Farmers who cultivate subsistence crops to reduce (production) risk will not invest in cash crops that have higher economic returns.

4.1.2 Traditional vs. modern market instruments and policies

The drawbacks linked to traditional mechanisms discussed above suggest that there is scope for policy and market instruments that support traditional mechanisms. Before implementing new policy instruments or modern market institutions, existing (traditional) income and consumption stabilisation strategies should be identified, and wherever possible, new instruments should be linked to existing ones.

> 'Recognition of this heterogeneity […] emphasises the importance of local contexts and therefore of tailoring local policies to local circumstances.' (Ellis, 1998:28)

Market instruments can also be combined to become more effective. We give three examples:

- price hedging instruments such as futures and options contracts can decrease price variability, but are insufficient to assure food security on their own. They should therefore be combined with other instruments such as import strategies and social safety nets (Dana and Gilbert, 2008);
- credit is often combined with insurances, to repay the lender (e.g. banks) if the creditor defaults because of weather shocks (in case of index based weather insurances);
- price stabilisation of agricultural commodities could be combined with investments in the agricultural sector, in order to build a strong and independent sector. Only then, the agricultural sector can become profitable without governmental support in the form of price subsidies on the long run.

4.2 Towards a dynamic understanding

There is no single recipe for a set of suitable instruments that stabilises prices and consumption in all countries. Differences in market institutions are large in Sub-Saharan Africa, not only between, but also within states. Several instruments can only be successfully implemented if certain market institutions are in place. Similarly, a basic level of market infrastructure is an important condition. In weak market institutions,

> 'governments are likely to achieve more through clarity of policy, transparency of execution, and a reduction in transport costs than through hedging.' (Dana and Gilbert, 2008:369)

In order to identify a suitable set of instruments, it is useful to distinguish countries with (relatively) advanced market institutions from countries with weak markets.

4.2.1 Sub-Saharan Africa country classification

Based on the quality of market infrastructure and institutions we constructed a rough country classification. This classification ignores differences within countries but serves as indication for the level of market infrastructure and institutions and the type of instruments that could be viable in these countries.
We group the African countries into 3 categories. The first group contains economies with limited market infrastructure and ill-functioning market institutions. The second group contains countries with emerging market institutions and infrastructure, while countries with relatively solid market conditions belong to the last category. We base our categories for institutions on two main indicators:

1. World Business Ranking: Doing Business (World Bank);
2. Corruption Perception Index or CPI (Transparency International).

The Doing Business index is compiled by the World Bank and ranks all economies from 1 to 183, based on a simple aggregation of their average score on ten topics (for more details see Appendix; Table A1). According to Doing Business:

'more complex aggregation methods - such as principal components and unobserved components - yield a nearly identical ranking.'

Data are based on laws and regulations and on time and motion indicators that measure the efficiency in achieving a regulatory goal (Doing Business, 2009).

The CPI 2008 is based on surveys from 2007 and 2008, using data sources from 11 independent institutions. Each of these sources measures the average level of frequency and/or size of corruption in public sectors.

'With countries such as Somalia and Iraq among those showing the highest levels of perceived corruption, Transparency International's (TI) 2008 Corruption Perceptions Index (CPI) highlights the fatal link between poverty, failed institutions and graft.' (Transparency International, 2009)

The data are analysed by non-resident country experts. The standardised indices rank between 0 (most corrupt) and 10 (least corrupt) (Transparency International, 2009).

We base our indicator for infrastructure on the World Bank's 'World Development Indicators' (World Bank, 2009):

1. internet users. Number of internet users per 100 people, 2007;
2. mobile phone subscribers. Number of mobile phone subscriptions per 100 people, 2007;
3. paved roads. Paved road as percentage of total, 2003.

Depending on availability, data are from 2007 (internet and mobile phones) or from 2003 (paved roads). The cut-off points are shown in Table 4.1. These were determined by the researchers and reflect a ballpark estimation. Although the exact cut-off points can be discussed, we feel they are fair proxies; the final classification correlates surprisingly well with GDP (not shown in appendix).

Table 4.1	Indicators and cut-off points for market infrastructure and institution per category		
	Category 1: solid market environment	**Category 2: emerging market environment**	**Category 3: weak market environment**
Market infrastructure			
Paved roads	>50%	25 to 50%	<25%
Internet connectivity	>10%	5 to 10%	<5%
Mobile phone subscription	>50%	30 to 50%	<30%
Market institutions			
Business environments	Top 33%	Middle 33%	Lowest 33%
Corruption perception index	>4	2-4	<2

All the data and calculations are in the appendix (Table A1). Table 4.2 lists the categories and the respective countries. The countries are listed according to the quality of market institutions and infrastructure, hence, the weakest market institutions in each category are at the bottom of the list. Countries marked with a) and b) have been making important steps in reforming their market institutions in recent years.

