Impact of increasing prices of agricultural commodities on poverty

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Abstract

The present paper attempts to identify the groups of households that most likely will face positive or negative welfare consequences as a result of food price increases. Using data from household surveys and differentiating urban from rural areas as well as food buyers from food sellers, the analysis presents preliminary evidence, showing that when the short run effects on consumption are considered, household welfare is expected to decrease, threatening initially food security. Real benefits are expected to occur for selected household groups, as soon as some second round effects, that transform the production structure, are considered. Market participation is critical for small land holders to capitalize potential benefits. Irregular wage earners may also gain from the price increases as long as expansion of the food producing sectors takes place in the parts of the developing countries that agriculture is the dominant source of income. Nevertheless it cannot be neglected that appropriation of the benefits, requires sufficient transmission of the price increases to the farm gate. On the other hand, and unless substantive action is taken, urban poverty is expected to increase given that almost uniformly, populations in such areas are net buyers of food.

Keywords: Food prices, Net sellers, Net buyers, Poverty.

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1. Introduction

The objective of this paper is to bring the discussion regarding the impact of soaring food prices[1], at the household level. Country-level impacts, no matter how important they are tend to mask important differences among socioeconomic groups and households within countries. Increasing food prices are expected to influence strongly the welfare outcomes of different groups of households particularly in developing countries, and thus their food security and poverty status. The present analysis tries to generate hypotheses with respect to the channels through which the price effects are expected to be transmitted, but mainly to characterize the groups of households that will most likely benefit or lose from the increasing food prices.

It has been estimated that about 70 percent of the world's poor live in rural, and strongly dependent from agriculture, areas. Soaring food prices generate possibilities for welfare improvements of their livelihoods and declining poverty numbers. Nevertheless among the rural population but also in urban areas, attributes of the social structure may result in welfare reducing outcomes. The relative position of households in the food market appears to be among the critical factors expected to determine the improvement or not of the household welfare. In particular households that are net buyers of food are facing the risk of declining welfare. Poorly endowed households such as landless or small landholders and out of agriculture wage earners belong in the groups of households that declining welfare is also the likely outcome.

The livelihood profile, which dominates in the developing world, and particularly in the rural areas, is dependent on the agricultural sector. While the majority possesses or rents, a small piece of land (that cultivates using traditional methods), the poorest part, is usually landless earning their livelihoods from irregular wage labor, which usually is related to agricultural activities. Quite significant is also the high uncertainty that frequently results into serious shocks (idiosyncratic or covariate).

Aversion to uncertainty associated with poor individual or communal access to assets (including institutions), is leading to net consuming positions. Thus the net market position is outcome both of individual choice and/or external factors. Individual choice may concern for

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[1] A thorough discussion concerning the reasons behind the recent price increases as well as their potential impact can be found in von Braun (2007) and Schmidhuber (2006). The authors argue that the changing consumer preferences in parts of the world (China, India), the booming of bio-fuels demand in association with adverse weather conditions that reduced food stocks contributed to the price increases. The impact on poverty is in line with what argued in the present paper, namely that wage earners and urban households are expected to lose while commercialized farmers will appropriate benefits in the medium or long run.

instance high reservation prices, while lack of markets and institutions may refer to missing markets. Furthermore the aftermath of the poor asset base associated with high uncertainty, is high vulnerability to poverty and extensive food insecurity.

Price increases of food items constitute a covariate shock, that if it persists in time, its consequences will affect all aspects of the livelihoods. As soon as they are transmitted locally, the impact will affect negatively the welfare of net food buyers in the short run. Substituting with cheaper food items is expected to reduce the size of the adverse effects. More serious consequences will take place gradually as the production structure changes as well.

For the groups of households that the effects continue to be negative, (urban wage laborers), several tools are set in motion to cope with the shock (depletion of savings or assets, request for assistance from networks, adaptation of the income generating strategies).

On the other hand commercialized farmers are able to appropriate larger benefits, adapting their farming process. Some benefits are also expected to occur for agricultural wage earners as soon as labor demand increases.

The framework for the analysis to follow is based on descriptive statistics derived from household survey data referring to 5 developing countries, namely Bangladesh, Bulgaria, Guatemala, Malawi and Nepal. The data come from the Rural Income Generating Activities (RIGA) database. Tabulations of key asset, livelihood characteristics and shares of income sources, along the quintiles of per capita expenditures, identify the direct income and consumption effects on the welfare status of the households and in their food security in particular. As stated above, the characterization of a household as a net food buyer or net food seller in the market for basic staple food items is expected to determine the benefits and/or losses resulting from the price increases.

Furthermore it need not be neglected that apart from the direct effects on consumption and income of the households, second round effects are equally important for their long run position. This type of effects modifies the structure of production activities (e.g. substitution between factors), and is difficult to assess given the complex interactions involved among different markets. It is necessary to say that the small number of selected countries as well as their strong diversity does not allow safe generalizations of results and conclusions.

The structure of the paper is organized as follows. In the next section follows the description of the RIGA database onto which the analysis is based. A short description of the household livelihoods is included paying particular attention in the poor. Section 3 discusses how effects

are expected to be allocated along different factors on the basis of economic theory and recent empirical evidence. The core of the descriptive analysis, where the potential winners and losers as a result of the soaring prices are identified as well as some preliminary evidence of the welfare impact, follows in section 4. Section 5 concludes the paper and suggests general policy guidelines that highlight the importance of the transmission of the price increases to small farmers as well as of the safety nets for the net consumers.

2. The Rural Income Generating Activities (RIGA) Dataset – The Livelihoods of the Poor.

The household surveys that assist in the purpose of identifying likely affected groups, belong to the Rural Income Generating Activities (RIGA) database[2]. The RIGA database includes Living Standard Measurement Survey (LSMS) data that are representative at country level, for more than 15 developing countries. From them Bangladesh, Bulgaria, Guatemala, Malawi and Nepal have been employed to serve the present analysis (table 1)[3]. These countries have been purposefully selected, so that some degree of geographic coverage of the developing world is maintained and so that all three typologies found in the World Development Report (2008) are present. Still agriculture based countries (Bangladesh, Malawi and Nepal), are mainly in the focus relative to countries in transition (Guatemala) and the urbanized (Bulgaria) categories.

Much more detailed description of the of the countries belonging in the database as well as analysis of the livelihoods both in terms of assets and income generating resources can be found in Zezza et al (2007) and Davis et al (2007) respectively. The findings with respect to the livelihoods (as from both references) are summarized below.

The outcome of high diversification of income sources in urban and rural areas is almost universal. Similar findings are reported for the poor from Banerjee and Duflo (2007a) that use a different set of 13 household surveys and describe the livelihoods of the poor. Risk spreading, allocation of time to different activities so that no time is wasted and efforts to build up a stronger capital base lie behind this livelihood choice. Among other characteristics small scale entrepreneurship (especially for women headed or low-skilled or lacking capital

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[2] Further information on the database can be found in http://www.fao.org/es/ESA/riga/index_en.htm
[3] Limitations in time did not allow the addition and analysis of a larger and more representative for the developing world, number of surveys.

households) as well as poor education and inadequate savings appear to be the norm for the poorer households.

As far as it concerns the dominant income sources, rural households in agriculture based countries, derive the larger share from on farm activities, while in households living in urban areas wage from skilled labor contributes mostly in income. Nevertheless it is important to notice that within the urban and rural populations, strong heterogeneity is evident among the quintiles of per capita expenditures where in the lowest ones unskilled wage labor contributes mostly to income. In urbanized countries appears along the years a significant reduction in the contribution of agriculture in the household income (in Bulgaria for instance in 2001 the share of income from agriculture fell to 25 from 51 percent six years earlier).

These livelihood strategies based on small scale agriculture, irregular wage labor, safety first considerations, being located in environments with high uncertainty and wide shock incidence, to some degree explain the poor asset base both in terms of physical and human capital, limited market access, isolation due to poor infrastructure and inadequate institutional base that mostly characterize rural households (Zezza et al 2007).

In tables 2 and 3 the basic demographic structure of the households is presented for 5 selected countries of the RIGA database that consist the focus of the present analysis. After separating rural from urban populations, along the respective per capita expenditure quintiles, the strong heterogeneity of the households as described above becomes evident.

Table 1. Selected country surveys

	Africa	Asia	East Europe	Latin America
Agricultural	Malawi 2004	Bangladesh 2000 Nepal 1996		
Transition				Guatemala 2000
Urbanized			Bulgaria 2001	

While standard factors in the literature (lack of infrastructure, initial conditions, but also low risk low mean income generating choices) are recognized as leading into poverty, Banerjee and Duflo (2007a) partly attribute some of these observed characteristics to the possibility of *miss-judgment* on behalf of the households. Keeping up with the neighbors may explain why

the poor do not eat more food consuming tobacco and alcohol while some difficulty in evaluating the quality of education may explain low investment in it. Finally the authors argue that "*vulnerability to temptation*" may be a factor behind reduced savings.

Table 2. Household demographic structure

		Urban Household Per Capita Expenditure Quintiles					Rural Household Per Capita Expenditure Quintiles				
		1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Bangladesh	Household head years of education	1.9	3.5	5.4	7.4	9.4	1.3	2.0	2.6	3.5	5.2
	Age of Household head	42.8	43.1	43.2	44.5	46.3	42.5	43.1	44.2	45.5	47.7
	Proportion of female headed hhs	0.11	0.08	0.10	0.08	0.12	0.08	0.08	0.06	0.10	0.12
Bulgaria	Household head years of education	9.2	10.8	11.5	12.2	13.5	6.2	7.0	8.0	8.6	9.1
	Age of Household head	54.6	55.0	52.9	51.0	48.4	49.7	55.8	59.8	58.2	60.0
	Proportion of female headed hhs	0.28	0.24	0.24	0.24	0.28	0.18	0.21	0.23	0.23	0.25
Guatemala	Household head years of education	2.7	4.4	6.5	7.7	8.6	1.4	1.9	2.6	3.1	3.7
	Age of Household head	45.8	44.6	44.3	44.9	48.3	43.8	43.0	41.9	42.6	46.4
	Proportion of female headed hhs	0.15	0.21	0.22	0.24	0.34	0.08	0.10	0.12	0.16	0.20
Malawi	Household head years of education	5.2	7.0	8.4	9.4	11.9	3.0	3.6	4.1	4.6	5.8
	Age of Household head	42.3	38.4	35.5	35.0	35.9	45.0	43.6	43.4	42.6	40.8
	Proportion of female headed hhs	0.21	0.13	0.13	0.14	0.15	0.26	0.24	0.25	0.23	0.21
Nepal	Household head years of education	4.0	5.7	6.7	8.3	9.4	2.2	2.9	3.2	4.0	4.7
	Age of Household head	42.1	43.3	45.0	42.9	46.2	42.7	43.7	44.2	45.8	47.0
	Proportion of female headed hhs	0.05	0.12	0.15	0.11	0.18	0.12	0.10	0.13	0.13	0.16

