Estudios Técnicos Inc.
Investigación | Estrategias | Soluciones

Economic Impact of the Agricultural Biotechnology Sector

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Executive Summary

This study highlights the importance of the agricultural biotech industry in Puerto Rico and analyzes the current incentives framework given to agro-biotech firms from the perspective of general well-being. This is especially relevant in the wake of recent events occurring in the island, which have reshaped the economy for years to come.

Economic Context

- According to the US Census, Puerto Rico had close to 3.3 million residents in 2017 and a population density of 1,000 inhabitants per square mile. The per capita income and average family income for 2016 were reported by the American Community Survey to be $11,688 and $34,710, respectively.
- In September of 2017 the Island was struck by two strong hurricanes, Irma & Maria. The destruction caused by these events exacerbated the fiscal crisis for the Commonwealth. It is estimated that the total impact caused by Hurricane Maria alone could be upwards of $67 billion. The Island's electric grid and telecommunications were disabled, and recovery will take years.
- Puerto Rico currently faces its most severe fiscal and economic crisis of the past three decades. This led to the enactment of the Federal Oversight & Management Board (FOMB) via the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA). As of today, the central government and most public corporations are under Title III of PROMESA, following a process similar to Chapter 9 bankruptcy proceedings.

Given the weak economic juncture of Puerto Rico in the past five (5) years. It's important to explore and develop alternative engines of economic growth, in which agriculture can play a key role.

Benefits of the Agricultural Biotech Industry

Technology, particularly that related to the life sciences or biotech, is a fast-growing sector in the US. Since 2012, annual growth has averaged 1.6%, while its employment has surpassed 300,000. The benefits of attracting these companies lay mainly in job creation; more jobs translate to more consumption and a higher indirect impact on the economy. However, *the existence of the industry in Puerto Rico also translates into intangible benefits regarding the role of Puerto Rico as a site for agro-industrial and other technology related activities.*

PRABIA members promote collaborations with public and private universities. These offer research opportunities and work experience to over 738 students from various disciplines. PRABIA members are the main employers of agronomists in Puerto Rico, currently hiring over 200 agronomists per year.

Puerto Rico Agricultural Biotech Incentives

Many states in the US provide economic incentives to this industry, as this has been found[1] to be an effective means of increasing the number of highly skilled scientists and establishments in the biotech industry. However, studies such as Moretti (2013)[8] also found that the Government doesn't necessarily recover all the investment through taxation.

Government is currently offering incentives worth at least $14.9 million to the agricultural biotech industry in Puerto Rico, specifically to the Puerto Rico Agricultural Biotechnology Industry Association (PRABIA) members. This was found to have substantial economic and social benefits:

- Using data from PRABIA and PRABIA members, direct high-skilled employment was reported as 778. These jobs generate $27.0 million in salary, $1.5 million in income tax and $1.3 million in Sales & Use Tax (SUT). Low-skilled direct employment was estimated at 1,370, with total salaries reaching $32.3 million and SUT revenue at $1.7 million.
- Nearly 5,000 acres are rented by PRABIA members, usually at above-market rates. PRABIA members pay an average of $547 per rented acre, this is higher than the estimated $258 average in Puerto Rico[2]. This provides a benefit to renters, both public and private, who receive an additional income. PRABIA members are estimated to pay $2.7 million in rent per year. To this, one can add the acres bought by PRABIA members, a further 3,700 acres. These were bought at a cost of $37.8 million.
- In direct salary, rented acres, local purchases and corporate income tax, PRABIA members contributed $80.2 million to the local economy in 2016. This is opposed to an estimated $14.9 million in costs to the Commonwealth.
- This means that in 2016, for every $1 given to PRABIA members via incentives, $5.36 was spent in the economy. This ratio should have improved after 2016, as salary subsidies were greatly reduced.
- It must be stressed that this doesn't consider the additional indirect and induced impacts presented in the previous section. In direct, indirect, and induced salary alone, PRABIA members help generate $82.5 million in salary, $1.5 million in income tax, and $4.2 million in SUT.

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[1] Moretti, E; Wilson, J; *State Incentives, Star Scientists and Jobs: Evidence from Biotech*; Working Paper 2013-17, Federal Reserve Bank of San Francisco.

