

Biofuels and food security

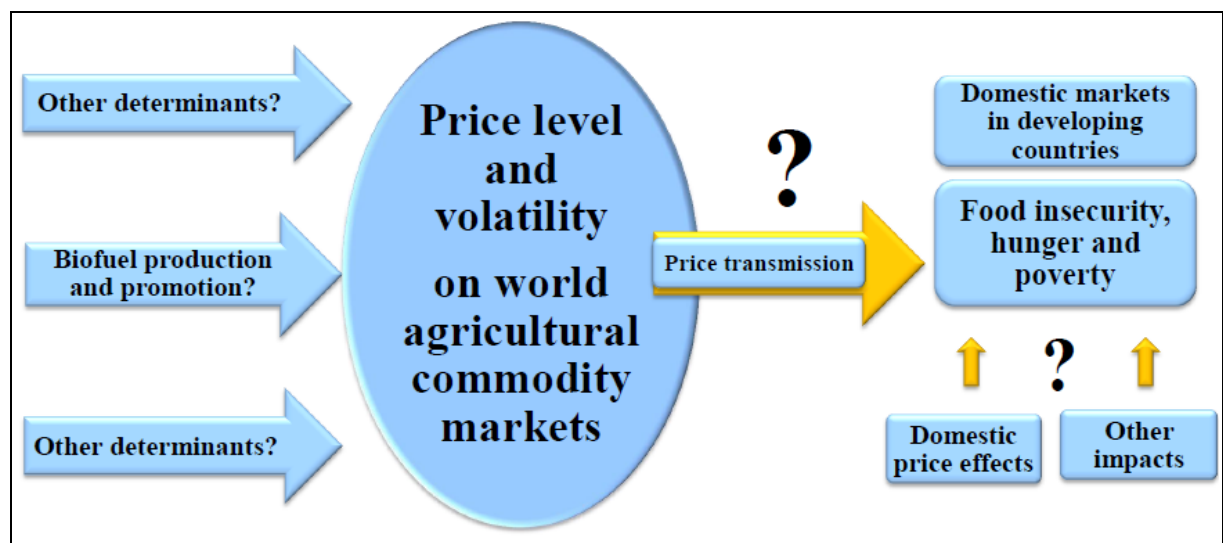
Comments of Prof. Dr. Dr. h.c. P. Michael Schmitz Justus-Liebig-University Giessen (Germany)

The following comments mainly addresses chapter three on “biofuels, food prices, hunger and poverty” of the document.

The analysis of this topic consists of three important research questions (see Fig. 1)

1. What factors contribute significantly and to what extent to the pricing of agricultural commodity markets, more precisely in respect to the level of prices and their volatility?
2. How are price effects of agricultural commodities on the world market transferred to the domestic markets of developing countries, if at all, and what are the key drivers of internal prices at wholesale and retail level?
3. What are the main causes of hunger and poverty in developing countries and what role do higher and more volatile prices play for the urban and rural population?

Figure 1: Three important research questions



Unfortunately, the HLPE project team has not analyzed in detail, if at all, the price transmission issue (from world to domestic markets and within the food chain) and the key drivers of poverty, hunger and malnutrition, as there are corruption, bad governance, nepotism, civil wars, extreme weather conditions and last but not least the discrimination of agriculture by overvalued currencies, industry protection and export taxes / import subsidies. And with respect to the first question the literature review / selection of the team is certainly not complete and reveals a bias of the authors towards biofuels as the main cause of higher and more volatile prices and of food insecurity.

Quotation:

