FUTURE SRJ
FUTURE STUDIES RESEARCH JOURNAL: TRENDS AND STRATEGIES

PROFUTURO: FUTURE STUDIES PROGRAM
Scientific editor: James Terence Coulter Wright
Avaliação: Doublé Blind Review by SEER/OJS
Revisão: Grammatical, normative and of layout

USE OF TREND IMPACT ANALYSIS AFFECTS PROJECTIONS OF EUCALYPTUS CULTIVATION IN BRAZIL

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ABSTRACT

Eucalyptus forestry is an important source of competitive advantage for Brazil and, since eucalyptus is a basic raw material for industrial segments that are undergoing great expansion, monitoring the growth rate of cultivated area is increasingly relevant. This study resorted to Trend Impact Analysis (TIA) to forecast the planting of eucalyptus in Brazil's reforested areas, adjusting the linear regression of historical data in the light of three events that were under way or that will probably influence the trend: timber funds, the world financial crisis and Biomass to Liquid (BTL) technology. The results allow one to infer that, in the short term, eucalyptus cultivation will expand at a rate similar to that of the linear curve, adversely affected by the world crisis and positively affected by timber funds. By 2016, however, the expansion of eucalyptus plantations is expected, largely because of the commercial scale of BTL technology.

Key words: Trend Impact Analysis. Eucalyptus. Future Studies.

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UTILIZAÇÃO DA TÉCNICA DE ANÁLISE DE TENDÊNCIAS IMPACTADAS PARA PROJEÇÃO DO CULTIVO DE EUCALIPTO NO BRASIL

RESUMO

O Brasil tem no cultivo de eucalipto uma importante fonte de vantagem competitiva, e por representar insumo básico de setores industriais que passam por momento de grande expansão, o acompanhamento de suas taxas de crescimento em áreas plantadas é cada vez mais importante. Neste estudo, utilizou-se a técnica de Análise de Tendências Impactadas (ATI) para desenvolver uma projeção sobre o cultivo do eucalipto em áreas reflorestadas do Brasil, ajustando a regressão linear de dados históricos de acordo com três eventos em curso ou de provável influência em sua trajetória: os fundos de investimentos em florestas, a crise financeira mundial e a tecnologia *Biomass to Liquid* (BTL). Inferiu-se que, em curto prazo, o plantio de eucalipto apresentará um crescimento próximo a curva linear, influenciado negativamente pela crise mundial e positivamente pelos fundos de investimentos florestais. Para 2016, no entanto, projeta-se aumento do plantio de eucalipto, atribuído principalmente à escala comercial da tecnologia BTL.

Palavras-chave: Análise de tendências impactadas. Eucalipto. Estudos do Futuro.

1 INTRODUCTION

Appropriate weather conditions for reduced cycle planting and the development of technologies that generate high yields per hectare allow the cultivation of eucalyptus in Brazil to be highly competitive on a global scale. Monitoring the projections of the expansion of eucalyptus planting has become increasingly strategic for the country, because 70% of the production is used to meet the needs of the steel and of the pulp and paper industries (ABRAF - Associação Brasileira de Produtores de Florestas Plantadas [Brazilian Association of Planted Forests]. Since 2008, these industries have been encouraged to join the ranks of the world's biggest global players (Ministry of Development, Industry, and Foreign Trade, 2008).

Some studies contribute to planning in these industries. According to a paper by Labate (2008), presented at the Simpósio Sobre Etanol de Celulose [Cellulose Ethanol Symposium] of the Programa de Pesquisa em Bioenergia/BIOEN [Program for Bioenergy Research] coordinated by the Fundação de Amparo à Pesquisa do Estado de São Paulo/FAPESP funding agency, Brazil is expected to have an area of 4.3 million hectares planted with eucalyptus by 2015. Another more optimistic projection, presented at FBOMS-Fórum Brasileiro de ONGS e Movimentos Sociais para o Meio Ambiente [environmental NGOs forum] states that these figures will reach 13.8 million in 2020 (GTEnergia, 2006). Many of these analyses focus on extending historical series and past events into the future; however, the cultivation of eucalyptus in Brazil may depend on very influential future events. The impact and probability of such events materializing are uncertain.

