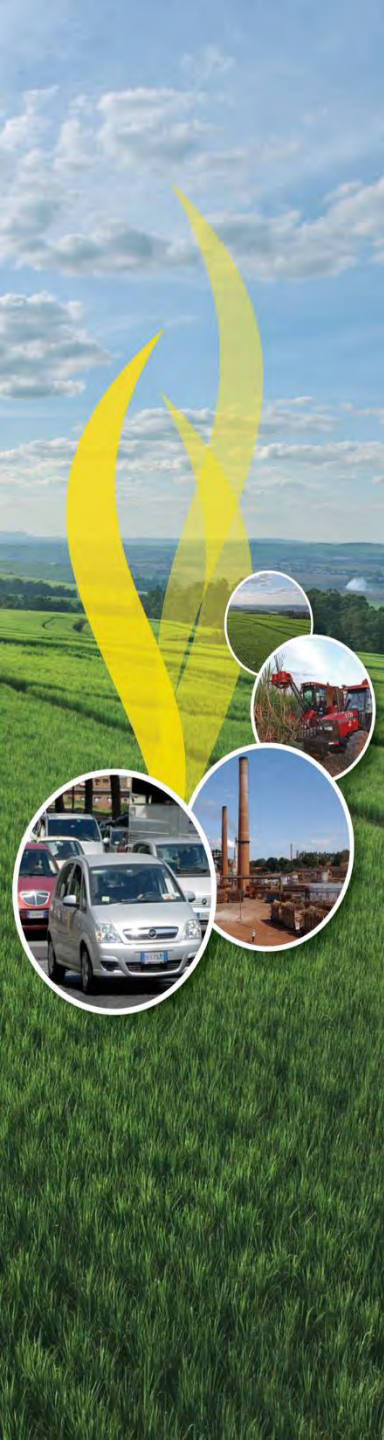


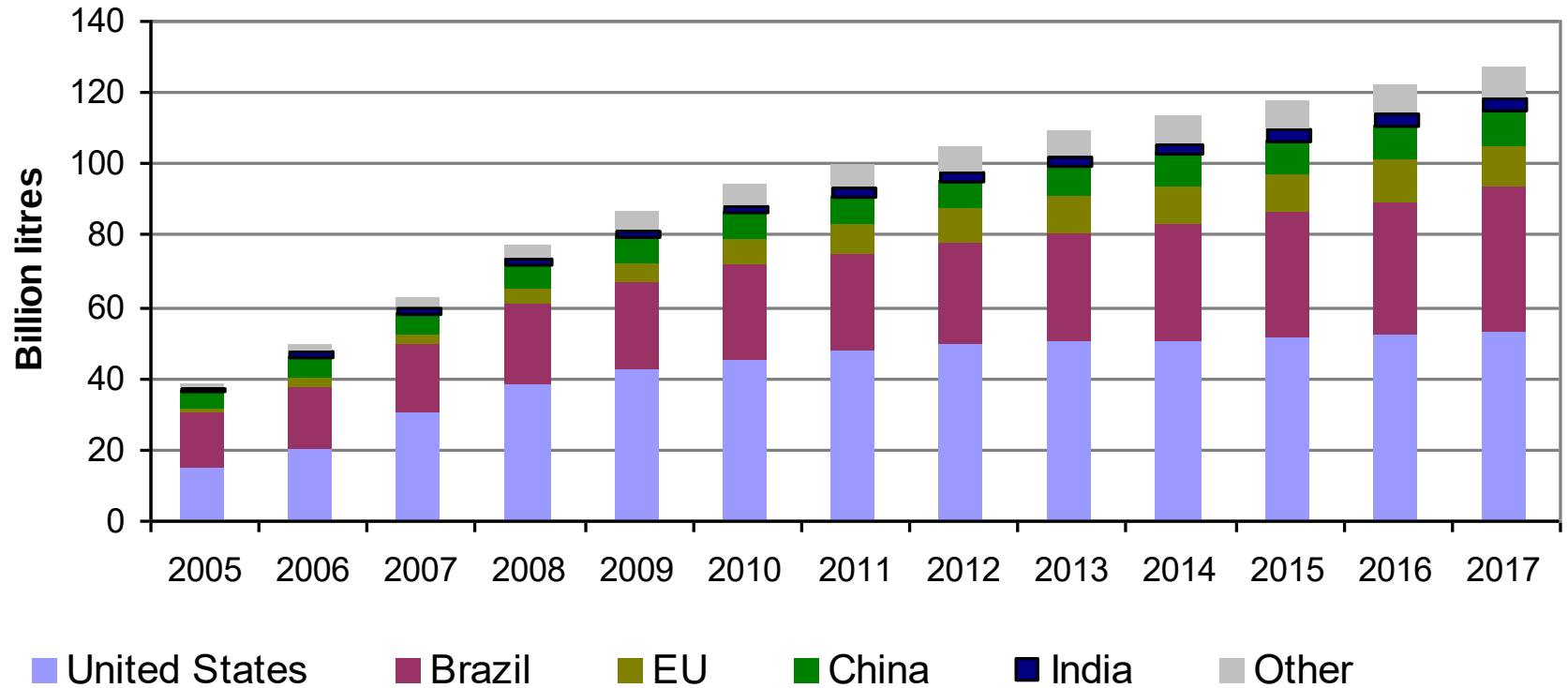
The State of Food and Agriculture 2008

Biofuels: prospects, risks and opportunities

Food and Agriculture Organization
of the United Nations
October 2008

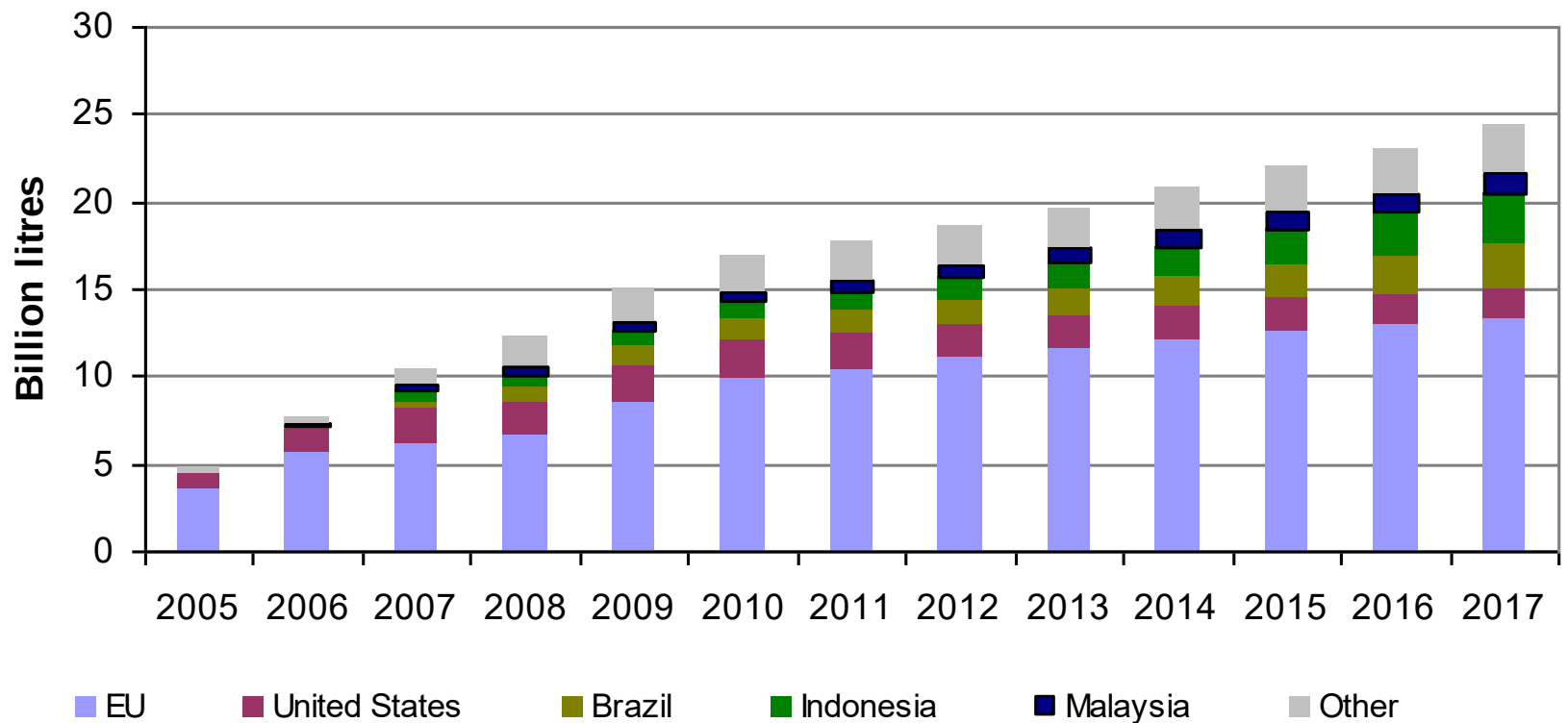


Ethanol production, 2005-2017



Source: OECD-FAO, 2008

