Global Assessment of Biomass and Bioproduct Impacts
on Socio-economics and Sustainability

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Introduction to the soybean complex in Argentina

How to address this in the Global-bio-Pact Case Study

WP 2/WP3 – Task 2.1 – 3.4

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Soybean case study in Argentina

Argentina's economy is heavily weighted toward commodity exports such as minerals, grains, oils and food. It was this sector that made it one of the 10 richest countries in the world a century ago, the last time there was a strong commodity-driven cycle driving economies. But following subsequent decades of unproductive boom-and-bust cycles, the country came back from its last economic crisis in 2002 with unusual strength due in large part because commodity prices began a long-term upswing coupled with an undervalued peso that facilitated exports. In food production, for example, the country is at the top or among the leading producers of almost every kind of product that can be converted to Biofuels.

Agriculture has always been an important component in Argentina's economy. The characteristics of the country as having an important area with deep soils, temperate climate, favourable levels of precipitation and good accessibility to ports, have given Argentina favourable advantages for agricultural productivity and export possibilities. These natural advantages have been increased with high technology input of farmers that adopted new technologies as no till, precision agriculture, modern and efficient farm machinery & GMOs. Thanks to the highly specialized and professional farming and the natural endowments the country has been able to maintain and increase its agricultural productivity. There is a parallel institutional development on the private and governmental sector that supports the steady growth of an evolved agriculture.

The evolution of the soybean chain has experimented an unprecedented growth since the early seventies growing from 37.000 (1970/71) till 17 million hectares. The complex is responsible of 25 % of currency income of the country with export amounting 22.030 million dollars explaining 31 % of the internal agroindustrial product.

The Argentine oilseed crushing complex is sophisticated, has modern infrastructure that allow for the profitable conversion of vegetable oils into biodiesel. It has a total crushing capacity in excess of 150,000 tons per day and is comprised of global enterprises such as Cargill, Archer Daniels Midland Co. and Bunge, as well as many smaller family-run facilities that are looking to partner with U.S. technology, capital and overseas buyers to build biodiesel plants. More than 80 percent of the crushing capacity is located in Santa Fe province. The 2008/09 exports of the complex could be summarize in 6412 million US$ in oil, 8781 as flour and 1300 as biodiesel.

Since a national Biofuels law was enacted in 2006, the industry has been growing from a mere 150,000 tons capacity in 2006 to 1.4 million tons by the end of 2008. An estimated 2.5 million tons of production capacity could be on line by mid 2011.

Although initially the industry was exclusively export oriented since the national Biofuels law was established (2010), a 5 percent biodiesel blending mandate started being derived to the internal market. This has already moved to B7 in biodiesel and government has plans to go further to B10 in general and B20 for agriculture (in study). Another specific law demands a contribution of 10 % of renewable sources for electricity production.

Since Argentina has at the present a high export tax on agricultural commodities the complex is generating near 7,000 million dollars to the central governments with a significant weight in the federal budget.

The case of soybean must be addressed in a specific way within the Global-Bio-Pact project framework. The reason for this is, that instead of using classic energy crops in the case of soybeans we are dealing with a food/feed crop were a minor byproduct is used for energy purposes.

By composition soybean oil content ranges around 18 % and it's a final co-product obtained from the feed and food flour production in big scale. Historically there have been market problems to introduce large amounts of oil produced by the enormous scale of production.

The general approaches of Bioenergy studies look for a farmer or producer of the product and all the social, economic and environmental impacts are developed around this concept. In the case of soybean productions there are no biodiesel soybeans farms or farmers since this crop is not planted thinking of on a byproduct as oil. Seeds are sold and commercialized and the farmer has neither intervention nor information regarding the final end use of the product.

Biodiesel is a very recent activity in Argentina and soybean expansion is related to other main drivers over the soybean price as commodity.

There are also very particular conditions regarding the Argentinean market, big retentions or export taxes are paid in the country so the farmer receives a diminished international price. This has important indirect consequences regarding the crop expansion to areas farther from the export ports.

Argentine soy oil exports are currently taxed at 32 percent, biodiesel pays an export tax (officially known as a "Retención" in Argentina) with a face value of 20 percent, but that nets out at approximately 17 percent after reimbursements and adjustments.

