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Attitude towards sustainable agriculture of towards sustainable agriculture of future farmers and agronomist generation in Brazil

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ABSTRACT

This study aims to identify the attitude of the future farmers regarding sustainable agriculture, based on the understanding of sustainable agriculture concept, its current and future importance and the fact that agronomy students will be future managers of rural enterprises, public managers and companies of the sector. The research was conducted with 288 students of agronomy from the best Brazilian universities. Through information analysis obtained from the application of the attitude scale toward sustainable agriculture it was possible to notice that the students associate aspects of this

concept to the balance of environment and natural resources, and that through these practices agriculture can have both environmental and economic gains. It is expected that the next farmers generation favorable attitude that was found in this research generate greater implementation of the practices of sustainable agriculture in the long term.

KEYWORDS: future farmers, sustainable agriculture, agronomist, Brazil, agriculture.

1. Introduction

Soil degradation, erosion, water pollution, overuse of chemical products, waste of natural resources, destruction of natural habitats, and resistance to insecticides and pesticides are some of the concerns expressed by environmentalists, ecologists, land managers, political leaders and farmers. There is a great concern about the destructive effects of some agricultural practices focusing on environment, natural resources and sustainable agricultural systems in the long term (Sadati 2010).

Several factors including the exponential increase in human population and developed agrarian policies have characterized conventional agriculture as a practice of intensive techniques, due to the use of agrochemicals that present serious environmental consequences such as pollution, depletion of natural resources and the rural exodus (CCE 1998, Marta-Costa 2001, Costa and Poeta 2003). According to Navarro (2002), these negative consequences observed in conventional agriculture has generated demand for crop alternatives for agriculture aimed at sustainability in all parts of the world.

Both agriculture and food production have been pressured due to their action on the environment. There is a social movement that attacks on three fronts: the combat of

ecosystem degradation caused by the modernizing process of the twentieth century; the demand for new disciplinary rules for the food system; and the promotion of more adequate practices regarding the preservation of natural resources and the provision of healthier foods. That was the triple role in campaigns for sustainable agriculture (Veiga 1996).

According to Lehman et al. (1993) Sustainable agriculture consists of agricultural processes, that is, processes involving biological activities of growth and reproduction with the intent to produce crops that do not compromise the future ability to practice agriculture successfully. Thus, it can be said that sustainable agriculture consists of agricultural processes which do not exhaust any resource that is essential for agriculture.

The objective of sustainable agriculture is the continuous satisfaction not only regarding present generation but also future generation's needs. Agriculture must not degrade the environment but it needs to be technically appropriate, economically viable and socially acceptable (FAO 1993).

Therefore, sustainable agricultural practices can not be only economically viable, but also environmentally and socially acceptable. Sustainable agriculture requires a long-term perspective and continuous activities over several generations. Thus, the performance and behavior of current agricultural students as farmers and professionals of the future can ensure sustainability of agriculture in the long term (Liaghati 2008).

It is understood that agronomy students are the next farmers' generation, as researchers, teachers, land managers and political leaders in the industry, and therefore,

concepts and policies aimed at the development of sustainable agriculture must address the needs of this group. According to Hungerford and Volk (1990) educational programs can influence the knowledge, attitudes and behavior of students and lead to greater environmental responsibility.

Based on this, for effective use of sustainable agriculture it is expected that agronomy students have behaviors and actions according to sustainable agriculture. It is important to develop a more familiar curriculum with the concepts and practices of sustainable agriculture, such as integrated management of pests, integrated cultivation, crop rotation, among others (Liaghati 2008).

According to Pereira et. al (2014) it is assumed that the participation of higher education institution is essential for the formation of beliefs and values in relation to environmental management, educating students who will be in the organizations in the future to become more involved in the transition process for a more sustainable society.

The theoretical basis for this study considers attitude as a learned predisposition to a consistently favorable or unfavorable behavior with respect to a certain object (Assael 1995, Schiffman and Kanuk 1997), using the tripartite classification of attitude proposed by Fishbein and Ajzen (1975), in which attitudes can be influenced by cognitive, affective and conative components.

In other studies conducted with farmers to study their attitudes toward sustainable agriculture, it is pointed out that farmers who are older, having experience with agriculture, family size and more land had low attitude to sustainable agriculture than younger farmers. However, farmers with high literacy level and participation in extension courses have a better attitude toward these practices (Sadati 2010).

Therefore, based on the importance of sustainable agriculture, this research sought to identify the attitude of agronomy students regarding sustainable agriculture. Aiming at the importance of encouraging these students to more sustainable behaviors in the long term, it is believed that they will be future managers of the agricultural sector.