Table 4.2	Sub-Saharan Africa country classification: market institutions and infrastructure		
	Solid	**Emerging**	**Weak**
1	Mauritius a)	Gabon	Nigeria
2	South Africa	Madagascar	Togo
3	Botswana	Namibia	Equatorial Guinea
4		Cape Verde	Benin
5		Kenya	Burkina Faso a)
6		Ghana	Cameroon a)
7		Swaziland	Congo, Dem. Rep.
8		Zimbabwe	Eritrea
9		Malawi	Lesotho
10		Saõ Tome and Principe	Liberia b)
11		Senegal	Mali a)
12		Congo, Rep.	Mozambique

a) Doing Business top reformers; b) Among top 10 top reformers in the world.

Table 4.2	Sub-Saharan Africa country classification: market institutions and infrastructure (continued)		
	Solid	**Emerging**	**Weak**
13		Côte d'Ivoire	Niger
14		Ethiopia a)	Sudan
15		Gambia, The	Tanzania
16		Mauritania	Central African Republic
17		Rwanda b)	Chad
18		Uganda	Comoros
19		Zambia	Somalia
20			Angola a)
21			Burundi
22			Guinea
23			Guinea-Bissau
24			Sierra Leone a)

a) Doing Business top reformers; b) Among top 10 top reformers in the world.

4.3 Linking instruments to markets

4.3.1 Weak market infrastructure and institutions

In our ranking system, the majority of the Sub-Saharan Africa economies is characterised by weak market institutions and infrastructure. With respect to market infrastructure, less than 25% of the roads in the country are paved, less than 5% of the population has access to an internet connection, and less than 30% of the population has a mobile phone subscription. Turning to market institutions, these countries are among the most disadvantageous business environments, and score highest on the corruption index (see Appendix).

There are several responsibilities that governments (and donors) can assume when market institutions are weak (see also Ellis, 1998).

First, they should provide safety nets that offer support for poor households. Examples are insurances and food aid. Price policies can constitute an additional mechanism to reduce the burden of high prices on poor consumers, but these must be short-term to avoid long-term market distortions.

A second important task of governments is to reduce market failures. Governments have an important function in facilitating free flows of information and

goods, supporting the labour market, and improving the transparency and accountability of governance.

Third, and related to the former, governments should invest in infrastructure. A good roads network brings down transaction costs, and supports labour, output, input and consumption markets. A widespread power network is important for basically all nonfarm rural activities, including storage and processing activities. Mobile phone reception and internet connections facilitate the free flow of information, and have proven invaluable (e.g. Jensen, 2007).

Fourth, (micro-)credit can be of substantial support to small farmers and help farmers to become more market oriented by enabling them to better cope with risks. While private players can play a central role in providing credit, the government should be involved as well in order to offer trust and legitimacy to the credit system, and to function as backup in case of defaulting in the occurrence of major shocks.

Fifth, the government has a central role in investing in rural services sector (including rural towns), in order to facilitate rural nonfarm employment and diversification options for rural households. Being less dependent on agricultural production will insulate farm households from the effects of extreme price swings. Therefore, investments in the rural nonfarm sector are as important as agricultural investments.

Sixth, investments in education are probably the basis for further development and long-term risk reduction, as it offers livelihood diversification possibilities. Training of skills (e.g. through extension training) is important for on-farm risk reduction strategies, but also for nonfarm income sources.

Finally, African governments should become more actively involved in regional trade agreements in order to spread risks that are related to food commodity prices and supply. Countries with weak market institutions are unlikely to sustain themselves in terms of productivity, and may hence need support from other markets in the region.

4.3.2 Emerging market infrastructure and institutions

Countries in this category score reasonably well on the infrastructure and institution indices. They do not necessarily score high on each index; while in some categories these countries perform strongly, there may be need for improvement in others. With respect to infrastructure, on average, between 25 and 50% of the roads are paved in these countries, 5 to 10% of the population is connected through the internet, and 30 to 50% of the population has got a mobile

phone subscription. With respect to market institutions, both in the 'Ease of Doing Business' and the Corruption Perception Index (CPI), these countries score on average compared to other countries in Sub-Saharan Africa. The emerging markets category contains the second largest group of countries in Sub-Saharan Africa.

In this category, because infrastructure and institutions are functioning reasonably well, there is potential for the development of market instruments, although the government still has a major role in facilitating markets. Market instruments such as basic commodity exchanges and index based weather insurances could reduce risks, while commercial producers organisations and forward or pooling contracts could improve market access for small farmers.