Table 3. Household demographic structure

		Urban Household Per Capita Expenditure Quintiles					Rural Household Per Capita Expenditure Quintiles				
		1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Bangladesh	Household size	5.6	5.2	5.1	5.0	4.7	5.4	5.3	5.2	5.1	4.9
	HH labour (members 15-60 years old)	2.8	2.9	3.0	3.2	3.2	2.4	2.6	2.8	2.9	2.9
	Female labour share (female/hh size)	0.53	0.51	0.50	0.49	0.49	0.54	0.52	0.50	0.50	0.50
Bulgaria	Household size	3.4	3.1	3.0	3.0	2.4	4.5	3.3	2.8	2.6	2.3
	HH labour (members 15-60 years old)	2.0	2.0	1.9	2.0	1.8	2.6	1.8	1.4	1.4	1.3
	Female labour share (female/hh size)	0.41	0.41	0.42	0.43	0.43	0.40	0.38	0.30	0.34	0.33
Guatemala	Household size	7.5	5.4	4.6	3.6	2.4	8.7	6.8	5.4	4.2	2.6
	HH labour (members 15-60 years old)	3.5	2.8	2.6	2.3	1.7	3.6	2.9	2.6	2.3	1.6
	Female labour share (female/hh size)	0.55	0.55	0.55	0.56	0.48	0.52	0.53	0.51	0.52	0.41
Malawi	Household size	5.5	4.8	4.3	3.6	3.3	6.0	5.1	4.5	4.0	3.1
	HH labour (members 15-60 years old)	2.6	2.4	2.4	2.3	2.2	2.4	2.2	2.1	2.0	1.8
	Female labour share (female/hh size)	0.52	0.49	0.45	0.42	0.37	0.55	0.53	0.52	0.49	0.43
Nepal	Household size	7.2	5.2	5.3	5.2	4.1	6.6	6.5	5.6	5.4	4.5
	HH labour (members 15-60 years old)	3.5	2.9	3.0	3.1	2.7	3.0	3.2	2.8	2.7	2.6
	Female labour share (female/hh size)	0.53	0.51	0.50	0.48	0.45	0.56	0.54	0.54	0.55	0.53

3. Welfare Impact of Price Changes – Lessons from the Literature.

As mentioned in the introduction the household's relative position in the food market as a net consumer or net producer, and the rural or urban character of its livelihood are among the crucial factors that differentiate the positive from the negative consequences of the increasing prices. In order to analyze the implications for the poor, it is necessary to account for the basic livelihood characteristics since they are expected to drive any welfare outcomes. In the next paragraphs some stylized facts are presented that indicate the major direction of the foreseen effects and from which the importance of the market position and the rural versus urban location, emerge.

a) Short run effects

The effects of soaring prices on household welfare can be diversified with respect to their immediate and medium or long run impact. The immediate impact at the level of the consumption side is expected to be negative and this outcome is hurting mainly the poorer households that allocate most of their consumption expenditures to food as can be seen in figures 1 and 2. The figures depict the declining trend of the share of food on total consumption along the quintiles of per capita expenditures. The figures also show that such direct effects will be more serious for the rural relative to the urban households, given the higher proportion of the food share along the quintiles. Substitution effects among different food items may reduce or even turn positive the overall effect.

Son and Kakwani (2006), develop a methodology that estimates the elasticity of consumption poverty as a result of price changes. The elasticity is further decomposed to its direct part that measures the effect in poverty when all prices change in the same direction and quantity (if prices increase the effect is positive), and the substitution counterpart that takes into account the relative position of each item in the distribution of consumption. If this latter part is strongly negative the overall effect on poverty maybe negative as well (poverty reducing). The negative sign of the substitution effect in poverty is claimed to be *pro-poor*. Applying the methodology in data from Brazil, the authors show that while the overall effect from 1999 to 2006 was poverty increasing, the substitution effect was *anti-poor* only up until 2004. During the two last years, this latter effect was poverty reducing but not that high so that to cause the total headcount ratio to decline as well.

While quite informative and easy to implement, the methodology of Son and Kakwani does not take into account the second round effects in the production structure that occur from the

price changes, even though partly such effects are mediated in the substitution among food items in consumption. In particular changes in the production mix of farmers are not easy to balance with the effects in their consumption attitudes as a result of price increases. Finally the effect on overall food security is not easy to capture. In particular increases in prices of specific food items may divert households to cheaper and perhaps less nutritious items. Detailed data on shares of food items produced and consumed and their nutrient equivalence, are necessary to identify effects on food security.

The short run effects if only the consumption side is considered, are easily identifiable and poverty increasing, unless the substitution effects discussed above, are not only *pro-poor* (poverty reducing - negative sign) but also high enough to overcome the level effects on consumption.

b) Medium or long run effects

Some basic channels through which the secondary effects are expected to affect the livelihoods can be traced on the basis of the relative comparative advantage regarding the economic sectors in each country. In particular price increases in food items, consist forces that may result in expanding the food producing sectors, if the country has a comparative advantage on these sectors[4]. In (agriculture based) developing countries these sectors are located mainly in rural areas and consist usually of large numbers of small landholders or land renters. The wider marketing margins set the ground for increased farm profitability and thus food crop producers are expected to be among the winners, seeing their welfare improving.

Food production in developing countries is usually labor intensive, utilizing mainly unskilled labor. As long as food prices are effectively transmitted at the farm gate then the expanding sector is expected to increase its demand for labor and subsequently wage earners in agriculture are also expected to gain. This outcome is particularly important given that poverty assessment analysis frequently recognizes the poorest as the landless, irregular wage earners in agriculture. In regions where land constraints are binding, (e.g. rice production in Asia), increases in the price of the fixed factor may also be considered.

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[4] Important issue that stems

Figure 1. Share of food expenditures - Urban households

Urban - Share of food expenditures
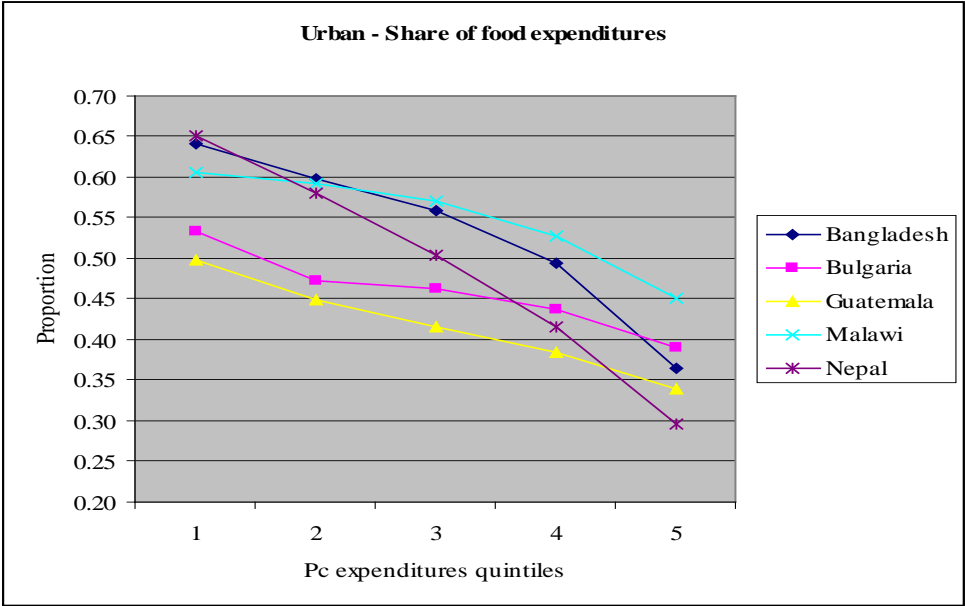
Figure 2. Share of food expenditures - Rural households

Rural - Share of food expenditures
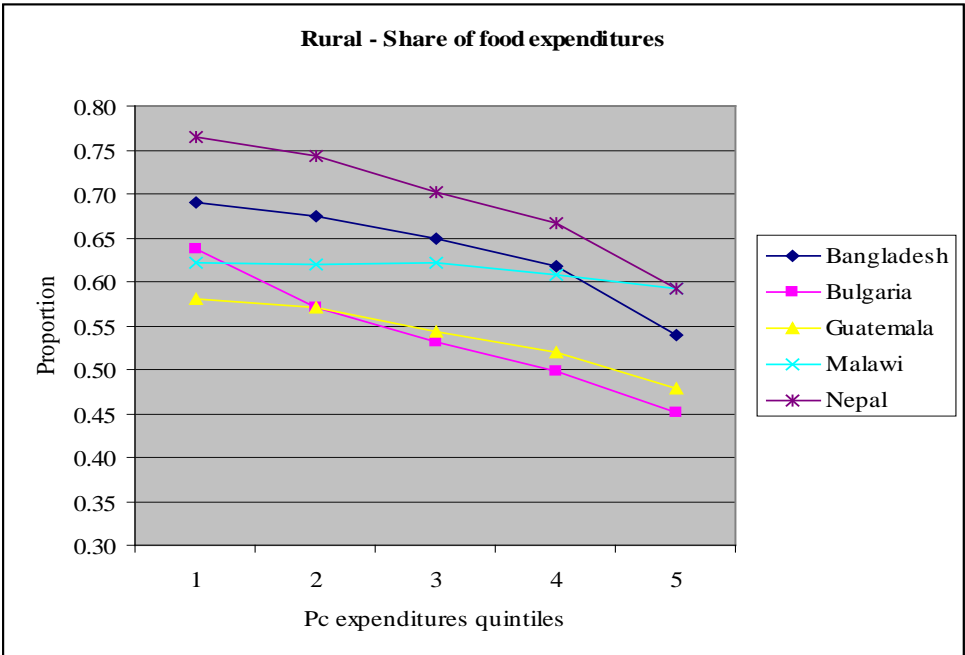
There exist two major cautionary notes that need to be taken into account in the above description. Firstly the price transmission channels are usually quite inefficient in developing countries. High costs due to poor transportation infrastructure significantly delay the changes in prices to arrive at the farm gate. If districts or communities are sufficiently market oriented in order to sell food crops but the food market is highly concentrated (monopsony), then producers will appropriate only a small part of the price increases. Barrett (2008), reports that

