

# WORKERS FROM THE COUNTRYSIDE: THE OCCULT FACE OF SUGARCANE PRODUCTION IN BRAZIL

*TRABALHADORES AGRÍCOLAS: A FACE OCULTA DA PRODUÇÃO CANAVIEIRA NO BRASIL*

Luis Abel da Silva Filho\*  
Silvana Nunes Queiroz\*\*

## ABSTRACT

The evolution of the relations of production and labor in Brazilian agriculture has undergone significant changes over the last decades. The mechanization of the agricultural sector was crucial in the structure of the labor market, especially in the monoculture activities, the case of cane sugar. Thus, this article aims at examining the formal labor market in cultivating the sugar cane, taking into consideration the turnover and their socioeconomic and demographic indicators. Methodologically is done a literature review in addition to the data from the *Relação Anual de Informações Sociais - RAIS* (Annual Relation of Social Information) and the *Cadastro Geral de Empregados e Desempregados - CAGED* (General Register of Employed and Unemployed) of the Ministry of Labor and Employment (MTE), for the construction of indicators turnover, rate of creation, rate of destruction and rate of net creation of jobs in the sector. The data refer to the years 2006-2011, with geographical boundaries covering the entire workforce employed in the sugar cane culture in Brazil. The results show that the sugarcane activity is seasonal, characterized by a high turnover rate and selectivity with regard to sex, age, educational level and pay range. Because of this, predominate male workers in the age group 30-49 years with little schooling and underpaid, earning from 1.0 to 2.0 minimum wages and busy especially in the Southeast of the country.

**Keywords:** Labor market. Turnover. Sugar cane.

## RESUMO

A evolução das relações de produção e de trabalho na agropecuária brasileira passou por mudanças significativas nas últimas décadas. A mecanização do setor agrícola foi determinante na estrutura do mercado de trabalho, sobretudo nas atividades monocultoras, caso da cana-de-açúcar. Diante disso, este artigo tem como proposta central analisar o mercado de trabalho formal no cultivo da cana-de-açúcar, levando em consideração a rotatividade e os seus condicionantes socioeconômicos e demográficos. Metodologicamente faz-se uma revisão de literatura, além dos dados da *Relação Anual de Informações Sociais (RAIS)* e do *Cadastro Geral de Empregados e Desempregados (CAGED)* do Ministério do Trabalho e do Emprego (MTE), para a construção de indicadores de rotatividade, taxa de criação, taxa de destruição e taxa de criação líquida de postos de trabalho no setor. Os dados referem-se aos anos de 2006 a 2011, com delimitação geográfica que abrange toda a força de trabalho ocupada na cultura canavieira no Brasil. Os resultados mostram que a atividade canavieira é sazonal, caracterizada por elevada taxa de rotatividade e seletividade no que se refere ao sexo, idade, escolaridade e faixa de remuneração. Por causa disso, predominam trabalhadores do sexo masculino, na faixa etária de 30 a 49 anos, pouco escolarizados e mal remunerados, ganhando de 1,0 a 2,0 salários mínimos e ocupados notadamente no Sudeste do país.

**Palavras-chave:** Mercado de trabalho; rotatividade, Cana-de-açúcar.

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\* Professor do departamento de Economia da Universidade Regional do Cariri – URCA. E-mail: abeleconomia@hotmail.com

\*\* Professora do departamento de Economia da Universidade Regional do Cariri – URCA. E-mail: silvanaqueirozce@yahoo.com.br

## **1. INITIAL CONSIDERATIONS**

Until the middle of 1950s the sugarcane activity was concentrated on in the Brazilian Northeast, and it was the main, if not the only major economic activity in the region. In this context, the Northeast region loses the leadership for decades and remains without a product that was its "dynamic center".

From the 1960s onwards sugarcane production advances in all regions of the country, given the need to attend the international demand, because of the restrictions made to Cuban production by the United States of America (NOVAES, 2009). The expansion of the agricultural border, stimulated by advances in sugarcane activity (amongst others agricultural activities) was determinant in the production processes, as from the mechanization of culture, especially in the Southeast.

The initial modifications found shelter in process of agro-industrialization by products of Brazilian agriculture, due to the stimulus given to the activity in the country. Subsequently, field activities were inserted in the process of mechanization with a strong presence of sophisticated machinery and equipment in the fields (GRAZIANO DA SILVA, 1999; BELIK et al., 2003; KAGEYAMA, 2004).

Such aspects markedly reduced the overall population occupied in the cultivation of sugar cane around the country - taking Brazilian regions to a lesser or greater extent. This advance had the greatest impact on a large portion of the workforce with less possibility of inclusion in other sectors of economic activity, particularly the least educated (SILVA FILHO *et al.*, 2012).

In recent years, even with the expansion of related activity by international demand and the need for production derived from cane sugar, the scene of the labor market sector presents us with another dimension. The proposals for mechanized cutting, thanks to the ban on burning in major producing regions, have become a threat to the labor market in sugarcane production (MORAES, 2007; NOVAES, 2009).

The own dynamic of the sector, establishing remuneration for productivity, in many cases, contribute to sharp changes in the labor market. High turnover rate, caused by the intense selection process of manpower, which demands those that are more productive, have been found throughout the country (SILVA FILHO *et al.*, 2012).

Thus, this paper intends to analyze the personal attributes of manpower employed in the formal cultivation of cane sugar, during the period 2006-2011, and estimate turnover rates, from economic and demographic conditions. To achieve these objectives, the paper is structured as follows: in addition to these initial considerations, the second section shows the importance of the cultivation of sugar cane in the creation of formal jobs in Brazil, then presents the methodology used in the research, in the fourth section outlines the profile of the person employed in the cultivation of cane sugar; fifth analyzes the determinants of turnover in the sugarcane industry, and the sixth presents the final considerations.