Apart from facilitating market instruments, the government still has a major responsibility. First, there is still need for governments involvement in the provision of social safety nets for the poorest to protect them from falling into a poverty trap in the occurrence of shocks. Second, government involvement is needed in the provision and improvement of infrastructure, the facilitation of market flows (including information), and the fight against corruption within the governmental bureaucracy. Further enhancement of the market environment will lead to more success of market instruments and policy arrangements, further reduction of risks and more development and economic growth.

4.3.3 Solid market infrastructure and institutions

Market institutions and infrastructure in this category score high on all proxies. With respect to market infrastructure (physical and information), over 50% of the roads are paved, more than 10% of the population is connected to the internet, and over 50% of the population has got a mobile phone subscription. With respect to market institutions, these countries are among the world's 60 most advanced business environments, and belong to the least corrupt countries.

The solid market category is by far the smallest group in Sub-Saharan Africa, and only include the island Mauritius, South Africa, and Botswana. The market institutions in these countries are similar to those in developed countries. Therefore, modern market institutions have the potential to succeed, if they are not yet in place yet. More advanced commodity exchange mechanisms, combined with warehouse receipt systems and futures and options contracts could work for large, commercially oriented farmers and traders, while contract farming could be suitable for smaller farmers. In advanced market in-

stitutions, the role of the market increases, and government involvement can be limited to a mere facilitating role.

Although the country classification does provide an idea of the average status of market institutions and infrastructure, we have ignored within-country variations. It is important to realise, however, that income distribution may be rather uneven in many countries in Sub-Saharan Africa, and that also in solid market institutions, the government has as central role in the provision of social security to the poor. In all three categories, there is need for insurances, credit facilities, and the provision of social safety nets.

5 Conclusion and recommendations

5.1 Viability of instruments in Sub-Saharan Africa

In order assess the viability of instruments, this report distinguishes three market types: weak, emerging, and solid markets, based on the quality of market infrastructure and institutions. We will discuss which instruments are most suitable for which category of market types.

Instruments suitable for solid markets
Based on a classification of market infrastructure and institutions, only 3 African countries fall into the solid markets category. Even when we would relax the cut-off points somewhat, only very few African countries would fall into this category. This means that the scope for implementing more advanced instruments that require well-functioning infrastructure and institutions is limited to only a handful of countries. Price stabilising market instruments such as Warehouse Receipt Systems (WRSs) as well as futures and options contracts that can be traded in commodity exchange systems are examples. South Africa for instance, is the only exchange in Africa that trades in futures.

It has to be noted that these more advanced instruments are usually only accessible to large producers, meaning that poor producers (and consumers) still need support from the government policies and market institutions.

Instruments suitable for emerging markets
Around 40% of the countries fall into the emerging markets category. In these countries, most of the required conditions are in place to implement various instruments except the more advanced instruments. In this category, market instruments such as Warehouse Receipts Systems connected to a commodity exchange may be implemented with additional investments in infrastructure (warehouses and roads) and institutions (financial system for the loans connected to receipts) may be necessary.

Instruments suitable for weak markets
The bulk (over 52%) of the African countries fall into the weak markets category, although some may move to the emerging markets category when the cut-off points are relaxed somewhat. The fact that most of the African countries fall

into this category has important implications for the usefulness of many instruments that reduce risks linked to (food) price fluctuations. It is likely that the necessary conditions are lacking for a successful implementation. Instead of focusing on instruments only, we recommend that governments (and donors) should invest in market infrastructure and institutions, in order to strengthen markets, and to improve their resilience. In addition, poor consumers and producers should be protected, and be supported in dealing with risk and uncertainty. Apart from investments in markets, investments in human capital are of central importance here.

In the weak markets category, policy instruments that aim at reducing risks on the household level, and to smooth consumption are probably the most important. This is achieved by providing safety nets, which generally consist of transfers to vulnerable people.

Government policies that are aimed at reduction of price variability may be implemented but must take into consideration the effects on market distortions. Because market institutions are weak and infrastructure is largely missing, government interventions may actually hamper emerging private initiatives. For instance, if the government provides subsidised inputs, the private sector may be crowded out. In addition, these instruments are a heavy burden on the government budget.

5.2 Donor policy recommendation

It is expected that price volatility and risk related to agricultural production will continue to increase in the future. Dutch development cooperation has long emphasised social infrastructure and services instead of focusing on economic infrastructure and services (such as market institutions) and has substantially reduced support in budgetary terms to the agricultural sector. Social infrastructure and services include emergency aid, which in the light of increased risks in the future is likely to continue to be important. However, if Dutch development cooperation is to focus on reducing future risk in a more structural manner, an increase in focus on economic infrastructure and services is needed.