in surveyed households appears that 6 to 29 percent of the farmers face only one trader. On the other hand, areas that are importing food, monopolistic power in the food market, is expected to raise significant food security concerns. Fafchamps and Hill (2008), provide evidence of the significant time lags that need international price movements to arrive in the farm gate of Ugandan farmers, using micro data. Thus in cases where price transmission channels are rigid, only minor welfare improvements are expected.
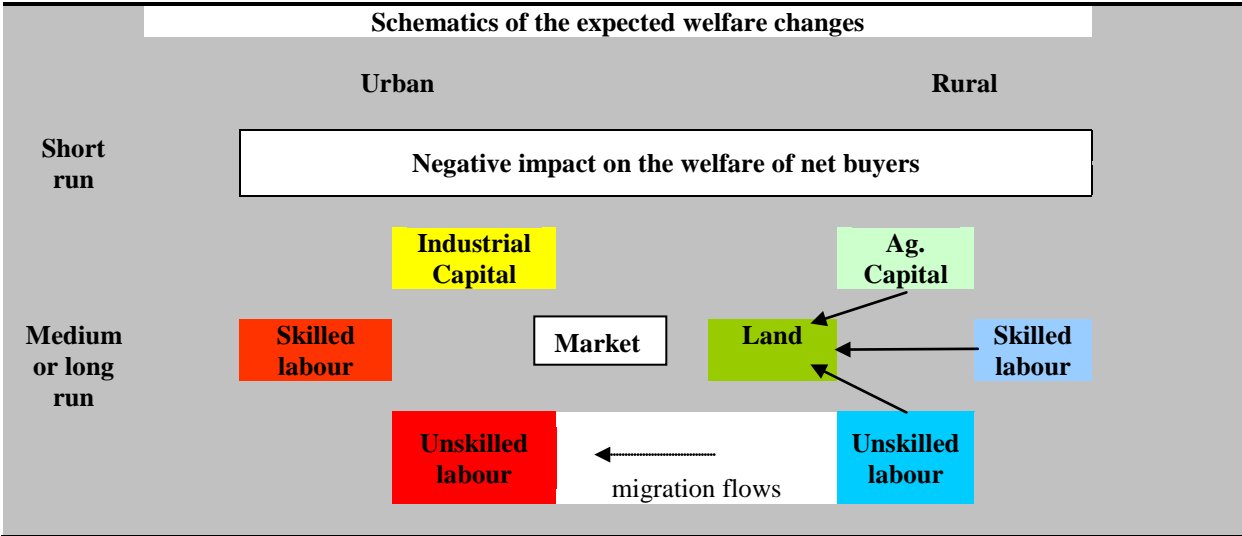
In the scheme above, the mechanics of the expected impact is graphically depicted. The red color is used for the groups that most likely will lose, green the likely winners, blue also identifies likely winners but with a question-mark given the uncertain of the direction of demand linkages and finally green identifies the likely winners. The yellow color for industrial capital is used to indicate the uncertainty with respect to the potential of diffusion of growth in other sectors of the economy.

The second cautionary note has to do with the scenario that food producers, in the aftermath of the higher marketing margins that are expected to face, increase their demand for more skilled labor instead of unskilled, in order to achieve higher revenues. In that case rural wage earners with low skills are expected to see their welfare deteriorating. Such experience faced rice exporting Asian countries when OECD countries reduced import tariffs and rice prices increased.

Finally, the effect on migration flows depends on how the welfare of rural unskilled wage earners will change. Immiserisation of rural poor may fasten the migration flows, but on the other hand, increased labor demand on behalf of the commercialized farmers may slower down migration.

While about 30 percent of the world's poor live in urban areas, this proportion is steadily increasing as the migration towards cities continues in increasing rates. Ravallion (2002) and Ravallion et al (2007) are among the relatively few papers that are concerned with urban poverty. These papers provide evidence that urban poverty is increasing fast, even though overall poverty numbers are decreasing in the world. These poverty rates will increase further because of the soaring prices. In urban areas, the role of agriculture as a source of income is minor but Zezza and Tasciotti (2008) provide evidence that in some developing countries urban agriculture may enhance food security through greater dietary diversity. Most of the urban households in lower expenditure quintiles are regular wage earners, while in richer quintiles entrepreneurship is the major income source. Thus the vast majority of the households are net buyers of food and increasing food prices are expected to have poverty increasing effects.

The most appropriate analytical tools, to identify the medium or long run impact of increasing prices, are the Computable General Equilibrium (CGE) models. The CGE models that are applied in developing countries are usually motivated from the discussion concerning the impact trade liberalization. In order to evaluate accurately and in depth, the impact on poverty, such models need to incorporate extensive micro-data. As an example we refer to Aredo et al (2007), who develop a micro-simulation model to analyze the impact of trade liberalization in Ethiopia. As a result of reducing import tariffs, the authors identify losses for the urban poor and the net food buyers, while surplus producing households are expected to gain. Second round effects through demand interlinkages in agricultural production (increased labor demand on behalf of the farmers), may improve the welfare of rural wage earners. Nevertheless, and if tariff reduction is less than 100 percent, poverty rates at the national level are increasing mainly because of adverse welfare effects in wage earners.

c) Uncertainty considerations

Lastly, particular attention is necessary to be addressed in the issue of the underlying risk and the variance of income and consumption, that price increases are expected to influence. Research in developing countries, argued and provided empirical evidence that especially in rural areas, risk and volatility in the income side, is not only quite extensive but usually remains uninsured (Dercon, 2006 and Fafchamps, 2003). Furthermore the evidence suggests that income shocks and uncertainty are strong enough that actually pass through at the consumption side, resulting to inadequate levels each period and poor smoothing of consumption across periods (Townsend, 1994).

The importance of stability in the livelihood is recognized as the crucial factor that characterizes the middle income classes of the developing countries in recent research. In particular, Banerjee and Duflo (2007b), using survey data from 13 developing countries in order to describe the livelihoods of the middle class[5], claim that what characterizes these households is the sense of stability occurring from activities that generate steady income flows. Instead, the entrepreneurial spirit of the middle class, that development economic theory argues is what drives development, is considered to be rather week.

The insufficient capacity of the poor to cope with the income shocks is mainly attributed to their limited asset base (land, livestock, physical and human capital), which leaves small space for efficient self-insurance. Also, the covariate character of several shocks (e.g. droughts) minimizes the role of assistance from family or related networks. Safety nets from governments or other institutions usually cannot cover all the parts of the developing areas that are hit by shocks. Finally recent empirical evidence from Ethiopia (Dercon and Christiaensen 2007), suggests that poor rural farmers are choosing to adopt low risk income generating strategies and tactics, in order to minimize their exposure to adverse outcomes. These safer strategies (e.g. small levels of fertilizer in farm production), are associated with lower average outcomes (small harvests), that if repeated through time may result in perpetuating poverty. The ultimate outcome of the *ex ante* to resolution of risk strategies that try to minimize risk exposure, and the *ex post* poor coping capacity, may be *entrapment into poverty that is induced from risk.*

Increases in the food prices, constitute covariate shocks that influence the welfare of the entire population of the developing countries. Even though they affect positively significant parts of the developing world (commercialized farmers that are net sellers of food), are reasonably expected to increase the volatility of income. The extensive and consistent evidence that suggests imperfect consumption smoothing in developing populations, clearly implies that greater variance in consumption can be expected as well. On the ground of higher expected volatility (that is corroborated by the recent liberalization trends), poverty and food insecurity considerations are expected to increase for significant parts of the populations.

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[5] Banerjee and Duflo (2007b) define middle income classes as the households that live with $2 to $4 or with $6 to $10 per capita per day.

4. The Impact of Price Changes on Household Welfare – Identifying Winners and Losers

a) Income Sources and Market Participation

Decomposing Income

In the present subsection, the income strategies of the households for the 5 developing countries are described. The relative importance and the diversification of the income sources in the household portfolio, is expected to characterize the groups of households that will confront the consequences of the raising prices. The idea behind, is that in the basis of expenditure quintiles, the major contributor sources in the earnings would identify how important the welfare effect of the soaring prices will be. Given that farming households are facing the consequences both from the earnings as well as from the consumption sides, special attention is paid to their livelihood.

Figure 3 depicts the proportion of income coming from Non-farm activities for urban households, while figure 4 shows the share of income from On-farm activities for rural households. Malawi and Nepal are the countries mostly dependent on agriculture in the rural areas as well as in the poorer quintiles of the urban counterparts. The pie graphs in the annex, (figures 1 to 5), further break down the farm and non farm income sources, to their specific components. Agricultural income consists from wages, income from crops and from livestock (including by-products), while income non-related to agriculture includes, wages, earnings from self-employment, transfers and other sources.

In the rural areas of Bangladesh, Guatemala, Malawi and Nepal, and in the poorest quintile, wages from agriculture, contribute significantly to household income. In the two Asian countries, about 45 percent of the household income comes from this source, while in Malawi and Guatemala the proportion is around 25 percent. As we go to richer quintiles the contribution of this source falls slowly. Also in the latter two countries, income from crop production belongs to the two most important sources. In Malawi above 40 percent of income comes from crops in the first 4 quintiles while in Guatemala the proportional contribution is always above 20 percent. In richer quintiles self employment outside agriculture and non farm wages, increase their contribution to income. Only in Malawi crop income contributes significantly to earnings of the rural rich. Finally in rural Nepal income from livestock is among the most important sources.

Both in urban and rural populations of the 5 countries, the proportion of income coming from farm and related activities is declining as we go from poorer to richer households, even though the level of farm income in rural areas is much higher relative to the poorer urban. The only exception in that pattern is Bulgaria, the unique urbanized country of the sample where no clear pattern appears, but where also the overall importance of agriculture in income is minor.

Figure 3. Share of income from Non-farm activities – Urban households
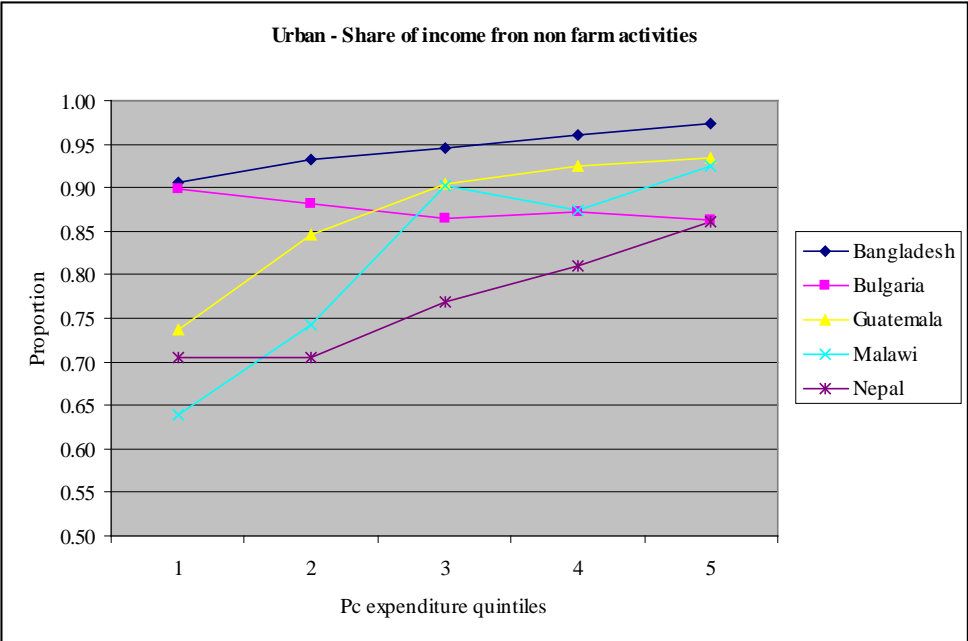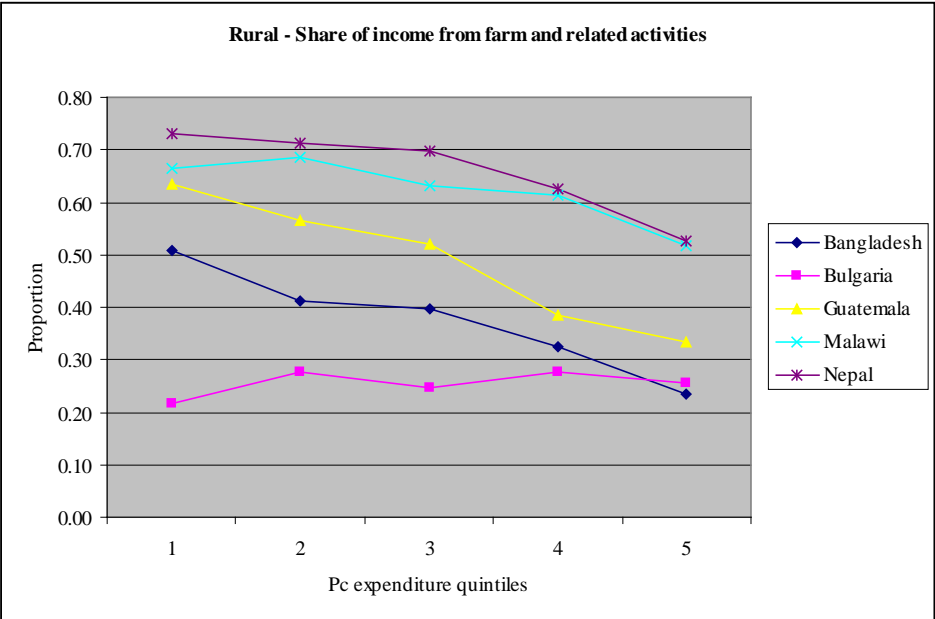