However, there is a theoretical gap on the study of environmental issues in higher education institutions. According to Jabbour (2010), the literature on the subject can be considered new and, soon after its beginning, this literature has followed a trend to prepare simple reports on the experiences and challenges faced by educational institutions to incorporate environmental issues in their résumés.

1.2 Objective

Based on the understanding of sustainable agriculture, its importance nowadays and in the future, and also that the future farmers will be key players and future managers of rural enterprises, public managers and companies in the sector, it was expected to identify the attitude of this target group regarding sustainable agriculture.

1.3 Attitude

The idea that attitudes are dispositions to evaluate objects, people, or actions seem that an individual has one, and only one attitude toward any object or subject. In more recent works, it is suggested that attitudes can change, and when they change, a new approach can replace the previous one, but it does not necessarily exclude the existing one (Wilson et al 2000). According to this model of dual attitudes, people may

simultaneously have different attitudes for a certain object in the same context, which may present an implicit or habitual attitude, and explicit (Ajzen 2001).

Reinforcing the idea, Schiffman and Kanuk (1997) emphasize that attitudes are relatively consistent with the behavior that they reflect. However, despite this consistency, attitudes are not necessarily permanent and can change over time. Thus, it is important to consider the influence of the situation in the attitudes and behavior of the person. Situational influences are events or circumstances that, at a specific time, influence the relationship between attitude and behavior. A specific situation can make people behave inconsistent with their attitudes (Giraldi 2005).

According to Ajzen (2001) strong attitudes are characterized by some factors such as stability over time, endurance and ability to predict behavior. These characteristics relate differently according to formation, gender, age and race, highlighting the notion that attitude is a unitary construction. The author points out that the strength of attitudes can vary over the person's life cycle with greater strength in mid-life. Strong relationships were found associated with the most accessible beliefs, and when the strength of attitude was assessed with more objective meanings, it showed a greater tendency to be more resistant to change (Ajzen 2001).

Attitude is understood in this research as a learned predisposition to a consistently favorable or unfavorable behavior with respect to a certain object (Assael 1995, Schiffman and Kanuk 1997). The object in question may refer to a product, product category, brand, service, use of a product, practices, people, events, issues, institutions, advertisements, among others. The fact that attitude is a learned predisposition means that it is formed as a result of direct experience with a particular

situation, information acquired from other people or exposure to an action. Moreover, attitudes have a motivational quality, i.e., they drive the person to a particular behavior or turn away from another (Giraldi 2005).

In the same concept, Ajzen (2001) states that depending on the perspective, different assessments of the same object in different contexts can be made. This may explain multiple attitudes toward the same object. McConnell et al. (1997) suggest that some discrepancies between attitudes and behavior may reflect the presence of multiple attitudes depending on the context and in relation to social norms.

Based on the theoretical approach discussed so far, an issue that arises when studying attitude is how the researcher can determine it, that is, to identify the components that constitute it. Fishbein and Ajzen (1975) proposed a model to represent the logic of the attitude concept called tripartite model of attitude. The model characterizes which types of response (attitudes) individuals may have to be stimulated by a particular object, which can be cognitive, perception and verbal statements of belief; affectionate, sympathetic nerve responses and statements of affection; and conative, representing explicit actions of verbal statements concerning the behavior. This vision establishes a correlation between attitude and behavior (Fishbein and Ajzen 1975).

The cognitive component consists of an individual's cognitions, in other words, the knowledge and the insights that have been learned by the combination of experience with a particular object with information acquired from various sources. The affective component represents consumers' emotions or feelings with respect to an object. And the conative component is related to the probability that an individual will adopt a

specific behavior with respect to the object of attitude, which can be treated as an expression of the individual's intention (Giraldi 2005).

In the study of attitudes, there is a concern with a predisposition to behavior and not the behavior itself. So it is necessary to distinguish between behavioral intention and effective behavior. This suggests a classification consisting of four broad categories: affection (feelings, reviews), cognition (opinions, beliefs), conation (behavioral intentions) and behavior (explicit actions observed) (Fishbein and Ajzen 1975).

1.4 Sustainable Agriculture

Thinking about technology, the first agricultural revolution was characterized by slow abandonment of fallowing and the introduction of crop rotation with legumes and/or tubers. These plants could be used both for soil fertilization, and in human and animal feeding (Oliveira Jr. 1989). Thus, it was possible to intensify land use and achieve significant increases in agricultural production, "eliminating" chronic food shortages that characterized the earlier periods (Ehlers 1996).