[2] Estimated using the US Department of Agriculture, *2012 Agricultural Census [Tables 13, 37, & 80]*.

- If the interindustry production multiplier[3] is used, the $80.2 million in spending translates to $134.9 million in total production (including indirect production) – a substantial benefit for the local economy.

[3] Interindustry production multiplier for agriculture is 1.6892 as reported by the PR Planning Board in its 2002 matrix.

Introduction

This report compares the benefits to the local economy and the costs to the Government of offering incentives to the agro-biotech industry in Puerto Rico, specifically to the Puerto Rico Agricultural Biotechnology Industry Association (PRABIA) members. The scope of benefits measured in this study will not be limited merely to fiscal income, but also incorporate indirect impacts such as job creation and additional consumption. This provides a more comprehensive view of the associated economic impacts of the agricultural biotech sector.

The report begins with a brief economic section, followed by a summary of the biotech industry in the US and Puerto Rico. Afterwards, the methodology and results of the economic impact study are presented. It is outside the scope of the report to deal with technical issues related to the industry's operations.

Economic and Demographic Trends

According to the US Census, Puerto Rico had close to 3.3 million residents in 2017 and a population density of 1,000 inhabitants per square mile. The per capita income and average family income for 2016 were reported by the American Community Survey to be $11,688 and $34,710, respectively. These estimates of population and income are pre-Maria numbers, and will change as a result of the hurricane. This is particularly true of the population numbers due to increased net migration.

The Island's Gross National Product for fiscal 2016 was $70.1 billion. In 2017, salaried employment (excluding self-employed and agricultural workers) was reported at 871,400, with collective wages of $23.8 billion.[4] The household employment survey reported a Labor Force Participation Rate of 40.2% and an unemployment rate of 11% with total employment (i.e. including self-employed and agricultural jobs) reaching 986,500.

TABLE 1. SELECTED ECONOMIC INDICATORS: PUERTO RICO 2017

General Indicators	
Indicator	**2017**
Population	3,337,177
Population Growth (2010-2017)	-10.3%
GNP (2016)	$70.1
5yr GNP growth	-3.1%

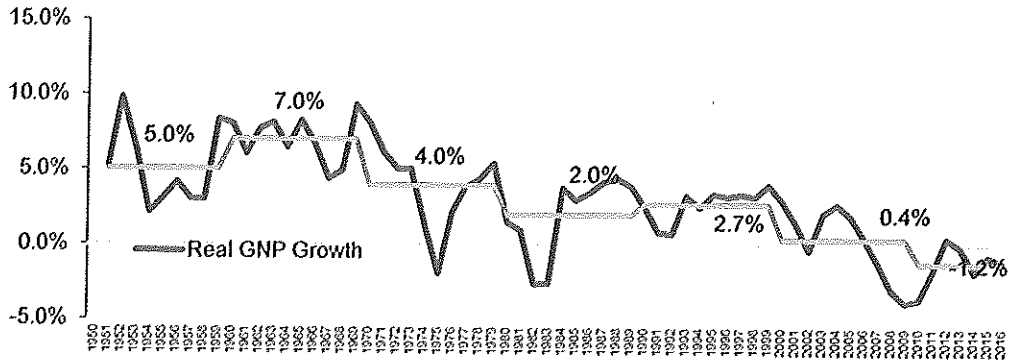
[4] Estimated based on the first two trimesters of 2017, does not take into account the possible impact of Maria on lost wages.

Per capita income*	$11,688
Average family income*	$34,710
Salaried Employment	871.4
Total Employment**	986.5
Labor participation rate	40.2%
Unemployment rate	11.0%

Source: Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017, US Census Bureau. PR Planning Board, Statistical Appendix, Table 1. Department of Labor and Human Resources, Establishment Survey. US BLS Quarterly Census of Employment and Wages *American Community Survey 5-year estimates 2016. **Preliminary & seasonally adjusted