Biodiesel production, 2005-2017

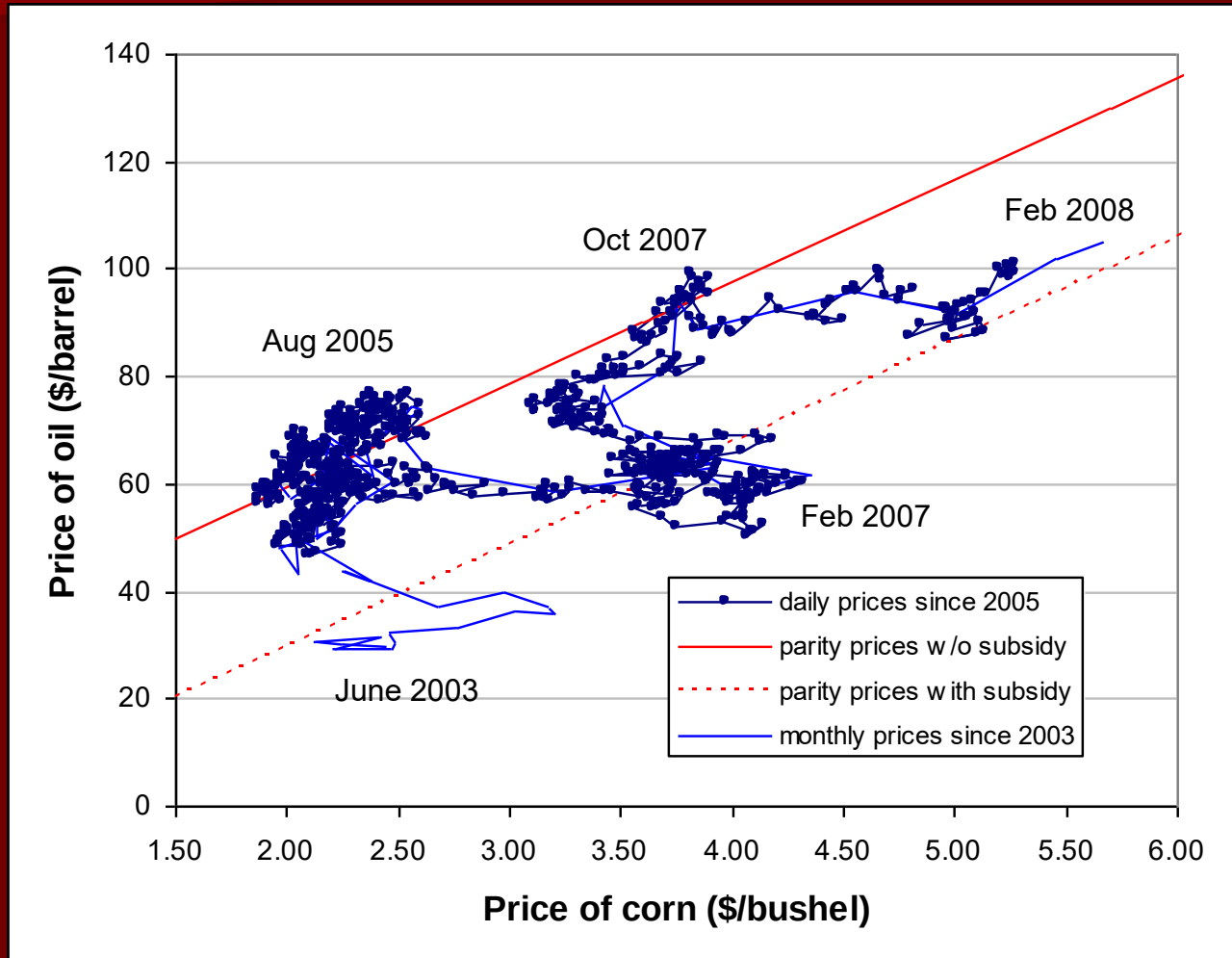


Source: OECD-FAO, 2008

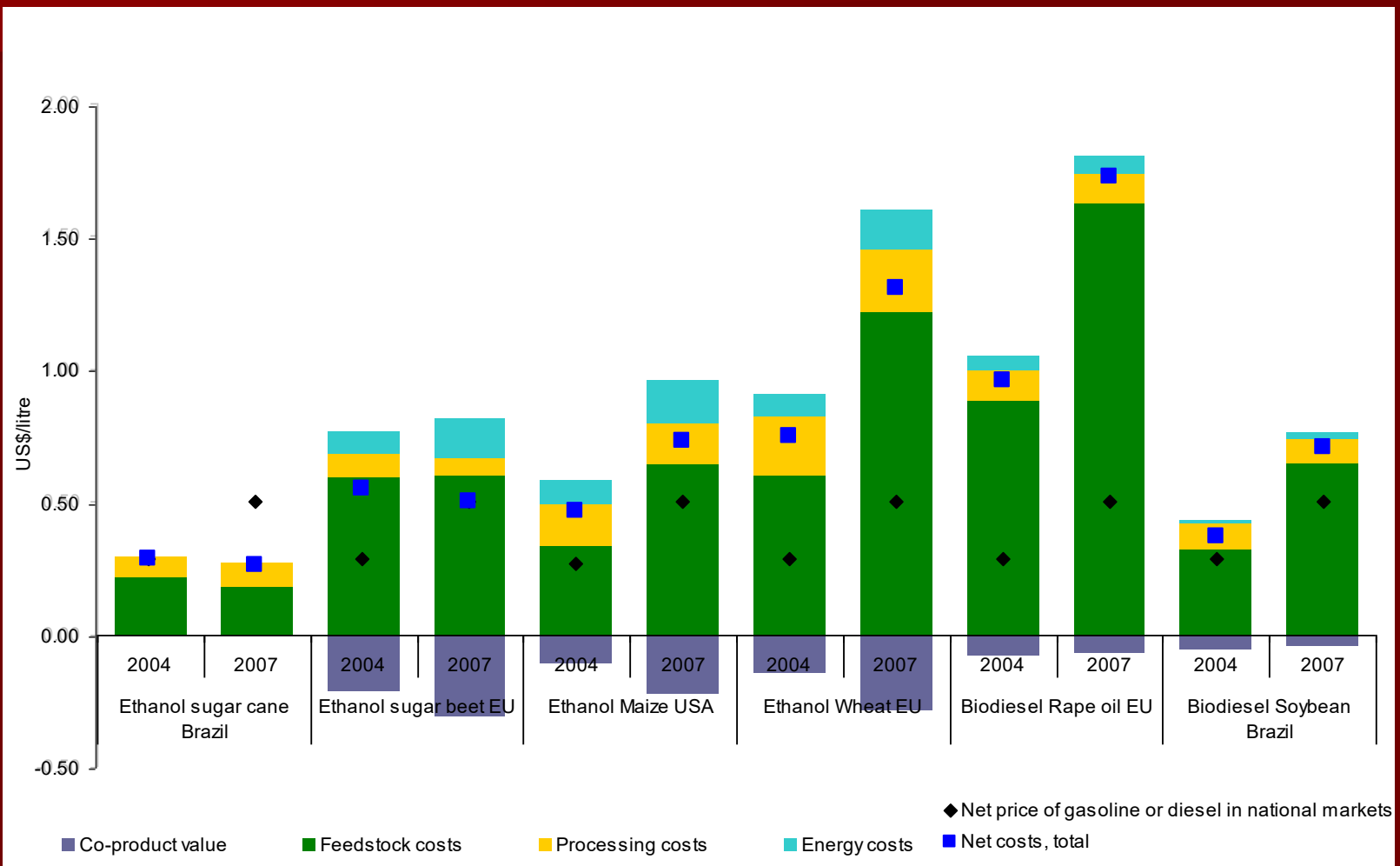
Biofuel development has been supported by policy measures

- goals include energy security, climate change mitigation and support for agriculture
- biofuel blending targets and support measures in Brazil, EU, US, China, India and many other countries