The late nineteenth century and early twentieth century was also a period of intense changes in agriculture. Great scientific discoveries, combined with the technological development of chemical fertilizers, internal combustion engines, plant breeding, among others, eventually imposed a new development pattern for agriculture. This period is noteworthy with significant changes: the reduction of the relative importance of crop rotation; the progressive abandonment of green and animal manure use on soil fertility; the separation of vegetable and animal production and mainly the absorption of some stages of the agricultural production process by the industrial sector.

Thus the opportunity for the development of more intensive production systems appeared, marking the beginning of a new stage in agriculture history. This new second stage is called contemporary agricultural revolution (Ehlers 1996).

Starting from the 1st World War, the emerging chemical and mechanical industries intensified the production of inputs (pesticides, fertilizers, seeds, animal feed) and agricultural machinery (tractors, harvesters, plows), and agriculture started to depend less on local resources. The industrial sector then began to transform products from agriculture, industrializing them and distributing an increasing share of agricultural production (Oliveira Jr., 1989). Advances in transport processes, storage and agricultural product conservation enabled the emergence of a "unified" international market (Marcatto 2002).

These transformations, along with surveys on chemical, genetic and mechanical areas, as well as strengthening the industrial sector focused on agriculture, culminated in the late 60s and early 70s in a new process of profound transformation of global agriculture known as the Green Revolution (Marcatto 2002).

The green revolution is nothing but a term used to identify the modernization model of world agriculture based on the principle of intensification through specialization (Crouch 1995). It involves technologies such as: moto-mechanization, use of genetically improved plant varieties aiming high production and productivity, high-tech fertilizers, pesticides, herbicides and irrigation. Besides, it has created food security to many food producing countries and allowed the consolidation of a global market to meet the growing population and food demand.

However, several factors, including the exponential increase in human population and developed agrarian policies, characterized conventional agriculture as a practice of intensive techniques, using agrochemical products and presenting serious consequences to the environment, especially pollution, depletion of natural resources and the rural exodus (CCE 1998, Marta-Costa 2001, Costa and Poeta 2003).

Sustainable agriculture expression started to be used more frequently in the mid-80s, also taking economic, social and environmental dimensions, although the term 'sustainable' based on the use of land and other resources had been used since previous decades (Ehlers 1999).

According to Flores and Nascimento (1994) agricultural production systems necessarily have to be sustainable, although technologies are not solutions to all environmental issues. To the author, sustainable agriculture is feasible only by obtaining productivity economic levels, with viable production systems in agronomic, social and ecological terms, meeting the demand for short and long term, achieving sustainability and production growth such as compatible goals, aiming greater energy efficiency and environment conservation, besides considering the need to develop and use more technologies.

2. Method

The paper is a descriptive research, and according to Andrade (2002) it is concerned to observe, record, analyze, classify and interpret facts without interference. Thus, the phenomena can be studied without being manipulated by the researcher.

The survey was conducted from November 2013 to December 2013. The study population included agronomy students from the best Brazilian universities. The sample consisted of 288 students, and the instrument for data collection was an online questionnaire designed in two sections.

The first section contained questions to characterize the sample with questions concerning the student's age, the year that he/she is attending, father's age, education of household head, household income, personal interests, and preferred area of professional practice in the future. The second section contained 14 statements to measure the attitude of students regarding sustainable agriculture. The statements were based on the five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree".

The questionnaire was sent electronically to students through social networks, emails researchers' emails and institutional emails. Institutional emails were sent by the coordinators of the courses of each university due to the request of the researchers of this study. According to Malhotra (2006) surveys conducted with the assistance of the internet are becoming increasingly popular among researchers, presenting advantages such as lower costs, speed and ability to reach specific populations. Also, according to the respondent's point of view, it is possible to answer since it is more convenient. However, some disadvantages such as reduced response rates, as it may be perceived as spam, the lack of respondents' ability, dependence on technological resources, impersonality, and the selection and quality of the sample.

One way to minimize these disadvantages is to know the respondents' profile and to plan the instrument to collect data in the most appropriate manner according to

the needs of those who will answer it. Regarding the profile of the people who responded to the questionnaires, it can be said that the majority are young (Vieira 2010). In the research, the profile of the sample consisted of university students who have contact with technological resources, who do not have resistance to this type of tool.

Data analysis was performed in two stages. The first was a descriptive analysis to characterize the sample and presentation of indicators such as frequency, mean, standard deviation, and variation coefficient, seeking to describe the sample profile and the phenomenon observed. The second analysis was performed by means of a factor analysis using Statistical Package for Social Sciences (SPSS 17.0). The suitability of data for factor analysis was validated by the Bartlett's sphericity test.

