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RESEARCH ARTICLE

ACADEMIC INTERNATIONALIZATION OF BRAZILIAN STUDENTS IN THE AGRICULTURAL SCIENCES AND LABOR OPPORTUNITIES IN BRAZIL AND ABROAD

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ABSTRACT

This research focuses on the Brazilian experience of the Science without Borders (Ciências sem Fronteiras - CsF) Program, launched in 2011 and terminated in 2017 after strong criticism from different sectors of society. The Program's objective was to promote scientific and technological development through the funding of an international exchange program for undergraduate and graduate students. The international academic qualification is discussed in this context as public policy and individual strategy of acquisition of competences and differentiation in the labor market. This article aims to discuss how the students evaluate their experience while participating in the program and the influence that CsF had in those youths' career projects. Once Brazilian economy relies on agricultural products and their exportation, the agricultural sciences were included in the program. Thus, given the importance of agriculture in the country's economy and the program, this study concentrated on students from agricultural sciences graduation courses. The data collection was conducted through literature and document research and a survey. The survey was performed through the application of a questionnaire to a sample of 31 students from the agricultural sciences graduation courses of the Federal University of Viçosa, in the state of Minas Gerais, Brazil. The results points to a positive evaluation of the international experience provided by the program considering personal and subjective aspects, language learning, and scientific and technological capacitation. However, the students highlighted the differences between Brazil and the other countries in terms of social valorization of rural producers and other professionals that work in the agriculture and farming sector. From the students' point-of-view, the economic, social and political crisis, and the lack of public policies focused on the sustainable rural development in Brazil are the obstacles to a professional fulfillment project and consequently reduce the intention of remaining in the country.

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INTRODUCTION

The internationalization of college education is being adopted in many developing countries as a strategy to promote scientific and technological progress. It cannot be said to be a new phenomenon, once the elites of countries that have gone through the process of European colonization – as in the case of Brazil – used to study and send their children to study abroad in the metropolis. In the last decades however, the strategy of internationalization of education has been gaining new outlines. Nowadays, it is possible to notice the valorization of a cosmopolitan graduation -advocated by the middle classes -, the spread of discourses on global citizenship and the notion of social distinction provided by personal experiences abroad. In this context, the most important factor to internationalize education is the competitive advantage that scientific, technological and idiomatic learning offer in the labor market. The qualification of the labor force has been used as a recurrent motive to the elaboration and implementation of several public policies in Brazil. Those policies usually target youths, inserted or not in the labor market. The spread of technical and vocational courses, the popularization of private and public institutions of high education, and the internationalization of college courses have been part of the educational agenda in the last few years. Those goals aim to meet the lack of qualified labor often presented as an obstacle to economic growth in Brazil. Yet due to the recent economic, institutional and political crisis, official data point to the increase of the unemployment rate – from 6,8% in 2014 to 11,8% in 2016 and 13,2% in the first quarter of 2017. In 2016,

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the unemployment rate among youths aged between 18 and 24 years reached 25,7% (IBGE, 2016). From the contradiction presented between the objectives of the educational agenda and the actual conditions of employability of young professionals, this article queries about the possibility on an inverse result from the policies destined to promote the internationalization of high education, once such policies are not followed by programs of retention of qualified labor in the country. This article focuses on the Science without Borders (Ciências sem Fronteiras – CsF) Program, created in 2011 aiming to enable the completion of part of undergraduate or graduate education abroad. Being a recent public policy, the program lack data on its implementation and results. Likewise, there are few scientific analyses of the CsF, making it difficult to get a global perspective on the influences of this policy on Brazil's technological and innovative trends and on the life project of its participants. Among the priority areas of internationalization of education in Brazil is the agricultural and farming sector. This sector presents vital importance to Brazilian trade balance and the country is widely known by its agro-exporter profile. From this, the article aims to investigate the participation of students from agricultural sciences' college courses in the program. In March of 2017, Brazil suffered the impact of a scandal involving the production and sale of meat out of the sanitary standards and corruption among public servants responsible for inspection and quality control. To this date, it is projected a reduction in 10% of Brazilian meat exports, resulting in the loss of 420.000 jobs and of US$3,5 billion from international sanctions. Such scandal brought to public debate the quality of education and capacitation of professionals that work or desire to work in the production of food in Brazil.