## **2. CHARACTERIZATION OF THE FORMAL LABOR MARKET IN THE CULTIVATION OF SUGAR CANE**

The large size allocated to agriculture Brazilian sugarcane comes from its high economic activity while contributing expressive magnitude in the agricultural sector of the country. According to Balsadi (2007), in the first five-year period of the first decade of this century, the cane sugar in Brazil, occupies the third place ranking in planted area and the second in terms of gross value of production.

In the conception of Camargo et al (2008), the expansion of the sugarcane industry in Brazil is the result of the high dynamics of the sector, in the process of

ethanol production, due to urgent need for the use of renewable fuels. The heated debate about climate change suffered by the world advises countries with capacity of renewable energy production to a new phase, which is concretized with increased productivity and product of the earth.

In this aspect, it is plausible that this activity is a major holder of employment in the Brazilian agricultural sector, even as a large monoculture activity in the process of mechanization in the field. Empirical studies show that the sector is a large employer of manpower nevertheless the elevation of the area harvested using mechanical system and without using of the burning as method of detrash. However, the trend toward a reduction of manpower per planted area is visible.

According Moraes (2007) there is a strong tendency that the advance of mechanization in sugarcane industry, with the ban on burning, is an aggravating factor for the labor sector. Significant reduction of jobs will be imminent, despite the higher acreage nationwide. This implies the vulnerability of the workforce, especially for the ones less educated, who are less likely to be reinserted into other sectors of the economy.

Another characteristic of the industry is the use of migrant labor, especially, coming from Northeastern states, moving from their homeland in the XXI century, in search of better opportunities in such activity (ALVES, 2007). However, for some, "improve life" is not always achieved. The acceleration in the pace of production and work, causes health problems, sometimes resulting in death or reduction in the life expectancy of the employee (GUANAIS, 2010).

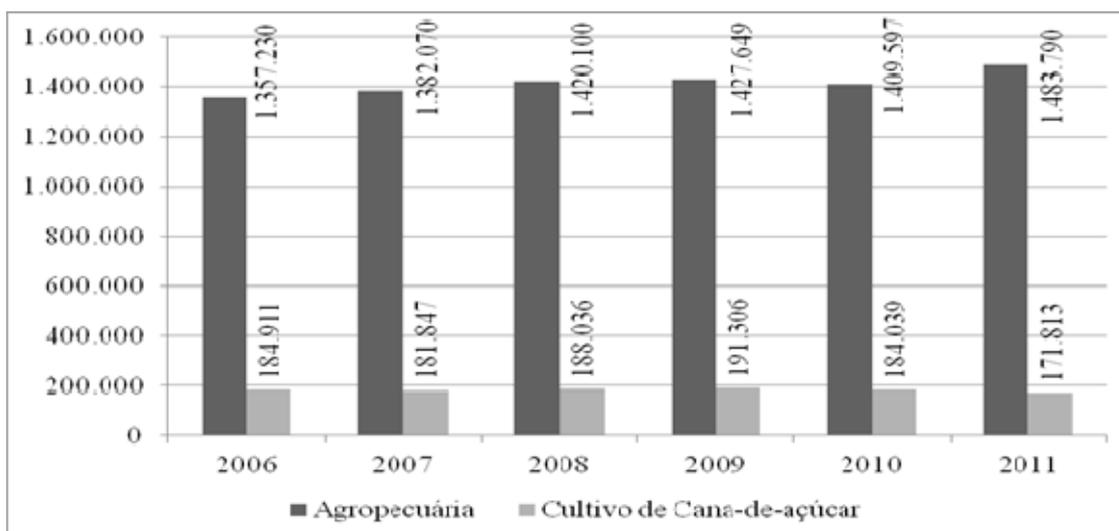
Menezes and Cover (2012) also emphasize the terrible living conditions in the accommodation of migrants who left Paraíba (Cajazeiras) to work in sugar cane mills in Piracicaba-SP. Moreover, still in regards to accommodation, Menezes and Cover (2012) points to the repression, domination and surveillance suffered by the migrants ("não se pode beber cachaça"), adding personal relations and resistance ("e bebem quando o supervisor não está").

In the temporal cut established for the study, it is remarkable the contribution of the cultivation of sugar cane, in the generation of jobs in Brazil (Graphic 01). It is worth highlighting that the data plotted here only treat the workforce formally occupied in the sector. Even so, it is seen that, throughout the series, especially between 2006 and 2010, approximately 13.0% of the labor force employed in agriculture in the country was in the direct cultivation of cane sugar<sup>1</sup>. However, in 2011, while the occupation in agriculture increases in absolute terms compared to 2010, the absolute and relative participation of cane sugar is reduced to approximately 11.0% of the labor employed.

Analyzing the extremes, it is observed that, in 2006, from a total of 1,357,230 million formally employed in Brazilian agriculture, 184 911 workers were in the cultivation of cane sugar. In 2011, from a total of 1,483,790 million to develop activities in agriculture, 171.813 million were in the fields of cane sugar. Therefore, there was reduction in the share of the employed in this activity, even with the increase in the records of occupied in agriculture. The most plausible explanation is the fact that they have increased the acreage without the use of burning as a method of detrash, especially in the state of São Paulo, which would eliminate jobs, without harming the production.