Given this context, the evolution of the cultivation of eucalyptus in the course of time becomes an important factor. This entails taking into account, realistically, the appropriate variables that might affect the process. In this study, we resorted to the Trend Impact Analysis (TIA) technique, in order to prepare a more likely projection. This technique tries to modify historical series based on the likelihood of the occurrence and impact of future events (Gordon, 2004). The objective is to answer the following question: How will present or future events influence the growth rate of eucalyptus cultivation in Brazil until 2018?

This paper is organized as follows: introduction, explanation of the research methods and techniques, application of TIA, explanation of the events that affect the cultivation of eucalyptus in Brazil, data analysis, and final comments.

2 RESEARCH METHODS AND TECHNIQUES

To develop a better understanding of the topic, this study resorted to a review of the appropriate literature during the exploratory phase. This was done prior to methodological definition and to data gathering. According to Gil (1999, p. 26), a research method can be defined as "a means to achieve a specific objective," a "set of intellectual and technical procedures adopted to achieve knowledge."

In this study, we used the exploratory method, of the case study kind, with a qualitative approach, to analyze the case of eucalyptus cultivation in Brazil. In a given context, a case study concentrates on an event by resorting to multiple information sources (Creswell, 1998), thus gaining a sound basis for the development of theories (Yin, 1994).

The gathering of primary data involved a semi-structured interview with four experts. Secondary data was obtained from institutional sites, documents of companies and associations, academic papers and public discussions, among others. This data formed the basis for the subsequent projections of the cultivation of eucalyptus in Brazil, which resorted to the Trend Impact Analysis (TIA) technique, described below.

Some of this study's limitations are the small number of experts interviewed, the possibility that events capable of affecting the cultivation of Brazilian eucalyptus in the future may have been disregarded, and the fact that TIA does not include cross-impact calculations.

2.1 TREND IMPACT ANALYSIS

Projections are important for decision-making and for business strategies, as they provide mathematical forecasts of historical series or intuitive judgments of future events that minimize the uncertainties of organizations' internal and external environments.

However, it is important to emphasize that purely quantitative approaches are limited by the assumption that past events will behave in the same way in the future, whereas qualitative approaches count on the subjectivity and arbitrariness that are inherent to human thought (Bouhid and Goodrich, undated).

Created by the *Futures Group* in the 1970s, Trend Impact Analysis (TIA) is a technique that seeks to reconcile two perspectives, namely, the modification of historical series according to the probability of occurrence of future events and the strength of their impact (Gordon, 2004).

Today, TIA is used by organizations such as Health Care Futures to analyze the pharmaceutical market and by the energy and transportation departments of the State of California, the Federal Aviation Administration, the National Science Foundation and other US government departments (Gordon, 2004).

In academic papers, Mathews and Boucher (1977) show that TIA can form the basis of contingency plans in the case of divestments, in connection with mergers and acquisitions. Various authors detail the process in different ways, but all of them mention two main phases: the mathematical extrapolation of a historical series of data and the analysis of how future events can change it (Bouhid and Goodrich, undated; Gordon, 2004; Huss, 1988; Huss and Honton, 1987; Mathews and Boucher, 1977).

In the 1980s, Bouhid and Goodrich (undated) used TIA to ponder how events might influence the technological evolution of Brazil's computer complex. Tables 1 and 2 show this study's historical series and the mathematical extrapolation of the equipment.

Table 1: Historical evolution of new Class B equipment

YEAR CLASS	74	75	76	77	78	79	80	81
B	64	78	95	117	142	175	213	324

Source: Bouhid and Goodrich (undated)

Table 2: Mathematical extrapolation of new class B equipment

YEAR	MEAN	YEAR	MEAN
82	369	87	1165
83	464	88	1466
84	584	89	1846
85	735	90	2323
86	925		

Source: adapted from Bouhid and Goodrich (undated)

Bouhid and Goodrich (undated) prepared forecasts on the evolution of a performance indicator for computers, named KOPS (thousands of operations per second), by initially using an exponential mathematical extrapolation. It is important to emphasize that one can adopt other simple curves, such as the linear one, for power and logistics, chosen according to the value of the r^2 regression coefficient (Bouhid and Goodrich, undated).

