THE FOOD VERSUS FUEL ISSUE: CASE OF THE PHILIPPINES

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Abstract

In light of the recent food crisis this paper dwells on the issue of whether or not biofuels production impacts on food security particularly among less developed countries. It uses initial findings from current research on the impact of the biofuels program in the Philippines. It first discusses the Philippines biofuels program in general using as a backdrop, the past and existing food policy in the country. Two levels of analysis are provided. At the macro-level, results from a computable general equilibrium model focusing only on sugarcane and coconuts as feedstock are presented. At the micro-level, results from partial budgeting analysis for jatropha are discussed. The CGE results indicate that promoting sugar and coconut as feedstock for biofuels tends to expand overall agriculture value added but output of the food processing sector declines. Experiments in the model suggest that household income increases primarily due to wage increase but level of output of the main staple crop (palay/rice) declines. In the farm level analysis, budgets generated for jatropha indicate favorable profits comparable to those in rice and corn farms. This suggests that jatropha grown in marginal land areas, as biofuels feedstock offers new alternative income opportunities among rural households without necessarily sacrificing food production.

INTRODUCTION

The recent food crisis manifested by the drastic drop in global grains stocks coupled with unprecedented rise in prices has brought to fore important policy issues particularly among the most vulnerable poor countries. Among these include the issue on whether or not biofuels production makes economic sense. To date, there is no clear consensus on the matter noting that different circumstances prevail and that food security is interpreted differently across countries.

In the Philippines, for example, government policy makers have equated food security to self-sufficiency in rice and corn – the two major grains produced in the country. This objective is etched in statutes the most recent of which, is Republic Act (AR) 8435 otherwise known as Agriculture and Fishery Modernization Act of 1997 (AFMA). This policy finds its roots in nationalistic ideals exemplified by the enactment of RA 3018, otherwise known as the Rice and Corn Nationalization law of 1960 (Cabanilla, 2006). This law, in fact, led to the establishment of government parastatals (e.g. Rice and Corn Board, National Grains Authority, National Food Authority) which monopolized international trade in food particularly rice and corn – now referred to as political commodities (Panganiban, 1998).

In contrast, Malaysia, a country which is more endowed with land and water than the Philippines has adopted a policy of self-reliance (instead of self-sufficiency)[1]. The argument for this type of policy is that while Malaysia has the resources to achieve self-sufficiency in rice, it will be achieved at the "expense of high financial costs to the government and relatively high taxes on poor consumers (Arshad, et al, 1996).

It is obvious from this policy stance that Malaysia was keen on adhering to the principles of comparative advantage in agriculture. Despite its high level of rice and corn import dependence it has posted favorable trade balance in agriculture compared to the Philippines which had a negative trade balance in agriculture since the early 1990s.

Undoubtedly, biofuels programs – a recent phenomenon among LDCs, have important implications on food security, trade, and rural poverty. Biofuels advocates in the Philippines, for example, argue that the program offers opportunities for expanding income sources among rural households. Those that oppose it, on the other hand, point out the negative impact on food production and the environment.

Using available information, this paper attempts to make an initial assessment of the implications of the biofuels program on food security in the Philippines. The next section discusses the concept of food security adopted in this paper. This is followed by a brief description of the biofuels program in the Philippines. Implications of the pro-

gram on food security are discussed in the last section.

Food Security: Our Definition

For this paper, we view food security in the context of the FAO definition: "A situation that exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2002, The State of Food Insecurity, 2001).

We note here that the above definition has evolved from the changing perception about the capacity of the world food system to address global food needs. As a review, the following definitions reflect epochal food concerns:

1974. In the 1974 food crisis, food security was referred to as "Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices. This reflects the global concerns in 1974 on the volume and stability of food supplies.

1983: The FAO definition of food security at this time was "Ensuring that all people at all times have both physical and economic access to the basic food that they need". This new concept includes securing access by vulnerable people to available supplies. Attention was called to the balance between demand and supply side of food security equation.

1996: In the FAO World Food Summit, the definition changed to "Food security, at the individual, household, national, regional and global levels (is achieved) when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".

The performance of the world food system has been an important factor in the changing perception about food security. From the first major food crisis in 1974, the record shows that except for periodic supply disturbances brought about mainly by bad weather, the world has been capable of producing enough food, and for rice, the percent share of total production that is internationally traded has increased (Dawe, 2006). The significance given to economic access in the recent definition of food security is therefore appropriate. This suggests that income generation is a key to food security. In the rural areas, expansion of economic opportunities is important.

Philippine Food Policy

Food policy in the Philippines is primarily anchored on two major crops – rice and corn. Almost 60 percent of the Philippine Department of Agriculture (DA) budget is allotted to rice and corn and domestic prices of these staples have been set higher than world market price – a stark contrast to the pricing policy in the 1980s when domestic price of basic staples were set below world prices (Cabanilla, 2006). In the current effort to achieve rice self-sufficiency and, as a reaction to the recent food crisis, the government has allotted P50B (roughly $1.13B). Referred to as FIELDS program, this fund is intended to subsidize Fertilizer, Irrigation, Extension, Loans, Dryers, and Seeds. No comparable amount has ever been channeled to programs covering other cash crops.

