

# PREVALENCE AND FACTORS OF ASSOCIATION OF MENTAL HEALTH PROBLEMS OF FAMILY FARMERS IN THE SOUTH OF BRAZIL

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*The objective of this research was to verify the prevalence of problems of mental health and association of the characteristics socio-demographic and of the work process of family farmers of the micro region of Ituporanga, Santa Catarina, BBrazil. The sample was constituted of 405 family farmers. In the collection of referring information to the problems of mental health, questionnaire was used with variables socio-demographic and of the work process and a Self Report Questionnaire (SRQ-20). It was used the descriptive and inferential statistics, with measures of central tendency and variability. Through the regression binary logistics, the probability of an event, the presence of problems of mental health, was analyzed to happen in function of predict variables. In all the statistical procedures, the level of significance of 5% was adopted. In the research it was verified a prevalence of 33,8% of problems of mental health and the variables that predicts the problems of mental health was shown they were: sex, age, pesticides use, working hours crop rejection and in the crop, but, the most important variable was intoxication in the family.*

*Keywords: Family farming, mental health, work process*

## 1 Introduction

The concern with the problems of mental health has been evidenced in studies accomplished by researchers and international institutions that have been demonstrating the association between the work process and the agricultural workers' mental health. The studies have been approaching the significance of the psychological risks associated to the farmers' activities (GREGOIRE, 2002), the high stress levels (MCGREGOR; WILLOCK; DEARY, 1995; BOOTH; LLOYD, 1999; LOBLEY et al., 2004), the depression and the anxiety (EISNER; NEAL; SCAIFE, 1999) and the increase of the cases of suicide (MALMBERG; HAWTON; SIMKIN, 1997; CONGER, 1999; BOOTH et al., 2000; PAGE; FRAGAR, 2002), among others.

In Brazil, few studies approach the agricultural workers' mental health, most refers to the population in general. However, Faria et al. (1999, 2000) they verified discharges prevalence of smaller psychiatric morbidity in farmers in the Gaúcha Mountains. However, the researchers point out the complexity of the studied occupational exhibitions. In another study, accomplished by Falk et al. (2003), in Venâncio Aires, in Rio Grande do Sul, the factor that wakes up the researchers' attention it is the perception of the great prevalence of problems of mental health and of suicides, being consent that this phenomenon prevails in the rural area. The suicide indexes are alarming, taking Venâncio Aires to have one of the largest numbers of cases for a hundred thousand inhabitants in the country and in the world.

However, little knowledge is had regarding the problems of agricultural workers' mental health and which are the factors related to the work process. The objective of this study was to verify the prevalence of problems of mental health and association of the characteristics socio-demographic and of the work process of the family farmers of the micro region of Ituporanga.

This study is justified for the increase of the number of problems of mental health in several parts of the world, besides in Brazil (BRAZIL, 2007) and for the complexity that involves the family of agricultural work. Studies developed in Canada (PICKETT et al., 1998), in the United States (US DEPARTMENT OF LABOR, 2007), in Australia (FRAGAR; FRANKLIN, 2000) and in England (PHELPS, 2001) have been identifying the agriculture as one of the most dangerous activities and associated with high stress indexes. The agricultural atmosphere is characterized by external changes of high risk physical, biological, chemical and mechanic (GERRARD, 1998; MCCURDY; CARROLL, 2000), what corroborates with National Institute of Occupational Safety and Health (NIOSH), which classified the rural work among the 10 more stressful occupations (SMITH; COLLIGAN; HURREL, 1977).

## 2 Method

The research, of traverse design, is characterized as a field research of exploratory and descriptive nature. It is believed that the study of exploratory-descriptive field comes to back the verification based on the subject, whose formulation flows of the relationship between the work process and mental health, so that the work process, in a family agricultural structure, it could be responsible for the offences to the mental health.

The study was accomplished in the micro region of Ituporanga, located in the south area of Brazil, in the State of Santa Catarina. With a total area of 2713,2 km<sup>2</sup>, in the region small properties prevail with diversified structures and it structures family of agricultural production. The total population belongs to 69.293 inhabitants, being the 41.894 inhabitants' rural population and the urban of 27.395, with 9.224 rural establishments (IBGE, 2007) in 10 municipal districts.