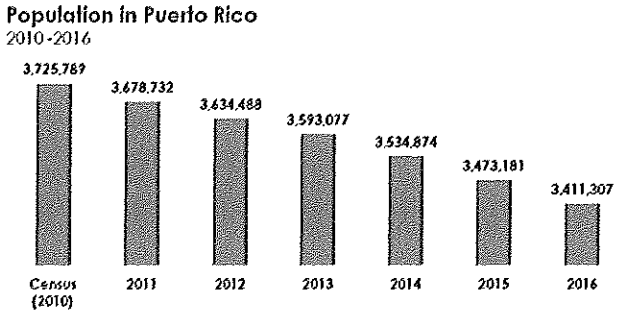
Puerto Rico's economy has underperformed for many years but beginning in 2006 it enter a period of severe economic contraction. The following graph illustrate the trends in Real GNP growth from 1950 until 2016. Official numbers for fiscal 2017 are still not available but ETI estimates a contraction of 2.8%.

Puerto Rico Real GNP



Likewise Puerto Rico's population has been undergoing a significant transition, both in terms of size and composition. The following graph reflects the fall in population until 2016. Since a large proportion of migrants are below the age of 40, the remaining population is heavily weighted towards older age cohorts. In fact, the most recent US Census Bureau Community Survey has the median age of the population at 40 years.

FIGURE 1

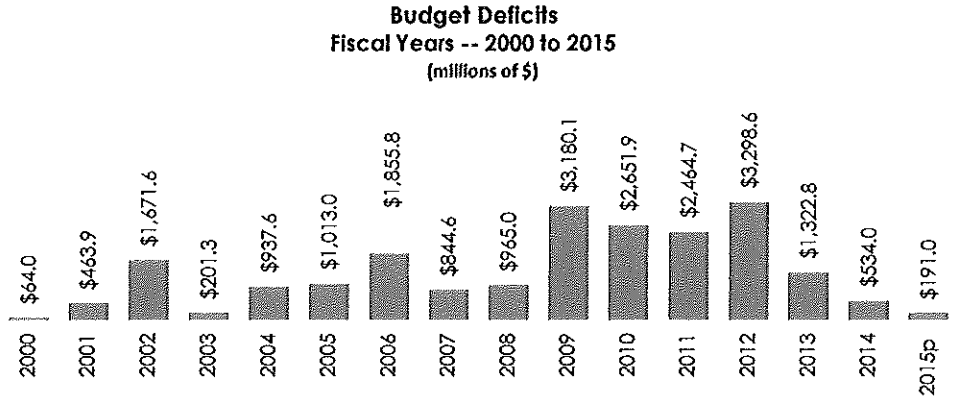


Source: US Census Bureau (2017). Annual Estimates of the Resident Population [Table PEPANNRES].

The Fiscal Crisis and Hurricane Maria

Puerto Rico currently faces its most severe fiscal and economic crisis of the past three decades. Given the magnitude of the crisis, the US Congress enacted PROMESA, establishing a Fiscal Oversight and Management Board (FOMB) to oversee Puerto Rico's budget and finances. A priority for the FOMB is assuring balanced budgets. Accumulating budget deficits led to an unsustainable fiscal situation. The following graph illustrate budget deficits in the period 2000-2015.

FIGURE 2



Sources: Office of Management and Budget (2015). Budget Petition (various years). Office of Management and Budget (2015). Approved Budget Fiscal 2015. From 2001 to 2013 accumulated budget deficits were $22 billion. During the same period $42 billion in debt was issued by the government.

As of today, the Commonwealth and its major corporations are under either the Title III or Title VI bankruptcy protection of PROMESA and follow a process similar to federal bankruptcy law.

In September of 2017 the Island was struck by two strong hurricanes, Irma & Maria. The destruction caused by these events exacerbated the fiscal crisis for the Commonwealth. It is estimated that the total impact caused by Hurricane

Maria alone could be upwards of $67 billion. The Island's electric grid and telecommunications were disabled, and recovery will take years.