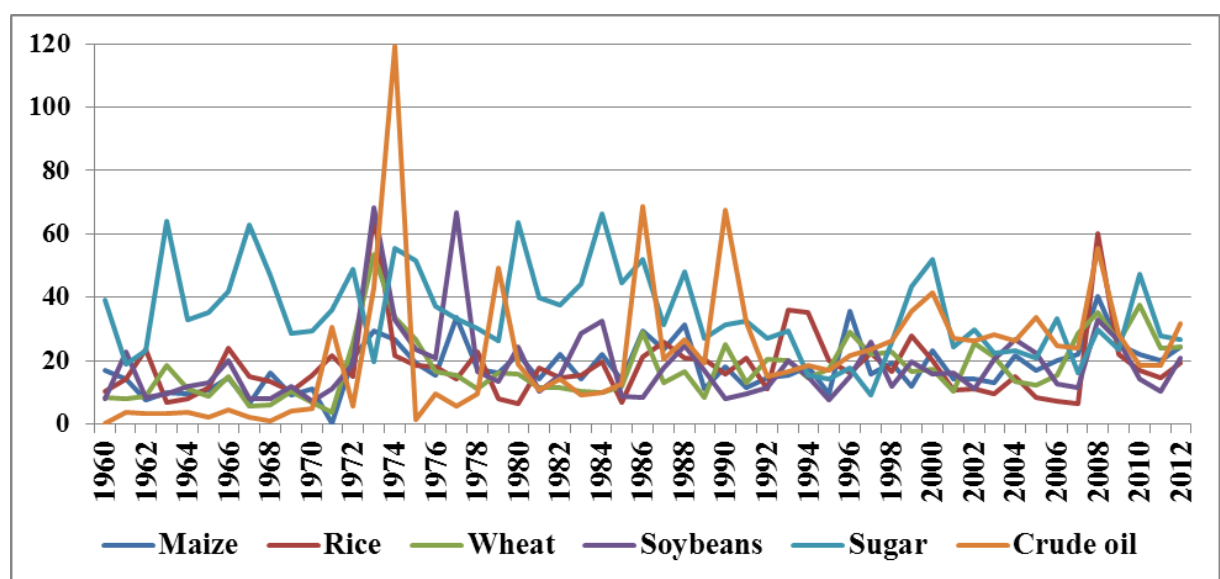
“Our analysis indicates that biofuels have played a predominant role in the increases in food prices and volatility since 2004” (p. 23 of the document)

“Rising food prices lead directly to poverty impacts by causing the poor to spend more of their incomes on food and as prices rise, some people will consume less and this contributes to poorer nutrition” (p. 21 of the document).

To be clear, there is no doubt that an additional demand for biofuel feedstocks has a price level effect on international agricultural commodity markets, especially in the short run and in conjunction with i.e. low stock-to-use ratios. However, the extent to which biofuels contributes to price rises is certainly overestimated by the HLPE project team.

By the way volatility of international commodity prices has not changed so much since 2006. A small increase can be seen for some products. Looking at a time series since 1960 there is nothing exciting. At the beginning of the 70s volatility was even higher than today. There is definitely no significant trend in volatility since the growth in biofuel production (See Fig. 2)

Figure 2: Development of price volatility for agricultural commodities and crude oil Jan.1960-Dec.2012 (percent)



Source: own calculations (on basis of World Bank data)

Looking carefully to the recent literature on the price level and volatility effects one can state that:

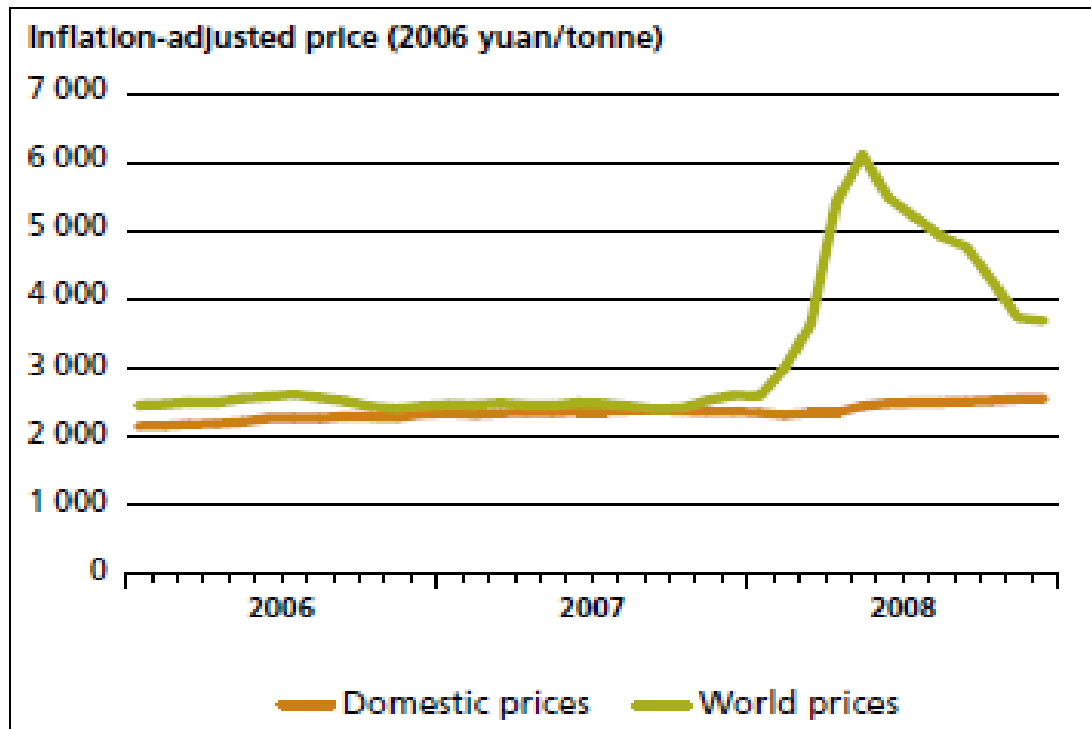
- trade policy responses by developed and developing countries play a major role in explaining price spikes and price volatility (see Anderson, K. (2012), Government trade restrictions and international price volatility. *Global Food Security* (1), pp. 157-166; and Headey, D. (2011), Rethinking the global food crises: The role of trade shocks. *Food Policy* (36), pp. 136-146). In another paper Will Martin and Kim Anderson estimated, that 45% of the price surge of rice between 2005 and 2008 was due to changed trade policies, for wheat it was 29% (Anderson, K. and W. Martin (2011), Export restrictions and price insulation during commodity price booms. *Amer. J. Agr. Econ.* 94(2), pp. 422-427). These figures (shares) are certainly higher than the estimated contributions of biofuels in average.
- price volatility was mainly driven by yield fluctuations, inflation volatility and exchange rate volatility (see OECD-FAO *Agricultural Outlook 2011*; and Roache, K. Shaun (2010), What explains the rise in food price volatility? IMF Working Paper).