Figure 4. Share of income from Farm activities – Rural households

As far as it concerns urban households, non farm wages (in poorer) and non-agriculture self-employment (in richer) quintiles, consist the most important source of income. Bulgaria appears to be a unique case where transfers play the most important role both in rural and urban areas.

Table 4. Farming characteristics.

		Urban Household Per Capita Expenditure Quintiles					Rural Household Per Capita Expenditure Quintiles				
		1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Bangladesh	Participation in agricultural activities (%)	31.8	33.4	30.1	24.2	20.7	76.7	80.6	85.8	82.1	84.8
	Percentage of landless hhs (%)	91.0	83.2	80.6	79.4	77.4	66.2	57.1	44.8	39.7	26.9
	Land size owned (ha)	0.1	0.6	0.5	0.6	0.5	0.8	1.2	2.1	3.7	7.2
	Share(%) of agricultural hhs using machinery	0.4	1.6	0.9	0.7	0.7	0.8	2.1	4.4	6.2	7.4
	Share(%) of agricultural hhs using fertilizer	8.4	14.2	10.7	6.7	2.5	40.1	46.0	55.7	56.0	57.4
	Share(%) of agricultural hhs using pesticide	8.0	13.9	9.6	6.4	2.3	39.1	43.6	53.3	53.7	55.9
	Total livestock holdings (TLU)	0.1	0.1	0.1	0.1	0.0	0.3	0.4	0.6	0.7	0.7
Bulgaria	Participation in agricultural activities (%)	16.9	20.1	24.9	24.1	18.4	51.1	71.4	81.3	83.5	81.0
	Percentage of landless hhs (%)	83.4	81.1	75.9	77.4	80.5	58.5	40.0	26.7	23.3	25.3
	Land size owned (ha)	0.2	0.2	0.3	0.5	0.5	0.3	0.6	0.6	0.9	0.9
	Share(%) of agricultural hhs using machinery	2.9	3.4	4.9	5.7	3.4	14.2	27.4	28.4	34.7	24.7
	Share(%) of agricultural hhs using fertilizer	5.7	7.2	11.2	10.3	7.8	21.0	37.7	46.6	53.4	47.1
	Share(%) of agricultural hhs using pesticide	2.9	4.3	6.3	4.6	3.7	10.2	15.4	23.9	29.5	31.0
	Total livestock holdings (TLU)	0.0	0.1	0.1	0.1	0.0	0.2	0.5	0.5	0.7	0.6
Guatemala	Participation in agricultural activities (%)	55.8	41.3	34.5	21.7	23.3	91.9	89.1	82.0	75.3	65.1
	Percentage of landless hhs (%)	70.8	81.4	85.4	90.4	90.2	36.9	47.8	51.7	60.6	68.2
	Land size owned (ha)	0.6	0.9	0.6	0.6	28.8	4.3	3.3	2.7	2.3	4.5
	Share(%) of agricultural hhs using machinery	3.8	2.9	4.7	2.2	3.8	7.0	6.1	8.8	6.4	9.3
	Share(%) of agricultural hhs using fertilizer	29.7	17.5	16.3	7.5	9.0	63.0	58.1	58.1	44.8	36.0
	Share(%) of agricultural hhs using pesticide	27.2	15.7	14.2	6.9	8.1	60.2	55.7	55.4	41.5	34.3
	Total livestock holdings (TLU)	0.2	0.2	0.4	0.2	0.7	0.7	0.7	0.8	0.6	2.8
Malawi	Participation in agricultural activities (%)	54.7	48.9	40.4	29.3	34.6	97.2	97.2	96.6	95.8	89.1
	Percentage of landless hhs (%)	48.6	55.9	69.0	77.3	75.2	5.3	5.2	6.8	8.0	17.8
	Land size owned (ha)	0.5	0.4	0.3	0.2	0.5	1.2	1.4	1.6	1.7	1.6
	Share(%) of agricultural hhs using machinery	2.4	4.6	7.2	6.1	20.4	0.9	1.8	2.6	4.0	6.8
	Share(%) of agricultural hhs using fertilizer	30.1	34.7	29.8	24.4	30.5	60.3	63.7	66.6	68.5	65.1
	Share(%) of agricultural hhs using pesticide	22.3	28.9	26.8	21.4	29.1	52.8	56.3	59.3	62.1	59.8
	Total livestock holdings (TLU)	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.4	0.4
Nepal	Participation in agricultural activities (%)	86.9	87.9	91.2	90.7	90.5	92.5	97.3	97.2	96.8	95.5
	Percentage of landless hhs (%)	76.7	59.0	57.2	68.5	71.7	24.3	19.0	21.4	21.4	19.1
	Land size owned (ha)	0.1	0.2	0.5	0.3	0.3	0.4	0.6	0.5	0.7	0.7
	Share(%) of agricultural hhs using machinery	1.3	1.9	2.0	2.0	5.6	5.0	8.7	5.7	7.8	9.0
	Share(%) of agricultural hhs using fertilizer	15.5	28.8	32.7	18.9	11.3	36.9	50.1	51.6	55.8	64.1
	Share(%) of agricultural hhs using pesticide	0.4	0.5	0.5	0.3	0.2	1.7	1.8	1.6	1.8	1.7

Given the decomposition of income to its respective components and the relative importance of each one of these, it becomes clearer which groups of households will confront directly the consequences of increasing food prices. The urban poor, being wage earners and net buyers of

food, need to cope with the adverse consequences of higher cost in their consumption. The transmission of price changes will take place earlier in these areas but at the same time the prices will be relatively lower in comparison with the rural areas where further transportation costs need to be added.

The situation is more complex for the rural households, being at the same time producers and consumers of food items, as well as for the labourers in the agricultural sector. The traditional character of agricultural production and the obstacles to market participation need to be taken into account beforehand. Modern farming procedures, together with increased market participation, are able to assist rural farmers in appropriating the benefits of price increases from the commodities they produce and deteriorate the impact of higher cost in the consumption side. Rural wage labourers may also gain in that case given the demand linkages that may be set in motion if farmers expand their production. In the next paragraphs we present some descriptive evidence and we discuss further these issues for the countries selected.

The Farming Process

The agricultural economics literature provides extensive evidence that farming in the developing world is usually based on traditional methods. In table 4, the farming process is shortly described for the 5 countries. It is noticeable the outcome that above 80 percent (above 95 percent in Malawi), of the rural population is somehow involved in agricultural activities. In rural Bulgaria the lower participation rates in agriculture appear in the poorest quintile; 49 percent of the households report no relation of their livelihood with agriculture.

The proportion of landless households in rural areas is significant in most of the countries. In Malawi appears the smallest proportion of landless, as less than 10 percent of the households do not own land. Excluding Bulgaria, the most important characteristic that emerges from the table is the minor utilization of physical capital in agriculture, since always less than 10 percent of the households use machinery that incorporates some kind of motorized particle.

As far as it concerns fertilizer and pesticides, stronger heterogeneity appears along the rural quintiles for Bangladesh and Guatemala relative to Malawi and Nepal. In rural Bangladesh the proportion oh households that use such inputs increases in richer quintiles while quite the opposite happens in rural Guatemala indicating probable the relative difference of the countries in the development path (Bangladesh is agricultural based while Guatemala in transition). In Nepal and Malawi the diversity among the rural households is much smaller

since, apart from the poorest quintile that uses less inputs in both countries, in the rest about 65 percent in Malawi and 50 percent in Nepal report using fertilizer and/or pesticides.

The traditional farming processes increase the importance of risk and uncertainty discussed earlier. In particular, the reduced capacity to employ capital and modern inputs, makes agriculture in developing countries heavily dependent on the weather conditions or other random shocks. Lack of insurance against droughts or other risks (pest attacks, price volatility, illness etc.), transfer the uncertainty not only in the income outcomes (volatile harvests), but to the consumption side as well. On these grounds vulnerability considerations become binding and seek for policy interventions to improve the capacity to achieve better and more stable welfare.

Another characteristic that pertains to the rural agricultural households is the significant amount of production that is kept for home consumption. In figures 5 and 6, the share of agricultural income sold is depicted for urban and rural areas, respectively. In agricultural based and in transition countries, the proportion sold exceeds always 25 percent in rural areas, irrespective of the quintile. In urban areas the associated proportion is below 15 percent with the exception of Bangladesh that is around 25 percent.

Figure 5. Agricultural product sales as share of agricultural income – Urban.
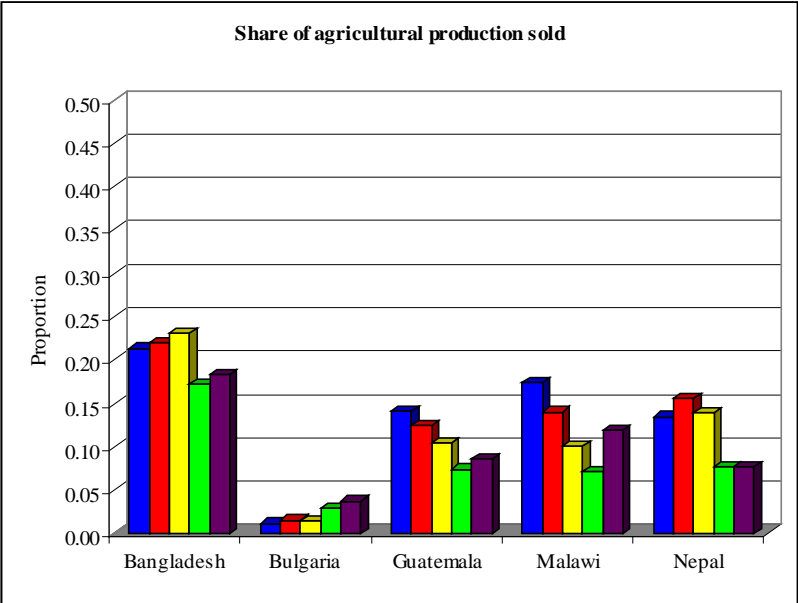
* Including livestock.