The Science without Borders Program

In Brazil, the internationalization of education can be analyzed through two scopes: as a family strategy and as a public policy. Until 2000, middle class families invested resources in ways to increase the social and cultural capitals of their children to turn them more able to achieve qualified jobs. In the 1990s, the motto of those families was "a dose of Europe or United States for each child", once the parents' preference relied on English speaking countries (NOGUEIRA, 1998). In this period, the internationalization could be achieved through short-term internships oriented to linguistic development, high school exchange programs, programs of academic mobility during college, and access to institutions that provided multilingual education (RAMOS, 2009).

From the directives of international institutions such as UNESCO, documents, treaties and agreements were created to discuss the possible effects of the globalization process in education, mainly in high education. To UNESCO, globalization "poses new challenges at a time when nation-states are no longer the sole providers of higher education and the academic community no longer holds the monopoly on decision-making in education. Such challenges not only address issues of access, equity, funding and quality but also those of national sovereignty, cultural diversity, poverty and sustainable development" (UNESCO, 2004). That concern resulted in a series of international treaties to regulate practices and curriculums, stablish criteria to obtain the equivalence of diplomas, and other subjects on the exchange of students and international cooperation agreements. In the European context, the Erasmus Program, created in 1987, aimed to promote the exchange of students and professors between countries of the European Community. In 2017, on the 30th anniversary of the program, Erasmus became Erasmus+ and expanded its coverage, encompassing school education (Comenius), high education (Erasmus), international high education (Erasmus Mundus), professional education (Leonardo da Vinci) and adult education (Grundtvig). In addition, the Erasmus+ expanded the number of countries in the network and became an agreement between the European Union and other countries (PROGRAMA ERASMUS +, 2017). Furthermore, still in the European context, it is possible to highlight the Sorbonne Declarations of 1998 and the Bologna Process of 1999. In turn, in Latin America, the agreements of the Montevideo Groups (1991) and of Tordesillas (2000), and the Magellan Network (2005) stimulated the standardization of the exchange of students and professors between European and Latin American countries (USP, 2009; RAMOS, 2009). In Brazil, the U.S.–Brazil Joint Action Plan to Eliminate Racial and Ethnic Discrimination and Promote Equality was signed in 2008 by then presidents Dilma Rousseff and Barack Obama. That plan envisaged short duration educational exchange programs (BORGES 2015) and had as a result the creation of the Science without Borders (CsF) Program in 2011. The CsF Program was supervised by both Brazilian Ministries of Education and of Science and Technology and its implementation was carried out by two governmental agencies of research promotion: the Coordination for the Improvement of Higher Education Personnel (CAPES) and the National Council of Technological and Scientific Development (CNPq) (SILVA, 2012).

The Science without Borders (CsF) Program aimed to "promote exchange in a way that undergraduate and graduate students take internships abroad to have contact with innovative and technologic competitive educational systems. Moreover, the program seeks to attract researchers from other countries who want either to live in Brazil or to stablish partnerships with Brazilian researchers, and to offer opportunities for company researchers to receive specialized training abroad (BRASIL, 2017). The 2015's goal was the concession of 101.000 scholarships to graduate students. The priority areas of the program are the following: Engineering and other technological areas; New Technologies in Construction Industry; Computer Sciences and Information Technology; Aerospatiale Technology, Creativity Industry; Exact and Earth Sciences; Oil, Gas and Mineral Coal; Renewable Sources of Energy; Mineral Technology; Nanotechnology and new materials; Biology, Biomedicine and Health Sciences; Pharmacology; Biodiversity and Bio-prospection; Biotechnology; Marine Sciences; Technology on Prevention and Mitigation of Natural Disasters; and Sustainable Agricultural Production (BRASIL, 2017). The program began in 2011 but by the end of 2016, it was interrupted for reformulation and the actual budgetary crisis in Brazil have also influenced on the interruption of CsF. In this period, 92.880 scholarships were granted. The CsF Program faced several criticism due to the absence of monitoring on the students activities abroad; the non-realization of a cost-benefit analysis on the investment, the delay on or lack of payment in scholarships; and the conception that the government was, in fact, financing tourism instead of capacitation. At the beginning of 2017, the Coordination for the Improvement of Higher Education Personnel (CAPES), linked to de Ministry of Education, proposed a new program, the "More Science, More Development". Such project was actually a broadening of the CsF Program, but with emphasis on the graduate.