- total support over \$6 billion in US in 2006
- total support about \$5 billion in EU in 2006

Profits remain elusive as feedstock prices rise



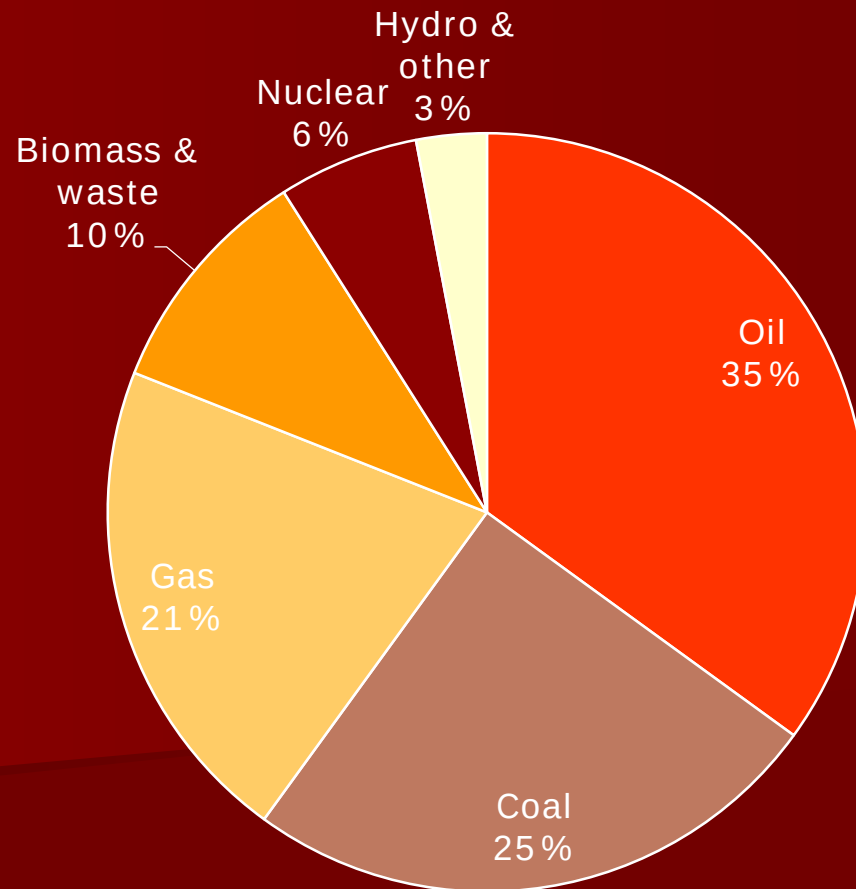
Production costs exceed net fossil fuel prices for most major biofuels



Key messages

- modest impact on energy security
- varying impacts on climate change
- significant impacts on agriculture and food security
 - short-term risks (*for some*)
 - longer-term opportunities (*for some*)
 - policy decisions are critical

Modest impacts on energy security



World
primary
energy
demand,
2005

...and varying impacts on greenhouse gas emissions...