TABLE 2 – IMPACT OF HURRICANE MARIA

Concept	Impact Maria (Lower Bound)	Impact Maria (Upper Bound)
Infrastructure Damage	$15,506	$19,553
Electric	$1,450	$1,800
Water	$60	$75
Transportation	$100	$120
Housing & Other Structures	$13,496	$16,991
Communications	$400	$567
Economic Damages	$15,303	$19,169
Agricultural Output	$116	$145
Government	$1,487	$1,858
Lost Business Activity	$13,700	$17,166
Cost of Reconstruction	$23,025	$28,850
Total	**$53,834**	**$67,572**

Sources: US Federal Emergency Management Agency (1999). *Plan de Acción Presidencial Para la Recuperación a Largo Plazo de Puerto Rico*. PR Planning Board (2001). *Impacto Económico del Huracán Georges 1999*. Acevedo, S. (2016). *Gone With the Wind: Estimating Hurricane Climate Change Costs in the Caribbean* [Working Paper]. Retrieved from the International Monetary Fund Database. [1]Represents lost revenue from stoppages in service, estimated by multiplying a $30 monthly average telephone bill by 2 months, and multiplying said subtotal by the affected consumers. [2]According to the PR Planning Board, room-nights lost by tourism cancellations were offset by increased room nights from additional assistance personnel. [3]Estimated by assuming partial damages worth 10% of the median household value, and a

According to the PR Fiscal Plan, the US Congress budgeted several disaster relief packages for Puerto Rico that total $49.1 billion. Private insurance disbursements could add $21 billion, resulting in $70 billion towards disaster relief. That is an amount equal to the 2016 PR Gross National Product (GNP).

Economic Forecast

Relief funding will greatly help in the rebuilding effort and increase aggregate demand. Economic activity is expected to increase in 2018, due to the significant flow of federal funds to the island. The reconstruction of more than 200,000 homes, the Island's electric grid, and transportation infrastructure would be registered as construction investment, leading to significant increases in overall investment. This could lead to a strange event in which **GNP could actually increase**, despite the sizable damages of the hurricane.

It must be accounted for that the main damage caused by the hurricane lies in lost capital *stock* (e.g. lost infrastructure, machinery, and equipment), whereas economic activity is measured in terms of *flows*, or the yearly production and demand for goods and services. Therefore, the main cost pertaining to Maria – the infrastructure and housing damage – is not reflected in national accounting, whereas new spending for reconstruction fueled by the Federal Government (FEMA and USACE) will be registered as new investment and have a positive impact on GNP. This is one of the main limitations of using GNP growth to measure economic activity after an event such as Maria.

Because of this, Estudios Técnicos, Inc. estimates that economic growth in

2018 will be 2.1% and 6.2% in 2019. This is due to growth in personal consumption and investment during the two years.

TABLE 3 – ESTIMATED ECONOMIC IMPACT OF FEDERAL RELIEF FUNDS & INSURANCE DISBURSEMENTS

Concept	2017	2018	2019
Real GNP	**-2.4%**	**2.1%**	**6.2%**
Personal Consumption	-0.1%	3.7%	0.3%
Government Construction Investment	-10.0%	29.2%	411.5%
Private Construction Investment	4.0%	16.5%	1.0%
Government Spending	-5.0%	7.2%	6.6%

Sources: Junta de Planificación (2017). *Apéndice Estadístico 2016* (Tabla 1). Estimados por Estudios Técnicos, Inc. (23 de febrero de 2018).

The Commonwealth presented a new fiscal plan in February of 2018, and this new plan should be certified by the end of March. Several restructuring measures are considered in the plan, among these, educational, health, tax, and labor reforms. The FOMB has asked that the new plan also include cuts in public pensions and that any tax reform be revenue neutral.

The Biotech Sector in Puerto Rico

Technology, particularly that related to the life sciences or biotech, is a fast-growing sector in the US. Since 2012, annual growth has averaged 1.6%, while its employment has surpassed 300,000.[5] According to IBISWorld, most of this growth can be attributed to an increase in demand for ethanol, improved crop yields, and increasing medical needs. This implies that this sector holds significant potential for the economy, as its expected demand will continue increasing, both locally and internationally.

In Puerto Rico, biotech firms are major employers of skilled labor in agriculture. In particular, members of PRABIA are the main employers of agronomists with over 200 hired per year, and also offer internships for local college students and collaborate in projects with local universities. Biotech firms also offer seasonal employment in municipalities with some of the lowest employment rates in Puerto Rico. Albeit seasonal, this provides an important benefit for municipalities, as it increases opportunities for employment, and reduces their probability of moving.