The sample was selected in the municipal district of Ituporanga, for being one of the representative municipal districts of the family agriculture in that region. In the selection of the sample, the calculation of the simple random sampling was used. The size of the sample was calculated with base

in Barbetta (2003) with a sample error of 4% ( $E = 0,04$ ) and level of trust of 95%. The sample of the research corresponded to 447 family farmers in activity in the municipal district of Ituporanga, in other words, it leaves of a resident total population in the 1.578 rural properties of the municipal district (IBGE, 2007). It was sought, in this study, to interview a person of each property. Considering the complexity that involves the family agricultural work in this micro region, only the farmers of the family-landlady were selected.

The referring protocols to the research were submitted to the Committee of Ethics in Research with human beings, of the Federal University of Santa Catarina. The interviewees were informed on the theme, the objectives and the ethical commitments of the research, being the signature of the term of free and illustrious consent, a requirement for the accomplishment of the interview.

In the rising of characteristics socio-demographic there were identified the variables: sex, age (complete years), civil status, ethnicity, religion and education. In relation to the work process, they were identified the variables: predominant culture, working hours, area of the property, use of machines and equipments, employees' recruiting, use of veterinary products and pesticide use and intoxications.

A questionnaire was applied with variables socio demographic and of the work process. The problems of mental health were measured for Self Report Questionnaire (SRQ-20) being positive the test with eight answers altered for women and six, for men. (MARI; WILLIAMS, 1986). SRQ 20 allows doing the track of smaller psychiatric disturbances for a significant sampling of the population. It was validated by international studies (WILKINSON, 1887) and, in Brazil, in users of primary attention (MARI; WILLIAMS, 1986; MARI et al., 1987). This instrument was used in Faria's set all study. (1999), with rural workers in Brazil, if not doing necessary, in the present study, the test of field of its translation.

## 2.1 Statistical Analysis

It was used the descriptive and inferential statistics. To describe the data, measures of central tendency were used (mean and mode) and variability (standard deviation, variation, frequencies and percentile).

To attend to the specific objective of the study that is to identify the factors that contribute to the problems of agricultural workers' mental health, regression binary logistics was used. As test of adaptation of the regression model, the tests of Omnibus were used and of Hosmer and Lemeshow. The regression method used it was the Enter, because steps were not accomplished in the model, but, three different models were tested. All the tested models had as dependent variable the presence of problem of mental health. That variable was measures starting from SRQ 2 (HARDING et al.,1980), and the groups (with and without problems) it were identified starting from a cut point and validated by the author of the scale with the same population, that is of 8 points for women and 6 for men.

In the first model, the prediction capacity of the variables socio-demographics was tested; in the second model, the prediction capacity of the variables related to the work process was tested; and finally, it took place a third regression binary logistics being used as dependent variables those that presented prediction capacity significant in the previous models.

To test other specific objectives, univariate tests of hypotheses were used. To verify the association among categorical variables, the chi-square test was used. To compare averages of continuous variables among groups with two categories, it was used it tests t for independent samples. To compare the working hours in the crop and out of crop, it was used it tests t pair. The trust interval adopted it was of 95% and the level of adopted significance was of 0,05.

## 3 Results

In this chapter, the results are presented obtained in the research in that was looked for to investigate the prevalence of problems of mental health and association of the characteristics socio-demographic and of the work process.

### 3.1 Prevalence of Mental Health Problems

The prevalence of problems of mental health among the farmers was of 33,8% (n=137). When analyzed the prevalence among the sexes, it is verified that the women presented a prevalence of 39,7% (n=91), while, the men of 26,1%(n=46).

When associating the occurrence of problem of mental health in relation to the variable sex, it was verified that the women present larger prevalence of upset than the men. It was observed that that association is statically significant ( $X^2=8,225$ ,  $df=1$ ,  $p=0,004$ ,  $\phi = -0,143$ ).

To analyze the frequency and the percentile of positive answers in each question of SRQ-20, the Table 1 was elaborated. This table describes the principal symptoms that the farmers declared.