Objectives

The objectives of this work are to analyze: a) the evaluation that graduate students from courses in the Agrarian Sciences and that have entered the program make from their academic experience abroad, and b) how those students elaborate their professional prospects in Brazil and abroad.

Review of Literature

The literature on the Science without Borders Program presents five common aspects. Firstly, the CsF is analyzed as a product of processes in globalization that have been creating a market for international education in which the access has been provided by educational policies and international partnerships and agreements (RAMOS, 2009; AMORIM, 2012). Being considered a peripheral country regarding the production of science and technology, Brazil is strengthening its policies to internationalize the education of young professionals and researchers. It can be noticed by the increase of international scholarships provided by governmental research agencies: in 2011, 1.825 scholarships were granted while in 2014, 35.976 scholarships were offered to graduate and post-graduate students (master, doctoral and post-doctoral), and to participants of the Young Talents Program (CAPES, 2016).

Secondly, there is a noticeable criticism trend in studies o CsF regarding the educational asymmetry between Brazil and the countries of destination of students. Those critics pose that that asymmetry could indicate an overvaluation of education abroad in detriment of national one. In Brazil, the choice of U.S. as destination prevail among students, what bolsters the sociological argument of the Complex of Inferiority suffered by Brazilians regarding American education and researching institutions, which are worldly renowned in the subject (RAMOS, 2009; Vilaça, 2014; MARTINEZ; 2016). Thirdly, the theoretic approach of the French sociologist Pierre Bourdieu stands out among others and is often used as a tool to analyze the CsF program.

It can be observed by the use of the conceptions of social distinction, cultural capital and mobility capital provided by Bourdieu. In this case, the internationalization of educational trajectories is considered a class strategy – Brazilian middle class strategy – that aims to provide opportunities for their children to develop skills that are valuable in the labor market such as the mastery of multiple languages, flexibility and individual mobility, and networking. Such skills create symbolic distinction and give bigger status to the graduation diploma, which is now a common degree in the country (MARTINEZ, 2016; RAMOS, 2009; AMORIM; 2012). Through this angle, Internationalization contributes to the maintenance of social inequality. Yet, if on the one hand, the internationalization of high education is advocated by the public policy agenda as a strategy for technological and scientific development in Brazil and by the families as a class strategy, it is necessary to consider that those initiatives also offer the opportunity to develop the individual and subjective competences of "global citizenship" and "cosmopolitan experience", which are pursued by the youth participating in the CsF (RAMOS, 2009). The fourth aspect highlighted in the literature on CsF points to the linguistic learning, English in special, as a benefit derived from international educational experience. According to the authors, such apprenticeship is guided by a utilitarian view of educational exchange and it does not cease to represent a way to obtain both social distinction and advantages in the labor market. Finally, the studies on the program take the origin of the family and the parents' social capital into account to define the profile of the youths participating in the CsF. In their researches, the authors registered the predominance of youths between 20 and 26 years of age, male, white, from the middle class, and whose parents have high school or college degrees. In addition, most of participants poses that the family support the decision to participate in the educational exchange (RAMOS, 2009; MARTINEZ, 2016, Borges, 2015). Since the Science without Borders is a relatively new program, the discussions on the brain drain subject is still crude (BRANDI, 2006; Pereira, 2013). Studies on similar policy experiences in other countries, such as India and China, suggest that although there is a youth's diaspora to study and capacitate themselves abroad, the origin countries can benefit from the international cooperation networks that are established in the process. Furthermore, in the case of political and economic crisis in the country of origin, the critical situation could be reversed and changes in the labor market, the employability conditions and the financial stability could encourage the return of emigrates (CASTRO *et al*, 2012). Although developed countries linger as attractive hubs to students from all over the world, they have recently been creating restriction barriers to foreign workers. Asa result, that kind of policy undermine the retention of high-skilled foreign young entrepreneurs. In a recent research, it was observed that currently, students from India or China declared no intention of remaining in the U.S. after they terminate their studies: "On graduating from engineering courses, most overseas students say that they will work for a short time to gain experience, then return home. Working for an exciting startup such as Baidu or Alibaba is more enticing than being locked into a menial US position for a decade awaiting your green card" (WADHWA, 2017).