The events that will interfere with extrapolation can have social, political, economic or technological characteristics, as exemplified by the launching of the first national super-minicomputers in the market, the unilateral moratorium of the foreign debt and the return of economic indicators to the same levels of the 1970s (Bouhid and Goodrich, undated). As explained in Tables 3 and 4, after defining the events, it is necessary to estimate the accrued probabilities of occurrence and the strength of the impact on each of the projected years.

Table 3: Accrued probabilities of the occurrence of events

EVENT / YEAR	A	B	C	D	E	F	G	H
83			40%					
84			40%					
85	35%	35%	40%		10%			
86	35%	35%	40%		10%		50%	
87	80%	80%	40%		20%		75%	
88	80%	80%	40%	30%	20%	10%	75%	20%
89	100%	100%	40%	30%	30%	10%	100%	20%
90	100%	100%	40%	70%	30%	30%	100%	40%

Source: adapted from Bouhid and Goodrich (undated)

Table 4: Values of the impact profiles of the events

EVENT / YEAR	A	B	C	D	E	F	G	H
83			5%				5%	
84			5%				8%	
85	5%	3%	5%		2%		10%	
86	5%	3%	8%		4%		12%	
87	5%	4%	8%		5%		12%	
88	10%	4%	5%	5%	5%	(8%)	5%	(10%)
89	12%	5%	5%	5%	6%	(12%)	5%	(10%)
90	12%	5%	5%	5%	6%	(15%)	5%	(10%)

Source: adapted from Bouhid and Goodrich (undated)

One must point out that impact profiles may take on negative values, take time to be noticed, have a maximum impact related with the occurrence period and undergo a regime impact after they stabilize, which requires a certain amount of time. Some of these factors are defined by Bouhid and Goodrich (undated) as time for the impact to begin being noticed (tn), time for maximum impact (tm), maximum impact (im), time for the stabilization of the intensity of the impact (tss) and regime impact (iss).

Once the related percentage figures are defined, one can calculate the projection values using TIA. These values represent the result of the mathematical extrapolation for each year (Chart 2), multiplied by the sum of the multiplication of both percentages of the events (Charts 3 and 4). Thus, the following calculation would be used for the year 1983: 464*[1+(0*0+0*0+0.35*0.05+0.35*0.05+0.8*0.05+0.8*0.10+1*0.12+1* 0.12)]. Table 5 presents a projection based on the aforementioned data.

Table 5: Illustrative example of projection modified by TIA

YEAR	MATHEMATICAL EXTRAPOLATION	TIA
83	464	473.28
84	584	595.68
85	735	771.75
86	925	1039.7
87	1165	1402.65
88	1466	1710.09
89	1846	2290.90
90	2323	2806.20

Source: adapted from Bouhid and Goodrich (undated)

One can see the usefulness of TIA from the improvement it generates on mathematical projections, including probability projections, through the combination of quantitative and qualitative factors (Bouhid and Goodrich, undated; Huss and Honton, 1987). TIA is also important in scenario analyses, as it contributes to quantifications and recognizes the uncertainty implicit in decision-making (Gordon, 2004). However, it is important to stress that events will usually be incomplete and will rely on subjective impact profiles (Gordon, 2004). Moreover, TIA does not consider cross-impacts between events, and depends on quantitative historical data for its analysis (Huss and Honton, 1987).

3 FACTORS IDENTIFIED AS IMPACTED TRENDS

This item describes future events or events that are under way – as mentioned by the experts – that influence or may come to influence projections for the cultivation of eucalyptus up to 2018, namely, timber funds, the global financial crisis and biomass to liquid/BTL technology.

3.1 TIMBER FUNDS

Brazil has witnessed the entry of several timber investment funds. Their aim is to purchase tracts of land to plant eucalyptus or pinus trees. According to a Brazilian company that is in the business of sustainable forest stewardship, these funds belong to an asset management category that has a total of US$ 45 billion invested worldwide (*Timber Value*, 2008).

As in North America, these funds operate in Brazil in three different ways: acquisition of reforested properties, development of reforestation on farmland and acquisition of logging rights. The profitability, low volatility, portfolio diversification and environment friendliness of this activity has attracted many investors, whose remuneration may also derive from the generated carbon credits (Scholtens and Spierdijk, 2008).