**Table 1:** Results Self Report Questionnaire

Variables	Occurrence of symptom % (n)		X <sup>2</sup>	P-value
	All respondents	Mental Health Problems		
Do you often have headaches?	36,3 (147)	57,1 (84)	56,041	<0,001
Is your appetite poor?	15,3 (62)	64,5 (40)	30,801	<0,001
1. Do you sleep badly?	41,5(168)	58,3 (98)	77,023	<0,001
2. Are you easily frightened?	44,4 (180)	51,7 (93)	46,064	<0,001
3. Do your hands shake?	20,7 (84)	65,5 (55)	47,425	<0,001
4. Do you feel nervous, tense, or worried?	58,8 (238)	51,23 (122)	78,367	<0,001
5. Is your digestion poor?	23 (93)	67,3 (63)	62,032	<0,001
6. Do you have trouble thinking clearly?	20,5 (83)	77,1 (64)	87,364	<0,001
7. Do you feel unhappy?	39,8 (161)	68,9 (111)	147,224	<0,001
8. Do you cry more than usual?	32,6 (162)	72 (95)	127,274	<0,001
Do you find it difficult to enjoy your daily activities?	13,3 (54)	94,4 (51)	102,280	<0,001
9. Do you find it difficult to make decisions?	21,5 (87)	49,4 (43)	12,043	0,001
10. Is your daily work suffering?	54,8 (222)	42,3 (94)	15,915	<0,001
11. Are you unable to play a useful part in life?	10,1 (41)	78 (32)	39,853	<0,001
12. Have you lost interest in things?	11,9 (48)	93,8 (45)	87,351	<0,001
13. Do you feel that you are a worthless person?	7,2 (29)	96,6 (28)	54,903	<0,001
Has the thought of ending your life been on your mind?	5,4 (22)	95,5 (21)	39,471	<0,001
14. Do you feel tired all the time?	37,5 (152)	64,4 (101)	115,666	<0,001
Do you have uncomfortable feelings in your stomach?	30,6 (124)	62,1 (77)	63,806	<0,001
15. Are you easily tired?	38 (154)	63,6 (98)	98,641	<0,001

Legend: P-value = significant < 0,05 level X<sup>2</sup> = Chi-square value

In relation to the questions of SRQ-20, it was observed that the largest frequencies with affirmative answers were: to feel nervous, tense or concerned (58,8%), to have difficulties in the service (54,8%), to get scared with easiness (44,7%), to sleep badly (41,5%), to feel lately sad (39,8%), in agreement with the Table 1.

Analyzing the results, it is observed that the subjects 9, 10, 11, 15, 16 and 17 were priority answered positively by the agricultural workers that presented problem of mental health. For that reason, these subjects were the ones that they presented higher values of qui-square, what indicates that are important symptoms in the upset.

### 3.2 Mental health problems – socio-demographic and worker process characterization

When analyzed the prevalence of problems of mental health associated to the characteristics socio-demographic, it was verified that the largest prevalence are found in women; after the 40 years of age; of mixed origin and others it does not know how to answer; married (34,3%) and widow /separated (33,3%); and belonging the Catholic religion. Although these tendencies have been observed, the only statically significant was the difference among the sexes.

The problems of mental health were also associated with the characteristics of the process of family, when associated agricultural work the problem of mental health with the agricultural production, in the predominant cultures (onion and tobacco), it was verified that the prevalence among the producing of onion was of 37,4% and enter the producing of tobacco of 36,8, having, therefore, a lot of likeness among them.

The use of machines and equipments, indicator of technological development, and the employees' recruiting associated with the decrease of prevalence of problems of mental health.

In relation to the intoxicated farmers, it was observed that 44,8% presented problems of mental health, while the farmers that didn't only have intoxications 30,4%. When comparing the frequencies, it is verified that the intoxicated farmers presented superior prevalence, but not statically significant ( $X^2 = 6,758$ ;  $p < 0,009$ ).

It was verified that the women present larger prevalence of problems of mental health, so much the ones that had intoxications in your family with relationship to the own ones intoxicated, in relation to the men. When comparing the frequencies, it was observed that the intoxicated women presented larger occurrence of problems of mental health in relation to the no intoxicated ( $X^2 = 17,661$ ;  $p < 0,000$ ). That result allows suggesting that the women are more affected for the intoxication, so many personnel as in the family. The results indicate that the regular use of pesticides and the intoxications have direct association with the prevalence of problems of mental health.

### 3.3 Prevalence of mental health problems and association factors

Through the binary logistic regression, the probability of an event was analyzed, in the case, the presence of problem of mental health to happen in function of some predict variables.

The technique of logistic regression is used when the answer variable is categorical, with two possible results (dichotomous). As she can observe, two great groups of variables that influence in the worker's mental health exist (characteristics socio-demographic and characteristics of the work process).

To test the capacity prediction capacity of those groups on the problems of mental health, two logistic regressions were accomplished, one for each group. After that procedure, the variables were selected with larger prediction capacity about the mental health of both groups, which served as independent variables for the third regression model accomplished.