References

Alesina, A. and E. La Ferrara, 'Participation in Heterogeneous Communities'. In: *Quarterly Journal of Economics* 115 (2000) 3, pp. 847-904.

Aliber, M., *South African Microinsurance Case-Study*. ILO, Geneva, 2001.

Banse, M., P. Nowicki and H. van Meijl, *Why are current world food prices so high?*. LEI Wageningen UR, 2001.

Bass, J. and K. Henderson, *Warehouse Receipts: Financing Agricultural Producers*. Weidemann Associates, Inc. and Development Alternatives, Inc., 2000.

Beekman, G., M. van der Heide, W.J.M. Heijman and M.A.H. Schouten, *Social capital and resilience in rural areas: responses to change*. Discussion Paper. Mansholt Graduate School of Social Sciences, Wageningen UR, Wageningen, the Netherlands, 2009.

Bello, W. and M. Baviera, 'Food wars'. In: *Monthly Review Press* 61 (2009) 3, pp. 17-31.

Bhattamishra, R. and C.B. Barrett, 'Community-Based Risk Management Arrangements: A Review'. In: *World Development* (in press).

Bijman, J., *Contract farming in developing countries: an overview*. Working Paper. Wageningen UR, Wageningen, May, 2008.

Binswanger-Mkhize, H. and A.F. McCalla, 'The Changing Context and Prospects for Agricultural and Rural Development in Africa'. In: *Handbook of Agricultural Economics* 4 (2010), pp. 3571-3712. Eds. P.Pingali and R. Evenson, Elsevier BV.

Byerlee, D., T.S. Jayne and J.M. Robert, 'Managing food price risks and instability in a liberalizing market environment: Overview and policy options'. In: *Food Policy* 31 (2006), pp.: 275-287.

Calvo, C., *Informal Risk-Sharing and Poverty Persistence*. Universidad de Piura, Lima, Peru, 2009.

Carter, C.A., Z. Funing and J. Zhu, 'China's role in the 2007-2008 Global Food Price Boom and Bust'. In: *EuroChoices* 8 (2009) 2, pp. 17-23.

Chavan, P. and R. Ramakumar, 'Micro-Credit and Rural Poverty: An Analysis of Empirical Evidence'. In: *Economic and Political Weekly* 37 (2002) 10, pp. 955-965.

Churchill, C., *Protecting the poor. A microinsurance compendium*. International Labour Organization, Geneva, 2006.

Coulter, J. and G. Onumah, 'The role of warehouse receipt systems in enhanced commodity marketing and rural livelihoods in Africa'. In: *Food Policy* 27 (2002) 4, pp. 319-337.

Coulter, J. and G. Onumah, 'Stabiliser les prix en facilitant les arbitrages spatiaux et temporels des opérateurs privés: les instruments de la catégorie A'. In: *Quels instruments mobiliser face à l' instabilité des prix alimentaires?* F. Galtier (ed.), CIRAD, Montpellier, 2009.

Cummings, R., R. Shahidur and A. Gulati, 'Grain price stabilization experiences in Asia: What have we learned?' In: *Food Policy* 31 (2006), pp. 302-312.

Dana, J., C.L. Gilbert and E. Shim, 'Hedging grain price risk in the SADC: Case studies of Malawi and Zambia'. In: *Food Policy* 31 (2006) 4, pp. 357-371.

Dana, J. and C.L. Gilbert, *Managing Agricultural Price Risk in Developing Countries*. Università degli studi di Trento, Trento, Italy, 2008.

Daviron, B., M. Aubert, N. Bricas, H. David-Benz, S. Dury, J. Egg, F. Lançon and V. Meuriot. *Les mécanismes de transmission de la hausse des prix internationaux des produits agricoles dans les pays Africains*. FARM, 2008.

Dawe, D., 'How far down the path to free trade? The importance of rice price stabilization in developing Asia'. In: *Food Policy* 26 (2001), pp. 163-175.

Dembélé, N.N., M. Cissé and R. Blein, 'La transmission des prix internationaux sur les prix des céréales dans le Sahel'. In: *Grain de sel* 43 (2008), pp. 13-15.

Denning, G., P. Kabambe, P. Sanchez, A. Malik, R.Flor, R. Harawa, P. Nkhoma et al., 'Input subsidies to improve smallholder maize productivity in Malawi: Toward an African Green Revolution'. In: *PLoS Biology* 7 (2009) 1.

Dercon, S., T. Bold and C. Calvo, *Insurance for the Poor?* Publication of the Inter-American Development Bank, 2006.