The Biofuels law is officially known by its number, Ley 26,093, and was enacted by the federal legislative branch in mid-2006. The Biofuels law and its regulations divide the market into three clearly separated segments:

- self-consumption, which is geared toward farmers and co-ops looking to produce Biofuels for their own use, in itself a noteworthy market given the country's enormous farm sector,
- internal demand, which began this year and already moved from B5 to B7
- Export markets. As the law currently stands they cannot be mixed, meaning one cannot sell part of their production to the internal market and export the remainder.

Only those producing for the domestic market or self-consumption have access to tax incentives such as accelerated depreciation. Hence, investors must choose from the beginning if they will sell production overseas or locally. Although the spirit of the law was to promote medium regional plants the evolution has produced big partners with own risk investments that at the present share the mandatory blend quota.

Thus far most investors target export as the overseas market is larger, less regulated and pay in hard currency. The B5/B7 internal demand requirement established under the Biofuels law created a growing with better internal prices than the export market

The Argentine Biofuels industry is becoming a leader in what will surely become known as the renewable energies century. It is particularly well poised to harvest excellent economic growth, job and wealth creation and help the planet run on clean energy. If a century ago Argentina became rich by feeding the world, in this century it can do so again by energizing it.

Argentine industry could be divided according to CADER proposal into three classes or castes, each with different strengths and weaknesses.

- "Oil Crushers" representing the large multinational oilseed crushers with the largest plants and ample access to feedstock;
- "Large Independents" large plants but without access to their own feedstock;
- "Small Independents" small and medium producers with none of the above, but count on the government's support from a policy level.

According to the different realities present in each region and particular feedstock used we propose as new criteria for Global-Bio-Pact studies in order to give a new framework of understanding and study with a new vision of feedstocks.

Feedstocks could be principally divided into three categories.

1. Energy crops which are specifically grown for energy purposes either by mass and economic weight (maximum competition with food feed crops). Example: Jatropha
2. Food crops for which the main mass and economic weight could be derived or transformed to Biofuels Examples: sugar cane, corn, wheat
3. Food crops for which a relative small part (in mass and economic significance) is eventually used and converted into Biofuels (by product use as Biofuels) a portion of the market commodity feedstock not exceeding 20 % of the overall weight by mass). Example: soy

There is also a strong need to clarify the principal drivers that produce the expansion of this feedstock in a certain country or region and consequently the use of one of the co-products as an energy source. The forces are interactive and complex and are build by many actors that include regulatory institutions, private sector organizations, market actors and the way they are organized, industrial development, laws regulations, internal and external market drivers etc.

In order to adequately address this complex chain in Argentina we propose the following two steps:

1. General review of research papers on soybean production in the country for the last twenty years.

Objectives of each study

- Identify the principal drivers that promote the expansion of the crop
- Identify the specific weight of feed/food products and oils
- Clarify consequences of tax policies
- Define the impact of the biodiesel industry in the crop

- Weigh the regional and national impact of the crop expansion on direct and indirect jobs

2. Focal case studies
    a. Focal case study on regional production chain in the north west part of Argentina
    b. Focal case studies on the main productive area of Argentina
        i. Medium scale production
        ii. Large scale farming investor groups

Objectives of focal studies

- Identify the principal drivers that promote the expansion of the crop in the area;
- Identify the specific weight of feed/food products and oils giving special attention to local final use in the case of regional site;
- Identify the overall impact of export of the commodities;
- Weigh the regional and of the activity on the crop expansion on direct and indirect jobs creation.

The general review study is already in progress and interim conclusions regarding the international and internal principal drivers of the crop are:

Summary of global soy developments

a) Growth of international production, trade and consumption of soy and derivates

- In a context of general growth both of demand and agricultural products production, soy endured a far more superior growth than other agricultural products. Over the last twenty years this tendency sustained.
- Soy flour production is 135% higher than twenty years ago, soy beans production 140% higher and soy oil 134% higher.
- Over the last decade soy production expansion has been higher than the hectares destined for that production. We can conclude that better cultivation techniques are in place, the implementation of genetically modified seeds seems to be the key asset to analyze such a growth in production
- Soy consumption has been steadily growing more than other agricultural products since the 60's : Between 1964/1965's campaign and 2010/11's soy consumption went up by 805%, over the same period corn consumption was 272% higher, wheat 164% and cotton 129%, soy and all their derivates account for this spectacular growth.
- Soy exports as well has experimented a substantial growth compared to other agricultural products. In this case the tendency is even superior than in consumption's case: The emergence of both China and India as world's leading demanders tend to explain this situation since mid 90's
- There is no clear cut leading country: Argentina for example is world's leader exporter of both soy oil and flour but is the third soy producer in the world
- Biofuels are named to be a leading industry in years to come, in the case of Argentina's biodiesel there is an enormous potential to become both a worldwide leading producer and exporter. The main reason is that the country is already the world leading exporter of soy oil.