Tariff policy has also favored rice and corn with 50% tariff rate for each, the highest among all agricultural commodities. The Philippine government has fortified its control on the market by granting the National Food Authority (NFA) full control over imports of rice and corn. Medium term agricultural development plans explicitly mention the promotion of high value crops (mostly cash crops) production but commensurate budgetary allocation has not been provided (CPDS 1996; WB 1999). Continued emphasis on self-sufficiency in rice and corn has rendered high-value commodities (HVC) production a minor agricultural undertaking.

Institutional reforms that would facilitate the needed rural transformation are constrained by the policy bias for rice and corn. For example, the enactment of the Local Government Code of 1991 (RA 7160) provides the means for an increased involvement of local government units (LGU) in pursuing agricultural development programs. However, fiscal constraints have compelled planners at the local level to implement programs that are attuned with national food self-sufficiency objectives. in their attempts to access national budget for food security purposes , local government units are forced to prepared plans that resemble national biases for specific commodities (Cabanilla, 2002). Thus, plans and programs implemented at the local level are usually not consistent with the demands of the community. Efforts towards rural diversification are stifled.

Despite the apparent policy bias for rice, however, domestic production has fallen short of demand. The Philippines is now among the highest importers of rice in the world averaging close to 2M metric tons of rice imports per year in recent times (Table 1) What compounds the problem is the fact that poverty incidence is in the uptrend with rates of incidence highest in known food surplus areas such as Mindanao. Periodic reports suggest incidence of hunger is highest in these food surplus areas (SWS, 2004). This gives credence to the efforts currently done to promote biofuels feedstock production which is intended partly to address rural poverty.

The Biofuels Program

The Philippines biofuels program is promoted with the view not only as a response to the soaring world oil prices but also to provide alternative income opportunities to rural households (Department of Agriculture, No Date). It stems from the Biofuels Law (RA 9367 of 2006) that stipulates mandatory mixing of bio-ethanol and biodiesel in domestically consumed gasoline and diesel respectively. In the initial year of implementation (2007), the required mixture is 1% for biodiesel and to increase to 2% in 2010. For bio-ethanol, the required mixture is 5% in 2007 and 10% in 2010.

Five feedstocks are currently being promoted for the program – coconut, and jatropha for biodiesel, and cassava, sugarcane and sweet sorghum for bio-ethanol. Among the five, jatropha and sweet sorghum are not yet part of the Philippine agricultural landscape. Jatropha is not a food crop and claimed to grow even on marginal land not normally planted to any commercial crop. Indeed, early par-

Table 1. Rice production, consumption, and importation of the Philippines, 1999-2007

	Palay production	Rice production	Rice consumption	Rice imports/deficit
1999	11,787	6,111	7,451	838
2000	12,389	6,424	7,892	642
2001	12,955	6,717	8,086	811
2002	13,271	6,881	8,589	1,201
2003	13,500	7,000	8,677	889
2004	14,497	7,517	9,596	1,003
2005	14,603	7,572	10,126	1,830
2006	15,327	7,947	10,324	1,723
2007	16,240	8,421	10,530	1,850

Source: Bureau of Agricultural Statistics

Figure 1. *Jatropha* plantation in Pangasinan, Northern Philippines

ticipants to the program have located jatropha projects in areas which have low opportunity cost (Fig. 1).

Coconut and sugarcane are among the country's major export crops and cassava is primarily a food crop with more than 80 percent of the 2M metric tons average annual production being processed into various food items such as starch. This suggests an unavoidable competition between food processing and biofuels production for available feedstock except in the case of jatropha.

From a purely technical point of view, none of these crops compete for land with rice which is grown normally under flooded condition (except upland rice). Sweet sorghum, however, may compete with corn for land since both crops basically have similar agronomic requirements and optimally grown after wet season rice (just before the onset of summer).

However, as demand for feedstock for biofuels production increases, changes in relative prices may actually lead to a siphoning off of resources away from food production. This brings to fore policy issues related to food security. On the supply side, will food production decline? What happens to aggregate output in agriculture? What happens to household income? The following section sheds some light to these issues.

Initial Findings

Table 2 summarizes initial results from a CGE modeling exercise with particular focus on using sugarcane and coconut as feedstock. Among the notable findings are the following:

a. Gross Value Added in Agriculture: As a whole, the CGE experiments point to relatively large increases in the value added of the Agriculture, Fishery and Forestry sector. This comes primarily from the expansion of the sectors (coconut and sugar) that produce the required feedstock. As expected, value added in food processing declines but by a lower amount compared to the increase in the sectors producing feedstock.

b. Employment: Total employment in agriculture also expands and this primarily comes from the sugar and coconut sectors.

c. Food Crops Output: There is a perceptible decline in the value added of rice and corn. This suggests that due to the change in relative prices variable inputs tend to move towards the production of biofuels feedstock. As shown in Table 2, the sugar and coconut sectors experience large increases in price.