Dercon, S., *Insurance against poverty*. UNU-WIDER. Helsinki, Finland, 2005.

Dercon, S., J. De Weerdt, T. Bold and A. Pankhurst, 'Group-based funeral insurance in Ethiopia and Tanzania'. In: *World Development* 34 (2006) 4 pp. 685-703.

Diarra, M.M., *Mécanisme de transmission de la hausse des prix des céréales depuis les marchés mondiaux vers les marchés du Mali et du Sénégal*. FARM, 2008.

Dismukes, R., Jr.L. Bird and F. Linse, *Risk Management Tools in Europe: Agricultural Insurance, Futures, and Options*. USDA, Washington D.C., 2004.

Doing Business, *Doing Business. Measuring business regulations*. October, 2009. <http://www.doingbusiness.org/features/Highlights2010.aspx>

Dronne, Y. and A. Gohin, *Les principaux déterminants de l'évolution des prix agricoles internationaux presented at the Prix agricoles : perspectives à moyen terme et implications pour les producteurs et les politiques publiques*. 15 December, Paris, 2008.

Ellis, F., 'Household strategies and rural livelihood diversification'. In: *Journal of Development Studies* 35 (1998) 1, pp. 1-38.

Di Falco S. and E. Bulte, *The Dark Side of Social Capital: Kinship, Consumption, and Investment*. CSAE conference, Oxford, 2009.

FAO, *The state of food and agriculture. Biofuels: prospects, risks and opportunities*. Food and Agriculture Organization, Rome, 2008a.

FAO, *Trade reforms and food security. Country Case Studies and Synthesis*. Food and Agriculture Organization, Rome, 2008b.

FAO, *Soaring food prices: facts, perspectives, impacts and actions required*. Food and Agriculture Organization, Rome, 2008c.

FAO, *The state of agricultural commodity markets. High food prices and the food crisis: experiences and lessons learned*. Food and Agriculture Organization, Rome, 2009a.

FAO, *National basic food prices - data and analysis tool*. Food and Agriculture Organization, Rome, 2009b.

FAO, *The State of Food Insecurity in the World. Economic crises - impacts and lessons learned*. Food and Agriculture Organization, Rome, 2009c.

FAO, *The 2007-2008 food price swing. Impact and policies in Eastern and Southern Africa.* Food and Agriculture Organization, Rome, 2009d.

FAOSTAT, *Agricultural production domain*. 2009.

Galtier, F.N., B. Bricas, F.Daviron, T. Gérard, J.F. Voituriez, R. Sempere, R. Blein et al., *Quels instruments mobiliser face à l'instabilité des prix alimentaires?* CIRAD, IRAM, NRI and Wageningen UR, 2009.

Geda, A. and H. Kebret, 'Regional Economic Integration in Africa: A Review of Problems and Prospects with a Case Study of COMESA'. In: *Journal of African Economies* 17 (2007)3, pp. 357-394.

Getnet, K., 'Optimizing the policy costs of market stabilisation: which commodity matters most in Ethiopia?' In: *Journal of International Development* 21 (2009), pp. 362-387.

Hardaker, J.B., R.B.M. Huirne, J.R. Anderson and G. Lien, *Coping with risk in agriculture*. CABI Publishing, Wallingford, Oxfordshire, 2004.

Hicks, F., *TechnoServe's Inventory Credit Programme in Ghana*. UNCTAD, Geneva, 1998.

Hossain, N., R. Eyben, D. Dem, N. McCulloch and A. Sumner, *Accounts of Crisis: Poor People's Experiences of the Food, Fuel and Financial Crises in Five Countries*. IDS, Sussex, 2009.

IFPRI, *Responding to the Global Food Crisis: Three Perspectives*. Washington DC, 2008.

Jensen, R., The Digital Provide: Information (Technology), Market Performance and Welfare in the South Indian Fisheries Sector. In: *Quarterly Journal of Economics* 122 (2007) 3, pp. 879-924.

Jodock, K., 'Continued volatility expected in commodity markets'. In: *Prairie Business Magazine* February 6 (2009).

Kajisa, K. and T. Akiyama, 'The Evolution of Rice Price Policies over Four Decades: Thailand, Indonesia and the Philippines'. In: *Oxford Development Studies* 33 (2005) 2, pp. 305-329.

Kapuściński, R., *De keizer. Macht en ondergang van Ras Tafari Haile Selassie.* Uitgeverij in de knipscheer, 1995.

Law, L., G. Onumah, Ch. Baine, H.W. Muzoora and R. Butterworth, *Coffee and cotton market development and trade promotion in Eastern and Southern Africa*. UK: Natural Resources Institute, University of Greenwich, 2007.