The first regression model, had as independent variables (predict) the characteristics socio-demographic (sex, age, civil status, education, religion and time of home), and as dependent variable, the indicative of problem of mental health (yes or not).

The first regression, the results of the test of Omnibus indicated that the tested model is adapted ( $X^2=25.160$ ,  $p=0.003$ ), suggesting that some of the variables have significant capacity to predict the problems of mental health. The test of Hosmer and Lemeshow indicated that the values predicted by the model don't differ significantly of the observed values ( $X^2=4.034$ ,  $p=0.854$ ).

It was verified that, among the characteristics socio-demographic, the variables more predict important were sex (masculine), age and time of home in the property (Table 2). It can be said in relation to the variable sex, that the men have the half of the chance of having problem of mental health. In relation to the age it is observed that as larger the age, larger the chance of presenting problem of mental health, but this tendency is less accentuated. The time of home indicates that there is time the more the farmer it to live in the property, smaller your chance of presenting problem of mental health.

**Table 2:** Results of binary logistic regression of characteristics socio-demographic in predicting problems of mental health

Variables	B	SE	Wald	DF	Sig	Exp(B)	95% I.C EXP(B)	
							Low	Upper
Sex - Male/Female	-,726	,226	10,334	1	,001	,484	,311	,753
Age	,021	,010	4,852	1	,021	1,022	1,002	1,041
Civil State			,553	2	,759			
Single	,284	,513	,306	1	,580	1,328 <sup>c</sup>	,486	3,632
Widow/separated	-,322	,645	,249	1	,618	,725	,205	2,566
Educational level			1,573	2	,455			
Schooling – Low	,504	1,161	,189	1	,664	1,656	,170	16,125
Schooling – Mean	-,117	1,237	,009	1	,925	,890	,079	10,056
Religion			5,638	2	,060			
Catholic	1,118	1,139	1,074	1	,300	3,256	,349	30,377
Lutheran	,591	1,159	,260	1	,610	1,806	,186	17,493
Time at home	-,146	,073	4,005	1	,045	,864	,748	,997

Legend: B = Regression Coefficient; SE = Standard Error; Wald = Statistics Wald; DF = Degrees of Freedom; Sig= significance; ExpB = Standard Coefficient of regression; I.C ExpB = Interval of Confidence of the standard coefficient.

The second model of regression had as independent variables (predict) the characteristics of the work process (working hours in the crop and out of crop, producing of onion, producing of tobacco, employees' recruiting, work with machines, pesticides use, intoxications in the family and intoxicated farmers), and as dependent variable, the indicative of problem of mental health (yes or not).

**Table 3:** Results of binary logistic regression the characteristics of the work process in predicting problems of mental health

Variables	B	SE	Wald	df	Sig	Exp(B)	95% I.C. EXP(B)	
							Low	Upper
Hours worked /in the crop	,232	,062	13,922	1	<,001	,793	,702	,896
Hours worked /out of crop	-,307	,086	12,749	1	<,001	1,359	1,148	1,608
Tobacco Producers	,439	,296	2,195	1	,138	1,551	,868	2,771
Onion Producers	,660	,281	5,514	1	,019	1,934	1,115	3,354
Works with machines	-,450	,242	3,455	1	,063	,637	,396	1,025
Employees' recruiting	-,281	,301	,876	1	,349	,755	,419	1,361
Pesticides use	,958	,434	4,876	1	,027	2,605	1,114	6,095
Intoxication in the family	1,261	,297	18,046	1	<,001	3,530	1,973	6,316
Intoxicated farmers	-,192	,328	,343	1	,558	,825	,434	1,569

The results of the Omnibus test indicated that the tested model is adapted ( $X^2=61,550$ ,  $p=0.000$ ), suggesting that some of the variables have significant capacity to predict the mental health. The test of Hosmer and Lemeshow indicated that the model is adapted to the data, because the predicted values don't differentiate significantly of the observed values ( $X^2=9,715$ ,  $p=0.286$ ).

It is observed, in relation to the work process, that the variables working hours in the crop and out of crop, intoxications in the family, producing of onion, pesticides use is the predict variables of problem of mental health.

In relation to the working hours, it is verified that as larger the number of hours worked in the crop, smaller the chance of presenting problems of mental health. The inverse tendency is observed in

relation to the number of hours worked out of crop, because who works more hours crop rejection presents larger chance of having problems of mental health.

