

## WORLD FOOD PRIZE 2007 YOUTH INSTITUTE PAPER TOPIC

### *“Biofuels: Promises and Implications for Food Security in Developing Countries”*

---

#### INTRODUCTION TO THE ISSUES

---

Citation from

*Biofuels: Promises and Constraints*

Laney, Kara. IPC Publications, IPC Discussion Paper, December 2006

“Concerns about energy supply, national security, climate change, and economic development crowd the public policy agendas of most countries around the world and dominate international dialogues. Political instability in many oil exporting countries threatens the steady supply of fossil fuel to importing countries, while diminishing oil reserves cause more environmentally damaging techniques to be employed in order to extract oil from less accessible sources. Both these factors, along with the rising demand for energy from the developed world, combine to raise oil prices, thus creating a significant drain on foreign exchange in developed and developing countries alike. Concurrently, the expanding uses of energy increases greenhouse gas emissions, adding to the destructive effects of climate change.

Into the fray of these diverse and cross-cutting issues steps biofuels. In this ordinary product, different countries and constituencies find potential answers for their utmost concerns. In the United States, national security advocates think biofuels will facilitate energy independence from unstable, unreliable sources. Signers of the Kyoto Protocol, such as the European Union and Japan, view biofuels as a tool towards meeting their emission reduction goals; environmentalists also are supportive for this reason. For farmers, biofuels represent a new market and a way to diversify risk. Developing countries hope these products will be new export commodities, and both developing and developed countries see them as an opportunity to keep expenditures on energy within the domestic economy.

Of course, an energy source that could single-handedly address energy supply constraints, climate change, national security, and economic development issues would be too good to be true, and indeed, the beneficial aspects of biofuels’ ability to address these diverse demands are countered by their own issues related to food security and economic and environmental sustainability. The promises of biofuels must be weighed against their costs.

**Biofuels Primer:** Biofuels are liquid or gaseous fuels derived from biomass, which can be identified generally as organic matter; for the purposes of fuel, organic matter is plant material or animal waste. While biofuels include compounds and elements such as methanol, methane, and hydrogen, the two fuels primarily in commercial production are ethanol and biodiesel. Ethanol is a liquid fuel generated from converting the carbohydrate portion of biomass into sugar and then fermenting the sugar, while biodiesel is produced through the transesterification of organically-derived oils or fats. (1) Ethanol can be used as a fuel oxygenate and, in compatible engines, as a substitute for gasoline. Biodiesel can replace petroleum diesel, but it is typically mixed for commercial use in 2/98, 5/95, or 20/80 biodiesel/petroleum diesel blends.

Brazil and the United States are the leading producers of ethanol. Brazil uses sugarcane as its feedstock, while corn is the crop of choice in the United States. By converting rapeseed oil into fuel, Germany produced over half of the world’s biodiesel in 2005. (2) Production in the US is rising, where soybeans are the primary feedstock. Malaysia and Indonesia, with an eye to export to Europe, are increasing their production of biodiesel from palm oil.” (Laney)

Following Information - Compiled from the Food and Agriculture Organization of the United Nations  
*The State of Food Insecurity in the World 2006 Report*

**Food Security Primer:** Food security is when people do not live in hunger or fear of starvation. Food insecurity exists when people are undernourished as a result of the physical unavailability of food, their lack of social or economic access to adequate food, and/or inadequate food utilization. World-wide around 852 million people are without enough food to eat on a regular basis and another 2 billion face

intermittent food insecurity. There are 22 countries, 16 of which are in Africa, in which the undernourishment prevalence rate is over 35%.

There are strong, direct relationships between agricultural productivity, hunger, and poverty. Families with the financial resources to escape extreme poverty rarely suffer from chronic hunger; while poor families not only suffer the most from chronic hunger, but are also the segment of the population most at risk during food shortages and famines. Three-quarters of the world's poor live in rural areas and make their living from agriculture. Hunger and child malnutrition are greater in these areas than in urban areas. Moreover, the higher the proportion of the rural population that obtains its income solely from subsistence farming (without the benefit of pro-poor technologies and access to markets), the higher the incidence of malnutrition. Therefore, improvements in agricultural productivity aimed at small-scale farmers will benefit the rural poor first.

Increased agricultural productivity enables farmers to grow more food, which translates into better diets and, under market conditions that offer a level playing field, into higher farm incomes. With more money, farmers are more likely to diversify production and grow higher-value crops, benefiting not only themselves but the economy as a whole.

---

## How to Write Your Paper

**Step I. Your Mission:** You will select and research one of the factors affecting biofuels production and food security in developing countries (see Step II below) in a region or country (see Step III below) of your choice. You will then prepare your *Youth Institute Paper* (see Step IV below) with your research findings and recommendations for implementing biofuels production in ways that improve food security and farm income in the region/country on which you have focused.

**Step II. Family Farm:** The world's small-scale subsistence family farmers and the communities and countries where they predominate suffer the greatest food and nutrition insecurity. These communities and countries are also areas of concentrated poverty containing over 92 percent of the world's households which consume less than one U.S. dollar's worth of goods per person per day.

Using crops grown by subsistence farmers for biofuels production could provide them with an important source of demand for their products. About 80 developing countries, for instance, grow and process sugarcane, a high-yielding crop in terms of photosynthesis efficiency that can also be used to produce ethanol. Recently with increasing sugar prices, sugarcane production for ethanol has become a more attractive option for developing-country farmers. Other energy crops include maize, soybeans, rapeseed, and oil palm, and many developing countries already grow or could grow these and other potential energy crops. Emerging biofuels cellulosic technologies that directly convert crop residues like stalks and leaves to ethanol or electricity could also provide developing-country farmers with additional income.