Maertens, M. and J.F.M. Swinnen, 'Trade, Standards, and Poverty: Evidence from Senegal. Ín: *World Development* 37 (2009) 1, pp.161-178.

McKie, R. and H. Stewart, *Hunger. Strikes. Riots. The food crisis bites*. The Observer, edition Sunday 13 April 2008.

Meijerink, G., P. Roza and S. van Berkum, *East African governments' responses to high cereal prices*. LEI Report. LEI Wageningen UR, The Hague, 2009.

Mellor, J.W. and R. Ahmed, *Agricultural Price Policy for Developing Countries*. The Johns Hopkins University Press. Baltimore and London, 1988.

Ministry of Foreign Affairs, *Agriculture, rural entrepreneurship and food security*. Directorate-General for International Cooperation (DGIS) and the Ministry of Agriculture, Nature and Food Quality (LNV), May 2008.

Mitchell, D., *A Note on Rising Food Prices*. The World Bank, Washinton DC, 2008.

Morales, C., A. Garrido, P. Pálinkás and C. Székely, *Risks Perceptions and Risk Management Instruments in the European Union: do farmers have a clear idea of what they need?* 12th Congress of the European Association of Agricultural Economists - EAAE, 2008.

Morduch, J. and M. Sharma, 'Strengthening public safety nets from the bottom up'. In: *Development Policy Review* 20 (2002) 5, pp. 569-588.

NAIC, *Nigerian Agricultural Insurance Corporation*. 12 October, 2009. Available at: <http://nigerianagricinsurance.com/>

Newbery, D.M.G. and J.E. Stiglitz, *The theory of commodity price stabilization : a study in the economics of risk*. Clarendon, Oxford, UK, 1981.

ODI, *Developing country responses to the food price spike: what have we learned? - Overview*. Presentation. 29 January 2010. Overseas Development Institute, London, 2010.

OECD, *Managing risk in agriculture - A holistic approach*. OECD publishing, Paris, 2009.

Poulton, C., J. Kydd, S. Wiggins and A. Dorward. 'State intervention for food price stabilisation in Africa: Can it work?' In: *Food Policy* 31 (2006), pp. 342-356.

Roozenboom, W., 'Volop verbeterpunten'. In: *Vice Versa* 42 (2008) 1, p. 29.

Sarris, A.H., World cereal price instability and a market based instrument for LDC food import risk management. In: *Food Policy* 25 (2000), pp. 189- 209.

Stoeckel, A., *High Food Prices: Causes, implications and solutions*. Rural Industries Research and Development Corporation, Canberra, Australia, 2008.

Timmer, C.P., 'Building efficiency in agricultural marketing: The long-run role of BULOG in the Indonesian food economy'. In: *Journal of International Development* 9 (1997) 1, pp. 133-145.

Timmer, C.P. and D. Dawe, 'Managing Food Price Instability in Asia: A Macro Food Security Perspective'. In: *Asian Economic Journal* 21 (2007)1, pp. 1-18.

Transparency International, *Corruption Perception Index 2008*. October 2009. <http://www.transparency.org/policy_research/surveys_indices/cpi/2008>

Trostle, R., *Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices*. USDA, 2008.

Ubels, J., R. van Klinken and H. Visser, *Looking at the 'macro-micro gap' from the other end. Clues for promoting local effectiveness*. Dutch Ministry of Foreign Affairs, The Hague, 2009.

UNCTAD, *Addressing the global food crisis. Key trade, investment and commodity policies in ensuring sustainable food security and alleviating poverty.* United Nations, Geneva and New York, 2008a.

UNCTAD, *Commodity prices, capital flows and the financing of investment*. United Nations, Geneva and New York, 2008b.

UNCTAD, *Export Performance Following Trade Liberalization: Some Patterns and Policy Perspectives.*: United Nations, Geneva and New York, 2008c.

UNCTAD, *Background paper on UNCTAD activities regarding information market systems, commodity exchange, supply chain finance in Eastern and Southern Africa*. UNCTAD, 2008d.

UNCTAD, *Overview of the World's Commodity Exchanges 2006*. United Nations, Geneva, 2006.

UNCTAD, *Responding to the global crisis, climate change mitigation and development*. United Nations, Geneva and New York, 2009.

United Nations, *The Millennium Development goals Report*. United Nations, New York, 2009.

Van Asseldonk, M., K. Burger and G. Meijerink, 'Réduire les effets de l'instabilité des prix en développant le crédit, l'assurance et les outils de couverture du risque-prix'. In: *Quels instruments mobiliser face à l'instabilité des prix alimentaires? F. Galtier (ed.)*. CIRAD, Montpellier, 2009b.