- especially in the long-run price effects are negligible, as a recent contribution of Timilsina et.al. (2012) shows (Timilsina, R. G., J. C. Beghin, D. van der Mensbrugghe and S. Mevel (2012), The impacts of biofuels targets on land use changes and food supply: A global CGE assessment. *Agricultural Economics* (43), pp. 315-332).

Stefan Tangermann, a leading agricultural economist and former director of the division trade and agriculture at the OECD, estimated the contribution of biofuels to the price spike 2006 – 2008 between 10% to 30% (Compare Table 1) and concludes that it is “still a matter of debate and probably impossible to quantify the precise price effect” (Tangermann, S. (2011): Policy solutions to agricultural market volatility: A synthesis. ICTSD. Issue Paper No. 33.).

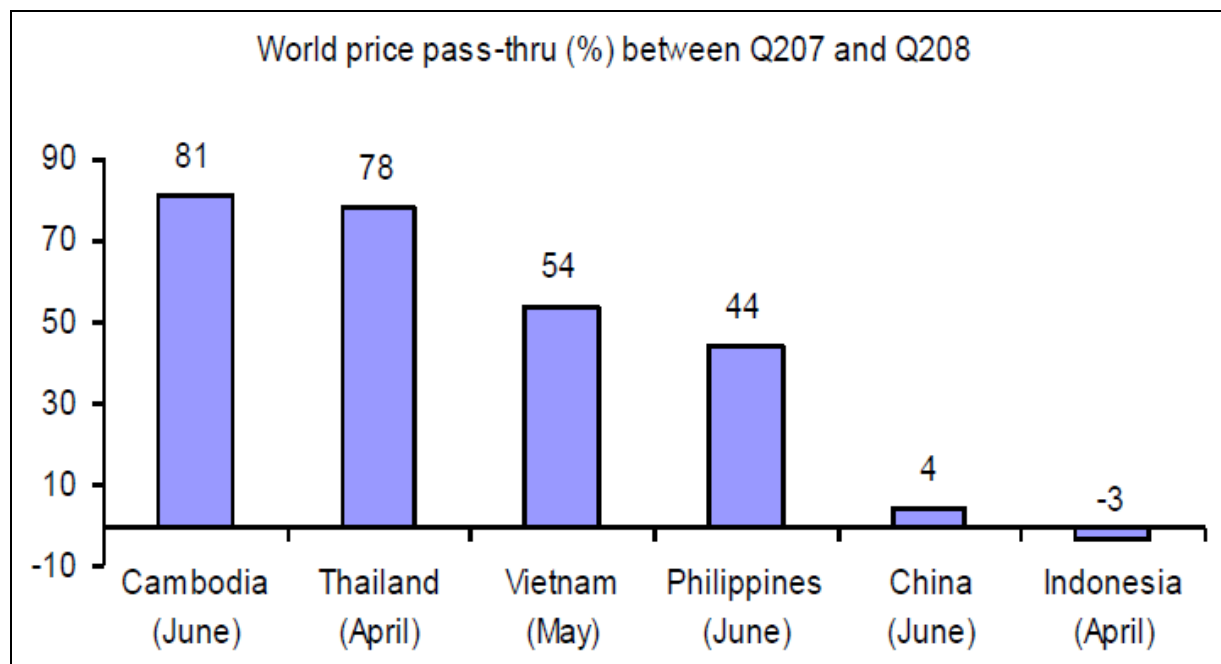
| Authors | Contribution to price increase |
|-------------------------|---------------------------------------|
| Mitchell (2009) | 66% between 2002-2008 |
| Rosegrant (2008) | 30% between 2000-2007 |
| Wright (2009) | substantial price effect of biofuels |
| USDA (2008) | 13% till 18% between 2007-2008 |
| Taheripour (2008) | 9% till 16% between 2001-2006 |
| FAO (2008) | 7% till 15% between 2008-2018 |
| OECD (2008) | 5% till 16% between 2008-2018 |
| Banse (2008) | 7% till 12% between 2008-2020 |
| EU Commission | 3% till 6% (only for grains) bis 2020 |
| von Witzke (2011) | 0.1% till 4.6% between 2007-2008 |
| Gilbert (2010) | hardly any impact of biofuels |
| Baffes/ Haniotis (2010) | hardly any impact of biofuels |