[5] As reported by IBISWorld on September 13th, https://www.ibisworld.com/industry-trends/market-research-reports/healthcare-social-assistance/social-assistance/biotechnology.html

The main attraction to establishing agro-biotech operations in Puerto Rico is the climate, which permits year-round research work on crops. Because of this, Puerto Rico has become a significant link in the research and development (R&D) supply chain for biotech companies. An estimated 85% of all seeds developed by PRABIA members pass through their Puerto Rico installations. Currently, the Island has few competitors (mainly Hawaii) that can offer these ideal growing conditions for crop development.

PRABIA members use their rented lands on the Island as a seed nursery for developmental-state crops. As such, very little income for the companies is generated by local activity. In fact, some members choose to decline some of the tax and wage incentives offered by the Commonwealth. This reduces foregone revenues to the State, while still providing the benefits of local employment. Protecting and incentivizing skilled employment is especially important at a time when Puerto Rico's economy has significantly deteriorated under a decade-long contraction that is expected to continue at least during the short term.

After hurricane Maria, the industry has aided in the recovery effort by donating over $2 million in emergency supplies that include: water, food, medicine, electric generators, and food for bees. This industry will also actively help in continuing rebuilding efforts to revive the agricultural industry post-Maria. Through its outreach programs, PRABIA has impacted more than 124,600 people as part of collaborations and workshops.

Incentives

Puerto Rico provides incentives for the biotech industry mainly in two forms: *Bona Fide Agriculture* and manufacturing incentives, for those corporations that qualify and choose to receive them.

Incentives for bona fide agriculture[6]

The key incentives for bona fide agriculture under which biotech firms qualify are:

- Property tax exemption;
- Exemption from Municipal Patent and/or other local taxes;
- Exemption from excise taxes related to the purchase of certain equipment;
- Exemption from the SUT in the purchase of agricultural inputs;
- 90% exemption on income tax;

[6] As stated in Law 225 of 2005, and Department of the Treasuries Informative Bulletin Number 06-03.

- Salary subsidy of $2.52 per agricultural worker-hour.

Manufacturing Incentives[7]

Tax rates

- 4% income tax on industrial development income;
- 0% to 1% tax rate on income for pioneer or novel products manufactured in PR.

Tax credits

- 25% tax credit for the purchase of products manufactured in Puerto Rico;
- Up to $5,000 credit for each job created during the first year of operations;
- 50% tax credit for investments in research and development, clinical trials, toxicology tests, infrastructure, renewable energy, and intangible property;
- 50% credit for investments in machinery and equipment for the generation with renewable resources and for the efficient use of energy;
- 50% of the investment in made in the acquisition of an equity interests or of the operational assets of an exempted business that is in the process of closing operations in Puerto Rico, to continue operating it, up to $8,000,000.

Research & Development Incentives

- A tax exemption of up to $195,000 on income generated from qualified federal research grants or up to $250,000 if the research is conducted within the Science District;
- A 50% tax credit for eligible investments in research and development, clinical trials, toxicology test, and any other qualified intangible property;
- A fixed 4% corporate income tax rate granted to Scientific or industrial R&D laboratories;
- 0 to 1% income tax rate for "Pioneer" Activities;
- Puerto Rico-based firms providing export services such as: environmental, technological, scientific, information technology or engineering consulting services pay a 4 % corporate income tax rate or a 3% corporate tax rate if 90% or more of its gross income comes from the export of services (Law 20 of 2011).

[7] Incentives as outlined in Business Puerto Rico, http://businessinpuertorico.com/en/incentives/incentives-by-industry/manufacturing

Effectiveness of Biotech Incentives

Many states in the US provide economic incentives to this industry, as this has been found[8] to be an effective means of increasing the number of highly skilled scientists and establishments in the biotech industry. However, the study by Moretti[8] also found that the Government doesn't necessarily recover all the investment through taxation. The benefits of attracting these companies lay mainly in job creation. More jobs translate to more consumption and a higher indirect impact on the economy.

One of the interesting findings of this report is that not all PRABIA members chose to apply for government benefits. The main reason for this is that, although Puerto Rico is key link in the R&D of PRABIA members, the local operations are mostly used as seed nurseries. That is, the research and development phases are performed at other facilities around the world. In winter months, specimens are sent to the Island to be grown and harvested for several generations (i.e. advanced). This way, R&D facilities around the world will have ample specimens to continue their work as the colder seasons arrive.