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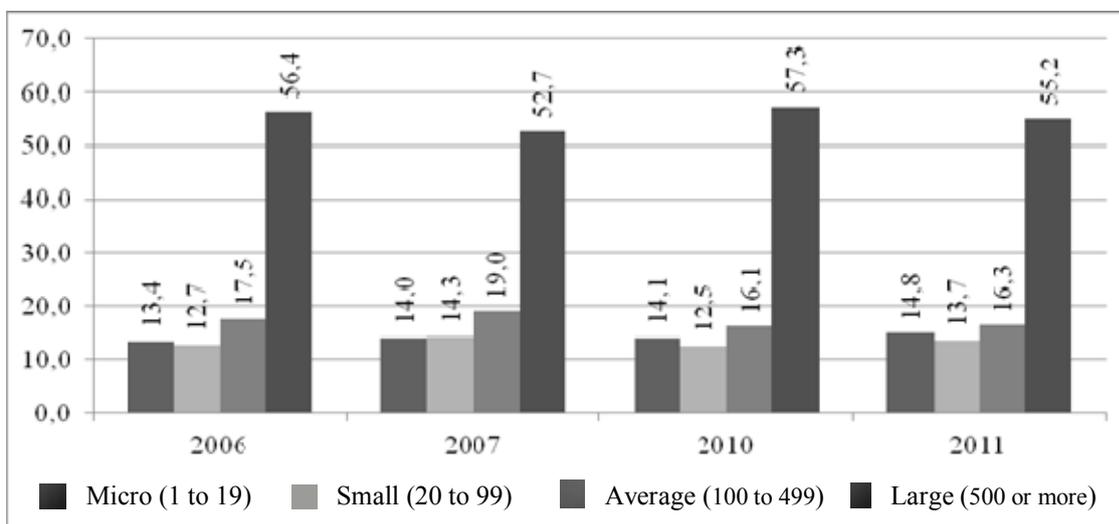
<sup>1</sup>Consider only formal workers engaged in the cultivation of sugar cane, not take into account the employed in the mills or other processing industries and cane products.



Graphic 01: Number of employed in agriculture and the cultivation of cane sugar Brazil 2006-2011.

Source: Elaborated by the authors from data of RAIS / MTE

Regarding the size of the establishments producing cane sugar, the data in Graphic 02 shows the concentration of labor in large establishments, in all the years observed. This result is based on the production scale of the activity, which guarantees the large establishment increased participation in employment generation. Moreover, with the increasing international demand for products derived from cane sugar, this circumstance has encouraged the opening of big foreign companies in the country.



Graphic 02: Relative participation of employed in the cultivation of cane sugar according to the size of the establishment: Brazil 2006, 2007, 2010 and 2011.

Source: prepared by the authors from data of RAIS / MTE

In this way, in 2006, the large establishment formally occupied 56.4% of the workforce in the sector in the country, and remains virtually unchanged, with a record of 55.2% in 2011. With this, what one has is the low occupancy capacity of micro and small establishments of sugarcane over the years. Apart from them, it is doable to

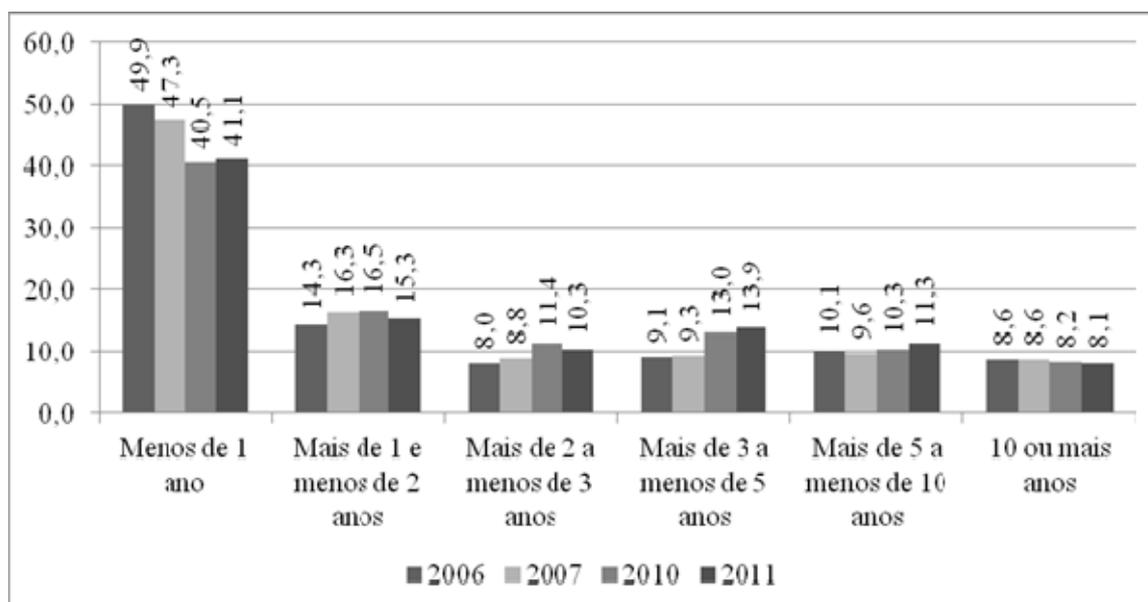
emphasize that the average property also has limited employment capacity. The three types of establishments occupy less than 50.0% of the formal workforce active in the cultivation of sugar cane during the years under observation.

In another way, it is noticeable the power of big capital that operates in the Brazilian sugarcane industry, given that large establishments are well regarded for their ability to employ more than 500 workers. From this viewpoint, the bargaining power of large employer is predominant, even to define the value of output per worker minimally acceptable for it to be kept employed. At this juncture, union power recedes and the actions of the contractor/employed proliferate in the national sugar production. Novaes (2009) believes that the selection process for the production, it is evident in the relations between capital and labor, while remaining busy the holder of the physical strength and skill in handling the tools.

Thus, as can be seen in Graphic 03, the turnover in the labor market in the cultivation of sugar cane is exceedingly accentuated, the majority remaining in employment for less than 1 year. It is believed that this high turnover is justified due to the natural selection process increase further throughout the productive cycle, with maintenance work only to those who have better performance in planting and harvesting.

Novaes (2009) explains this phenomenon in terms of this activity which develops, especially in the region of highest production in the country, with a strong contingent of migrant labor from the Northeast. In this case, the off-season accentuates the layoffs raising the indicators of turnover.

In time and space, given the high turnover in sugar production (SILVA FILHO, MARIANO and QUEIROZ, 2012), poor working conditions and housing, physical wear and exploitation of manpower (ALVES, 2007; COVER, 2011), Menezes and Cover (2012, p.102) emphasize that the migratory movement is marked by passages: "... renewed or not at each harvest time, and with a certain deadline to finish each, the cutter due to health and competitiveness will migrate at the latest on 40 years of age. "



Graphic 03: Relative participation of employed in the cultivation of sugar cane sugar according to length of stay: Brazil 2006, 2007, 2010 and 2011.

