6 CONCLUSIONS

Price increases in key food staple crops can hinder domestic and household level food security depending on whether the country and households are, respectively, net-importers or exporters or net-producers or consumers of the food crop considered. This component of the Bioenergy and Food Security (BEFS) analysis allows identification of the foods for which the country is most vulnerable to price shocks and the segments of the population that are vulnerable to these shocks.

Rice is the main food staple in Cambodia and for most Asian countries. We show that in the case of Cambodia 2/3 of total calorie intake comes from rice. Due to this, the analysis presented has primarily focused on rice. Cambodia is a net exporter of rice and therefore the country as a whole can benefit from price increases in the price of rice.

In the analysis households are initially disaggregated by quintile and location, i.e. urban and rural. Based on the CSES 2004, 2.2 percent of the poorest quintile resides in urban areas, while 17.1 percent live in rural areas.

The analysis shows that, at the household level, increases in the price of rice are beneficial for all segments of the population. This is also the case when distinguishing between urban and rural poor, although the benefit accrued by the urban poor is marginal. When adding household characteristics such as land ownership and gender of the household head, we find that some segments of the poor are hurt by the price increase. In the case of land ownership, all landless poor are negatively impacted by rice price increases. In the case of the gender of the household head, the analysis shows that urban female headed households are hurt by an increase in the price of rice. Overall, land ownership status has a larger impact on welfare results compared to gender status.

The welfare analysis presented is based on a hypothetical 10 percent price change on the producer side which can be compared to recent price movements or price movements obtained from economic simulations. Recent price movements are also discussed in the paper. Key food staples' prices surged in Cambodia between 2007 and 2008 and then tapered off during 2009, although remaining at high levels compared to previous periods. Between 2007 and 2008 the price of rice mix, the low quality rice, increased by 101 percent.

In conclusion, from a food security perspective, the price of rice should be monitored closely for particular segments of the population as described in the analysis, although overall the increase in the price of rice can be beneficial for Cambodia.

1 METHODOLOGICAL BACKGROUND FOR THE ASSESSMENT OF NET HOUSEHOLD WELFARE IMPACTS

An outline of the procedure used to calculate the net welfare impacts of price changes at the household level is given here. For the full technical details the reader is referred to the complete BEFS Analytical Framework.

The methodology was initially provided in Deaton (1989), then followed by a number of empirical applications by other authors including Budd (1993), Barrett and Dorosh (1996), Minot and Goletti (1998, 2000) and, recently, Ivanic and Martin (2008). Here we apply the methodology as described in Minot and Goletti (2000).

The impact of a price change on household welfare can be decomposed into the impact on the household as a consumer of the good and the impact on the household as a producer of the good. The net welfare impact will be the difference between the two. Therefore if we set the demand and supply side elasticities equal to zero, thus ignoring consumer and producer side response to price changes, the short run welfare impact on households is calculated as

$$(1) \qquad \frac{\Delta w^1}{x_0} = \%P_{p,i} \cdot PR_i - \%P_{c,i} \cdot CR_i$$

where $\dfrac{\Delta w^1}{x_0}$ is the first order approximation of the net welfare impact on producer and consumer households deriving from a price change in commodity i, relative to initial total income x_0 (in the analysis income is proxied by expenditure)

$P_{p,i}$ is the producer price of commodity i

$\%P_{p,i}$ is the change in producer price for commodity i

PR_i is the producer ratio for commodity i and is defined as the ratio between the value of production of i to total income (or total expenditure)

$P_{c,i}$ is the consumer price of commodity i

$\%P_{c,i}$ is the change in consumer price for commodity i.

CR_i, is the consumer ratio for commodity i and is defined as the ratio between total expenditure on commodity i and total income (or total expenditure).

Assumptions made on the producer and consumer price changes have proven to be crucial in the welfare impact assessment analysis[5]. In the analysis presented here we

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5 For a technical discussion and proof on this assumption and its implications the reader may refer to Dawe and Maltsoglou (2008). The document shows the effects of these assumptions on the estimated net welfare effects.

assume that marketing margins are constant in absolute terms. This assumption entails that producer price changes will be larger than consumer price changes in percentage terms and that the percentage producer price change is equal to the percentage consumer price change weighted by the consumer to producer price ratio as shown in (2).