- impacts vary with feedstock, location, agricultural practices and conversion technologies
 - 80-90 % reductions for Brazil sugarcane ethanol and 2nd-generation biofuels
 - 40-60 % reductions for EU rapeseed biodiesel
 - 10-30 % reductions for US corn ethanol
 - smaller reductions—or even increases—when land use change is considered

Land use change can be critical

- Searchinger et al (2008) estimate that increases in US maize area by 2016 could lead to an additional 10.8 million hectares of additional land being brought into cultivation worldwide, including 2.8 million hectares in Brazil (mostly soybean) and 2.2 million hectares in China and India (mostly in maize and wheat).

Land use change can be critical

- Fargione et al (2008) estimated that land use conversion releases at least 17 times as much carbon dioxide as these biofuels save annually by replacing fossil fuels.
- This “carbon debt” would take 48 years to repay in the case of Conservation Reserve Program land in the USA, and more than 400 years in the case of tropical peatland rainforest in Indonesia or Malaysia.

...but much bigger impacts on agriculture and food security

- a significant and growing share of agricultural land and commodities are used for biofuels

	Brazil	US	EU	World
Cropland	5% → 10%	2% → 5-10%	1% → 12-16%	1% → 3-4%
Output	50% of sugarcane → 65%	30% of corn → 40%	60% of rapeseed → ?	5% of cereals, 9% of vegetable oils, but <u>over half of the increase</u> since 2005

Biofuels are one of several key drivers of high food prices

- declining investment in agriculture
- weather-related production shortfalls
- rising energy costs
- exchange rates
- trade policies, e.g. export restrictions
- economic growth and changes in diet
- rapid growth in biofuels

Oil prices v. biofuels policies

- Abbott et al (2008) estimate that the US ethanol subsidy of \$0.51 per gallon leads to corn prices that are higher by about \$40 per ton. Thus, while biofuels policies are important, much of the increase in corn prices was due to other factors such as higher oil prices.

- A study by the OECD estimated that removal of all biofuels support policies, as distinct from biofuels production, would lead to a 7% decline in corn prices and a 5% decline in wheat prices.

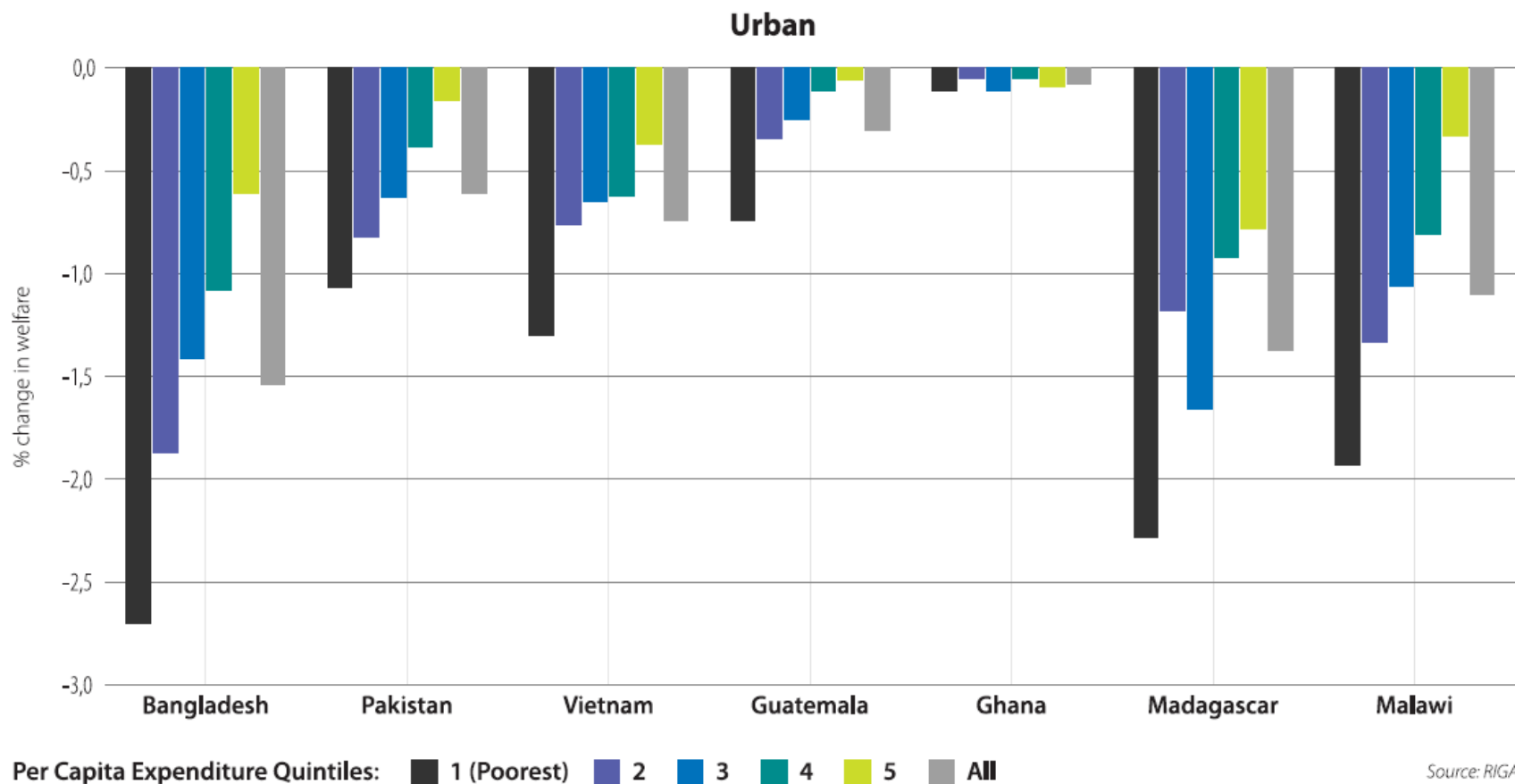
The Poor are Hit the Hardest by an Increase in the Price of Food Staples