Source: Prepared by the authors from data from RAIS / MTE

In 2006, approximately 50.0% of the occupied left their jobs in less than one year, declining to 41.1% in 2011. This result has positively impacted ranges from 1 to 10 years of employment, which increased the length of stay of workers in sugarcane plantations.

The turnover in the Brazilian labor market is an intrinsic characteristic of the process. However, seasonal activities, especially those related to agriculture, such as the cultivation of cane sugar, are greatly accentuated. Besides the sector constitutes itself of workers with low qualification, which are easily replaceable, yet account the seasonality of the market, the relation between supply and demand, as a condition of movement entry and exit of the workforce.

### 3. METHODOLOGICAL PROCEDURES

The causes and consequences of turnover in the Brazilian labor market have been studied in several investigations (CACCIAMALI, 1992; OAK and FEIJÓ, 1993; BALTAR and PRONI, 1995; PAZELLO *et al.*, 2000; CORSEUIL *et al.*, 2002a, 2002b; ORELLANO and PAZELLO, 2005; SILVA FILHO, 2012a, 2012Bb). The main consequences are the low capacity of formation of durable links and the limited possibility of the rise of the labor force.

In the agricultural sector, particularly in activities of monoculture, high turnover can be a devastating phenomenon to the manpower that mostly carries little chance of inclusion in other sectors. The pattern of the sugarcane industry workers, even in the formal labor market is composed of individuals with few years of schooling, with little chance to insert themselves in other activities, who undergo low wages due to the need to maintain their survival and / or family.

In this perspective, admission and dismissal of labor in the sector constitutes a phenomenon 'relatively natural' for the employer. On the other hand, for the employee, there is a strong intrinsic motivation, since the selection process, particularly in the activities of cutting cane sugar, occurs via productivity. Dismissal, in many cases, means low production capacity and little skill in the craft.

For this context of the analysis, the article aims at analyzing the labor market in the cultivation of sugar cane in Brazil, with emphasis on the process of turnover and its determinants. Therefore it refers to the method of composition of turnover used by some authors (CORSEUIL *et al.*, 2002a, 2002b; ORELLANO and PAZELLO, 2005; SILVA FILHO, 2012), in various sectors of economic activity. It is noteworthy that, until now, there is no known study that uses the method about the turnover in Brazilian sugar cane.

For the observation of the labor market and the turnover, are considered demographic and socioeconomic characteristics of the labor force employed in the sector and off during the years 2006-2007 and 2010-2011, bienniums immediately preceding the global economic crisis and the subsequent it.

The turnover of the workforce in farming activities of cane sugar can be so interpreted:

$$R_{it} = \left[ \frac{\sum (A_{it} + D_{it})}{(L_{cit} + L_{fit}) / 2} \right] \quad (1)$$

where:

$R_{it}$  = Turnover in the labor market in the cultivation of cane sugar;

$A_{it}$  = Number of workers hired in the time study;

$D_{it}$  = Number of workers dismissed during the period of time;

$L_{cit}$  = Total work force at the beginning of the time period;

$L_{fit}$  = Total workforce at the end of the period.

To calculate the rate of creation of jobs in the sector in the period of time, it is necessary:

$$TC = \left[ \frac{\sum_{i=1}^n (L_{ait} - L_{dit})}{\bar{L}_{it}} \right], \text{ for the sector growing sugar cane, such that: } [L_{ait} > L_{dit}] \quad (2)$$

The rate of destruction of jobs can be presented in the following way:

$$TD = \left[ \sum_{i=1}^n \left| \frac{L_{dit} - L_{ait}}{\bar{L}_{it}} \right| \right] = \sum_{i=1}^n \left[ \frac{L_{ait} - L_{dit}}{\bar{L}_{it}} \right], \text{ for the labor market in the cultivation of sugar cane, such that: } [L_{ait} < L_{dit}] \quad (3)$$

With this, it follows that  $[(L_{ait} - L_{dit}) = (A_{it} - D_{it})]$  is respectively, the number of workers hired (input) minus the number of workers off (exit) of labor in the cultivation of sugar cane in the period of time  $t, t_{t-1}$  in the country  $i$ . Thus, the rate of creation /destruction liquid of jobs can also be inferred thus:

$$TCL = \left[ \sum_{i=1}^n \left( \frac{L_{ait} - L_{dit}}{\bar{L}_{it}} \right) \right] = TC - TD \quad (4)$$

Exposed the method, the rate of creation / destruction liquid of jobs in growing sugar cane in Brazil can be empirically tested. For this, it is necessary to construct the rates of creation and destruction of jobs. Thus, it can be inferred by market turnover in the sector for a particular country, in the period of time  $t, t_{t-1}$ . In this study, it is considered that the rotation consists of movement in and out of the labor in the cultivation of sugar cane  $(A_{it} + D_{it})$ , respectively.

#### 4. PERSONAL ATTRIBUTES OF THE WORKER IN THE CULTIVATION OF SUGAR CANE

According to the information in Table 1, it is in the Southeast region that concentrates the largest share of workers employed in the cultivation of cane sugar. In all the years of the series, it was the holder of more than 50,0% of jobs. In this region concentrates the largest portion of the method of cultivation without straw removal (burning) (MORAES, 2008), which could reduce its ability to occupation, not being possible because large areas of cultivation be presented in rugged terrain, which hinders the cultivation by machine, and a significant portion of producers are not large enough to acquire machines for cutting service.

Table 1: Employment in the formal cultivation of sugar cane according large region Brasil-2006-2007/2010-2011

Natural region	2006-2007		2010-2011	
	ABS	%	ABS	%
North	690	0,4	831	0,5
Northeast	49.667	27,1	46.316	26,0
Southeast	105.996	57,8	98.386	55,3
South	13.027	7,1	11.884	6,7
Midwest	14.000	7,6	20.510	11,5
<b>Total</b>	<b>183.379</b>	<b>100,0</b>	<b>177.926</b>	<b>100,0</b>

Source: Prepared by the authors from data of RAIS / MTE.

