Greener Pastures for Globalization: How European Farmers Can Help Save the Planet as Well as the Doha Round

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The advent of biofuels offers a new opportunity for agriculture to contribute to society by reducing trade rivalry. Biofuel production gives farmers a new source of income while helping to reduce external energy dependence. European farm support is also an impediment to global trade negotiations, and we believe a new food-fuel perspective can help overcome this by reconciling the needs of EU farmers and those in Europe and elsewhere who gain from more liberal international trade.

Two of the most momentous policy issues of modern times are climate change and globalization. Europe has shown consistent and remarkably unified leadership in the first context, yet the same cannot be said of its role in the latest round of WTO negotiations. The EU's path-breaking initiatives for carbon trading and affirmation of commitments beyond the Kyoto Protocol have given essential impetus to global greenhouse gas mitigation, and the European private sector has responded with alacrity to emerging green technologies and investment opportunities. In contrast to this, the EU (along with some other OECD economies) has consistently resisted the agricultural reforms necessary to facilitate competition in global food markets.

This paper poses a challenge to European farmers and policy makers to advance the trade agenda by expanding production of biofuels. Specifically, as the same feedstocks can be used to produce both food and fuel, we propose that EU policy makers alter EU farm policy to support the production of fuel rather than food and thus enhance competitiveness in global food markets. Doing so would help advance the current round of World Trade Organization (WTO) negotiations, the Doha Development Agenda (DDA), which seeks to further liberalize free trade but is currently deadlocked on the issue of agriculture protection.

The farm support agenda has always been premised on the importance of agriculture to European society, until now defined primarily in terms of food and direct environmental services. The advent of biofuel offers two dramatic new contributions from agriculture, greater domestic energy self-sufficiency and global greenhouse gas mitigation. Biofuels represent the remarkable option of substitution between two leading commodities, food and energy, within a single sector. Both are essential to Europe; one is in excess supply and the other largely imported and increasingly scarce. Until now, Europe has leaned toward self-sufficiency in the first commodity, while becoming ever more import-dependent on the other. A one-sided approach like this is rarely optimal, yet agricultural support has strongly biased the European food-energy portfolio in this direction because food was the primary source of farm livelihoods. Now that farmers can use their resources to earn income as energy producers, the EU has a wider range of food-energy portfolio choices.

Using detailed data on EU agricultural production and energy conversion estimates, our results indicate that Europe's existing crop potential could displace over 23 percent of its transportation fuel imports through domestic ethanol and biodiesel substitution. This is far in excess of current EU renewables targets, and the same strategy would necessitate significant food imports (without, it must be emphasized, a corresponding loss of EU farm livelihoods). At the other extreme, if production of biofuels were confined only to land that now produces food crops beyond EU self-sufficiency, only five percent of oil imports would be displaced. Surely, the optimum mix of imported and domestic food and energy lies somewhere in between. An essential feature of the biofuel option is that these decisions can be made in a way that offsets revenue losses for domestic agricultural interests.

Finally, 34 percent of aggregate farm balance sheets would be revenue-neutral at current ethanol and biodiesel prices given existing farm support levels, meaning revenues from crops that would earn a premium in biofuel markets rather than food markets could be used to offset losses to crops that would earn a premium in food markets rather than biofuel markets. An essential difference in this case, however, is that producer support for biofuel is not currently recognized as a trade distorting measure, and a significant portion of EU agriculture could be removed from the Doha negotiations. Ultimately, in the face of rising energy prices, there may be significant scope for unwinding support levels in these crop categories ($27.5 billion in 2004, about a quarter of producer income) and redirecting the fiscal savings to other priorities.

European Biofuel Capacity and the Potential to Increase Production

Although the EU biofuel sector is only just emerging, a substantial amount of European agriculture is already dedicated to crops that are eligible as biofuel feed stocks, including corn, sugar beet, wheat, barley, soybean, sunflower, etc. Figure 1 shows these crop portfolios for the EU27 economies, indicating crop-specific yields and the percent of all European output represented by each

country. Our results indicate that substantial potential exists across Europe to expand biofuel production, and this potential can be more fully realized if alternative uses (food) are evaluated with reference to more competitive international agricultural markets.