(2)
$$\%P_p = \left(\frac{P_c}{P_p}\right) \cdot \%P_c$$

The consumer and producer price ratio can be calculated using commodity price data, aggregate survey data, macroeconomic data or a mixture of these. In the analysis presented in this paper we use aggregate survey and macroeconomic data to calculate the price ratio. It can be shown that in the case of a self-sufficient commodity the ratio of the consumer to producer price is equal to the total consumer expenditures *(CE)* divided by the gross production value *(PV)*, as showed in the following equation (3).

(3)
$$P_C/P_F = CE/PV$$

If the country is not self-sufficient in the production of the commodity being considered, an adjustment is needed to account for the consumption share of the good that is imported (or the production share that is exported). In this case the calculation is amended as shown in equation (4).

(4)
$$P_C/P_F = CE'/PV$$

where *CE'= CE•(PROD/CONS)*, *PROD* is domestic production and *CONS* is domestic consumption. In the results presented we use a hypothetical price variation of 10 percent on the producer side and evaluate the consumer price change based on the calculations outlined above.

The analysis also accounts for purchasing power differences between urban and rural locations and processing factors depending on the crop being considered.

2 ADDITIONAL TABLES

Household access to energy in urban areas, rural areas and for the whole country.

Table 10

Household energy access by quintile and location

Urban					
Quintile	Public provided electricity	Privately generated electricity	Battery	Kerosene lamp	Other
1	6.4	3	9.4	78.3	3
2	15.5	9	11.9	61.9	1.4
3	29.4	10	16.8	42.4	1.5
4	57.5	14.3	9.9	18.2	0.2
5	82	10.7	3.1	4.2	0.1

Rural					
Quintile	Public provided electricity	Privately generated electricity	Battery	Kerosene lamp	Other
1	1.1	0.8	16.3	80.4	1.4
2	1.8	2.2	25.4	69.6	0.9
3	2.5	3.9	31.3	61.6	0.6
4	6	9.8	35.5	48.4	0.3
5	20	18.9	31.5	28.9	0.5

Total					
Quintile	Public provided electricity	Privately generated electricity	Battery	Kerosene lamp	Other
1	1.7	1.0	15.5	80.2	1.6
2	3.4	3.0	23.8	68.7	1.0
3	6.4	4.8	29.2	58.8	0.7
4	16.2	10.7	30.4	42.5	0.3
5	45.2	15.5	20	18.9	0.4

Source: CSES 2004

Household level welfare impacts due to a 10 percent price increase for rice by region.

Table 11

Rice household welfare impacts by region (percent)

Region	Welfare change (percent)
Banteay Mean Chey	0.86
Bat Dambang	0.65
Kampong Cham	-0.01
Kampong Chhnang	0.26
Kampong Speu	0.71
Kampong Thum	0.18
Kampot	0.25
Kandal	0.06
Kaoh Kong	-0.32
Kratie	0.14
Mondul Kiri	-0.50
Phnom Penh	-0.24
Preah Vihear	0.01
Prey Veaeng	0.89
Pousat	0.32
Rattanak Kiri	1.20
Siem Reab	0.03
Krong Preah Sihanouk	-0.13
Stueng Traeng	0.79
Svay Rieng	0.30
Takaev	0.62
Oudor Mean Chey	0.75
Krong Kaeb	0.05

Source: Calculations by the authors

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There has been widespread concern regarding the surge in staple food prices over the last few years and biofuel developments have been widely recognized, although to a varying degree, as one of the key drivers of the recent price surge and increased price volatility. Within the Asian context, food security conditions are mostly related to rice production and the price of rice. The analysis presented in this paper sheds light on the impacts of the increase in the prices of key food staples on different household groups and identifies the vulnerable segments of the population. The analysis shows that generally Cambodia gains from an increase in the price of rice although particular segments of the poor stand to lose. The analysis concludes that from a food security perspective, the price of rice should be monitored closely while considering the identified vulnerable household groups.