In the case study, through Ergonomic Work Analysis (EWA) it can be verified that the periods crop rejection are prolonged for the whole year, while the crop period varies a lot in function of the culture and with intervals of time with decrease of the labour activity. In some properties, activities are accomplished characterizing as intense work not only in the crop but during the whole year, without intervals.

It is observed, also, that there is more probability of the producing of onion they present problems of mental health than the one of tobacco. When analyzed the problems of mental health among producing of onion and tobacco, the prevalence were very similar to each other (Table 3). Although experiences of production of organic onion exist, most of the producers cultivate the onion in a conventional system that he/she foresees great use of inputs, represented by the intense pesticides use.

The pesticides use has direct relationship with the problem of mental health and intoxication in the family it is the largest prediction, what is a very important indicative and that will be treated along this thesis.

The third regression model had as independent variables (prediction) the characteristics socio-demographic and the characteristics of the work process and, as dependent variable, the indicative of problem of mental health (yes or not).

**Table 4:** Results of binary logistic regression of characteristics socio-demographic and of the work process in predicting problems of mental health

Variables	B	SE	Wald	df	Sig	Exp(B)	95% C.I. EXP(B)	
							Low	Upper
Sex (Male)	-,624	,246	6,417	1	,011	,536	,330	,868
Age	,021	,010	4,699	1	,030	1,021	1,002	1,040
Time at home	-,145	,077	3,582	1	,058	,865	,744	1,005
Onion Producers	-,409	,243	2,833	1	,092	1,505	,935	2,421
Pesticides use	1,164	,419	7,726	1	,005	3,203	1,410	7,279
Intoxication in the family	1,111	,302	13,492	1	,000	3,038	1,679	5,496
Hours worked / in the crop	-,215	,061	12,450	1	,000	,807	,716	,909
Hours worked / out of crop	,287	,085	11,453	1	,001	1,322	1,128	1,573

The regression logistics (Table 4) it showed that, in relation to the characteristics socio-demographic and of the work process, the prediction variables of problems of mental health were masculine sex (smaller chance than the women), age (it increases the chance in function of the age), pesticide use, working hours crop rejection and in the crop, but the most important variable was intoxication in the family.

The results of the Omnibus test indicated that the tested model is adapted ( $X^2=65,138$ ,  $p=0.000$ ), suggesting that some of the variables have significant capacity to predict the mental health. The test of Hosmer and Lemeshow indicated that the model is adapted to the data, because the predicted values don't differentiate significantly of the observed values ( $X^2=2,632$   $p=0.955$ ).

#### 4. Conclusion

The application of Self Report Questionnaire revealed that the family farmers have high risk of problems of mental health. The identified variables as prediction of problems of mental health are: sex, age, time of home, working hours (out of crop and in the crop) and the pesticides use. The study identifies as more important variable the intoxication in the family, important fact for the occupational health.

In that research, it was verified the high prevalence of problems of mental health and they showed association with the pesticides use. It was observed that the prevalence of problems of mental health among the producing of onion and tobacco is to each other very similar, but the producing of onion present larger chance than the producing of tobacco. During the study, it was verified that a great amount of pesticides is used in the plantations of tobacco and onion, needing subsequent studies that they investigate, the risks the one that is exposed these farmers.

The results evidence the need of a group of measures to minimize the offences to the family farmers' mental health, in the sense of developing appropriate services for the cares of this population. The lack is observed a model of service of mental health specific for the agricultural community, because the farmers are constituted a group of the vulnerable population in terms of attention given to the problems and needs of the occupational health.

With base in these results, it is offered information to the epidemiology services, of sanitary surveillance, of agriculture and to the other organs of interest, for the development of prevention politics to the family farmers' occupational health, mainly with relationship to the problems of mental health and events of intoxications in the researched area and in the implementation of programs in the sphere Federal, State and Municipal. Therefore, it is proposed new studies giving continuity to the investigated themes, seeking a better understanding of the complexity of the family agricultural work and the offences to the physical and mental health.