The Northeast region, according Balsadi (2007), was the second largest producer in the mid-2000s, stands out as the second largest employer. In the 2006-2007 period, occupied 27,1% of the workforce, declining slightly to 26% in 2011. Undoubtedly, the decline in absolute and relative participation in the region follows the national trend (decrease from 183.379 thousand to 177.926 thousand workers, between 2006-2007 and 2010-2011, respectively). However, in the meantime, other areas improve their performance, especially the Midwest.

In the last biennium, the Midwest region stands out in relation to the south of Brazil. This because in the first two years, the ability to create jobs, among them, had similar values. In addition, the North region was the one that generated fewer jobs, due to the low dynamism of its sugarcane industry, according Balsadi (2009), with the smallest share in national production.

Regarding gender, the data in Table 2 show that men are the majority in formal employment in the sugarcane activity, turning their occupation around 90% in the two intervals. According to Novaes (2008), some unions set goals for 10.0% occupied by female staff cut (NOVAES, 2008). In fact, it is believed that the low female participation in such activity, stems from the fact that the selection of workers to be made on the basis of labor productivity. Physical limitations exclude them from unfair competition. Even so, they increased their share by one percentage point, between the two ranges. In 2006-2007, accounted for 9,9% of seats occupied, rising to 10,9% in the last two years (2010-2011).

It is therefore worth noting that female participation in the cultivation of sugar cane may occur in activities not directly related to the cane cutting, but of assistance in the field.

Table 2: Employment in the formal cultivation of sugar cane according to gender Brazil: 2006-2007/2010-2011

Gender worker	2006-2007		2010-2011	
	ABS	%	ABS	%
Masculine	165.298	90,1	158.542	89,1
Feminine	18.082	9,9	19.385	10,9
Total	183.379	100,0	177.926	100,0

Source: Prepared by the authors from data of RAIS / MTE

Those with education up to the 5th year incomplete of elementary school occupied the largest industry statistics, registering 28,1% in 2006-2007 and 24,1% in the 2010-2011 biennium. Stand out even increased, both in absolute and relatively busy with the amount of education from junior high school complete. The employed population with high school education had high participation compared the first two years in the last analysis. It was registered 16.456 thousand (9,0%) in 2006-2007, rising to 26.455 thousand (14,9%) in 2010-2011. The improvement in educational performance of labor in the cultivation of cane sugar, as well as other activities in the country, does not necessarily guarantee better working conditions, but becomes significant for educational statistics.

The data in Table 5 reports the amount of pay range occupied by average shows significant concentration busy with income located in the first three ranges.

There was a decline in absolute and relative terms, in the share of those with incomes of up to 1,0 minimum salary, when compared the biennia in the study. However, there is a marked quantity of workers earning income between 1,0 and 2,0 minimum salaries. In the 2006-2007 period, 48.3% of them earned incomes in this range, dropping slightly to 44.3% in the 2010-2011 biennium.

In the pay range of over 2.0 to 4.0 minimum salaries, there was high both absolutely and relative first to the last biennium. In 2006-2007, this share was 34.8%, and, in 2010-2011, reported incidence of 38,5%. In general, it is observed that there is bad sector pay, given that from the income bracket of more than 7.0 minimum salaries, do not aggregate more than 2% of workers in sugarcane plantations in the country.

Table 5: Employment in the formal cultivation of sugar cane, according to the pay range Brazil - 2006-2007/2010-2011

Range of Average Pay (MS)	2006-2007		2010-2011	
	ABS	%	ABS	%
Up to 1,0 MS	14.138	7,7	11.528	6,5
More than 1,0 to 2,0 MS	88.690	48,3	78.928	44,3
More than 2,0 to 4,0 MS	63.855	34,8	68.488	38,5
More than 4,0 to 7,0 MS	10.494	5,7	11.159	6,3
More than 7,0 to 10 MS	1.457	0,8	1.562	0,9
More than 10 to 15 MS	704	0,4	780	0,4
More than 15 MS	576	0,3	603	0,3
{not rated}	3.468	1,9	4.880	2,7
Total	183.379	100,0	177.926	100,0

Source: Prepared by the authors from data of RAIS / MTE.

## 5. DETERMINANTS OF TURNOVER IN THE FORMAL LABOR MARKET IN THE CULTIVATION OF SUGAR CANE

The turnover in the Brazilian labor market is widely known. To a greater or lesser extent, all sectors experience the simultaneous movement in and out of the workforce. There is, therefore, have to consider that in some sectors and in some regions the incidence of this practice is higher. In Brazil, sectors such as construction and agriculture are holders of higher rates.

Furthermore, most dynamic regions economically and better jobs can accentuate the movement of incoming and outgoing labor as a result of the search for better job opportunities. In this perspective, Bivar (1993) adds that the high turnover may be driven by the protection intended for unemployed workers. Diverging of Bivar (1993), Corseuil *et al.* (2002b) sees turnover as a result of marked changes in the expansion of capitalism in Brazil.

Regarding this, it is pertinent to note that turnover often affects the labor market with greater opportunities to acquire employment, or varies according to the economic activity, time period and has a regional character. In this context, the sugar cane shows the highest turnover in the biennium 2006-2007, registered in Midwest region (6.15%), headed by the movement of the input and output, since the rate of creation liquid was only 0,02 (Table 6). Beyond this region, the Southeast region, the largest producer of sugar cane also recorded high rates (3,34). Here, it is noted that both the input motion as output were significantly increased, and therefore, the rate of creation two years at very low liquid (0,06). Thus, in general, the rotation across the country was 2.91, with the net creation rate of 0,03, in other words, very low for the sector.