Seeds sent in and out of Puerto Rico have little or no monetary value, given that they are still in their research state. As such, no selling and or buying of the seeds takes place: the seeds are merely transferred from one facility to the other. This places a natural limit upon the taxable income of the corporations, as their local activity holds virtually no monetary value. It should be remembered that only income generated in Puerto Rico is subject to local tax laws.

For members applying for benefits, the most used incentives would therefore be those for the purchase of equipment and/or investment. As such, these incentives can serve to promote investment and not just provide tax cuts with little economic impact.

Methodology to Estimate Economic Impact

The economic impact of the Bio-technology sector comprises the employment (direct, indirect & induced), the consumption generated by said employment, plus an estimate of applicable taxes paid by the firms and their employees. Direct employment was subdivided into high-skilled and low-skilled labor, and estimates were calculated separately for each of the two groups.

[8] Moretti, E; Wilson, J; *State Incentives, Star Scientists and Jobs: Evidence from Biotech*; Working Paper 2013-17, Federal Reserve Bank of San Francisco.

For high-skilled labor, indirect and induced employment was estimated using the 2002 inter-industry multipliers for agriculture. The average wage reported by PRABIA members was $34,700 for full-time employment (assumed to be all high-skilled labor). The average wage used for indirect and induced employment used the median household income in Puerto Rico ($19,350).

For low-skilled labor, 2002 inter-industry multipliers for agriculture were also used to estimate indirect and induced employment. Direct employment salary was assumed to be that of NAICS 1114 (Greenhouse and Nursery production) at $11,793[9], given that all employees considered in this part of the analysis were low-skilled and the significant presence of seasonal employment in this sector. Indirect and induced employment used the median household income in Puerto Rico ($19,606).

All part-time labor reported by PRABIA members was assumed to be low skilled. This was then converted to full-time equivalent labor – that is, every 2 part-time workers represent one full-time employee with a salary of $23,586 (or $11,793 x 2).

Impact on Taxes

The impact on income tax revenue was estimated by multiplying the estimated payroll by an average effective tax rate, taking into consideration that the initial $20,000 of income is exempt from Puerto Rico income tax. The impact upon the Sales and Use Tax (SUT) was estimated based on disposable personal income as defined below:

> **Personal Disposable Income (PDI)** = Total wages, net of social security, Medicare, and income taxes (if any).

The PDI was multiplied by the percentage of goods and services subject to the SUT. Estudios Técnicos, Inc. estimates that approximately 50% of all goods and services consumed are subject to the tax. The other 50% includes automobile, gasoline, and other items, which are either exempt or subject to other taxes. This base-adjusted PDI was then multiplied by the 11.5% tax. Obviously, this is conservative since this other taxes are excluded from our impact estimates.

Data Sources for Indicators

The main sources of information in the report are 1) aggregate data on Puerto Rico's economy, and 2) data provided by PRABIA members. Additional

[9] This average salary is quite low as the BLS in its QCEW does not convert to FTE. As such, part time and seasonal employment reduce this average salary. For this reason both employment and salaries were converted to FTE in this report.

sources were used for macroeconomic impact indicators such as:

1) The 2002 Input-Output Matrix for Puerto Rico – used to obtain coefficients of direct employment requirements, and indirect/induced impacts for employment and income.
2) The median household income, obtained from the 2016 American Community Survey 5-Year Estimates.
3) The US Bureau of Labor Statistics – used to obtain wage estimates.

Economic Impact

Using data from PRABIA and PRABIA members, direct high-skilled employment was reported as 778. These jobs generate $27.0 million in salary, $1.5 million in income tax and $1.3 million in Sales & Use Tax (SUT). Low-skilled direct employment was estimated at 1,370, with total salaries reaching $32.3 million and SUT revenue at $1.7 million. Income tax for low skilled jobs is estimated at $0 because the assumed salary for direct, indirect, and induced employment lies below the $20,000 threshold (before converting to FTE) and is thus exempt from income tax.