Table 2. Selected impacts for industries in the agricultural and food processing sectors, in percent deviation from the base

Commodity	Value Added	Employment	Consumption	Imports	Exports	Price[a]
Agriculture Fishery and Forestry	0.42	1.27	0.03	0.04	-0.12	0.12
Palay	-0.03	-0.05	na[b]	0.00	0.00	0.16
Corn	-0.08	-0.13	0.02	0.45	-0.17	0.13
Sugar	13.41	42.74	-15.36	0.00	1.32	18.32
Coconut	2.71	6.41	-3.16	0.00	0.42	3.42
Other crops	-0.04	-0.11	0.03	-0.01	-0.12	0.12
Livestock and poultry	-0.07	-0.20	0.05	0.07	-0.14	0.10
Other agriculture fishery and forestry	0.01	0.03	-0.07	0.06	-0.13	0.23
Food Processing	-0.26	-0.88	-0.27	1.00	-0.90	0.44
Rice and corn milling	-0.03	-0.07	0.00	0.54	-0.13	0.15
Sugar milling	-5.77	-20.01	-5.99	26.25	-9.77	6.53
Other food manufacturing and beverages	-0.11	-0.40	-0.08	0.10	-0.27	0.23
Coconut oil and related products	-0.57	-5.93	-0.99	0.00	-0.88	1.15

[a] This is the weighted average of the prices of imports and domestically produced goods.

[b] Not applicable.

d. Household Income: Although not shown in the table, results of the modeling experiments suggest that household income tend to increase (Cabanilla and Rodriguez, 2007).

Tables 3 and 4 summarize initial findings for the farm-level analysis. It will be noted that profitability of jatropha production is comparable to rice and corn. Interviews with scientists in the University of the Philippines at Los Banos suggest that profits become positive after the third year. If indeed, as claimed by those promoting jatropha, the crop will not displace other crops currently in the cropping system, it will bring about net economic benefits to rural areas. Farm operators will earn Php 5,460.00 per hectare per year, on the third year and additional employment equivalent to 40 man days per hectare will be generated.

Concluding Comments

With population in the Philippines now at 89 million and growing at 2 percent per year, the pressures on existing resources are mounting. The country is now the number one rice importer in the world the socio-political pressure to increase domestic production has risen to unprecedented level. Since poverty incidence is now in the uptrend, the need to increase incomes of the poor has become even more crucial.

The challenge in addressing these domestic problems is further heightened by the emergence of global concerns on climate change and deteriorating environment. Amidst all these, the role of the rural/agricultural sector has remained highly significant. Agriculture is a sizeable proportion of the economy generating close to a quarter of Gross Value Added and over 40 percent of total employment.

Table 3. Comparative costs and returns of biodiesel feedstock (pesos per hectare)

Items	Value*
Total Cost	24,610.00
Cost of producing a ton	1,640.67
Cost of producing a kilogram	1.64
Gross Return	37,500.00
Net Return**	12,890.00
Net Profit-Cost Ratio (%)	0.52
Net Present Value (NPV)	5,224.73

Table 4. Comparative costs and returns of staple food crops (pesos per hectare per cropping)

Item	Rice	Corn
Variable Costs	11,395.00	18,600.00
Labor	5,850.00	10,560.00
Material Inputs	5,545.00	7,950.00
Fixed Costs	6,537.78	9,212.00
Total Cost	17,932.78	27,812.00
Gross Return	22,218.00	38,250.00
Net Return	4,285.28	10,438.00
Net Profit-Cost Ratio (%)	0.28	0.38

Data taken from case interviews with farmers, Laguna, Philippines.

Inherent difficulties underscore the need for a careful reshaping of the agriculture landscape. For example, the country suffers from an average of 20 typhoons every year, the incidence of calamities have become more frequent. The opportunity costs of land and water are rising rapidly with population.

By presenting preliminary results of analysis on the impact of the biofuels program in the Philippines, this paper has provided initial insights on the issues related to food security confronting the country especially in light of the recent food crisis. Two specific points need reiteration. First, use of coconut and sugar as biofuels feedstock expands GVA in agriculture, increases total employment but contracts food processing and rice and corn production. In the current situation, this suggests net contribution to economic output and employment but at the political cost of declining output in the major grains sector. Second, prospects of using jatropha for biofuels production look positive. It is a non-food crop and if planted on marginal areas, as planned by the government, it will have positive contribution to food security particularly on the demand side.

From a broad perspective, the paper reiterates the need to improve productivity in agriculture in general. The Philippines has historically underinvested in agricultural R&D having allocated less than one percent of agriculture GVA to research. The increase in feedstock prices noted in the modeling exercise – a point already emphasized earlier from a global perspective (Rosegrant et al, 2006) serves as a signal for the continuous introduction of new technology in agriculture.

Even on food, a high price policy which has been adopted in the past to encourage grains production is counterproductive. Its wage-price spiral effects stifle economic growth. It also penalizes food producers themselves since many are net food buyers (Dawe, 2006).

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