Figure 6. Agricultural product sales as share of agricultural income – Rural.

Share of agricultural production sold
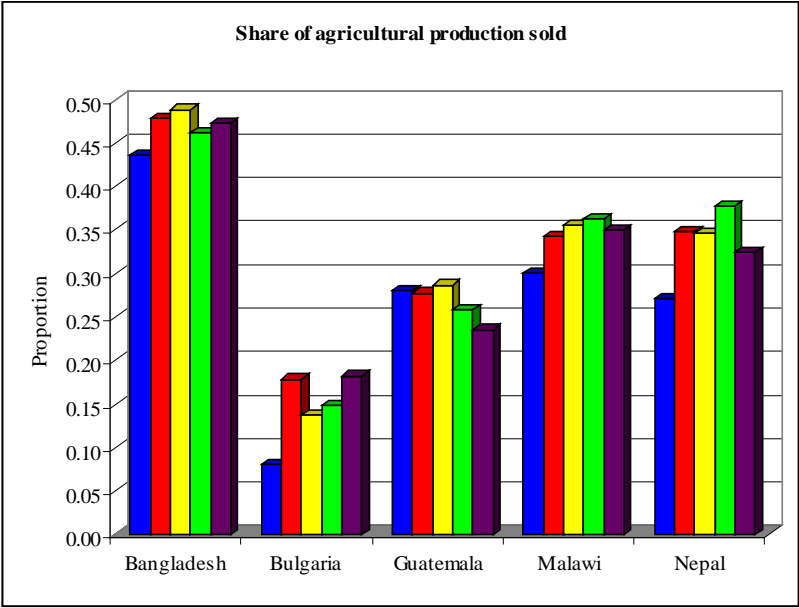
* Including livestock.

Even though several reasons may explain this fact, reducing volatility may be considered one of them. In particular, it may be that households want to reduce the underlying price volatility that characterizes the commodities they produce. In other words households try to be autarkic, since producing for the market may turn out to be harmful if they are not insured against undesired price changes. In the following paragraphs the issue of market participation is further addressed along with evidence regarding the net market position of the country surveys analyzed in the paper.

Market Participation

As claimed in the introduction of the paper critical factor regarding the impact of prices on poverty and food insecurity, is the relative position of the households in the food market. Taylor et.al. (2008), discuss in depth the role of markets in economic welfare. In tables 5 to 8 we present descriptive evidence, using alternative definitions of the market participation variable, for the surveyed households. In particular in tables 5 and 6 gross market participation rates are presented. The first table presents the proportion of households selling anything produced on farm (crops and livestock or by-products). Common characteristic across countries is that in urban areas the households belonging to the 2 poorest quintiles have relatively higher participation in the market relative to the richer ones, but this proportion is always 2 to 3 times lower in comparison with any rural household class.

Table 5. Proportion of households selling agricultural products (market participation).

		Urban Household Per Capita Expenditure Quintiles					Rural Household Per Capita Expenditure Quintiles				
		1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Proportion of hhs selling....											
Bangladesh	...crops	0.06	0.12	0.09	0.05	0.04	0.33	0.40	0.48	0.47	0.47
	...livestock and by-products	0.25	0.25	0.22	0.18	0.16	0.48	0.55	0.58	0.60	0.66
Bulgaria	...crops	0.02	0.01	0.02	0.04	0.04	0.05	0.13	0.11	0.16	0.18
	...livestock and by-products	0.01	0.03	0.02	0.04	0.02	0.09	0.25	0.23	0.24	0.21
Guatemala	...crops	0.21	0.14	0.12	0.08	0.06	0.53	0.51	0.45	0.39	0.33
	...livestock and by-products	0.13	0.09	0.08	0.05	0.04	0.30	0.33	0.30	0.28	0.26
Malawi	...crops	0.13	0.11	0.10	0.06	0.08	0.35	0.44	0.47	0.50	0.46
	...livestock and by-products	0.07	0.07	0.06	0.04	0.05	0.27	0.34	0.35	0.36	0.30
Nepal	...crops	0.13	0.21	0.15	0.05	0.06	0.26	0.44	0.47	0.51	0.48
	...livestock and by-products	0.17	0.20	0.06	0.05	0.06	0.48	0.53	0.49	0.56	0.50

Table 6. Rural households and main staple (market participation).

		Rural Household Per Capita Expenditure Quintiles				
Proportion of households...		**1**	**2**	**3**	**4**	**5**
	... only buying	0.47	0.44	0.43	0.37	0.39
Bangladesh	... only selling	0.09	0.10	0.13	0.14	0.12
(rice)	... buying and selling	0.18	0.23	0.26	0.25	0.28
	... not buying or selling	0.26	0.23	0.18	0.24	0.21
	... only buying	0.36	0.37	0.45	0.41	0.42
Bulgaria	... only selling	0.00	0.02	0.01	0.01	0.02
(wheat	... buying and selling	0.00	0.01	0.00	0.00	0.01
potatoes)	... not buying or selling	0.64	0.61	0.54	0.58	0.56
	... only buying	0.56	0.54	0.49	0.49	0.44
Guatemala	... only selling	0.15	0.15	0.12	0.11	0.12
(maize)	... buying and selling	0.07	0.09	0.11	0.10	0.08
	... not buying or selling	0.23	0.23	0.28	0.30	0.36
	... only buying	0.28	0.25	0.24	0.20	0.22
Malawi	... only selling	0.00	0.00	0.00	0.00	0.00
(maize)	... buying and selling	0.69	0.71	0.72	0.75	0.69
	... not buying or selling	0.03	0.04	0.04	0.05	0.09
	... only buying	0.84	0.81	0.80	0.77	0.79
Nepal	... only selling	0.00	0.00	0.00	0.00	0.00
(rice)	... buying and selling	0.05	0.13	0.13	0.15	0.13
	... not buying or selling	0.10	0.06	0.07	0.07	0.08

The most important result coming from table 5 is the observation that in rural areas the higher market participation rates appear in the middle quintiles. The result is consistent across countries and irrespective on if we consider crops or livestock items. Even when we restrict attention in the main staple produced and consumed in the rural part of each country as we do

in table 6, and when the *selling* plus the *selling and buying* categories are considered together, the same result appears to hold.

In table 7 the analysis proceeds one step further, by comparing the value of sales (from production) with the value of purchases (from consumption), of the most important 2 or 3 staple food items in each country. In order to create the net sellers variable, the following procedure was followed; the ratio of the value of sales to the value of purchases for the basic staples was created (the value home consumed production is considered to be the same in both sides), and households for which the ratio was above 1.2 were defined as net sellers. The reason to choose the threshold of above 1.2 (instead of 1), is that the net position of households around and near unity maybe considered as unclear.

It is necessary to caution that this comparison entails some concern regarding the reliability of the results. The reliability concern, refers for instance to the different effects of seasonality on production and consumption prices, or the differences that occur from the fact that survey consumption sections refer to a relatively short recall period, while the value of harvested crops refers to the whole season (crop year). Nonetheless, the comparison of these values provides information with respect to the net position of the households in the corresponding markets, and may give richer information regarding the identification of the groups of winners and losers as a result of the price increases.

Table 7. Proportion of net food sellers in the basic staples*.

	Urban Household Per Capita Expenditure Quintiles					Rural Household Per Capita Expenditure Quintiles				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Bangladesh	0.01	0.03	0.03	0.03	0.02	0.12	0.15	0.19	0.21	0.23
Bulgaria	0.04	0.04	0.08	0.07	0.04	0.18	0.27	0.31	0.32	0.29
Guatemala	0.11	0.06	0.05	0.02	0.04	0.32	0.30	0.26	0.21	0.17
Malawi	0.07	0.08	0.11	0.08	0.19	0.06	0.08	0.10	0.16	0.20
Nepal	0.16	0.25	0.33	0.09	0.11	0.44	0.59	0.57	0.60	0.61

* Bangladesh: (Rice Wheat/Bread), Bulgaria: (Potatoes Wheat Maize), Guatemala: (Maize Beans),
Malawi: (Maize Beans Cassava), Nepal: (Rice Wheat Maize)

From the table can be seen that apart from Nepal, where more than half of the rural population are net sellers, in all other countries the vast majority of the households are net buyers of the basic staples. In the poorest quintile of rural Malawi, where 63 percent of the income comes from crop production plus agricultural wages (pie graph 4b in annex), only 6 percent of the households are net sellers. Again in Malawi only 20 percent of the richest rural households are net sellers. Things are somewhat better in rural Guatemala, where 32 percent of the

poorest quintile, are net sellers, earning 56 percent of their income from crop production and agricultural wages (pie graph 3b in annex). The corresponding proportions of net sellers in the urban regions are several times lower (about 3 to 6 times). Going from lower to higher quintiles, there appears a common trend for 4 out of the 5 countries, since with the exception of Guatemala, the proportion of net sellers, increases as we go from the poorer to richer households.

Overall, the rates of market participation are low. As far as poorer households are concerned, the majority of them are net buyers of food in rural but mainly in urban areas. The result corroborates strongly with similar research in other developing countries as table 3 of the annex, reproduced from Barrett (2008), shows. In the table, the proportion of households that are (net or gross) sellers of specific grains for several African countries is shown, as computed from other researchers, and common observation is the small rates of market participation.

The consistency of the poor market participation result across countries, leads to the characterization of the households as net food buyers and seems to reduce the possibilities for improvements in the welfare and the food security status, unless serious action is taken in order to strengthen any comparative advantage but also to increase market participation.

Before closing the subsection a small note regarding the reasons behind the low market participation rates in the developing world, seems necessary. The note is based on Barrett (2008), who after surveying the relevant literature suggests interventions, that facilitate producers' organizations (and increase collective power), and reduce transactions costs. If furthermore, access to assets for the poor is promoted, increasing market participation can be achieved. The benefits from increased market participation refer not only to wider margins (in comparison with self-consumption), but also to motives for further expansion in the scale of production.

Standard explanation in economic literature attributes the issue of small market participation, to inadequate levels of investment in the necessary institutions to build free markets and the appropriate infrastructure (market places). Increased transaction costs of this kind are acting as a barrier to entry reducing market participation. At the household level, econometric evidence suggests that market participation increases with the level of wealth, the use of modern production technologies, access to credit and with collective power that maybe the outcome of associations of producers.