According to Rodrigues (2002) what is intended with the factor analysis is to identify possible associations between observational variables in order to define the existence of a common factor (latent) between them. Thus, it can be said that factor analysis, or common factor analysis, aims to identify factors or constructs that are implicit in the observational variables, which facilitates the interpretation of data.

3. Results and discussions

In the first analysis the sample was characterized. All of the 288 respondents are studying agronomy. 10% of them are enrolled in the first year, 11% in the second, 17% in the third, 16% in the fourth, 46% in the fifth or more. The sample is composed of 65% men and 35% women, and the average age of respondents is 23 years, with a maximum age of 33 and minimum age of 18.

The sample consists of respondents with high education level, with 83% of the heads of the students' families having completed high school or more, and 46% having completed university, 24% high school education and 12% post-graduate. Regarding universities that responded to the survey, 45% of respondents are from the Universidade Estadual Paulista (UNESP), 42% are from the University of São Paulo (USP), 7% are from the Federal University of Santa Maria (UFSM), and 7 % from other universities.

In the characterization of the sample, respondents were asked about areas related to work activities, and drivers of performance for a future situation. When they were asked which area they would act after the graduation, 29% of the sample would like to be in the farm activities, 26% in inputs companies, 13% would like to work in public companies, 31% commented that they would prefer to work in companies directly linked to agribusiness such as resale of inputs, banks, machinery and implements, associations, research, rural tourism and other companies.

Regarding personal interests, the vast majority (70%) said they enjoy being in the field, watching the activities of planting, growing and harvesting. And almost half of the sample is from a family who owned agricultural enterprises, with 40% who have and 60% who do not.

To complete the first analysis it is possible to see that most students are in the last years of the course and are men, and the average age is in agreement with the age group of college students. The sample was made up of students from major agronomy universities of the country and most of them prefer to work in the field and on the farm. Also, many of them intend to work on these activities at the end of the study, indicating that these students will be the future agricultural managers and if they have a favorable

attitude toward sustainable agriculture, they may have a more sustainable behavior in the long term.

Statistical Analysis

Table 1 shows the frequencies of responses, means, standard deviations and variation coefficients of each question answered by the participants. The question that had the highest rate of agreement and mean, that is, the one that the majority of students agreed with the statement, had the lowest standard deviation and variation coefficient. The question that addressed that sustainable agricultural practices (soil conservation, integrated pest management, decrease in the use of fertilizers and other chemicals) help to protect the environment and natural resources.

This showed that most respondents associated the concept of sustainable agriculture with aspects of environmental protection and natural resources, which is one of the pillars of this concept.

Other statements that showed high average was related to use the non-renewable resources and other resources in the property in an efficient way, and when it is possible, integrate cycles and biological controls with the balance of the environment as a basis for sustainable agricultural practices. Besides that, farmers who practice sustainable agriculture live in greater harmony with nature. These statements follow the same analysis as before.

Table 1. Frequency, mean, standard deviation and variation coefficient of the attitude scale toward sustainable agriculture

Scale	Frequency (%)					M	DP	CV
	1	2	3	4	5			
Environmental balance is one basis for sustainable agricultural practices	0	4	27	70	187	4.53	0.72	0.16

Economic gains when employing sustainable agriculture practices are not convincing	53	63	89	64	19	2.77	1.18	0.43
Sustainable agricultural systems can improve income on a farm	2	32	63	89	102	3.89	1.04	0.27
Recommended pest control methods for sustainable agricultural systems have potential for more pests in long term	5	26	50	95	112	3.98	1.04	0.26
Sustainable agricultural systems should produce an adequate food supply to feed the world population	24	47	58	64	95	3.55	1.32	0.37
Adoption of sustainable agriculture practices will be easier for farmers who have both cropped and livestock enterprises	36	44	105	58	45	3.11	1.21	0.39
An advantage of sustainable agricultural practices is reduction on the use of chemical fertilizers	14	35	44	86	109	3.84	1.20	0.31
Net farm income may decrease when a producer implements sustainable agricultural practices	31	79	91	65	22	2.89	1.11	0.38
Sustainable agriculture practices would work well on any farm	58	70	57	55	48	2.88	1.38	0.48
Sustainable agricultural practices (e.g. soil conservation, integrated pest management, decrease use of fertilizers and others chemicals) help protect the environment and our natural resources	0	1	10	39	238	4.78	0.51	0.11
Sustainable agricultural practices may require additional management beyond conventional practices	12	38	89	92	57	3.50	1.08	0.31
Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls	3	4	16	49	216	4.64	0.74	0.16
Farmers in sustainable agriculture lives more in harmony with nature	7	25	54	62	140	4.05	1.11	0.27
There may be insufficient labor for workload required in sustainable agricultural systems	42	58	84	63	41	3.01	1.26	0.42
Environmental balance is one basis for sustainable agricultural practices	0	4	27	70	187	4.53	0.72	0.16
Economic gains when employing sustainable agriculture practices are not convincing	53	63	89	64	19	2.77	1.18	0.43