TABLE 4 – IMPACT ON EMPLOYMENT (FTE)

Impact on Employment (FTE)					
Type of Employment		Employment	Salary	Income Tax	Sales & Use Tax
Direct	High-skilled	778	$26,997,378	$1,470,529	$1,338,949
	Low-skilled	1,370	$32,312,820	$0	$1,677,460
Indirect		795	$15,582,065	$0	$821,603
Induced		387	$7,580,464	$0	$399,699
Total		3,329	$82,472,726	$1,470,529	$4,237,711

Source: PR Planning Board, Inter-Industrial Multipliers 2002; BLS Quarterly Census of Employment & Wages (QCEW); American Community Survey, 5-year estimates; Estimates by Estudios Técnicos, Inc.

Indirect employment generated, considering total direct employment (low and high skilled), was 795 with salaries of $15.6 million. Given the lower wages no income tax revenue is received by the Commonwealth. Induced employment reached 387, with total salaries near $7.6 million and SUT revenues at $399,699.

Additional Benefits

Nearly 5,000 acres are rented by PRABIA members, usually at above-market rates. PRABIA members pay an average of $547 per rented acre, this is higher than the estimated $258 average in Puerto Rico[10]. This provides a benefit to renters, both public and private, who receive an additional income. PRABIA members are estimated to pay $2.7 million in rent per year. To this, one can

[10] Estimated using the US Department of Agriculture, *2012 Agricultural Census* [*Tables 13, 37, & 80*].

add the acres bought by PRABIA members, a further 3,700 acres. These were bought at a cost of $37.8 million.

PRABIA members also promote collaborations with public and private universities. These offer research opportunities and work experience to over 738 students from various disciplines. PRABIA members are the main employers of agronomists in Puerto Rico. PRABIA hires over 200 agronomists per year, currently they are the main employer of agronomist in Puerto Rico.

Cost to the Commonwealth

To determine the cost to the Commonwealth of PRABIA members' operation on the Island, four cost metrics were estimated:

1. Corporate Income Tax;
2. Municipal Patent;
3. Salary Subsidy;
4. Sales & Use tax of local purchases.

All data presented in this analysis was from 2016. For the corporate income tax, it was assumed that these foreign companies would be subject to a 4% corporate income tax. The cost to the State is 90% (the exemption) of the tax while 10% (the amount currently paid) serves as a benefit.

The municipal patent was estimated as 0.5% of all revenue by PRABIA members. The salary subsidy provided to many "bona fide" farmers was also estimated for all PRABIA members. It was assumed that only those part-time workers, in low skilled positions qualified for this subsidy. It should be mentioned this subsidy has been reduced to a maximum of $250,000, meaning **the current cost to the State is much lower than the presented in this analysis.**

"Bona Fide" farmers also have an exemption on SUT on local purchases for agricultural inputs. In this analysis it was assumed that all local purchases made by PRABIA members were exempt. The only cost for the State not included in the analysis was the exemption on property taxes.

As a separate analysis the same comparison of costs and benefits was done assuming costs were equal to those presented in the report[11] by the *Center of Investigative News* (CPI, by its Spanish acronym). This second scenario is presented in the appendix.

Benefits to the local economy include wages paid to workers (full and part time), rented/acquired cropland, local purchases and corporate income tax paid. The analysis only includes direct employment, not the indirect and induced employment presented in the previous section, to compare the direct cost of the State with the direct benefits to the local economy.

[11] Elivan Martínez Mercado, *"Una alfombra roja de mantengo corporativo impulsa los transgénicos en Puerto Rico"* published on March 8, 2017. Website: http://periodismoinvestigativo.com/2017/03/una-alfombra-roja-de-mantengo-corporativo-impulsa-los-transgenicos-en-puerto-rico/

Conclusions & Recommendations

It is clear from this report and the research carried out in its preparation that even using exaggerated estimates of the cost to the Government, (as presented in scenario 2 in the appendix) PRABIA companies provide a substantial net benefit to the economy.

In addition to the measured benefits in terms of jobs – over 20% of jobs[13] in agriculture - and incomes, the existence of the industry in Puerto Rio also translates into intangible benefits regarding the role of Puerto Rico as a site for agro-industrial and other technology related activities. This is especially important, as the leading firms in the industry have operations in the Island and play a key role in the industry's value chain worldwide.

For this reason, a normal cost-benefit analysis shouldn't be used, the "cost" to the State should be compared to the benefit to society not just what's returned to the State through taxes.