Empirical research estimated the welfare loss resulting from production of subsistent goods, to reduce income by above 30 percent while the transport cost from local market to the nearest city is greater than 15 percent on average.

b) *Quantifying the Short-run Impact of Price Changes on Welfare: The cases of Malawi and Bangladesh*

In order to quantitatively assess the short run effect of price changes on household welfare, a simple methodology proposed by McCulloch (2003) was applied[6]. The underlying assumption is that the impact of price changes on household welfare could be disaggregated into the impact on the household as a consumer of the good and the impact on the household as a producer of the good[7]. So, being a net seller or net buyer of the good defines the welfare effect of an increase in staple price in the short run. It is assumed that quantities produced do not respond at all and substitution effects in production and consumption decisions are not included. Following Minot and Goletti (2000), a simple version of the basic methodology expresses the change in household welfare as:

$$
\begin{array}{c}
\text{Proportional} \\
\text{change in welfare}
\end{array}
=
\begin{bmatrix}
\text{Proportional} \\
\text{change in} \\
\text{prices}
\end{bmatrix}
*
\begin{bmatrix}
\text{Share of item} \\
\text{produced in} \\
\text{net income}
\end{bmatrix}
-
\begin{bmatrix}
\text{Share of item} \\
\text{consumed in} \\
\text{expenditures}
\end{bmatrix}
$$

Given the same change in producer and consumer staple price, the net effect on household welfare would depend on household condition as net seller or net buyer. If staple price increases, a welfare gain in the short run is expected when the household is net seller and welfare losses when the household is a net buyer.

The assumption that the proportional change in prices is the same in the production and the consumption sides may not be valid. Asymmetries in the transmission of price changes in the two sides, would justify differential proportional changes in prices. Depending for instance on the degree of market concentration (monopsonistic power in crop sales, or monopolistic power in food purchases), or the homogeneity of the staple produced and consumed (processed or not), seasonality issues etc, usually the proportional change in the price of the crop sold should be lower than the change in the price of the purchased staple for

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[6] An original version was suggested by Nicita, Olarreaga and Soloaga (2002).
[7] A theoretical derivation of the welfare measures, considering the effect of price changes on households as consumer and producers is found in Minot and Goletti (2000).

consumption. In that case the welfare losses are underestimated. It should also be noticed that this approach does not take into account general equilibrium effects such as the effect of higher staple price on demand for labour and wage rates.

Bangladesh

Table 8 presents data on the budget share of food, non food and rice for urban and rural households by per capita expenditure quintiles in Bangladesh. As expected, lower income households allocate a higher proportion of their expenditure to food. This share is larger in rural household than urban households.

It is also noticed that the share of rice in food expenditure confirms its importance as staple food, represents between 29 percent and 54 percent of food expenditure in rural area and between 18 percent and 44 percent in urban area. FAO estimates of per capita daily energy availability in Bangladesh shows that 82.5 percent of dietary energy is derived from cereals and 81 percent comes from rice alone[8] (FAO, 1996).

Given the previous scenario, how changes in rice price would affect the welfare of households in Bangladesh?[9]

Table 8. Bangladesh: Budget shares of food, rice and non food items (%)

		Per Capita Expenditure Quintiles					
Rural		**1**	**2**	**3**	**4**	**5**	**All**
Food		69.30	67.46	64.57	60.76	49.99	59.31
Rice*		53.76	48.24	43.11	38.60	29.30	40.00
Non food		30.70	32.54	35.43	39.24	50.01	40.69
Urban							
Food		63.80	59.38	54.97	48.02	31.25	44.58
Rice*		43.95	36.25	29.47	24.06	18.03	27.48
Non food		36.20	40.62	45.03	51.98	68.75	55.42
Total							
Food		68.80	65.83	62.69	57.64	41.15	54.63
Rice*		52.24	45.92	40.16	34.14	23.76	36.72
Non food		31.20	34.17	37.31	42.36	58.85	45.37

*Share of food expenditure

Table 9 displays the short run effect of a 10 percent increase in rice price[10] on the net income of households by expenditure quintile. It is assumed that both producer and consumer prices

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[8] The emphasis on cereals as main source of calorie intake gives causes for serious concern about the quality of diet.

[9] The extent to what changes in international prices are transmitted from border prices to the prices faced by households and domestic producers depends on the competitive structure of the distribution sector and on the quality of internal transport infrastructure (Gill, et al., 2003).

are increased by the same 10 percent. The findings reveal that both urban and rural households are losing. The household welfare losses are higher in the lower quintiles. It is also observed that a rural household exhibits higher welfare losses than an urban household from the increase in rice prices.

The description of the livelihood strategies in the previous subsection is able to explain the outcome. In particular households in the poorest rural quintile in Bangladesh, earn on average 63 percent of their income from on and off farm wages (annex, pie graph 1b). Furthermore the vast majority of them are net food buyers (only 12 percent are net food sellers – table 7) .These characteristics on the base of the previous discussion, identify a household profile that price increases are expected to reduce its welfare as it is shown in table 9. The loss for the urban poorest quintile is somewhat lower and this can be justified by the fact that less than 60 percent of income comes from wages, while 23 percent is derived from crop production.

Table 9. Bangladesh: Effect of a 10 percent increase in the price of rice (%)

	Per Capita Expenditure Quintiles					
	1	2	3	4	5	All
Rural	-3.19	-2.60	-1.88	-1.64	-1.10	-1.83
Urban	-2.37	-1.90	-1.45	-1.09	-0.71	-1.26
Total	-3.02	-2.33	-1.83	-1.36	-0.94	-1.64

In table 10 the welfare effects to the rural households are further disaggregated by land quintiles as well. As expected the small land holders and the landless face the most serious consequences in terms of welfare reduction. The consistent result of bigger losses in large land owners maybe attributed to productivity reasons even though is difficult to convincingly justify the claim.

Table 10. Rural Bangladesh: Effect of a 10% increase in the price of rice (%)

	Rural Pc Expenditure Quintiles					
Land Quintiles	**1**	**2**	**3**	**4**	**5**	**All**
Landless	-3.26	-2.81	-2.28	-2.02	-1.41	-2.33
1	-3.72	-2.59	-2.19	-2.14	-1.66	-2.31
2	-3.10	-2.88	-2.34	-1.66	-1.23	-1.76
3	-1.77	-2.55	-1.61	-1.45	-0.86	-1.44
4	-2.49	-1.33	-1.06	-0.85	-0.74	-0.99
5	-5.09	-2.45	-0.23	-1.09	-0.79	-0.98

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[10] As of Food Outlook (2007), price increases at world markets, for the basic staples the past years were very high, exceeding even 100 percent in some cases. Considering a hypothetical change of 10 percent price change in the present experiment, maybe considered to capture the lowest possible impact on welfare.

Malawi

In exploring the case of Malawi, table 11 presents the budget shares of food and non food items by expenditure quintiles. Unsurprisingly, food share exhibits higher value with lower income, ranging from 62 percent in the button quintile to 56.5 percent the top quintal in rural area and from 61 percent to 36 percent, respectively, in the urban area.

Table 11. Malawi: Budget shares of food and non food items (%)

	Per Capita Expenditure Quintiles					
Rural	**1**	**2**	**3**	**4**	**5**	**All**
Food	62.08	61.97	62.04	60.47	56.51	59.90
Non food	37.92	38.03	37.96	39.53	43.49	40.10
Urban						
Food	61.05	58.72	55.94	48.78	36.06	45.60
Non food	38.95	41.28	44.06	51.22	63.94	54.40
Total						
Food	62.11	61.73	61.50	60.29	49.37	56.72
Non food	37.89	38.27	38.50	39.71	50.63	43.28

Table 12. Malawi: Share of maize in total calorie per capita consumption (%)

	Per Capita Expenditure Quintiles					
	1	**2**	**3**	**4**	**5**	**All**
Rural	72	65	62	56	51	61
Urban	65	55	51	45	35	50
Total	72	65	60	55	48	60

Table 13. Malawi: Effect of a 10 percent increase in the price of maize (%)

	Per Capita Expenditure Quintiles					
	1	**2**	**3**	**4**	**5**	**All**
Rural	-1.23	-0.57	-0.23	-0.02	0.53	-0.17
Urban	-2.56	-1.95	-1.38	-1.19	-0.22	-1.12
Total	-1.26	-0.64	-0.37	-0.23	-0.13	-0.35

Table 14. Rural Malawi: Effect of 10 percent increase in the price of maize (%)

	Rural Pc Expenditure Quintiles					
Land Quintiles	**1**	**2**	**3**	**4**	**5**	**All**
Landless	-1.72	-1.46	-1.23	-0.77	-0.37	-0.74
1	-1.86	-1.40	-1.02	-0.89	-0.25	-0.99
2	-1.49	-0.97	-0.32	-0.42	0.50	-0.52
3	-1.20	-0.72	-0.21	-0.08	0.39	-0.33
4	-0.89	-0.22	0.05	0.44	0.52	0.07
5	-0.36	0.26	0.36	0.51	1.78	0.75

Regarding consumption of maize[11], table 12 shows that maize is the main source of calorie intake in Malawi. Poorer households in both rural and urban areas consume a much higher share of maize source in their daily per capita calorie intake when compared with the highest quintal. The poorest 20 percent of the households in rural area derives 72 percent of their daily per capita calorie consumption from maize, and the same group in the urban area derives 65 percent of calorie from this source. This fact has important implications for household food security status when changes in maize price are taking into account.

Table 13 shows the short run effect of a 10 percent increase in maize prices on the net income of households by expenditure quintile. Overall, the results suggest small welfare loses for urban (-1.2 percent) and marginal for rural households (-0.17 percent). The tabulation of welfare losses by expenditure quintiles indicates that the poorest households exhibit higher welfare losses than the wealthiest households. It is also observed that the wealthiest 20 percent of households in rural area gains from the increase in maize price even in the short run. The associated livelihood profile in terms of high contributions of crop income in household earning seems to justify the result even though market participation is small. Finally table 14 tabulates the welfare changes by land quintiles as well. The pattern of losses for the poorest and landless or small landholders is evident to Malawi as in Bangladesh. Noticeable result is that owners of land that belong to the fifth quintile seem to benefit from the staple price increase even in the short run.

As we saw earlier in the discussion regarding the decomposition of income, in Bangladesh, the share of income from crop production of the bottom 20 percent of rural households represents only 5 percent of total income, while in Malawi counts for 40 percent. Another remarkable difference refers to high proportions of landless households. In Bangladesh, 66 percent of rural households at the lowest quintile are landless, while in Malawi only 5 percent of rural households are in this condition. These facts could be one of the reasons behind the higher welfare losses in rural households in Bangladesh, where landless and casual workers are the worst off, when compared with the Malawian rural households.

5. Conclusions and Policy Implications.

The present paper attempted to shed some light in the welfare impact of the continuously upward trending food commodity prices the recent years. Using a subset of 5 country surveys,

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[11] We thank Carlo Azzari for providing the data for the maize shares in Malawi.

that belong to the uniquely rich RIGA-FAO database, preliminary descriptive evidence is presented that characterizes the groups of households most likely affected (positively or negatively) because of the soaring prices. The analysis differentiated the expected welfare outcomes through time, since the impact eventually, but not immediately, will modify the structure of the established modes of economic activity. Nonetheless, the relative market position appears to be the crucial factor that differentiates winners from losers both in the short and the long run.