Food security must be a primary consideration for biofuel crop conversion, so it is reasonable to ask how self-sufficient EU economies are in these crops. Figure 2 shows that about half the EU27 are self-sufficient in aggregate biofuel crop production. Both France and Hungary, for example, are producing more than double their food requirements in biofuel-eligible crops. Clearly, there is significant potential within Europe to explore alternative uses.

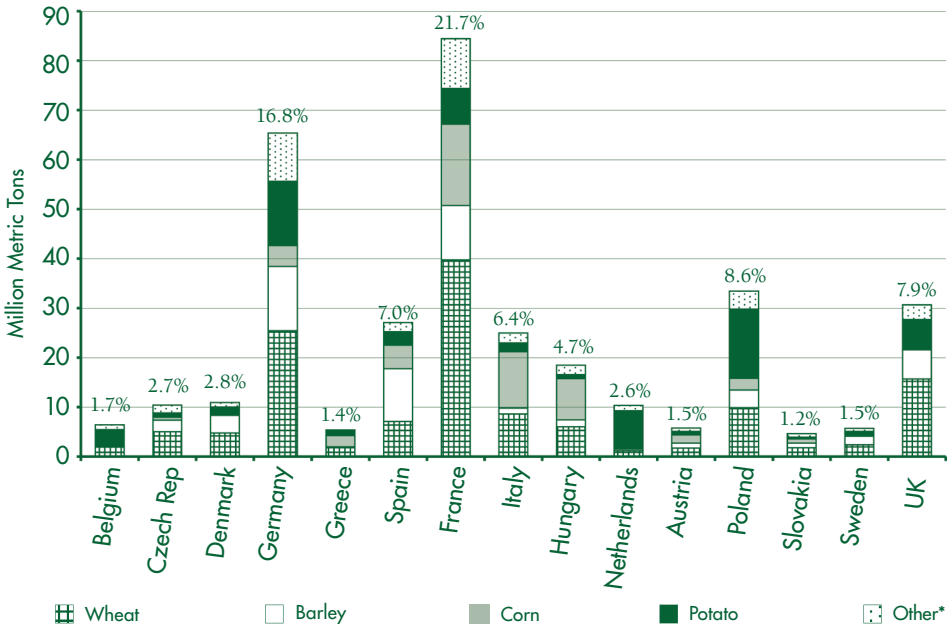
Opportunities to Mitigate Energy Import Dependence

Given the substantial existing production eligible for biofuel conversion, it is reasonable to ask how much Europe could reduce its current dependence on energy imports. Conversion of existing agriculture to biofuel raises issues of food security, but these have a compelling analogy in energy security. Food may be a more elemental human need, but energy is essential to modern society. Biofuel offers EU farmers an opportunity to defend basic living standards in both ways.

Using the crop- and land-use information of the previous section, combined with median estimates of biofuel yields and energy potential, our results indicate that the EU can reduce its current and long-term energy import dependence substantially.

Table 1, accompanied by country detail in Figures 3 and 4, represents two relatively extreme scenarios. In the first, we assume that all Europe's eligible crop production is converted to biofuel and used in the transportation sector. In this case, food needs in the same crops would have to be met by increased capacity (i.e., conversion from other crops) or imports.

Figure 1. Production of Potential Biofuel Crops, 2004



** Includes rapeseed, sunflower seed, soybean and sugar beet.*

Notes: Percentages are country percentages of total EU potential biofuel feedstock production.