Agro-biotechnology firms are part of a system that includes activities in Academia such as a Center for Agricultural Biotech Research and Training and university programs in agricultural R & D. PRABIA members, as mentioned, employ the largest number of agronomists in Puerto Rico, and thus help support the university programs in the field.

In addition, as the PR Industrial Development Company mentions in a recent report: "The crops of the future are developed in Puerto Rico with ongoing research with corn, soy, sorghum, sunflower, cotton, among others since 1983". This image of Puerto Rico as an agricultural research area is an intangible benefit that complements promotion efforts in other areas that are biotechnology-centered.

Ultimately the decision on incentives hinges on the policy decision of whether it is convenient for Puerto Rico's development prospects to have an agricultural biotechnology industry in the Island. In 2009, then Governor Fortuño signed into law the "Law for the Promotion and Development of Agricultural Biotechnological Businesses in Puerto Rico." This legislation established Puerto Rico's industrial policy, adopting the best practices already in place in U.S. states.

Although PRABIA organizes fairs and other education programs, there is a need to intensify these efforts aimed at a larger public, not necessarily related to the agricultural industry. This report is a first step in this direction but further

[13] Non-FTE jobs.

work needs to be done in generating the necessary information, particularly in terms of the cost to the Government. A second recommendation is to engage municipal governments in terms of generating awareness of how the jobs created in each facility impact the various municipalities.

Appendix

Second Scenario

To determine the cost to the Commonwealth of PRABIA members' operation on the Island, a report[14] by the *Center of Investigative News* (CPI, by its Spanish acronym) was also used. The CPI estimated total costs to the state over a ten-year period, accounting for wage and electricity subsidies, among many others. Using those numbers, the yearly cost to the State was then estimated at $57.8 million.

Although these numbers are being used in the study, ETI is well aware that they most probably exaggerate actual costs. This is particularly true of the imputed cost to the Department of the Treasury. Therefore, this should be looked at as a worst-case scenario in terms of costs to the State compared to benefits to the local economy.

TABLE 6 – GOVERNMENT YEARLY COST

overnment Agency or Departme	Yearly Cost
Department of the Treasury*	$53,083,248
ADEA	$3,726,993
PREPA	$632,166
PRIDCO	$348,000
DRNA	$47,639
Total	**$57,838,046**

Source: Centro de Periodismo Investigativo (CPI).

*The cost in the report was presented for 9 years.

Department of the Treasury costs are overestimated as they assume that the cost figure is actually incurred, and also because they do not consider that the companies' economic activity would not have taken place without the incentives offered. In other words, the incentive cannot be looked upon as foregone income.

Although this appears costly to the Commonwealth, PRABIA members leave $80.2 million in Puerto Rico in the form of salaries, rent on land, local purchases and corporate income tax. This represents a net benefit of over $22.4 million. This means that for every dollar in subsidy to PRABIA members, $1.39 are returned directly to the economy.

If the interindustry production multiplier[15] is used, the $80.2 million in spending

[14] Elivan Martínez Mercado, *"Una alfombra roja de mantengo corporativo impulsa los transgénicos en Puerto Rico"* published on March 8, 2017. Website: http://periodismoinvestigativo.com/2017/03/una-alfombra-roja-de-mantengo-corporativo-impulsa-los-transgenicos-en-puerto-rico/

[15] Interindustry production multiplier for agriculture is 1.6892 as reported by the PR Planning Board in its 2002

translates to $134.9 million in total production (including indirect production).

TABLE 7 – COST BENEFIT

Benefits to the Local Economy	
Benefit	
Salary	$59,310,198
Rented Acres	$2,724,851
Local Purchases	$17,669,200
Corporate Income Tax	$512,094
Total Benefit	$80,216,343
Costs to the State	
Department of the Treasury*	$53,083,248
ADEA	$3,726,993
PREPA	$632,166
PRIDCO	$348,000
DRNA	$47,639
Total Cost	$57,838,046
Net Benefit	**$22,378,298**

Source: Centro de Periodismo Investigativo (CPI); Estimates by Estudios Técnicos, Inc.

*The cost in the report was presented for 9 years.

**Potential if companies does not use SUT exemption on local purchases.