- Biodiesel market is not deep yet due to its recent appearance

b) Soy and derivates International prices rice in recent years

- Soy and derivates prices over the last twenty years have been especially high, since 1980 soy price growth has been higher than food and beverages average prices.
- Prices peaked in mid 2008 just before the subprime crisis.
- There seems to be a downward tendency between soy prices vs. industrial inputs.
- Two theories try to explain commodities prices boom in general and soy's in particular: One based on the "Demand Hypothesis" and other based on the "Financial Hypothesis".
- The former accounts for world's food demand growth and the latter has a central point in financial speculation, however there is no clear cut proof of either.

c) Supply and Demand concentration

- The soy market is characterized by an elevated level of concentration, 4 or 5 countries lead in production, consumption, exports, etc.
- Argentina is one of the "big players", being in the upper tier in production and exportation; however is not a significant country consumption-wise.
- Production and Consumption of Biodiesel also shows and elevated level of concentration with the US and European Union as the leading areas.
- However this tendency is starting to change with the emergence of both Brazil and Argentina as players in the market of biofuels (Brazil was known as an ethanol producer but the last couple of years emerged as a leading producer of biodiesel as well).

Summary of soy developments in Argentina

a) Production and basket composition

- Soy production has had an explosive growth since the early 1980's in Argentina, since mid 90's the growing trend line has not decreased.
- Modernization is the key to understanding the phenomenon regarding Argentina's soy production, more specifically the introduction of the GMO RR + glyphosate no tillage combination.
- Nowadays soy accounts for 60% of the "big three production" (soy, corn, wheat), in the mid 80's it only explained 30%.
- Industrialization of soy beans is showing an stabilized tendency rounding 60%
- Biodiesel production capacity is showing an elevated growth rate since the beginning of the industry back in 2007 at the end of 2010 the production capacity is expected to be 24 times higher than in 2006.
- Argentina's biodiesel sector can be divided in three castes or classes : 1) Large oilseed crushers (largest biodiesel producers with an strategic feedstock: soy oil) ; 2) The second caste are large plants that are not directly associated with any of the oilseed crushers , are located near the ports but have one big disadvantage in having to buy the feedstock from the oilseed crushers ; 3) The third group is the smallest and is composed by small to medium sized facilities typically built with Argentine technology, often located far from both ports and access to feedstock.

- Like in other parts of the world the biodiesel market seem driven by Central Administration's policies rather than being market driven

b) Hectares implanted and cropped

- Soy phenomenon is particularly clear when the amount of hectares destined to the cultivation are reviewed. Soy/ soy+wheat+corn ratio is near 70% when in the 80's was 15%

c) Performance

- Soy performance growth has grown near 4.9% annually since 1969/70. This evolution does not have difference with wheat's growth rate (4.8%) but outlasts corn (3.2%).

d) Cost and Rentability

- Since 2003 soy's production costs has been growing in total product measured in tons and in dollars. Land prices, agrochemicals and farming explains the upward rate in part. Fleet prices have a high correlation with international soy prices.
- Expressed in constant US dollars soy margins are lower than in the 90's

e) External Sector

- Argentina is the leading exporter in both soy flour and soy oil, with a market share of 51% and 58% respectably in 2010/11.
- Soy sector exports were beyond 14.000 Million USD in 2009.
- Soy exports account for 20% of Argentina's exports; in 1993 it explained only 2.5%.
- Production growth and lack of internal consumption allowed Argentina to become in the leading exporter of biodiesel.
- Since 2007 39.5 of biodiesel exports went to the US, 32.7% to Netherlands and 17.3% to Spain, meaning that only 3 countries account for 90% of Argentina's biodiesel exports.

f) Domestic and international prices

- Fiscal policy does not seem to distort the correlation between domestic and international