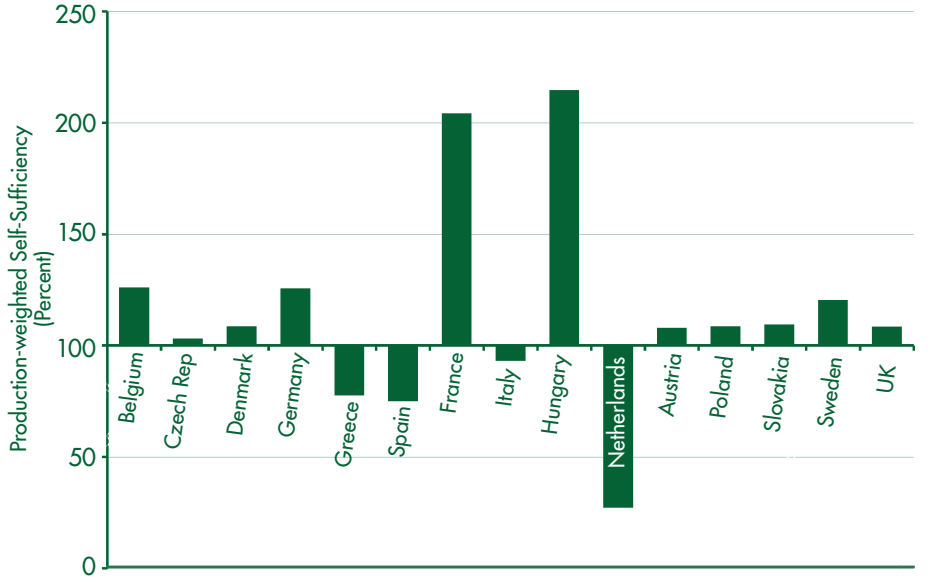
Sources for figures 1 and 2: (1) EU DG Agriculture & Rural Development (2005). Agriculture in the European Union- Statistical and Economic Information 2005. (2) Eurostat.

Table 1: Scenarios for Biofuel Production and Oil Import Substitution

	Current Transport Energy		Energy-Equivalent Biofuel Production Potential			Displacement Potential	
Scenario	Total Oil Use	Imports	Biodiesel	Ethanol	Total	Total Oil Use	Imports
	---------(mtoe/year)----------					-----percent-----	
1	347	278	6.16	58.39	64.54	-18.62%	-23.22%
2	347	278	1.23	13.57	14.80	-4.27%	-5.33%

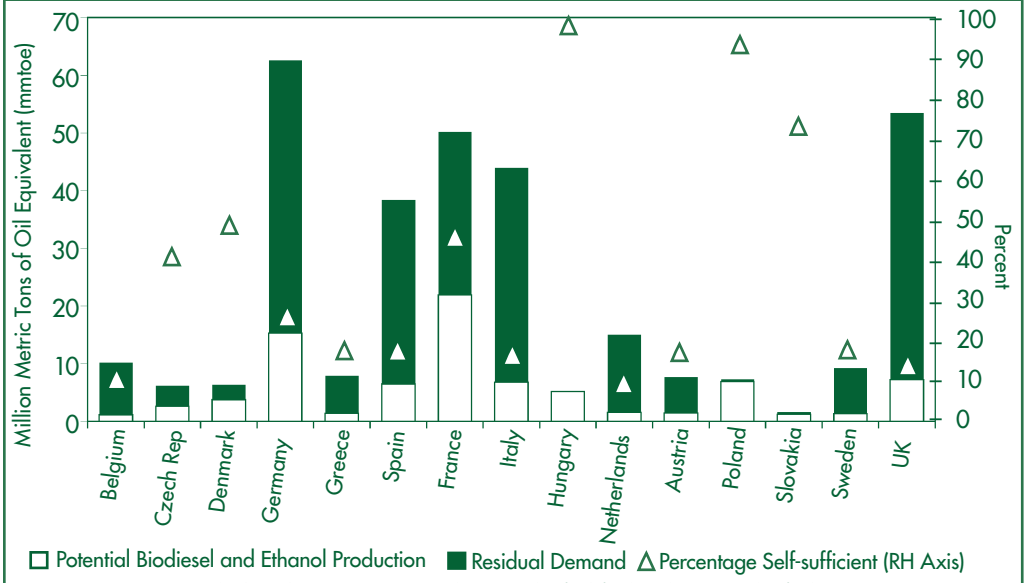
Note: mtoe=million tons of oil equivalent, which is equivalent to 7.37 million barrels of oil (mbbl).