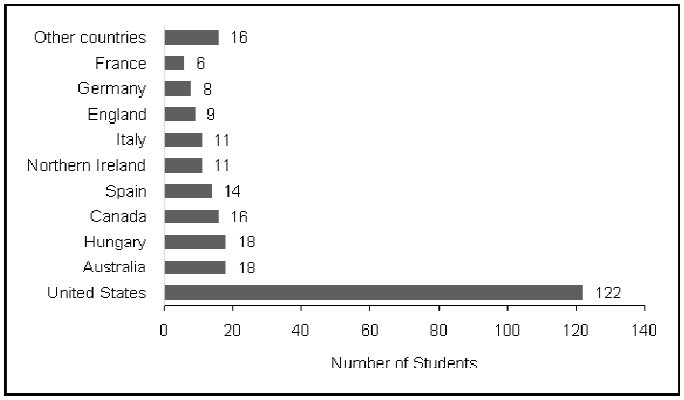
MATERIALS AND METHODS

The research was conducted at the Federal University of Viçosa (UFV), located in the state of Minas Gerais, in Brazil's Southeast region. The state of Minas Gerais is the largest producer of dairy in the country and is responsible for more than 50% of the national coffee harvest. Also, coffee is the main commodity exported by the state. The UFV was created in 1922 as a result of an agreement signed between the governments of Brazil and United States, and was firstly named Higher School of Agriculture and Veterinary (Escola Superior de Agricultura e Veterinária – ESAV). The U.S. mission aimed to reproduce the models of the Land-Grant Colleges in order to disseminate the adoption of scientific and technological principles in Brazilian farming. Therefore, since its foundation, the university's institutional identity is defined by the agricultural sciences. In 2015, UFV had around 11.500 undergraduates and 2.800 graduates (master and doctoral degrees) (UFV, 2016). The graduation courses that compose the Agricultural Sciences Center at the university are agronomy, agricultural and environmental engineering, forest engineering, agribusiness, cooperatives management and zootechny. In the research, there were two stages of data collection. The first stage was a documental investigation performed through the access of the Science without Borders' official website and consultations to the Board of International Relations of the university (DRI-UFV), responsible for the monitoring of the youths' activities abroad. At the second stage, a query was conducted through the application of

questionnaires to 31 undergraduate of agricultural sciences courses that had participated in the program. That sample represents 12% of the total students in agricultural sciences courses that have participated in CsF between 2012 and 2016. The sample was selected randomly, resulting from answers to requests on the university's social media, mainly Facebook. The survey was composed by both structured and unstructured questions. The unstructured questions provided broad information on opinions and evaluations about educational exchange, the CsF Program, the experience acquired abroad, the contact with other cultures, the linguistic learning and the professional prospects in Brazil and abroad.