World Bank, 'Investments in rural finance for agriculture'. In: *Agriculture investment sourcebook: agriculture and rural development*. Module 8. World Bank, Washington DC. 2005.

World Bank, *Distortions to Agricultural Incetives Database 1955-2007*. The World Bank, Washington D.C., 2008a <http://go.worldbank.org/YAO39F35E0>

World Bank, *Rural finance in Nigeria. Integrating new approaches*. The World Bank, Washington D.C., 2008b.

World Bank, *World Development Indicators. Quick Query*. Available at <www.devdata.worldbank.org/data-query/> Accessed 01-10-09, 2009.

World Bank, *Measuring poverty*. World Bank Website. Available at: <http://tinyurl.com/yz7d8eo>. Accessed 23-02-2010, 2010.

WRR, *Minder pretentie, meer ambitie. Ontwikkelingshulp die verschil maakt*. Amsterdam University Press, Amsterdam, the Netherlands, 2010.

Zezza, A., B. Davis, C. Azzarri, K. Covarrubias, L. Tasciotti and G. Anriquez, The Impact of Rising Food Prices on the Poor. International Association of Agricultural Economists Conference, Beijing, China, August 16, 2009.

Appendix

Sub-Saharan Africa country classification

Table A1	**Doing business indicators**
Starting a business	*Protecting investors*
Procedures, time, cost and paid-in minimum capital to open a new business	Strength of investor protection index: extent of disclosure index, extent of director liability index and ease of shareholder suits index
Dealing with Construction permits	*Paying taxes*
Procedures, time and cost to obtain construction permits, inspections and utility connections	Number of tax payments, time to prepare and file tax returns and to pay taxes, total taxes as a share of profit before all taxes borne
Employing workers	*Trading across borders*
Difficulty of hiring index, rigidity of hours index, difficulty of redundancy index, redundancy cost	Documents, time and cost to export and import
Registering property	*Enforcing contracts*
Procedures, time and cost to transfer commercial real estate	Procedures, time and cost to resolve a commercial dispute
Getting credit	*Closing a business*
Strength of legal rights index, depth of credit information index	Recovery rate in bankruptcy

We scored countries on each of the five indicators; countries were scored 1, 2, or 3, which led to an average score. Countries with an average score equal or smaller than 1.5 were placed in category 1; countries scoring between 1.5 and 2.5 in category 2; all countries with an average score higher than 2.5 were placed in category 3. Results are in Table A2 and Table A3.

Table A2 **Scores on indicators for infrastructure**

Country	internet users (per 100 people) 2007	score	mobile cellular subscriptions (per 100 people) 2007	score	roads, paved (% of total roads) 2003	score	*average infrastructure*
Angola	2.8	3	28.3	3		?	3.00
Benin	1.8	3	22.7	3		?	3.00
Botswana*	5.3	2	61.2	1	12.1	3	2.00
Burkina Faso	0.7	3	10.9	3	12	3	3.00
Burundi	0.7	3	3.4	3	10.4	3	3.00
Cameroon	3	3	24.5	3	8.3	3	3.00
Cape Verde	8.3	2	31	2	76.5	1	1.67
Central African Republic	0.4	3	3	3	21.8	2	2.67
Chad	0.8	3	8.5	3	36.3	2	2.67
Comoros	3.5	3	6.4	3	35.4	2	2.67
Congo, Dem. Rep.	0.4	3	10.6	3		?	3.00
Congo, Rep.	2.8	3	36.3	2		?	2.50
Cote d'Ivoire	2.2	3	37.1	2		?	2.50
Equatorial Guinea	1.6	3	34.3	2	29.6	2	2.33
Eritrea	2.5	3	1.7	3		?	3.00
Ethiopia	0.4	3	1.5	3	7.9	3	3.00
Gabon	5.8	2	82.2	1		?	1.50
Gambia, The*	6.2	2	49.5	2	31.6	2	2.00
Ghana	3.8	3	33.2	2		?	2.50
Guinea	0.8	3	20.8	3	11.8	3	3.00
Guinea-Bissau	2.2	3	19.2	3	12.1	3	3.00
Kenya	8	2	30.2	2	9.7	3	2.33

* Marked by World Bank as improving rapidly.