Figure 3: Rice price on the world market in China 2006 - 2008



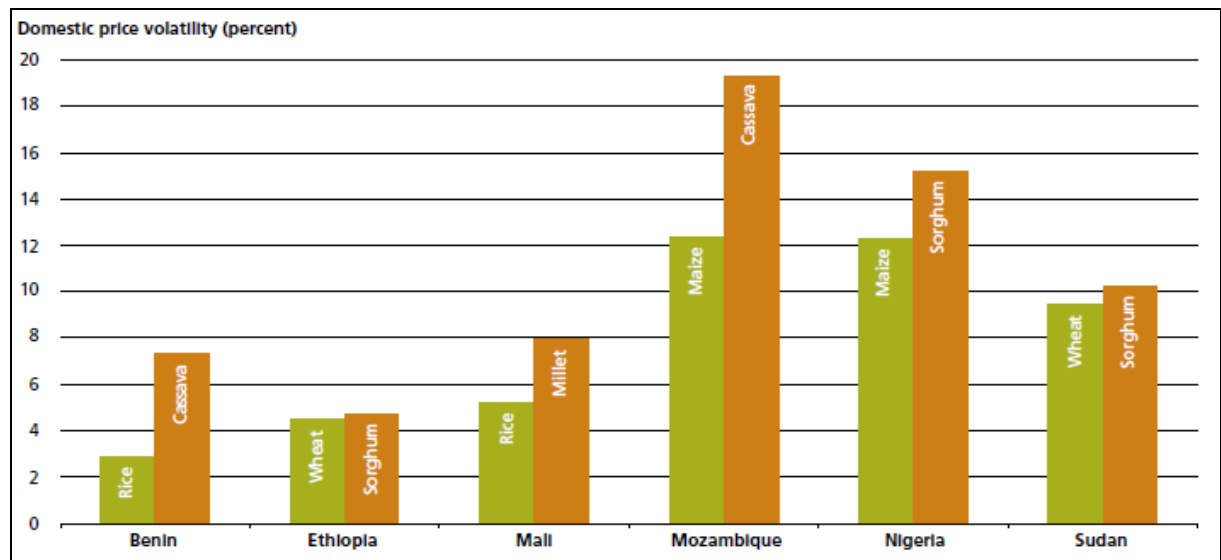
Source: FAO 2011, The state of food insecurity in the world.

Figure 4: Price transmission elasticity in developing countries 2007 – 2008



Source: Aldaz-Caroll 2008. In: Delgado (2011), The increased need for transparency in global cereal policies and data. World Bank.

Figure 5: Domestic prices for rice, wheat and maize were less volatile than those for traditional staples in Africa between 2005 and 2010



Source: FAO 2011, The state of food insecurity in the world.

Moreover the statement that price increases lead to more poverty and hunger has to be questioned. Certainly, urban people as net buyers of food suffer from a fall of real income and less consumption. However, the rural population, where 70% to 80% of the poor and hungry people live and which mainly consists of farmers, benefits from higher prices. It generates more income and gives incentives for investments in farming and market infrastructure. And even the landless farm workers may benefit by higher wage rates and better employment.