The North and Northeast regions had negative net creation rate in the 2006-2007 period, given that layoffs were higher than admissions during the period. Thus, the North region had a rate of -0,14 and -0,06 the Northeast region. It is thus seen that in this biennium these two regions accentuated layoffs, which may result from the reduction of the workforce, as well as the production of sugar cane, taken by replacement of land for the cultivation of other activities or by climatic factors.

Table 6: Turnover rate in formal employment according to the macro-region: Northeast - 2006-2007 and 2010-2011.

Region	2006-2007				2010-2011			
	Rate ciation	Rate destruction	Turnover rate	Net criation rate	Rate ciation	Rate destruction	Turnover rate	Net criation rate
North	0,89	1,03	1,91	-0,14	1,23	1,07	2,30	0,17
Northeast	0,66	0,72	1,39	-0,06	0,64	0,68	1,32	-0,05
Southeast	1,70	1,64	3,34	0,06	1,01	1,00	2,01	0,02
South	1,00	0,83	1,83	0,17	0,52	0,63	1,16	-0,11
Midwest	3,09	3,07	6,15	0,02	1,29	1,15	2,44	0,14
Total	1,47	1,44	2,91	0,03	0,92	0,91	1,83	0,01

Source: Prepared by the authors from data of RAIS / MTE

In the second biennium the turnover rate decreased in Brazil. Between 2010-2011, it was still high at 1,83. Note that the Midwest region remained showing the highest turnover rate (2,44), but with the second highest rate of the net creation (0,14), which is a result of good performance in the hiring of labor in sector, compared to the first biennium. Beyond this region, the North figured high turnover rate (2,30), recording the highest rate of net creation (0,17) between regions. On the other hand, the

Northeast (-0,05) and South (-0,11) had negative net creation rate, due to the number of contracts below the layoffs.

Regarding turnover by gender, the data in Table 7 denounce higher rate for male labor, both the first and the last biennium. The men experienced turnover of 2,92 in 2006-2007, against 2,82, women. In fact, turnover is high for both sexes, but women had movement in higher than men, thus the rate of net creation of jobs for women was 0,06, versus 0,03 for men.

Table 7: Turnover rate in formal employment in the cultivation of cane sugar by gender: Brazil - 2006-2007 and 2010-2011.

Gender	2006-2007				2010-2011			
	Rate creation	Rate destruction	Turnover rate	Net creation rate	Rate creation	Rate destruction	Turnover rate	Net creation rate
Masculine	1,48	1,45	2,92	0,03	0,92	0,92	1,85	0,00
Feminine	1,44	1,38	2,82	0,06	0,86	0,79	1,66	0,07
Total	1,47	1,44	2,91	0,03	0,92	0,91	1,83	0,01

Source: Prepared by the authors from data of RAIS / MTE.

In the second biennium (2010-2011), the turnover rate declines, both for men and for women. The men recorded a rate of 1.85, and the women 1,66. Moreover, the rate of net job creation for the female workforce was 0,07, while the male experienced near zero (0,00). As noted in the descriptive statistics, there were gains in female participation in the sector, with an increase of 1% between biennia.

The data on the turnover by age group realize high rate for the workforce and young juvenile, both the first and the last biennium in question. In the period 2006-2007, both the movement and the input output were higher for those aged between 18 and 24 years, with a turnover rate of 5.04. Moreover, the net creation rate was only 0,22.

Also in the first biennium were recorded negative net creation rate for the labor force between 25 and 29 years, as well as for that over the age of 50 years. This reflects the fact that layoffs are higher than the admissions to the labor force at an older age, the result of selection for productivity and demand for physical strength in cutting sugar cane.

Table 8: Turnover rate in formal employment in the cultivation of sugar cane according to age: Brazil - 2006-2007 and 2010-2011.

Region	2006-2007				2010-2011			
	Rate creation	Rate destruction	Turnover rate	Net creation rate	Rate creation	Rate destruction	Turnover rate	Net creation rate
Up to 17 years	1,75	1,13	2,88	0,62	1,75	0,68	2,43	1,07
18 to 24	2,63	2,41	5,04	0,22	1,72	1,53	3,25	0,19
25 to 29	1,79	1,80	3,59	-0,02	1,15	1,17	2,31	-0,02
30 to 39	1,34	1,34	2,68	0,00	0,86	0,88	1,75	-0,02
40 to 49	0,97	0,97	1,94	0,01	0,65	0,66	1,31	-0,02
50 to 64	0,66	0,69	1,34	-0,03	0,46	0,51	0,96	-0,05
65 or more	0,32	0,52	0,84	-0,19	0,23	0,39	0,63	-0,16
{not rated}	4,00	13,50	17,50	-9,50	0,00	0,00	0,00	0,00
Total	1,47	1,44	2,91	0,03	0,92	0,91	1,83	0,01

Source: prepared by the authors from data of RAIS / MTE.

In the 2010-2011 biennium, reducing turnover rates occurred for all age groups established. The employed in the age group 18 to 24 experienced the highest turnover rate (3,25), followed by those aged under 17 years (2,43). However, it is noteworthy that only the age groups mentioned above, the net creation rate was positive 1,07 for the first track, and 0,19 for the second. Thus, the remaining tracks experienced negative net creation rate, which confirms the strong outflow of labor from the cultivation of sugar cane in Brazil, especially those with older age. This time, there were negative rates for workers aged above 25 years.

The data in Table 09 refer to the turnover by age of schooling. In the biennium 2006-2007, the turnover was high for labor with schooling to complete basic education. For those with the 5th complete year of elementary school, gave the highest rate (3,50). Moreover, the rate of net job creation was negative for the workforce with education until 5th grade incomplete elementary school. It should be added that the lower turnover rate was observed for labor education graduate (0,60).

Table 9: Turnover rate in formal employment in the cultivation of sugar cane according to schooling Brazil - 2006-2007 and 2010-2011.