RESULTS AND DISCUSSION

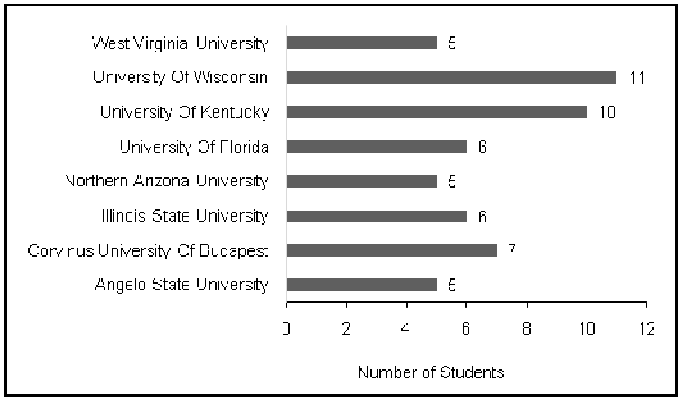
According to official data on the Science without Borders Program, from the 92.880 scholarships granted nationally between 2012 e 2016, the majority (41.594 scholarships) was allocated to students in the area of "Engineering and other technological areas". Considering the Agricultural Sciences, each area accounted for the following number of scholarships: 3.197 to Sustainable Agricultural Production, 2.039 to Biotechnology and 1.000 to Renewable Sources of Energy. Accounting for the gender aspect, from the total number of scholarships granted in the period, 56% were destined to men and the remaining 44% to women. As for the destination, the U.S., United Kingdom and Canada welcomed 27.821, 10.740 and 7.311 CsF students respectively, confirming the Brazilian preference for English speaking countries. The state of Minas Gerais accounted for 15.925 scholarships, lagging behind the state of São Paulo, which accounted for 19.232. In Minas Gerais, the Federal University of Viçosa (UFV) is the second placed in the number of undergraduate scholarships granted, accounting for 1.692 of them in the period. Through the data collected from the monitoring system of the university's International Relations Board (DRI-UFV), students from Agricultural Sciences graduation courses accounted for 249 scholarships between 2012 and 2016, being 123 to Agronomy, 91 to Forest Engineering, 22 to Agricultural and Environmental Engineering and 13 to Zootechny students. Following the national trend, most of the students from Agricultural Sciences graduation courses in UFV chose the U.S. as destiny, followed by Australia, Hungary and Canada. The category "Other countries" include China, the Netherlands and New Zealand (with 3 students each); Portugal and Brunei (with 2 students each); Colombia and South Korea (one student each), and a non-classified student (see chart 1 below).



Source: Designed by the authors using DRI-UFV data

Chart 1. Destination of UFV's students in CsF - Agricultural Sciences courses - UFV, 2012/2106

In turn, chart 2 lists the universities that welcomed more students among the group from Agricultural Sciences graduation courses in UFV. To build this chart, the authors considered only institutions chosen by 5 students or more. As expected, the majority of the universities listed are in the United States, being the Corvinus University of Budapest the sole exception. It is important to highlight that both the universities of Wisconsin and Kentucky (respectively second and third placed in the chart below) were stablished in the 19thcentury under the model of Land-Grant Colleges. In 1922, Peter Henry Rolfs, then director of the Florida Agricultural College, used that same model to create and develop the Higher School of Agriculture and Veterinary (ESAV), which further became the UFV. Hence, the data points that beyond promote the production of scientific and technological knowledge and the learning of the English language, the exchange of students with U.S. universities befits UFV's institutional and historical tradition.



Source: Designed by the authors using DRI-UFV data

Chart 2. Universities that welcomed more Agricultural Sciences students from UFV – CsF only

Considering the sample to which the questionnaires were applied, from 31 students in the survey, 19 of them were male, following the national trend. Regarding the academic majors, the sample was composed by 13 students of Environmental Engineering, 12 of Agronomy, 3 of Agricultural and Environmental Engineering and 3 of Zootechny. The predominance of students from Environmental Engineering and Agronomy match with the priority areas of the CsF Program, which include sustainable agricultural production, biodiversity and renewable sources of energy. As for the countries of destination, the English-speaking countries prevail in the sample, once 17 students went to the U.S, 3 to Australia, 2 to Canada, and 2 to Ireland, totalizing 77.41% of the respondents. From the remaining students, 5 went to Hungary, 1 to Italy and 1 to Austria. In average, the students remained in their destination for 14 months. Regarding the justification presented by the students to perform the exchange, 19 pointed to the opportunity of widening their scientific and technological knowledge and improving their professional skills. By the end of the term abroad, this groups of students declared that the results of the academic exchange met their expectations, highlighting the advantages of learning in modern laboratories and of practical problem resolution. In short, they declared that the agricultural sciences abroad are "applied" and considered it an advantage in comparison with the one in Brazil, which they considered excessively theoretical. To get to this conclusion, those students compared Brazil and the country of destiny according to some issues.