Data from the 80 biggest pension funds in the United States show that institutional investors' investment in timber funds may reach US$ 4 billion dollars in the next 5 years (Herzog, 2008). In this context, Brazil is viewed as a probable global supplier and has been the target of such funds because the productivity of its eucalyptus cultivation is much higher than that of other countries.

The competitive edge of Brazilian forest production is related to the eucalyptus cycle. Thanks to a favorable climate and efficient stewardship, eucalyptus trees are cut at the age of 7, which allows up to three successive and economical rotations, with renovations occurring at the age of 21. According to data of SBS -Sociedade Brasileira de Silvicultura (the Brazilian Forestry Society), in 1965, the productivity in Brazil stood at 10 m3/hectare/year, whereas current productivity is 50 m3/hectare/year.

Upon analyzing investment trends and forestry production, Wear (1994) found that, thanks to the expansion of timberland and improved forest stewardship, eucalyptus growth was higher on property dedicated to industrial production than on private lands. Therefore, the entry of investment funds in the field of forest stewardship may further improve productivity, this being one of the investors' aims. The pulp and paper industry's demand for certified wood, along with the demand for reconstituted wood particle boards, the existence of charcoal-fuelled steel mills and demand for solid wood products have also driven up forestry investments in Brazil; these investments are expected to exceed US$20 billion in the next ten years (ABRAF; 2008).

3.2 GLOBAL FINANCIAL CRISIS

During the second half of 2008, the global economy plunged into a crisis that originated in the United States' real estate market. This crisis had then and continues to have an impact on Brazil's economy. US citizens became debtors by going on a real estate buying spree, driven by the real estate industry's growth bubble and based on low interest rates and easy loans for virtually all borrowers, regardless of profile or credit history.

As the banks had transformed mortgages into mortgage-backed securities sold to other financial institutions, the real estate debacle began to expand, resulting in widespread losses. The banks had already posted losses in June 2007, but the peak of the global financial crisis struck in September 2008, when Lehman Brothers filed for bankruptcy and unleashed the deepest US stock market crash since the September 11 terrorist attacks.

In the subsequent months, several other banks found themselves in distress. This led to such transactions as the sale of Merrill Lynch to Bank of America. The world's six major central banks announced that they would inject

billions of dollars into the financial market to face the liquidity crunch. It is important to point out that the consequences of this crisis affected the economy as a whole, because the fast-paced industrialization of emerging countries and the globalization of supply chains were capitalized thanks to the availability of low-cost capital, which, when suspended, adversely affects global growth (Rhodes, Stelter, Saumya and Kronimus, 2008).

In Brazil, the effects of the global economic crisis are evidenced by the slowdown in the granting of credit, the stock market downturns, big firms' huge losses on the derivatives markets and production volume cutbacks. As for eucalyptus planting, the crisis affected the pulp and paper companies, which faced global stock growth, falling pulp prices and cancelled projects. According to Risi (2008) data, pulp prices began slipping in September 2008; by late November, they were down to the previous year's levels.

The drop in Chinese consumption, the world's second biggest paper and cardboard market, was one of the main reasons for the growth of global stocks. This had a direct impact on Brazil, which exports 8% of its paper and 25% of its pulp to China (data from BRACELPA - Associação Brasileira de Celulose e Papel [Brazilian Pulp and Paper Association], 2008). This situation was coupled with the meltdown of the major global economies and the resulting credit crunch; together, these events reduced the demand for paper.

Brazilian corporations, such as Aracruz and Votorantim Celulose e Papel, reduced production to lessen the impact of the crisis. The postponement of investments in forestry and the reduction of expenses connected with eucalyptus lands that were to form the basis of new projects further illustrate the extent of the crisis.

3.3 BIOMASS TO LIQUID (BTL) TECHNOLOGIES

Liquid biofuels have an outstanding position in Brazil, accounting for 30% of its automobile fleet's energy consumption (IEA - International Energy Agency, 2004). However, it is necessary to invest in new fuel production technologies, as the efficiency of the extraction of sucrose from sugar cane juice has just about reached its limit, while the biomass from bagasse and straw is not being exploited (Sugimoto, 2007). In this context, second generation biofuels are an

important path that should lead to the production of fuel from cellulose and other wood fibers, or from non-edible plant parts, thus releasing land for other crops, such as eucalyptus.