## References

- BARBETTA, P. A., (2003). Estatística aplicada às Ciências Sociais. 5. ed. Florianópolis: Editora da UFSC.
- BOOTH, N. J.; LLOYD, K., (1999). Stress in farmers. *International Journal of Social Psychiatry*, v. 46, n. 1, pp. 67-73.
- BOOTH, N.; BRISCOE, M.; POWELL, R. (2000). Suicide in the farming community: Methods used and contact with health services. *Occupational and Environmental Medicine*, v. 57, p. 642-645.
- BRASIL. MINISTÉRIO DA SAÚDE. (2007). Manual ajudará a prevenir suicídio. Disponível em: <[http://portal.saude.gov.br/portal/saude/visualizar\\_texto.cfm?idtxt=25076](http://portal.saude.gov.br/portal/saude/visualizar_texto.cfm?idtxt=25076)>. Acesso em: 20 out. 2007.
- EISNER, C. S.; NEAL, R. D.; SCAIFE, B. (199). The effect of the 1996 "beef crisis" on depression and anxiety in farmers and non-farming controls. *British Journal of General Practice*, v. 49, p. 385-386.
- FALK, J. W. et al. (2003). Suicídio e doença mental em Venâncio Aires-RS: consequência do uso de agrotóxicos organofosforados. Relatório preliminar de pesquisa, n. 1-4, p. 23- 31.
- FARIA, N. M. X. et al. (1999). Estudo transversal sobre saúde mental de agricultores da Serra Gaúcha (Brasil). *Revista de Saúde Pública, São Paulo*, v. 33, n. 4, p. 391-400.
- GERRARD, C. E., (1998). Farmer's occupational health: cause for concern, cause for action. *Journal of Advanced Nursing*, 28 (1),pp.155-163.
- FRAGAR, L.; FRANKLIN, R. (2000).The health and safety of Australia's farming community. ACAHS e RIRDC, Moree, March.
- EPAGRI. (2008). Destaques 2008. Secretaria do Estado da Agricultura e Desenvolvimento Rural, Florianópolis: EPAGRI, 18p.
- GREGOIRE, A., (2002). The mental health of farmers.*Occupational Medicine*, 58 (8), 471-476.
- HARDING, T. W. et al. (1980). Mental Disorders in primary health care: a study of their frequency and diagnosis in four development countries. *Psychological Medicine*, v. 10, p. 231-241.
- IBGE - INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. (2007).Censo Agropecuário 2006: Resultados preliminares. Rio de Janeiro: IBGE,141 p.



- LOBLEY, M. et al. (2004). Rural stress review. Centre for Rural Research, Lafrowda House, University of Exeter. St German's Road: Exeter.
- MALMBERG, A.; HAWTON, K.; SIMKIN, S. (1997). A study of suicide in farmers in England and Wales. *Journal of Psychosomatic Research*, v. 43, n. 1, p. 107-111.
- MARI, J.; WILLIAMS P. A. (1986). A validity study of a psychiatric screening questionnaire (SRQ-20) in primary care in the city of São Paulo. *British Journal Psychiatry*, v.148, p. 23-26.
- MARI, J. J. et al. (1987). Detection of psychiatric morbidity in the primary medical care settings in Brazil. *Revista de Saúde Pública*, v. 21, p.501-507.
- MCCURDY, S.; CARROLL, D. J. (2000). Agricultural injury. *American Journal of Industrial Medicine*, v. 38, p. 463-480.
- MCGREGOR, M.; WILLOCK, J.; DEARY, I. (1995). Farmer Stress. *Farm Management*, v. 9, p. 57-65.
- PAGE A. N.; Fragar, L. J. (2002). Suicide in Australian farming, 1988–1997. *Australian and New Zealand Journal of Psychiatry*, v. 36, n. 1, p. 81–85.
- PHELPS, C. (2001). Stress in farming in North Yorkshire. WPS/01/06, Phase 1 Report. Sheffield: Health and Safety Laboratory.
- PICKETT, W. et al.,(1998). Suicide mortality and pesticide use among Canadian farmers. *American Journal Industrial Medicine*,16 (1), 115-128.
- SMITH, M. J.; COLLIGAN, M. J.; HURREL, J. J., (1977). A review of NIOSH psychological stress research. Paper presented at a conference on job stress. University of Southern California, Los Angeles.
- STALLONES, L. et al. (1995). Depressive symptoms among Colorado farmers. *Agricultural Safety and Health*, 1, 37-43.
- U.S. DEPARTMENT OF LABOR. BUREAU OF LABOR STATISTICS. (2007). Occupations. Disponível em: <<http://www.bls.gov/bls/occupation.htm> >. Acesso em: 20 set. 2007.
- WILKINSON, R. (1987). Health inequalities: relative or absolute material standards? *BMJ*, v.314, p. 581-585.