Unless strong substitution effects towards cheaper food items are present, in the short run the majority of the households will see their welfare deteriorating. Net selling positions in the food markets of the developing world, characterize only a small proportion of relatively wealthier and market oriented rural households. Thus poverty rates are expected to increase initially.

On the other hand and when the production structure adapts to the price changes, possibilities for welfare gains appear for some specific household categories. The households that earn their livelihood from agriculture, as self-employed farmers, will be able to appropriate wider marketing margins. The efforts to increase farm production create general equilibrium effects, which may diffuse benefits to household groups that are owners of other production factors necessary to increase production (casual wage labourers in agriculture).

The findings for Malawi and Bangladesh constitute a preliminary test of robustness regarding the effects of soaring prices on poverty. The results suggest that potential short run losses and gains in household welfare, are country specific and closer attention needs to be paid to the household characteristics as consumer and producer of a staple food. Net buying positions in the food markets associated with low market participation, that characterize not only the case studies of the present paper but the majority of the developing economies, could explain the welfare losses in rural and urban areas. Household access to resources and household income composition matters significantly in explaining these findings.

Nevertheless especially in agriculture based countries the soaring prices may be able to generate overall economic growth. Sufficiently developed market infrastructure with increased competition, identifies wider marketing margins for the (small-holder) farmers. If in view of the increased profitability opportunities, the agricultural sector manages to exploit its comparative advantage then its expansion associated with linkages to other sectors may contribute to overall growth.

It is necessary though, to be cautious against the possibility of *immiserising growth* that may be the outcome, if large groups of the population are hurt from the price increases. In particular and even if the agricultural production sector expands and feeds overall economic development, there is the possibility that significant parts of the population cannot appropriate any benefits. This may happen for instance, when landless unskilled rural workers are substituted for skilled labour. Furthermore, for urban households and irrespective of the time dimension, the impact of soaring food prices is negative. These groups usually constitute the core of the poor in the developing world as we saw in the present analysis.

In terms of policy, the appropriation of any benefits and on the other hand the minimization of welfare losses, require substantive intervention from policy makers. These policy interventions need to take into account the extensive levels of uncertainty that characterizes all groups of households in the developing world. In particular it seems that policy is necessary to interfere at three major levels.

Firstly, intervention is needed at the level of price transmission. Investment in institutions and physical infrastructure in order to develop adequately functioning competitive markets, allows the price increases to arrive to the farm gate. Meeting this precondition allows greater market participation and given the increases in food prices, assists in providing to the farmers the incentives to expand their production and increase their productivity.

Secondly, measures to increase the productivity of the farmers, especially the small land holders, are necessary. Greater use of fertilizer and improved seeds, increased technology adoption, may be achieved if subsidies that do not distort the price incentives are implemented. Such subsidies for example, may refer to preferential credit and/or input provision. Such policy interventions need not neglect the importance of supporting the asset base of the households, since research surveyed here, has shown that facilitates increased productivity and greater market participation.

Finally, as discussed in the paper, there exist groups of households that not depending on agriculture for their income generating activities, it is almost certain that their welfare will decline (e.g. urban dwellers). For these groups, safety nets are important in order to minimize as much as possible the increased cost of their food budget and enhance the threats in their food security.

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Annex.

Table 1. Proportion of households surveyed

	Bangladesh	Bulgaria	Guatemala	Malawi	Nepal
Rural	67.7	33.3	52.9	87.2	78.8
Urban	32.3	66.7	47.1	12.8	21.2
Total	100.0	100.0	100.0	100.0	100.0

Figure 1a. Share of household income from different activities along pc expenditure quintiles – Urban Bangladesh

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
23% 53%	24% 53%	26% 46%	29% 40%	28% 35%
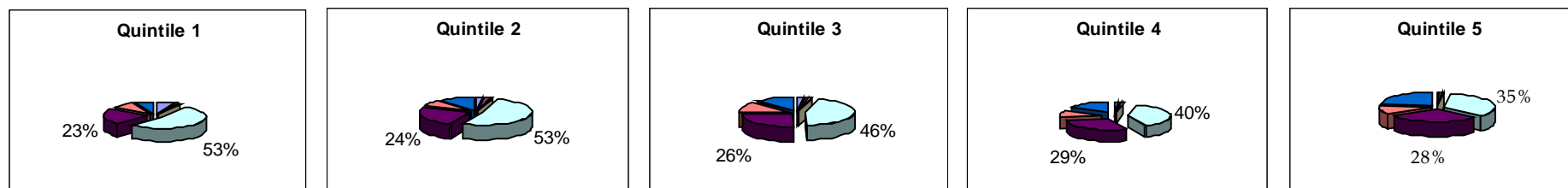
Figure 1b. Share of household income from different activities along pc expenditure quintiles – Rural Bangladesh

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
20% 43%	21% 25%	18% 21%	22% 20% 20%	23% 22%
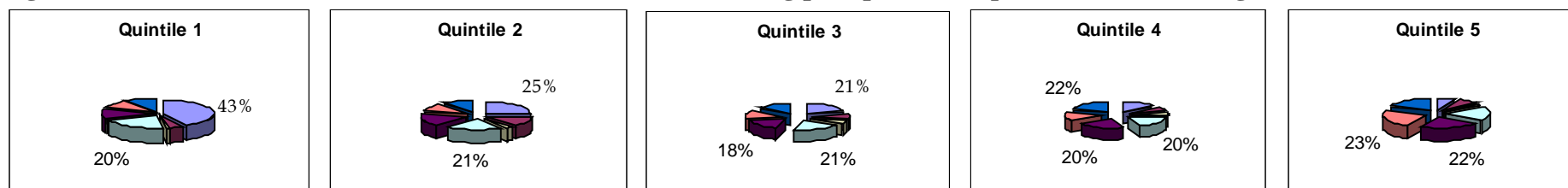
Figure 2a. Share of household income from different activities along pc expenditure quintiles – Urban Bulgaria

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
70% 18%	56% 30%	48% 33%	43% 40%	37% 38%
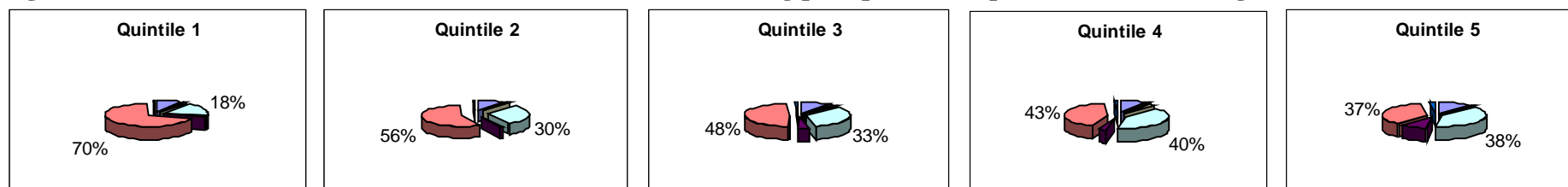
Figure 2b. Share of household income from different activities along pc expenditure quintiles – Rural Bulgaria

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
72% 9%	60% 13%	61% 13%	56% 13% 13%	57% 16%

■ Agriculture and fishing wage ■ Crop production □ Livestock
□ Non agricultural wage ■ Self employment ■ Total transfers
■ Other sources
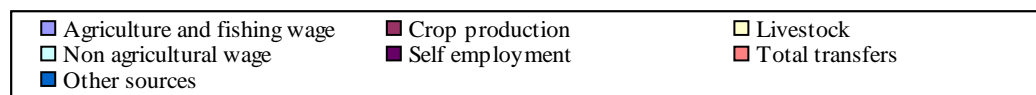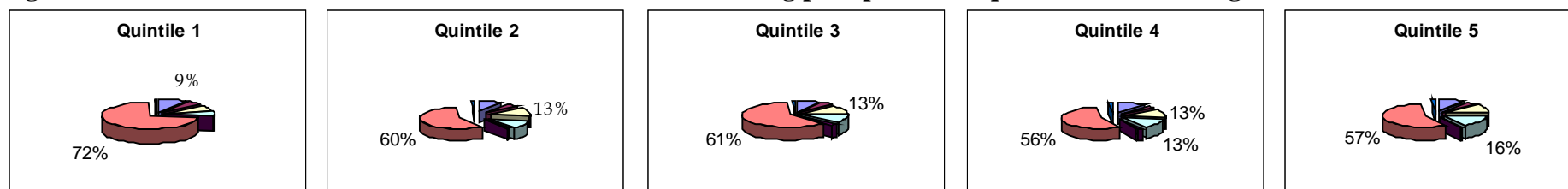
Figure 3a. Share of household income from different activities along pc expenditure quintiles – Urban Guatemala

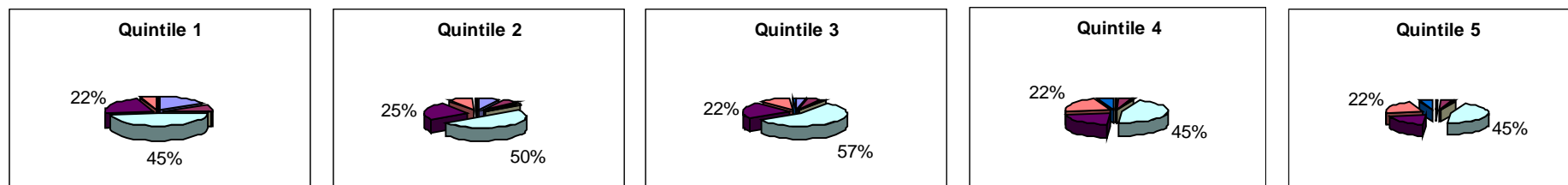| Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5

Figure 3b. Share of household income from different activities along pc expenditure quintiles – Rural Guatemala

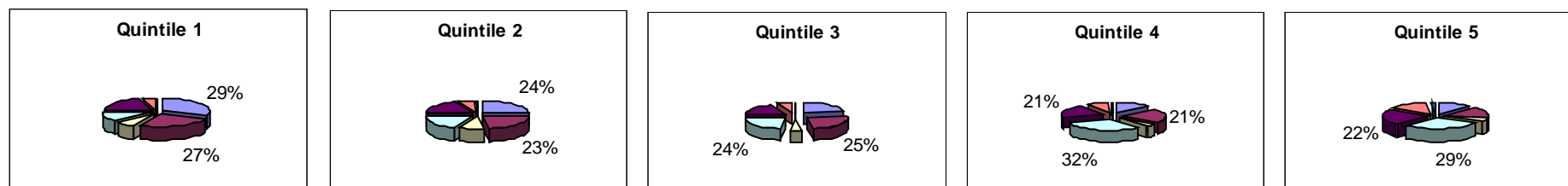| Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5

Figure 4a. Share of household income from different activities along pc expenditure quintiles – Urban Malawi