Schooling	2006-2007				2010-2011			
	Rate creation	Rate destruction	Turnover rate	Net creation rate	Rate creation	Rate destruction	Turnover rate	Net creation rate
Illiterate	1,00	1,04	2,03	-0,04	0,72	0,77	1,49	-0,05
Up to 5 <sup>th</sup> Year Inc.	1,72	1,76	3,49	-0,04	1,06	1,07	2,13	0,00
5 <sup>th</sup> Comp. Elem.	1,77	1,73	3,50	0,04	0,94	1,04	1,98	-0,10
6 <sup>th</sup> to 9 <sup>th</sup> Jr. School	1,66	1,58	3,24	0,07	1,07	1,05	2,13	0,02
Comp. High	1,29	1,27	2,57	0,02	0,98	0,91	1,89	0,07
Scho. Inc. High Sc.	1,00	0,96	1,96	0,04	0,81	0,76	1,56	0,05
Comp. College	0,94	0,72	1,66	0,21	0,67	0,60	1,27	0,07
Inc. College	0,51	0,37	0,88	0,14	0,40	0,33	0,73	0,07
Comp. College	0,37	0,24	0,60	0,13	0,30	0,24	0,54	0,06
Total	1,47	1,44	2,91	0,03	0,92	0,91	1,83	0,01

Source: prepared by the authors from data of RAIS / MTE

In the 2010-2011 biennium, the reduction in turnover rates was experienced by all levels of schooling. However, it is worth noting that turnover was pronounced for the employed population up to the 5th grade education (2,13) and between the 6th and 9th grade level (2,13). Moreover, the workforce occupied up to the 5th full year of elementary school had a zero rate of net creation of jobs. Thus, it is evident that the turnover reaches more vigorously the least educated.

Regarding turnover by pay range, the data in Table 10 show that this is more pronounced in jobs with the lowest income. In the first two years, the turnover rate for compensation up to 1,0 minimum wage was 2,27 with the net creation rate of 0.29. For those with compensation of more than 1,0 to 2,0 minimum salaries, registered the highest turnover rate (5,09), with the net creation rate of 0,16. However, for ranges above 2,0 and up to 15 minimum salaries, the creation rate was negative in the first

biennium. This reveals that the net creation of jobs occurred only in posts paying jobs, and the best posts, or better, for those who earn more than 15 salaries, minority of the population employed in the sugarcane industry in the country.

Table 10: Turnover rate in formal employment in the civil construction according to the pay range: Northeast - 2000-2001 and 2009-2010.

Range of average pay (MS)	2006-2007				2010-2011			
	Rate ciation	Rate destruction	Turnover rate	Net ciation rate	Rate ciation	Rate destruction	Turnover rate	Net ciation rate
Up to 1,0 MS	1,38	1,09	2,47	0,29	1,40	0,80	2,20	0,60
More than 1,0 to 2,0 MS	2,63	2,46	5,09	0,16	1,71	1,66	3,37	0,05
More than 2,0 to 4,0 MS	0,20	0,38	0,58	-0,18	0,13	0,27	0,40	-0,13
More than 4,0 to 7,0 MS	0,14	0,34	0,48	-0,20	0,06	0,15	0,21	-0,09
More than 7,0 to 10 MS	0,16	0,26	0,42	-0,10	0,12	0,19	0,31	-0,08
More than 10 to 15 MS	0,19	0,27	0,46	-0,09	0,13	0,19	0,32	-0,05
15 or more MS	0,21	0,19	0,40	0,01	0,19	0,29	0,49	-0,10
{not rated}	0,85	0,49	1,33	0,36	0,33	0,19	0,52	0,15
Total	1,47	1,44	2,91	0,03	0,92	0,91	1,83	0,01

Source: prepared by the authors from data of RAIS / MTE

In the 2010-2011 biennium, the data show that the turnover rate rose for workers with remuneration in the first track. For those with incomes of up to 1,0 minimum salaries, the turnover was 2,20 with the net creation rate of 0,60, more than double in the first biennium. In the case of employed people pay between 1,0 and up to 2,0 minimum salaries, the turnover rate rose 3,37, and the rate of net job creation fell to 0,05. Moreover, all ranges occupied on the other suffered from the motion compensation output than the input, since the rate of creation liquid was negative. This means that in the short time analysis, the situation of workers worsened in the sugarcane industry, affecting this time, all pay ranges.

## 6. FINAL CONSIDERATIONS

This article aims to analyze the labor market in the cultivation of sugar cane in Brazil, focusing on the turnover of the labor force employed in the sector. The data used are from the *Relação Anual de Informações Sociais (RAIS)* and the *Cadastro Geral de Empregados e Desempregados (CAGED)*, the Ministry of Labour and Employment (MTE) for the period 2006-2011.

The main findings show a reduction in the absolute number of formal jobs in the sector, from 183.379 thousand in the first biennium (2006-2007), 177.926 thousand for the second biennium (2010-2011). In addition, the Northeast, Southeast and South had a decline in the number of workers in the comparison from first to last, with only the North and Midwest showed elevation.

Regarding the sex of the occupied, the male labor was prevalent in the biennium under review, even with women slightly improving its performance in the second biennium, an increase of 1% in their participation. Additionally, there was concentration

of the employed in the age groups 30-39 and 40-49 years. That is, experienced adults endowed with physical strength.

Regarding the educational level, it was observed that even before a visible improvement in the worker's education, the sugarcane sector employing labor remains less educated. With this, the share of employed people with higher education is modest, justified by the fact that activity predominantly employs workers for cutting and harvesting activities, not being necessary high level of education, but physical strength and skill.

Regarding remuneration, the main findings reveal concentration of workers in the first tracks, and the phenomenon is accentuated even more in the second biennium observed. This is a result of the cultivation of sugar cane, usually develops itself for productivity and also requires workers with few years of schooling, resulting in low wages.

Regarding turnover, it is pronounced in regions with greater capacity to absorb labor in the cultivation of sugar cane, applied more to men than women. The phenomenon affects more manpower juvenile and youthful, with rates of net creation negative for those with older age.

The less educated are also the most affected, with rates of net creation in the higher levels of schooling. Furthermore, the highest turnover rates were recorded in the first pay ranges, with negative net creation rate of return on the best tracks.