It is common knowledge that, at present, 20 tons per hectare of eucalyptus bark remain in the soil as waste, once eucalyptus trunks have been extracted. This could be used to produce bioethanol and biopolymers. According to a study coordinated by the ESALQ - Escola Superior de Agricultura Luiz de Queiroz college of agriculture, the amount of biomass generated a year by eucalyptus trees in the State of São Paulo is more than twice the amount generated by sugar cane (*Administradores*, 2008). Furthermore, wood and timber correspond to half of the world's biomass energy potential (Kavalov and Peteves, 2005).

The most promising technology for the expansion of eucalyptus plantations for biofuel production, however, seems to be a third generation technology called Biomass to Liquid (BTL). A good definition of this technology was given at an event coordinated by the IPT-Instituto de Pesquisas Tecnológicas technological research institute, as follows.

> This technology, derived from the technology for converting coal into liquid fuels (gasoline and diesel oil), also known as CLT (Coal to Liquids), initially converts the entire biomass, and not only its cellulose fraction, into combustible gases through gasification. In a second phase, the fraction of these gases comprised of hydrogen and carbon monoxide, also known as synthesis gas, can be converted by means of catalyst reactors into a wide range of liquid and gas fuels. This process is similar to the one used at industrial facilities fueled by coal, natural gas and petrochemical residues (Workshop *Tecnologias BTL*, 2008).

Experts argue that BTL can lead to an impressive biofuels market increase. They estimate that its output capacity is higher by 4,000 liters per hectare than the output capacity of the first generation technology (German Energy Agency, 2006). This huge production would lead to a boom in the ethanol-chemistry industry, replacing oil by-products, which currently comprise countless products, such as plastics, paints and solvents (Sugimoto, 2007). Moreover, BLT has an environmental competitive advantage, given that its greenhouse gas emissions are 90% lower than those of fossil fuels (German Energy Agency, 2006).

There are different production routes for BTL technology, all of them at an incipient development stage (German Energy Agency, 2006; Kavalov and Peteves, 2005). Stephane Delodder, an analyst at Rabobank, a bank whose core

business comes from the food and agribusiness markets, states that second generation technologies will be economically feasible only in 2015. Heightened demand, however, will force companies to develop the BTL concept (Globo, 2007). Gerrero (2007) estimates that the related development will take place faster in Brazil, where, by late 2010, Petrobrás and Dedini are expected to produce cellulose ethanol and third generation biofuels. Some forecasts have already confirmed that market applications will only be possible after 2010 (German Energy Agency, 2006; Kavalov and Peteves, 2005), while financing agents will be more inclined to invest in this industry in 2015 (German Energy Agency, 2006). According to Kavalov and Peteves (2005), BTL production costs may be lower than those of other biofuels in the upcoming years, but in the medium to long term, they would be two or three times higher than those of traditional fuels. The German Energy Agency, however, believes in the possibility of speeding up the pace of operating efficiency, given the sharp slope of the learning curve in the technology field (German Energy Agency, 2006).

It is important to point out that the investment that is needed in basic research and development of BTL is very high (Gerrero, 2007) and that BTL's feasibility depends on long-term sales and distribution contracts (German Energy Agency, 2006). In Brazil, some of the barriers to the development of such research are lack of skilled labor, skimpy financial resources and few networks involving research centers, companies and the government (*Workshop Tecnologias BTL*, 2008).

4 DATA ANALYSIS

The variables that influence or that may come to influence the cultivation of eucalyptus in Brazil having been identified, we will proceed to describe the analysis of the research data, concentrating mainly on the results of the quantification of the future impact of the said variables.

4.1 EXTRAPOLATION OF HISTORICAL DATA

As previously mentioned, the two main steps of TIA are the mathematical extrapolation of a historical series of data and the analysis of how future events may change the extrapolation. The historical series of data and the mathematical extrapolation of this study are shown in Table 6.