By the way, it is striking that for decades international organisations and agricultural economists argued that low prices aggravate the hunger problem (See Box 1), whereas since 2008 the opposite seems to be true. In both cases either the consumers or the producers have been neglected and only half of the story has been told. J. Swinnen, a leading economist in that field, has a convincing explanation (See Box 1) for this biased view.

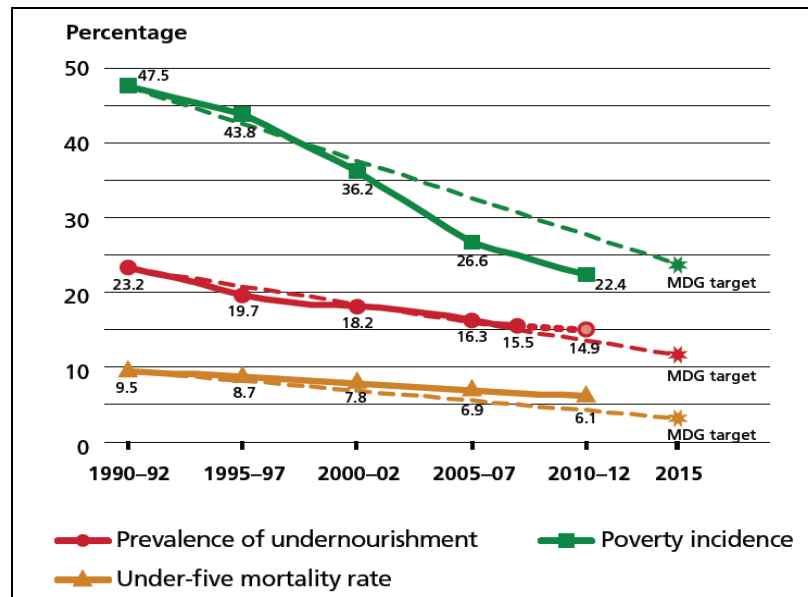
Box 1: Low or high prices: What causes hunger?

| | |
|--|--|
| FAO (2005): | „The long-term downward trend in agricultural commodity prices threatens the food security of hundreds of millions of people in some of the world’s poorest developing countries“ |
| IFPRI (2008): | ...rapidly rising food prices began further threaten the food security of poor people around the world“ |
| Explaining the contradiction | |
| <i>“[...] all these [international] organisations face a demand to demonstrate the importance of their work. Focusing their reports and analyses on those hurt by price changes may fit in such strategy to show relevance and importance – and may thus help in securing and raising funds.”</i> | |

Source: Swinnen, J. F. M et al (2011), The food crises, mass media and the political economy of policy analysis and communication. European Review of Agricultural Economics, Vol 38 (3), pp, 409-426.

Concerning the hunger situation it is interesting to read the newest report of the FAO 2012, where the authors revised their earlier estimates of more than 1 Billion hungry people. It is said “The new estimates suggest that the increase in hunger during 2007 – 2010 – the period characterized by food price and economic crises - was less severe than previously estimated (See Fig.6). There are several reasons for this. Most importantly, the transmission of economic shocks to many developing countries was less pronounced than initially thought. ...and increases in domestic staple food prices were very small in China, India and Indonesia (the largest developing countries)”.

Figure 6: Poverty, undernourishment and child mortality in the developing world



Source: FAO 2012, The state of food insecurity in the world

Only few words are said with respect to the main drivers of poverty and food security within the developing world. Only in the chapters 4 (Biofuel and Land) and 5 (Social implications) some of the home-made causes are addressed. Certainly more than 90% of poverty and hunger are driven by bad governance, poor administration, corruption, nepotism, missing infrastructure and education, absence of property rights and discrimination against agriculture and rural areas (urban bias) by export and production taxes, import subsidies, industry protection, overvalued currencies and parastatal food distribution systems. As far as these deficits are not removed, the potential benefits of investments in land cannot be realized. Hence, not “land grabbing” and biofuels are the problem, but the internal institutional structure and behaviour of stakeholders in developing countries.

In addition, with respect to food security, food supply and regional land supply effects two recent studies of Rosegrant et.al. and Timilsina et.al. are of utmost interest. Even if one assumes a doubling of the announced biofuel targets worldwide the regional food supply in developing countries is only marginally affected compared to the baseline scenario, with the highest reduction of only 1.0 % in the Middle East and North Africa (See Table 2).