- In urban areas, both rich and poor are hurt by higher food prices, but the poor are hurt more because a much larger share of their income is spent on food.

Price impacts on urban households

Figure 12

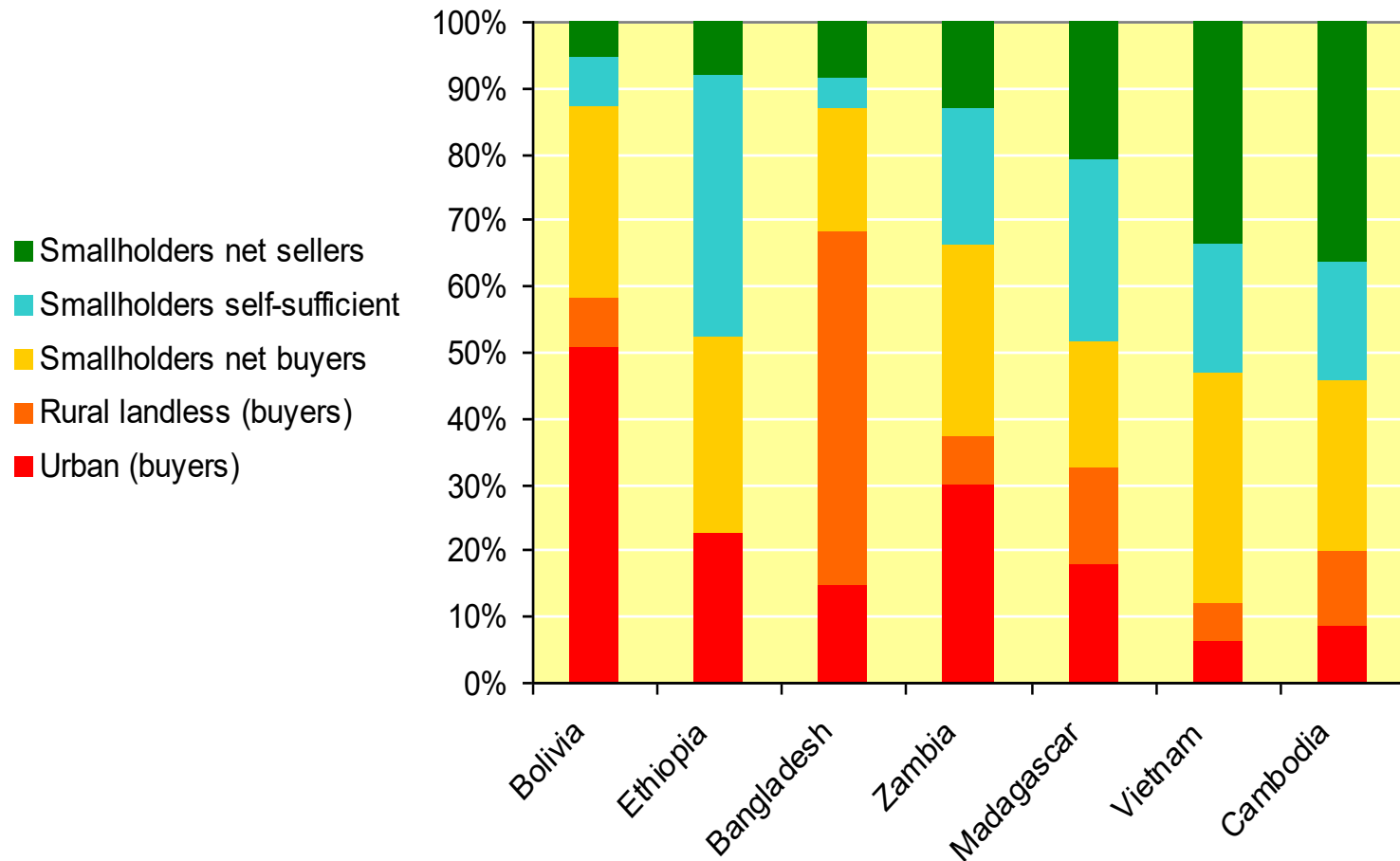
Percentage welfare gain/loss from a 10 percent increase in the price of the main staple, by income (expenditure) quintile