Table 6: Mathematical extrapolation of the areas reforested with eucalyptus in Brazil until 2018

YEAR	HISTORY IN HECTARES	LINEAR REGRESSION IN HECTARES
1998	23,694	
1999	23,243	
2000	39,867	
2001	80,873	
2002	106,642	
2003	137,824	
2004	154,288	
2005	179,856	
2006	226,312	
2007	297,862	
2008		288,391
2009		317,727
2010		347,063
2011		376,398
2012		405,734
2013		435,069
2014		464,405
2015		493,740
2016		523,076
2017		552,411
2018		581,747

Source: Adapted from Sociedade Brasileira de Sivilcultura (2008)

The data shows the evolution, in hectares, of the area reforested with eucalyptus in Brazil from 1998 to 2007. Because of the high regression coefficient (r^2) and of how near it is to the kind of extrapolation conducted in this study, we used linear regression. Based on growth in the last ten years, it can be inferred that, in 2013, the cultivation of eucalyptus in Brazil should be about 50% higher than the area estimated in 2008, adding up, at the conclusion of the extrapolation, to a total of 581,747 hectares (twice as much as the base year amount).

4.2 PROJECTION ACCORDING TO TREND IMPACT ANALYSIS (TIA)

We sought to identify the occurrence probabilities and the strength of the impact of the events by using TIA. According to the experts interviewed, these events have a significant influence on the cultivation of eucalyptus in Brazil. The related values are shown in Table 6.

Table 6: Influence of events on the cultivation of eucalyptus in Brazil until 2018

EVENTS	INVESTMENT FUNDS		FINANCIAL CRISIS		BTL TECHNOLOGY	
Year	Probability of occurrence	Strength of impact	Probability of occurrence	Strength of impact	Probability of occurrence	Strength of impact
2009	100%	3%	100%	-		
2010	100%	5%	100%	-15%	10%	-
2011	100%	-	100%	-10%	20%	-
2012	100%	-	100%	-5%	30%	-
2013	100%	8%			40%	-
2014					50%	-
2015					60%	-
2016					70%	15%
2017					80%	20%
2018					90%	35%

Potential cross-impacts can be seen in the projections of the interviewed experts and in others divulged in executive and academic studies. According to Table 6, timber funds will influence the planting of eucalyptus from 2009 to 2013. In fact, international timber funds have already started buying land to plant eucalyptus, which is reflected in the short-term expansion of the cultivated land. Projections indicate that by 2012, foreigners will have invested approximately US$ 2 billion in Brazil (Herzog, 2008).

However, one must keep in mind that a global financial crisis tends to have a negative impact on fund raising and on projects' expansion. Even if the funds have a positive influence in 2009 and 2010 thanks to the investments already made, less liquidity in the market could offset these investments in the two subsequent years. In 2013, as the possibility of a global economic rebound becomes stronger, one might foresee the return of the positive impact of such investments.

In the next two years, the development of BTL technology will give rise to a cumulative probability of 10% a year, in the sense of influencing the cultivation of eucalyptus in Brazil, with a great chance of doing so in 2018 (90%). In 2010, Brazilian cellulose ethanol will most likely come turn to extraction from sugarcane (Gerrero, 2007); however, it is possible that this technology will be developed for the production of eucalyptus ethanol because of its competitive advantages (Administradores, 2008). These advantages might also attract local investments, as Swedish companies and enterprises from other countries are already using forest by-products to generate fuel (Netao, 2008).

According to the data collected, BTL will only demonstrate its replication ability on an industrial scale in 2016, thus actually affecting the forecast. This argument is in line with the belief that this technology's market application possibility will only materialize after 2010 (German Energy Agency, 2006; Kavalov and Peteves, 2005). This factor is added to the fact that finance agents will only be inclined to make investments after 2015 (German Energy Agency, 2006).

Chart 2 and Table 7 show the projection results of the cultivation of eucalyptus in Brazil in reforested areas, these results having been adjusted by the influence of timber funds, of the global financial crisis and of BTL technology.