Thus, it follows that the labor market in the cultivation of sugar cane in Brazil is an industry marked by seasonality due to its high turnover rate and selectivity with regard to sex, age, educational level and pay range.

Because of this reality, it is necessary to emphasize that this labor out of sugarcane activities will have accentuated difficulties of integration in other industries. The reduction of jobs in Brazilian agriculture becomes therefore worrying for the employment policies in the country.

In short, the high turnover rate observed in this study is one of the hidden faces of the Brazilian sugarcane industry. The challenge, therefore, is to reduce such turnover rates and improving through public policies, working conditions, accommodation / housing, health, education and income of the worker / the migrant of the sugarcane.

## REFERENCES

BALSADI, O. V. Evolução das Ocupações e do Emprego na Agropecuária do Centro-Oeste Brasileiro no Período de 2001-05. **Informações Econômicas**, SP, v. 39, nº 1, janeiro, p.32-40, 2009.

BALSADI, O. V. Mercado de trabalho assalariado na cultura da cana-de-açúcar no Brasil no período de 1992-2004. **Informações Econômicas**, São Paulo, v. 37, nº 2, fev-2007.

BALTAR, P. E., PRONI, M. W. **Flexibilidade do trabalho, emprego e estrutura salarial no Brasil**. Campinas, SP: Unicamp, 1995 (Cadernos do CESIT e Texto para Discussão, 15).

BELIK, Walter; BALSADI, Otávio Valentim; BORIN, Maria Rosa; CAMPANHOLA, Clayton; DEL GROSSI, Mauro Eduardo; SILVA, José Graziano da. O Emprego Rural nos Anos 90. In PRONI, M, W e HENRIQUE, W. (Org) **Trabalho, Mercado e**

**Sociedade:** o Brasil dos Anos 90. São Paulo – editora UNESP; Campinas, SP: Instituto de Economia UNICAMP, 2003.

BIVAR, W. **Aspectos da estrutura do desemprego no Brasil:** composição por sexo e duração. Rio de Janeiro: BNDES, XV Prêmio BNDES, 1993 (Dissertações de Mestrado).

CACCIAMALI, M. C. **Mudanças estruturais e na regulação do mercado de trabalho no Brasil nos anos 80.** IPE/USP, maio 1992 (Texto para Discussão Interna, 6).

CAMARGO, A. M. M. P.; CASER, D. V.; CAMARGO, F. P.; OLIVETTE, M. P. A.; SACHS, R. C. C.; TORQUATO, S. A.. Dinâmica e tendência da cana-de-açúcar sobre as demais atividades agropecuárias, estado de São Paulo, 2001-2006. **Informações Econômicas**, SP, v.38, n.3, mar. 2008.

CARVALHO, P. G. M., FEIJÓ, C. A. do V. C. Rotatividade do pessoal ocupado na indústria: sua evolução nos anos recentes — 1985-1993. **Anais da Associação Brasileira de Estudos do Trabalho**, 1993.

CORSEUIL, C. H.; RIBEIRO, E. P.; SANTOS, D. D.; DIAS, R.. **Criação, destruição e realocação do emprego no Brasil.** Texto para discussão Nº 855, Rio de Janeiro, IPEA, 2002a.

———. Job and worker flows in Brazil. In: MENEZES-FILHO, N. A. (coord.). **Labor market dynamics in Brazil.** Final Report, 2nd draft, Part I, Inter-American Development Bank Research Network, 11th round, Fipe-USP, Sep. 2002b.

GRAZIANO DA SILVA, J.. **O novo rural brasileiro.** Campinas, São Paulo: IE/UNICAMP, 1999. (coleção pesquisas 1), 153 páginas.

KAGEYAMA, Angela. Mudanças no Trabalho Rural no Brasil, 1992-2002. **Agricultura**, São Paulo, São Paulo, v. 51, nº 2, p. 71-84, jul/dez, 2004.

MORAES, M. A. F. D.. O mercado de trabalho na agroindústria canavieira: desafios e oportunidades. **Economia Aplicada**, São Paulo, v. II, nº 4, p. 605-619, out-dez - 2007.

NOVAES, J. R. P.. Trabalho nos canais: os jovens entre a enxada e o fâcão. **Rurais I**, Volume 3, Nº 1, março de 2009.

ORELLANO, V. I. F.; PAZELLO, E. T.. Evolução e determinantes da rotatividade da mão de obra nas firmas da indústria paulista na década de 1990. **Revista Pesquisa e Planejamento Econômico**, v.36, n.1, abr 2005.

PAZELLO, E., BIVAR, W., GONZAGA, G. Criação e destruição de postos de trabalho por tamanho de empresa na indústria brasileira. **Pesquisa e Planejamento Econômico**, Rio de Janeiro, v. 30, n. 2, ago. 2000.

SILVA FILHO, L. A. **Mercado de trabalho e rotatividade no emprego industrial no Nordeste.** X Encontro Nacional da Associação Brasileira de Estudos Regionais e Urbanos – ANABER. Recife, Anais..., 2012b.

SILVA FILHO, L. A. **Rotatividade no mercado de trabalho formal brasileiro.** V Congresso de la Asociación Latinoamericana de Población, Montevideo, Uruguay, Anais... 2012b.

SILVA FILHO; L. A. MARIANO, J. L. LIMA, M. M. F.. **Mercado de trabalho formal no cultivo da cana de açúcar: Nordeste – 2000/2010.** 50º Congresso da

sociedade brasileira de economia, administração e sociologia rural – SOBER. Vitória, Anais... 2012.

SILVA FILHO; L. A. MARIANO, J. L. QUEIROZ, S, N, de. **Emprego formal e rotatividade no mercado de trabalho agropecuário no Nordeste**. 50º Congresso da sociedade brasileira de economia, administração e sociologia rural – SOBER. Vitória, Anais... 2012.

Submissão: Março de 2013

Aprovação: Outubro de 2013