Figure 2: Production-weighted Average Self-sufficiency Levels for Biofuel Crops, 2004



Note: Production weights assigned based on country-level percentages. 2003 self-sufficiency levels were used in instances where 2004 levels were not available.

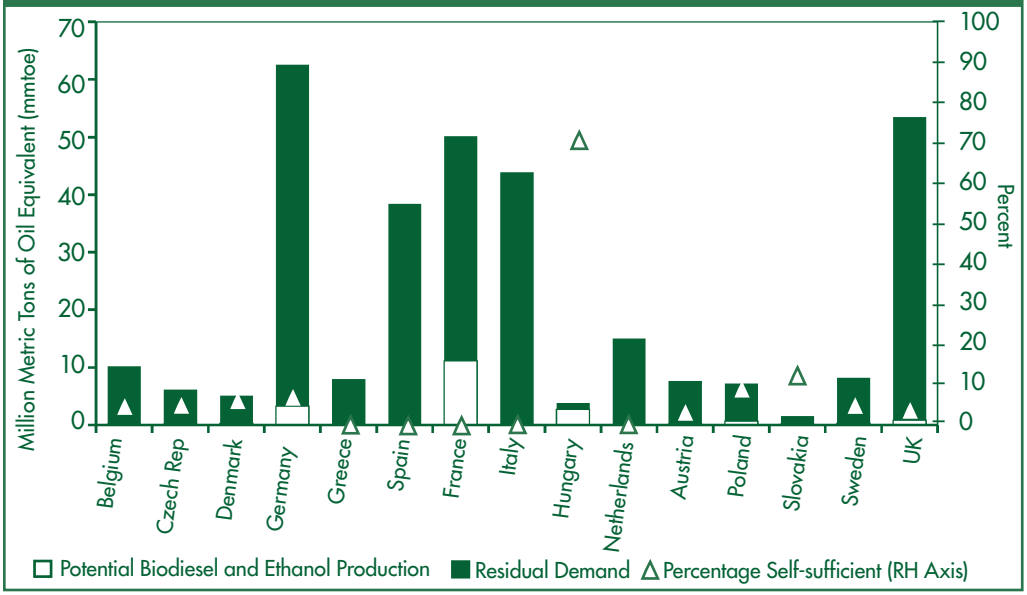
Figure 3. Scenario 1: Petroleum Displacement Potential for Complete Conversion of Biofuel Crops



Note: Figures 3 and 4 based on converting total current biofuel feedstock crops to biofuel.

Sources: OECD (2005).

Figure 4. Scenario 2: Petroleum Displacement Potential for Conversion of Surplus Biofuel Crops



Scenario 2 evaluates the potential of converting only the eligible output in excess of today's self-sufficiency levels (i.e., crops with self-sufficiency levels greater than 100 percent).

European agricultural potential to reduce oil imports is substantial. In Scenario 1, we estimate that over 23 percent of overall EU27 transport-fuel imports could be displaced. This figure is far higher than EU targets for biofuel development, indicating that it might be appropriate to reconsider the food-fuel tradeoff. When biofuel conversion is limited only to the proportion of eligible crop output that exceeds national self-sufficiency, it is still possible to displace over five percent of EU transport-fuel imports. This number also exceeds current biofuel development targets, and suggests strongly that the latter may be too conservative. In France, for example, crops are over double food requirements in these categories, and biofuel conversion of the excess could displace over 10 percent of imported transport fuel.

By its nature, biofuel conversion is dominated by ethanol production, yet by global standards the EU has a relatively large share of diesel in transport fuel demand. This mismatch of fuel composition is relatively unimportant in the present case, since self-sufficiency levels remain below 25 percent. In any case, energy markets can reconcile these differences, so Europe can get the fuel it wants while its farmers reap the rewards of producing valuable energy crops.

European Biofuel and the Doha Development Agenda

Agriculture is widely seen as the primary stumbling block in the current Doha round of WTO-mediated trade negotiations. Within this category, farm support in higher-income countries is seen as trade distorting, putting taxpayer-subsidized downward pressure on global food prices and, by extension, impacting negatively the livelihoods of farmers in lower-income countries. While the degree of such price-income transmission is an independent empirical question, there is no doubt that existing patterns of farm support, particularly in Europe, are a highly contentious negotiating point. Biofuels offer the possibility of supporting farmers in a different way, one that recognizes their contribution to energy self-sufficiency rather than food self-sufficiency.