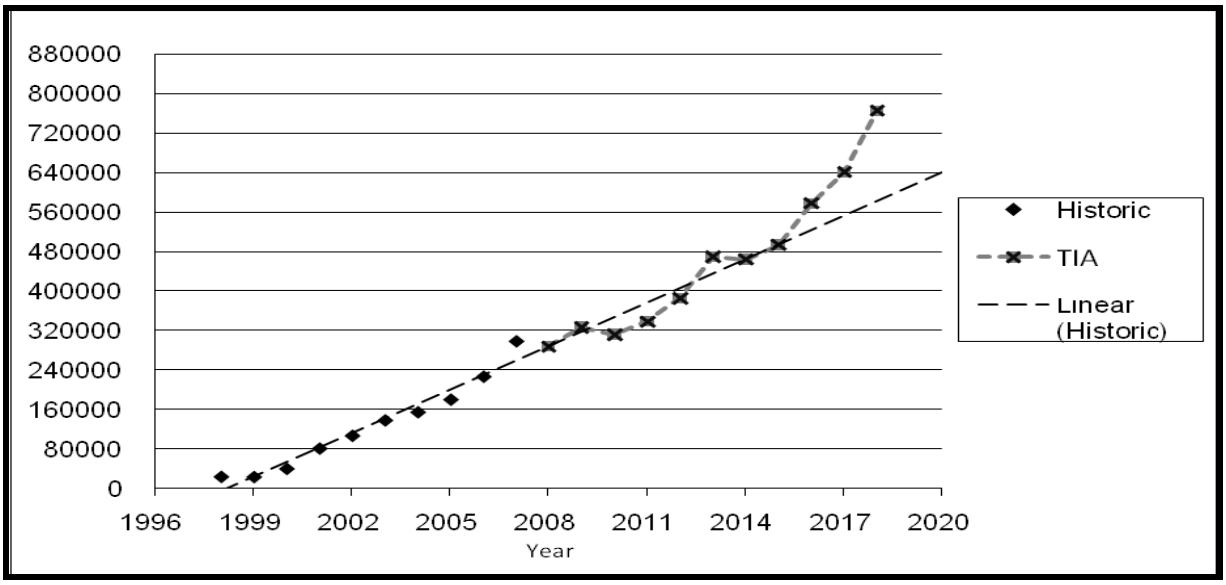

Chart 2: Projection modified by TIA (in hectares)

Table 7: Projection modified by TIA (in hectares)

YEAR	LINEAR	TIA
2008	288,391	288,391
2009	317,727	327,259
2010	347,063	312,356
2011	376,398	338,758
2012	405,734	385,447
2013	435,069	469,875
2014	464,405	464,405
2015	493,740	493,740
2016	523,076	577,999
2017	552,411	640,797
2018	581,747	764,997

When analyzing Chart 2 and Table 7, one can see the influence of the events that the experts named on the projection resulting from TIA. Although the investment funds have a positive impact on the cultivation of eucalyptus in Brazil for the first few years of the forecast, the negative influence of the global financial crisis makes the modified curve follow an upward direction close to the linear regression until 2015. Indeed, it shows lower values related to hectares of eucalyptus planted from 2010 to 2012. From 2015 onwards, however, the end of the global financial crisis and, mainly, the beginning of the use of BTL technology on a commercial scale, according to TIA, result in a curve that slopes upward more sharply than the linear regression figures. Comparatively speaking, its values will be higher than the first curve by approximately 10% in 2016, 16% in 2017, and 31% in 2018, leading to a total of 764,997 hectares.

5 FINAL COMMENTS

Projections are important for decision-making and for business strategies. TIA is a forecasting technique that reconciles quantitative and qualitative data, modifying historical series by the probability of an occurrence and the intensity of the impact of future events (Gordon, 2004).

This study developed projections for the cultivation of eucalyptus in reforested areas in Brazil for the next 10 years, adjusting the linear regression of historical data according to three events that are under way or that are likely to influence results: timber funds, the global financial crisis and BTL technology.

The evolution of eucalyptus plantations should be projected realistically, taking into account variables that may have an impact in the course of time. The results of this study show that, in the short term, the planting of eucalyptus will show growth close to the linear curve, negatively influenced by the global crisis and positively influenced by the timber funds. The forecast for 2016, however, is that eucalyptus planting will grow primarily because of the commercial scale of BTL technology.

For future studies, we suggest that an evaluation be made of the relation between the facts mentioned by the experts, as well as focusing on the forestry sector's technological alternatives, such as the BTL technology mentioned above.

Despite this study's limitations, unlike purely quantitative, surprise-free projections, the analyses proposed in it can support the formulation of strategies for companies in the eucalyptus cultivation business, such as steel or pulp and paper companies. Thus, this paper strengthens the possibility of the academic and business communities using Trend Impact Analysis in the Brazilian context.

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