Table 2: Change in regional food supply in 2020 relative to the baseline (%)

| Region | Announced targets | Doubling the announced targets |
|---|-------------------|--------------------------------|
| China | -0.1 | -0.2 |
| India | -0.4 | -0.3 |
| Indonesia | -0.1 | -0.1 |
| Malaysia | -0.1 | -0.3 |
| Latin American and Caribbean countries | -0.1 | -0.3 |
| Russia | -0.2 | -0.6 |
| Middle East and North Africa | -0.4 | -1.0 |
| Sub Sahara Africa | -0.2 | -0.5 |

Source: Timilisina et.al. (2012), Journal of Agric.Economics, Vol.43, pp.315-332

The same holds for the induced reduction in forest and pasture land (land use change) which is larger in western countries than in the developing countries, where it comes up to a maximum of 1.4% in Brazil (See Table 3).

Table 3: Change in regional land supply in 2020 relative to the baseline (%) due to a doubling of the announced targets

| Region | Total Crop Land | Forest Land | Pasture Land |
|--------------------------|-----------------|-------------|--------------|
| France | +0.7 | -5.1 | -4.1 |
| Germany | +0.8 | -2.2 | -1.5 |
| United Kingdom | +1.0 | -3.1 | -3.0 |
| USA | +0.1 | -0.3 | -0.2 |
| China | +0.3 | -0.2 | -0.3 |
| India | +0.2 | -0.6 | -0.5 |
| Indonesia | +0.1 | -0.4 | -0.4 |
| Thailand | +0.1 | -1.1 | -1.2 |
| Brazil | +0.3 | -1.2 | -1.4 |
| Argentina | +0.2 | -0.5 | -0.6 |
| Sub Sahara Africa | +0.1 | 0.0 | -0.2 |
| World total | +0.2 | -0.6 | -0.5 |

Source: TIMILISINA et.al. (2012), Journal of Agric.Economics, Vol.43, pp.315-332

Rosegrant et.al. run interesting simulations with the IFPRI-Model IMPACT on population at risk of hunger and malnourished children till 2050 (see Table 4). The trend projection 2050 shows a decline of the number of hungry people from 918 Mill. down to 794 Mill. Assuming an energy shock with a tremendous increase of the biofuel production leads to a lower reduction towards 854 Mill. However considering higher yield increases due to higher commodity prices – which is a likely scenario – the slowing down of the reduction effect by the energy shock is more than overcompensated by the yield increase. Thus, finally the number of hungry people is reduced to 569 Mill.

Table 4: The future of food security under different scenarios

| Scenarios | Population at risk of hunger (Mill.) | Malnourished children (Mill.) |
|-----------------------------|---|----------------------------------|
| 2010 | 918 | 164 |
| Trend projection 2050 | 749 | 117 |
| Energy shock 2050 | 854 (+ 105 Mill.) | 121 (+4 Mill.) |
| Higher yield increases 2050 | 569 (-180 Mill.) | 107 (- 10Mill.) |

Source: ROSEGRANT et.al. (2012) on basis of the IFPRI-Model IMPACT

Conclusions

Short-term price effects of biofuels are measurable, especially in combination with other demand and supply shocks, but are not as large as other key drivers (weather, trade policies, macroeconomic changes, feed demand) → estimated contribution of biofuels in average between 10% - 30%

- In the long-run the price effects of biofuels are negligible. For most commodities they are less than 10%. Price volatility is mainly influenced by inflation, exchange rate and oil price volatility.
- World market prices have only a limited effect on food insecurity, hunger and poverty. Developing countries insulate their domestic markets and discriminate agricultural producers and rural areas (urban bias). The problem is home-made. Domestic markets of staple food are often more volatile than prices on international markets, because supply and demand shocks on insulated markets are not dampened by regional trade.
- Even if world market price surges are completely transferred to domestic markets of developing countries, the impact on food security is not unequivocal. Higher farmgate prices e.g. generate more income and employment and contribute to more investment and market integration.
- Biofuel production and promotion in high and middle income countries can thus not be blamed for food insecurity, hunger and poverty in the world. The same statement holds for foreign direct investments in low income countries producing biofuel feedstocks and/or biofuels. All the problems mentioned in the document are existing in developing countries even without occurrence of biofuels and investments in land and have many internal causes. There is some empirical evidence that biofuels and land investments have the potential to improve the living conditions of the poor people.