Table A2	Scores on indicators for infrastructure (continued)						
Country	**internet users (per 100 people) 2007**	**score**	**mobile cellular subscriptions (per 100 people) 2007**	**score**	**roads, paved (% of total roads) 2003**	**score**	***average infrastructure***
Lesotho	3.5	3	22.7	3		?	3.00
Liberia	0.6	3	15.5	3	11.6	3	3.00
Madagascar*	0.7	3	11.9	3		?	3.00
Malawi	1	3	7.5	3	69	1	2.33
Mali	0.8	3	20.5	3	4.2	3	3.00
Mauritania	1.4	3	45.3	2		?	2.50
Mauritius	27	1	73.7	1	20.3	2	1.33
Mozambique	0.9	3	15.4	3	7.1	3	3.00
Namibia	4.9	3	38.5	2		?	2.50
Niger	0.4	3	6.3	3	9.9	3	3.00
Nigeria	6.8	2	27.3	3	9.7	3	2.67
Rwanda*	2.1	3	6.7	3		?	3.00
Sao Tome and Principe*	14.6	1	19	3	16.5	3	2.33
Senegal	6.9	2	30.5	2	8.1	3	2.33
Sierra Leone	0.2	3	14.3	3		?	3.00
Somalia	1.1	3	6.9	3	29.3	2	2.67
South Africa	8.3	2	88.4	1	68.1	1	1.33
Sudan	8.7	2	20.3	3		?	2.50
Swaziland	4.1	3	33	2	18.3	3	2.67
Tanzania	1	3	20.2	3	18.7	3	3.00
Togo	5.4	2	18.9	3	0.8	3	2.67
Uganda	3.7	3	13.7	3	6.2	3	3.00
Zambia*	4.9	3	21.4	3	11.3	3	3.00
Zimbabwe	10.9	1	9.8	3	97	1	1.67

* Marked by World Bank as improving rapidly.

Table A3	Scores on indicators for institutions and total					
Country	**world business**	**score**	**2008 CPI index**	**score**	**average institute**	**total (average inst + infr)**
Angola	169	3	1.9	3	3.00	3.00
Benin	172	3	3.1	2	2.50	2.75
Botswana*	45	1	5.8	1	1.00	1.50
Burkina Faso	147	3	3.5	2	2.50	2.75
Burundi	176	3	1.9	3	3.00	3.00
Cameroon	171	3	2.3	2	2.50	2.75
Cape Verde	146	3	2.0	2	2.50	2.08
Central African Republic	183	3	1.6	3	3.00	2.83
Chad	178	3	1.7	3	3.00	2.83
Comoros	162	3	1.9	3	3.00	2.83
Congo, Dem. Rep.	182	3	2.0	2	2.50	2.75
Congo, Rep.	179	3	3.0	2	2.50	2.50
Cote d'Ivoire	168	3	2.8	2	2.50	2.50
Equatorial Guinea	170	3	1.7	3	3.00	2.67
Eritrea	175	3	2.6	2	2.50	2.75
Ethiopia	107	2	2.6	2	2.00	2.50
Gabon	158	3	3.1	2	2.50	2.00
Gambia, The*	140	3	1.9	3	3.00	2.50
Ghana	92	2	3.9	2	2.00	2.25
Guinea	173	3	1.6	3	3.00	3.00
Guinea-Bissau	181	3	1.9	3	3.00	3.00
Kenya	95	2	2.1	2	2.00	2.17
Lesotho	130	3	3.2	2	2.50	2.75
Liberia	149	3	2.4	2	2.50	2.75
Madagascar*	n.a.	n.a.	3.4	2	1.00	2.00
Malawi	132	3	2.8	2	2.50	2.42
Mali	156	3	3.1	2	2.50	2.75
Mauritania	166	3	2.8	2	2.50	2.50
Mauritius	17	1	5.5	1	1.00	1.17
Mozambique	128	3	2.6	2	2.50	2.75

* Marked by World Bank as improving rapidly.

Table A3	Scores on indicators for institutions and total (continued)					
Namibia	135	3	4.5	1	2.00	2.25
Niger	66	2	2.7	2	2.00	2.50
Nigeria	174	3	2.7	2	2.50	2.58
Rwanda*	125	2	3.0	2	2.00	2.50
Sao Tome and Principe*	67	2	2.7	2	2.00	2.17
Senegal	180	3	3.4	2	2.50	2.42
Sierra Leone	157	3	1.9	3	3.00	3.00
Somalia	148	?	1.0	3	3.00	2.83
South Africa	34	1	4.9	1	1.00	1.17
Sudan	154	3	1.6	3	3.00	2.75
Swaziland	115	2	3.6	2	2.00	2.33
Tanzania	131	3	3.0	2	2.50	2.75
Togo	165	3	2.7	2	2.50	2.58
Uganda	112	2	2.6	2	2.00	2.50
Zambia*	90	2	2.8	2	2.00	2.50
Zimbabwe	159	3	1.8	3	3.00	2.33

* Marked by World Bank as improving rapidly.