The Poor are Hit the Hardest by an Increase in the Price of Food Staples

- In rural areas, the poorest of the poor often have very small plots of land and are net buyers of food because they don't produce enough to feed their own family. Most of the benefits of higher prices go to farmers with relatively large amounts of land who produce a surplus for sale to markets.

Impacts will vary for net sellers and net buyers of staple foods

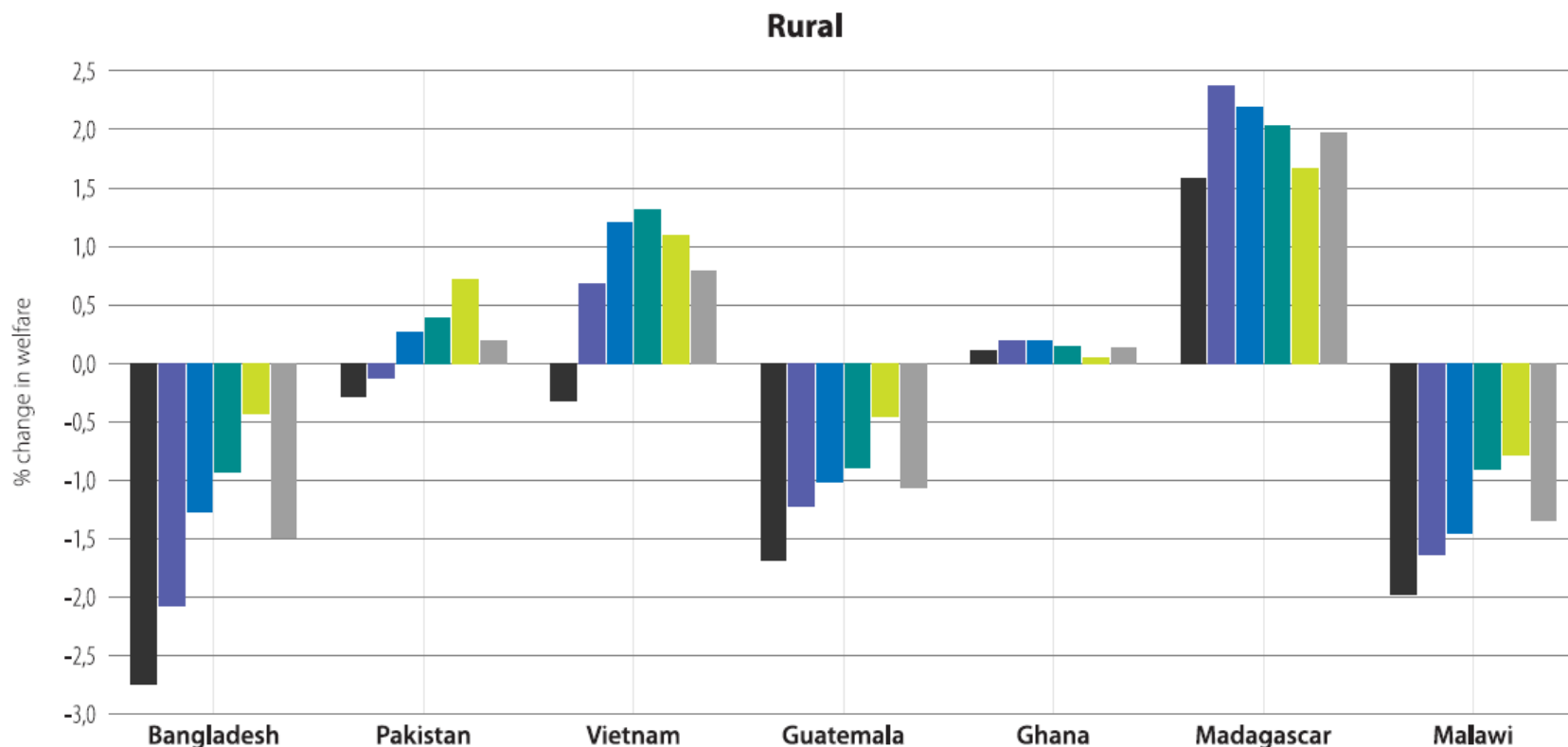


Source: World Bank 2007

Price impacts on rural households

Figure 12

Percentage welfare gain/loss from a 10 percent increase in the price of the main staple, by income (expenditure) quintile