Current agricultural yields are insufficient to both feed growing populations and meet projected demands for biofuels production. Agricultural production is also being negatively impacted by environmental degradation, political instability and inequitable market systems, and severe droughts or pest and disease infestations. Changing diets in countries experiencing rapid economic development, such as China, and the likely effects of climate change will also affect food availability.

Addressing the promise of biofuels for subsistence family farmers while providing for food security therefore entails improving the farm yields of these farmers. Yield increases translate into higher farm incomes under appropriate market conditions. With more money farmers can attain better diets and improved health care, better educate their children, and purchase house hold goods and farming technologies.

Subsistence farm yield improvement depends on agricultural science, access to technology, land, and water, open markets, and economic incentives and supporting institutions. Appropriate action must

address these interrelating factors in ways that balance implementing biofuels production with improving subsistence farm yields and the economies of family farmers and their communities.

**Key Factors** in increasing agricultural productivity for biofuels production and improved food security are:

1. Conducting scientific research into crop biology and agronomic technologies for improving yields, disease and drought resistance, and sustainable agricultural systems.
2. Reversing natural resource degradation and adapting farming to water scarcity and climate change.
3. Securing property rights and access to finance; improving farm marketing infrastructure and institutions; and addressing problems created by globalization and trade policies for subsistence family farmers.
4. Educating family farmers about results from agricultural yield and sustainability research and providing access to and support for implementing methods from this research.
5. Formulating public policy initiatives to address increasing populations, rapid urbanization, and gender or cultural discrimination.
6. Engaging in diplomatic initiatives for conflict prevention and resolution and governance based on principles of democracy, accountability and transparency in public institutions, and the rule of law that are basic to reducing vulnerable members of society.

**Step III. Select only ONE of the regions or countries listed below as the focus of your research:**

**Example 1:** If you choose "**East Africa**", your research will focus on biofuels production and food security issues in any of these countries: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Reunion, Rwanda, Seychelles, Somalia, Tanzania, Uganda

**North Africa:** Algeria, Canary Islands (Spain), Egypt, Libyan Arab Jamahiriya, Morocco (including Western Sahara), Tunisia

**Central Africa:** Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo (Zaire), Equatorial Guinea, Gabon, Sudan, Zambia

**East Africa:** Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Reunion, Rwanda, Seychelles, Somalia, Tanzania, Uganda

**West Africa:** Benin, Burkina Faso, Cape Verde islands, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, São Tomé and Príncipe, Senegal, Sierra Leone, Togo

**South Africa:** Botswana, Lesotho, Namibia, South Africa, St. Helena (U.K.), Swaziland, and Zimbabwe

**Caribbean:** Anguilla (U.K.), Antigua & Barbuda, Bahamas, Barbados, Bermuda (U.K.), Cayman Islands (U.K.), Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique (France), Montserrat (U.K.), Netherlands Antilles, Puerto Rico (U.S.), St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago, Turks & Caicos (U.K.), Virgin Islands (U.K., U.S.)

**South America Tropical:** Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, and Venezuela

**South American Temperate:** Argentina, Chile, Falkland Islands (U.K.), and Uruguay

**Central America and Mexico:** Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama

**Indian Subcontinent:** Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka

**East Asia:** China, Hong Kong S.A.R. (China), Japan, Democratic People's Republic of Korea (North), Republic of Korea (South), Macao S.A.R. (China), Mongolia, Taiwan

**South East Asia:** Brunei, Darussalam, Burma (Myanmar), Cambodia, East Timor, Indonesia, Lao People's Democratic Republic (Laos), Malaysia, Philippines, Singapore, Thailand, Vietnam

**Middle East:** Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen

**Eastern Europe:** Albania, Armenia, Azerbaijan, Belarus, Bosnia/Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Serbia/Montenegro, Slovakia (Slovak Republic), Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

**South Pacific:** Christmas Island, Cook Island, Federated States of Micronesia, Fiji, French Polynesia (Tahiti), Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn, Samoa, American Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wake Island, Wallis and Futuna

**Step IV. Follow these instructions to develop your Youth Institute Paper:**

1. Choose ONE of the important regions above as the focus of your research. (You may focus on one country in a particular region if you prefer.)
2. Define a “typical” subsistence family farm in your region: a) family composition, diet, education, and income; b) farm size, crops grown, agricultural practices, and marketing; and c) major barriers to improving agricultural productivity and farm income.
3. Select ONE of the important factors (*Step II*) above as the focus of your research.
4. How does the factor you selected affect agricultural productivity and farm income on your family farm in your chosen region/country? Discuss the following:
  - What role does the factor presently play in causing your family to not produce enough food or earn sufficient income?
  - What is the present status for this factor? How severe is the situation? What percentage of the necessary amount of food and income for the family is being attained? Is the environment being degraded or biodiversity diminished? Are women, rural or urban poor, or developing countries disadvantaged?
  - What are the trends for this factor? How are the trends for this factor measured? Do these measurements indicate the situation is changing? If so, how? Because of potential change, or no change, is the situation for your farm family getting worse, improving or staying the same?
  - How would improving or resolving this factor increase the amount of food or income available to your family? Preserve the environment or biodiversity in a sustainable fashion? Benefit women, small farmers, or developing countries?
5. How could biofuels production affect the status and trends of this factor? Improve or harm the yield or livelihood of this subsistence farm family?
6. Based on your research give your recommendations as to how biofuels production should be implemented to also improve the food security and incomes of impoverished family farmers in the region/country on which you have focused.
7. Give your suggestions for appropriate roles of corporations, national governments, and other organizations (United Nations, World Bank, private or civic organizations and others) in implementing your recommendations.