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
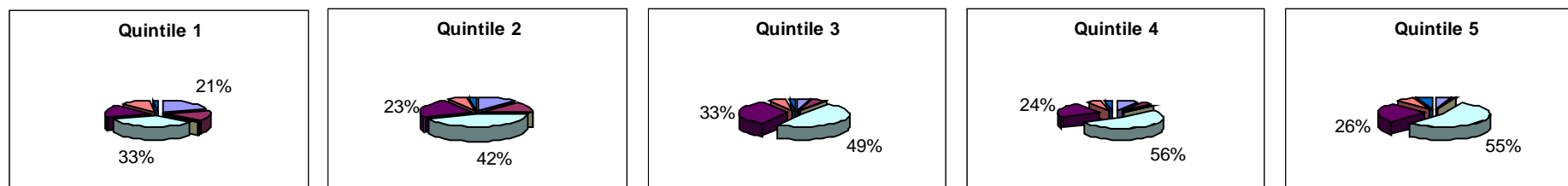
Figure 4b. Share of household income from different activities along pc expenditure quintiles – Rural Malawi

Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5

- Agriculture and fishing wage
- Crop production
- Livestock
- Non agricultural wage
- Self employment
- Total transfers
- Other sources

34
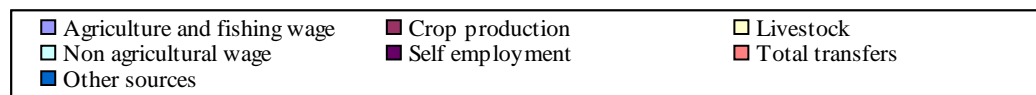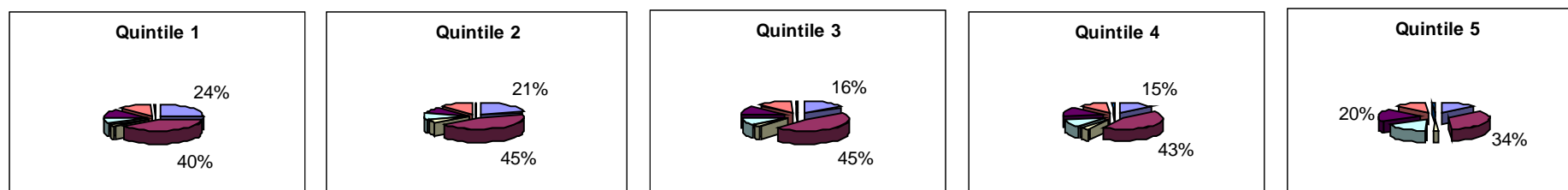
Figure 5a. Share of household income from different activities along pc expenditure quintiles – Urban Nepal

| Quintile 1 | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 |

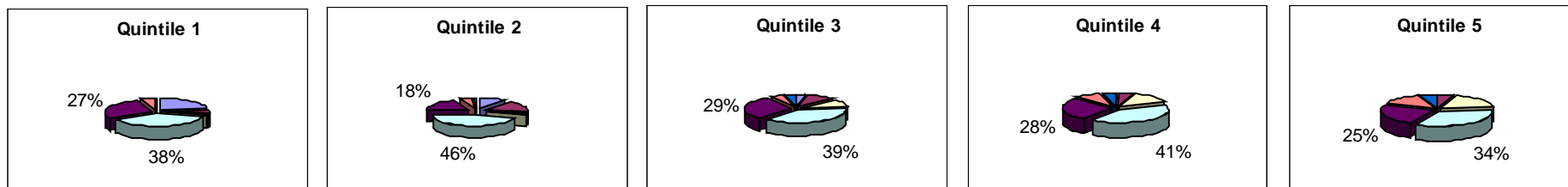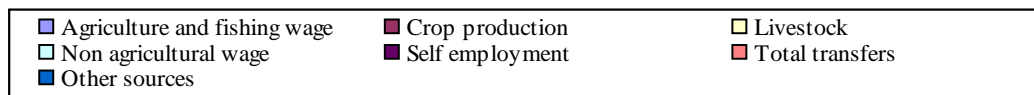**Figure 5b. Share of household income from different activities along pc expenditure quintiles – Rural Nepal**

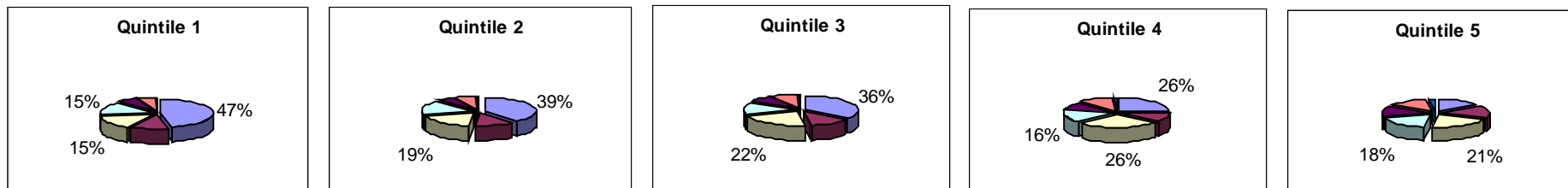| Quintile 1 | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 |

☐ Agriculture and fishing wage ☐ Crop production ☐ Livestock
☐ Non agricultural wage ☐ Self employment ☐ Total transfers
☐ Other sources

Table 3. Farm household market participation in Africa

Country	Crop	Year	% Sellers (g=gross, n=net)	Study
Ethiopia	Maize and teff	1996	25[n]	Jayne et al. (2006)
	Barley	1999-	10[g]	Levinsohn and Macmillan
	Maize	2000	23[g]	(forthcoming)
	Sorghum		11[g]	(rural households only)
	Teff		20[g]	
	Wheat		12[g]	
Kenya	Maize	1997	29[n]	Nyoro et al. (1999)
		1998	34[n]	
		1999	39[n]	Renkow et al. (2004)
		2000	30[n]	Jayne et al. (2006)
Madagascar	Rice	1990	32[g]	Barrett and Dorosh (1996)
		2001	25[n]	Minten and Barrett (2006)
Mozambique	Basic food	1996-7	14[g]	Heltberg and Tarp (2002)
	Maize	2001-2	30[g]	Boughton et al. (2007)
	Maize	2005	16[g]	Tschirley and Abdula (2007)
	Rice	2002	43[n]	
Rwanda	Beans	1986-7	22[n]	Weber et al. (1988)
	Sorghum		24[n]	
Somalia	Maize	1986-7	39[n]	Weber et al. (1988)
Tanzania	Food	2003	33[n]	Sarris et al. (2006)
Zambia	Maize	2000	26[n]	Jayne et al. (2006)
Zimbabwe	Maize	1984-5	45[n]	Weber et al. (1988)
	Grains	1996	27[g]	Govereh and Jayne (2003)

Source: Reproduced from Barrett (2008)

Appendix. Why Agricultural Food Prices Increased?

Lately a range of factors has contributed, in increasing demand for agricultural commodities that resulted in increasing prices. The discussion regarding the reasons behind the food price increases is not reproduced here, but some basic points are reported in bullet form along with some figures and tables reproduced from the analysis of von Braun (2007). In von Braun (2007) and Shmidhuber (2006), more in depth analysis of the factors can be found. The most important of them refer to the high growth rates of the developing countries, the increasing urban relative to the rural population and the observed shift of preferences towards higher value agricultural production in large counties like China and India. Tables 1 and 2 of this appendix indicate the shift of the preferences for some developing countries including China.

Table 1—China: Per capita annual household consumption

	Urban			Rural		
	1990 (kg)	2006 (kg)	2006/1990 ratio	1990 (kg)	2006 (kg)	2006/1990 ratio
Grain	131	76	0.6	262	206	0.8
Pork, beef and mutton	22	24	1.1	11	17	1.5
Poultry	3	8	2.4	1	4	2.8
Milk	5	18	4.0	1	3	2.9
Fish and aquatic products	8	13	1.7	2	5	2.4
Fruits	41	60	1.5	6	19	3.2

Source: Data from National Bureau of Statistics of China 2007a and 2007b.

Reproduced from von Braun (2007)

Table 2—Change in food-consumption quantity, ratios 2005/1990

|	India	China	Brazil	Kenya	Nigeria
Cereals	1.0	0.8	1.2	1.1	1.0
Oil crops	1.7	2.4	1.1	0.8	1.1
Meat	1.2	2.4	1.7	0.9	1.0
Milk	1.2	3.0	1.2	0.9	1.3
Fish	1.2	2.3	0.9	0.4	0.8
Fruits	1.3	3.5	0.8	1.0	1.1
Vegetables	1.3	2.9	1.3	1.0	1.3

Source: Data from FAO 2007a.

Reproduced from von Braun (2007)

At the same time movements on the food production stock do seem to contribute to price increases. Such factors refer to the deterioration of stocks resulting from adverse supply shocks (weather conditions and reduced plantings). In figure 2 the gradual decline in food

production stocks is depicted. Furthermore the contribution of agriculture in the GDP even for developing countries is forecasted to decrease as a result of global warming.

The increasing demand for biologically produced energy need not be neglected. The evidence that prices of energy and cereal goods are linked is strong and increasing. Preliminary analysis suggests that agricultural commodity prices move in the limits set by their energy equivalent price (floor), while a ceiling may be formed as well (set by the price of the competing energy resources). Simulations project that increasing trends on food staples will continue and most importantly will be accompanied with decreasing calorie availability especially for the poorer regions of the world. Table 5 presents the expected increases on prices of agricultural commodities used as bio-fuels. The results are based on experiments that simulate a lighter and a stronger increase in the demand for the commodities (sugar, maize).

Figure 2—World cereal stocks, 2000-2007
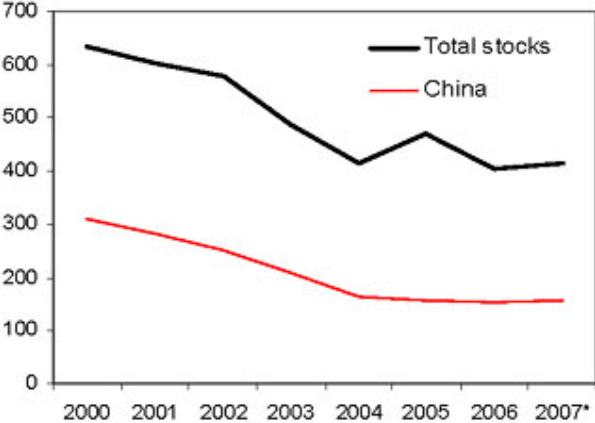
Source: Data from FAO 2003, 2005, 2006b, and 2007b.   Note: Data for 2007 are forecasts.

Reproduced from von Braun (2007)

Table 5—Changes in world prices of feedstock crops and sugar by 2020 under two scenarios compared with baseline levels (%)

Crop	Scenario 1 Biofuel expansion [1]	Scenario 2 Drastic biofuel expansion [2]
Cassava	11.2	26.7
Maize	26.3	71.8
Oilseeds	18.1	44.4
Sugar	11.5	26.6
Wheat	8.3	20.0

Source: IFPRI IMPACT projections.
Notes: [1]Assumptions are based on actual biofuel production plans and projections in relevant countries and regions.
[2]Assumptions are based on doubling actual biofuel production plans and projections in relevant countries and regions.

Reproduced from von Braun (2007)

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