The criteria used were the importance given to techniques and agricultural machinery in classes, the value given to the students' research activities, the availability of financial resources to maintain the work of the research centers, the supply of specific disciplines, and simulations of concrete situations of the professional life. A second group of 18 students entered the program aiming to learn and improve language and communication skills, mainly in English. Although the students perceived the different language as an obstacle at the beginning, by the end of the time abroad they considered that their improvement in the matter was the most substantial during the CsF experience. The opportunity of getting to know other cultures was mentioned by 13 students. Also, from the complete sample, 17 had the opportunity to visit other countries (different from the one chosen as exchange destination) on vacations or even in the period of classes during their time abroad. The intercultural contact brought to the students the opportunity to compare ways of thinking and acting in Brazil and in other countries. Those students mentioned some disappointments during their time abroad, such as lack of security and the prejudice they suffered regarding their gender, color and "underdeveloped" origin. During this contact, those students presented Brazil as a promising country, but with several government problems.

Finally, 8 students stated that acquire new personal experiences was their main goal in the CsF. They mentioned that by having to live by themselves and to learn different cultural rules, and by being introduced to new nutritional habits, they could exercise flexibility, tolerance and citizenship. The adaptation to new institutional rules regarding disciplines, schedule and assessment activities was also considered a personal achievement, which will have an impact in their professional future. The experience gathered by those students in their time abroad certainly changed their life projects. From the complete sample, 15 students had already considered to enter an international exchange program before the CsF opportunity. In addition, after the period abroad, 19 students stated that they intend to participate in other exchange programs, especially in a graduate level. Such project not only indicates the desire to keep studying, but also point to the appreciation of new experiences, knowledges and competences that lead the life project to the incorporation of new roles and social identities (VELHO, 2004). As for the professional future, 19 students stated the desire of working abroad, 4 want to remain in Brazil and 8 are not certain of where they want to work. From the answers given in this matter, it is noticeable that those students evaluate their "field of possibilities", or the concrete reality's horizon that constrain their options to choose and act (VELHO, 2004). This repertoire of options is composed by the public policies, the individual's financial and intellectual conditions, the infrastructure provided, the individual history, and other factors. The field of possibilities allows the evaluation of an assortment of projects that possible to be created considering the context and the chances of success (or failure). In addition, it allows analyzing the displacement of an individual to other contexts in which the field of possibilities presents more chances of success in the project chosen (VELHO, 2004). According to the students in the sample, they desire to contribute to the scientific and technological development in Brazil as a manner to repay the investment the country made in their education. However, by analyzing the Brazilian economic, political and social context, those students do not glimpse the expansion of job offerings or retention of qualified labor in the country.

Other information that support this insight is the assessment performed by the students on the rural realities in Brazil and abroad. From the sample, 26 students had the opportunity to visit the countryside during their term abroad. From this experience, they stated that in other countries, the agricultural producers – small ones included – benefit on the availability of modern technologies of production, comfortable houses, infrastructure to distribute their production, market and social valorization of their profession and more capable professionals who work to improve their productivity and the quality of the products. In comparison, those students consider Brazil a backward country, once there is a lack of coherent, continuous and effective coordination of the public policies aimed at sustainable rural development.

Conclusion and Recommendations

This research showed that the academic exchange provided by the Science without Borders Program inserted the option of working abroad in the field of possibilities of the students from Agricultural Sciences in Brazil. The majority of participants intend to take their post-graduation degrees in other countries, mainly the ones they went to during the CsF and the U.S. Although this insight needs further and more thorough investigation, it indicates the emergence of two problematic trends. By one side, there are the Brazilian huge challenges to increase its agricultural productivity considering the world's phytosanitary standards, to provide infrastructure to distribute the production over a country with continental dimensions, to increase both income and the technology availability to familiar farmers and agricultural producers, to prevent deforestation and degradation of water resources, and to foster research in renewable sources of energy. Such challenges become more relevant in an economic and political context in which there are scarce job vacancies and the market has little capability of absorbing qualified labor. On the other side, the countries of destination chosen by most of the students of the CsF Program – mainly the United States –are currently creating barriers to the entrance and hiring of foreign workers. The interruption of the program for the undergraduate and its new emphasis on the graduate set an important moment to perform the evaluation of this public policy, especially to map where the participants of the program are currently working or studying.

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