The general situation in terms of market value and support for the crops in question is summarized in Table 2. If a substantial share of existing EU agricultural production would be eligible for biofuel production, this in turn could reduce the likelihood that current surpluses might repress international prices by their diversion to international food markets. At current market prices for crops, biofuel, and crude oil, Table 2 summarizes the authors' estimates of crop values in the two alternative uses, including estimates of support and tax levels. The basic price of the crops (column 1) reflects the market price of

Table 2: Food, Fuel, Support, and Taxation Levels for Biofuel Eligible European Crops (millions of 2005 USD and percentage)

Crop	Value at Basic Price	Subsidies on Products	Taxes on Products	Net Support	Percent of Total Net Support	Value at Producer Price	Biofuel Value**	Food Premium
Wheat	61,610	18,370	126	18,244	66	43,409	25,630	17,781
Barley	13,110	4,137	4	4,133	15	8,983	8,470	513
Sugar beet	7,654	11	228	(216)		7,870	957	6,913
Grain Maize	14,685	2,799	50	2,749	10	11,936	13,136	(1,200)
Potato	11,057	112	2	110	0	10,948	5,597	5,350
Rape and Turnip Seed	5,560	1,537	0	1,537	6	4,023	4,336	(313)
Sunflower Seed	2,445	615	1	614	2	1,831	1,193	638
Soybean	444	153	11	142	1	302	144	158
Total	116,566	27,735	422	27,529	100	89,302	59,463	29,840

**The value at producer price is equivalent to the market price of a product, the price a producer would receive exclusive of subsidies and taxes. The value at basic price measures the total compensation a producer receives, including the market price and subsidies minus taxes.*

*** Biofuel value calculated using current market prices of ethanol and biodiesel and biofuel production under Scenario 1, complete conversion to biofuels. As of March 2007, the U.S. prices for ethanol and biodiesel were $124.32/bbl and $152.22, respectively. We assume EU prices are roughly equivalent.*

the crops plus subsidies and minus taxes. The subsidies and taxes paid by crop are shown in columns 2 and 3 while net support per crop, subsidies minus taxes, is presented in column 4. For reference, the percent distribution of subsidies across crops is shown in column 5. The producer price of the crop (column 6) reflects the market value of the crops, or for purposes of this analysis, the food price of the crop. Alternatively, column 7 shows the biofuel value of the crop, the price producers would earn from converting crops to fuel. Finally, column 8 presents the difference between the food and fuel value of the crops.

The two most arresting aspects of these results are somewhat contradictory. There is a significant aggregate value disadvantage for biofuel-eligible crops, but also apparent are highly diverse returns to crops between the two markets. The former helps explain the slow uptake of biofuel conversion, but the latter identifies important opportunities for Europe to pursue energy price risk management while reducing the scope of Doha actionable food support. Both maize and rape/turnip seed crops have a negative food premium, indicating that biofuel values exceed support- inclusive food value. In these cases energy markets not only offer alternative demand for farm products, but may also bear part of the cost of producer support. Alternatively, these savings could be used to step up support for crops with low food premia, making them revenue-neutral to farmers in fuel production. If barley, sunflower, and soybeans were brought in this way, fully 34 percent of net CAP support would be removed from food marketed commodities.

The magnitude of this kind of product diversion is of course very ambitious, and in all societies there are non-market reasons for domestic food production. The potential to influence Doha also depends how negotiators treat biofuels in comparison to food. Furthermore, many assumptions have gone into the present estimates, since support levels themselves are imprecise, and we have for convenience assumed food and fuel processing costs are comparable. Despite the need for more rigorous empirical work on this issue, we believe these preliminary results show the important role the food-fuel conversion issue plays in European agricultural, energy, and trade policy.

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For additional information, the authors recommend the following:

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