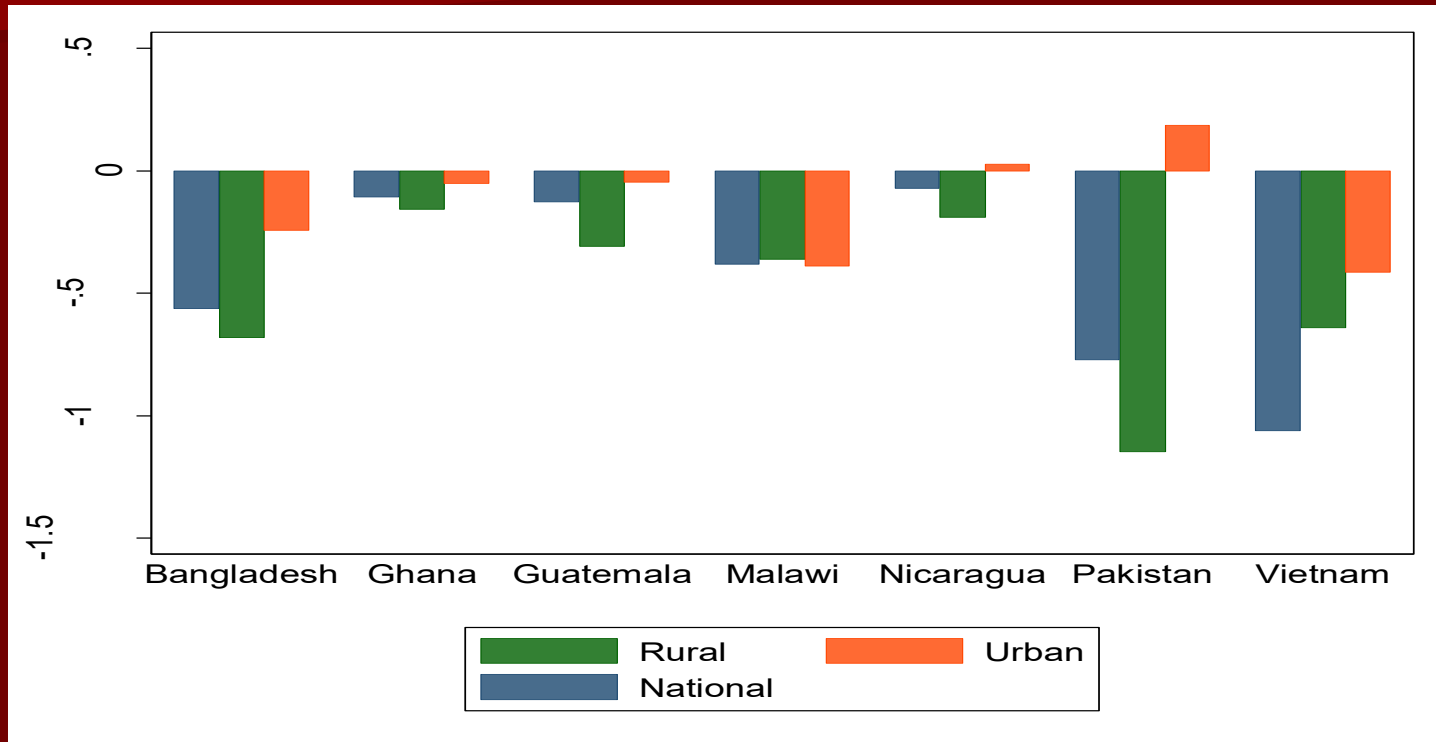
Per Capita Expenditure Quintiles: 1 (Poorest) 2 3 4 5 All

Source: RIGA

Female-Headed Households Are Hit Harder by High Food Prices

- In urban and rural areas, female headed households tend to spend a higher proportion of their income on food compared to other households at similar levels of income.
- In rural areas, female headed households tend to have less access to land, thus making it more difficult to benefit from high food prices.

Female-Headed Households Are Hit Harder by High Food Prices



Note: The graph shows the differential change in welfare between FHH (female-headed households) and MHH (male-headed households).

Labor markets

- Higher food prices can increase the demand for farm labor, which would benefit the poor because labor earnings are an important source of income for the poor.
- It can take several years or longer, however, before the wage increase is enough to compensate the poor for higher food prices.

Impacts of liquid biofuels depend on technology, policy and access to resources

- diverse impacts on net buyers and sellers at household and country levels
- employment opportunities depend on scale of production and technology
- rising resource values: opportunity and conflict
- short-term risk to the poor, but this could change in the longer term—with appropriate policy measures and agricultural sector response

Policy action is urgently needed

- protect the poor and food insecure
 - safety nets, access to resources, tenure security
- invest in agriculture and rural development
 - seeds, irrigation, technology, infrastructure, institutions
- ensure environmental sustainability
 - good practices
- review current biofuel policies
 - support 2nd-generation technologies, reduce trade barriers
- promote international policy coordination
 - food, agriculture, environment, trade, energy

2008

ISSN 0011-4539

THE STATE OF FOOD AND AGRICULTURE



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