Source: Prepared by the authors

The statements that obtained lower frequency said that the economic gains from the use of sustainable agricultural practices are not sufficient and that the farmer's net income may decrease when sustainable agricultural practices are implemented. This indicates that respondents believe that sustainable agricultural practices can indeed

generate greater income and economic gains to farmers, since the economic balance is inside this concept, as shown Pinheiro (2000) that for economists, sustainable agriculture is synonymous of production maintenance and income of production physical systems, if possible with low external inputs.

In a second data analysis, factor analysis was applied with the scale that was performed, and approximately 50.79% of data variability is explained by four main factors (Table 2). These are factors that can be accepted to explain the attitude of agronomy students regarding sustainable agriculture.

Table 2. Total of the data variability

Factors	% of Variance	% Accumulated
1	14.77	14.77
2	13.86	28.63
3	13.63	42.26
4	8.53	50.79

Source: Prepared by the authors

The Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO) was also performed (Table 3). This test is a statistic that indicates the proportion of variance for each variable that can be caused by underlying factors. According to George and Mallery (2003), high values (close to 1.0) generally indicate that factor analysis may be useful with its data. If the value is less than 0.50 the results of factor analysis probably will not be very useful. The test result was 0.793 showing that factor analysis is useful for data.

Bartlett's sphericity test was performed (Table 3). This statistic tests the hypothesis that the correlation matrix is an identity matrix, which would indicate that the variables are independent and therefore unsuitable for the detection of structure.

Small values (below 0.05) of significance level indicate that factor analysis with the data used can be useful (George and Mallery 2003). The test results presented a significance lower than 0.05, then it can be said that factor analysis is useful for data.

Table 3. KMO and Bartlett's Test

KMO		.793
Bartlett's Test	Approx. Chi-Square	572.920
	df	91
	Significance	.000

Source: Elaborated by the authors

To identify which variables grouped to which factors, Rotated Factor Matrix was performed. These factors are shown in Table 5.

Table 4. Rotated Factor Matrix

Scale	**Factors**				
	1	2	3	4	Factor Name
Economic gains when employing sustainable agriculture practices are not convincing	-.666				Feasibility
Sustainable agricultural systems can improve income on a farm	.576				
Net farm income may decrease when a producer implements sustainable agricultural practices	-.567				
Sustainable agriculture practices would work well on any farm	.593				
There may be insufficient labor for workload required in sustainable agricultural systems	-.507				
Recommended pest control methods for sustainable agricultural systems have potential for more pests in long term		.623			Adoption and Contribution
Sustainable agricultural systems should produce an adequate food supply to feed the world population		.611			
Adoption of sustainable agriculture practices will be easier for farmers who have both cropped and livestock enterprises		.731			
Environmental balance is one basis for sustainable agricultural practices			.665		Environmental Balance
Sustainable agricultural practices (e.g. soil conservation, integrated pest management, decrease use of fertilizers			.680		

and others chemicals) help protect the environment and our natural resources			
Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls	.623		
Farmers in sustainable agriculture lives more in harmony with nature	.461		
Sustainable agricultural practices may require additional management beyond conventional practices		-.776	Paradigm
An advantage of sustainable agricultural practices is reduction on the use of chemical fertilizers		.556	

Source: Prepared by the authors

After identifying the factors, Table 6 shows the description of each factors according to the group of variables that was displayed in table 5, the numerical description was performed according to the theoretical framework and knowledge of the researchers.

Table 5. Description of the factors

Factor 1	**Viability:** This factor is characterized by the perception that sustainable agricultural practices work well in any rural property, and that economic gains are sufficient for its application. It is also evident that sustainable agricultural practices can improve the income of a rural property, with no negative impact on net income. There is also an impact on the workload required for the use or not of sustainable agricultural systems.
Factor 2	**Adoption and Contribution:** Behind this factor there is the perception that the adoption of sustainable agricultural practices will be easier to implement for farmers who have both agriculture and livestock on their farms. It also demonstrates that pest control methods commonly recommended in sustainable agricultural systems have the potential to control more pests in the long term and that these systems must produce food supply for the world population.
Factor 3	**Environmental Balance:** This factor expresses the view that environmental balance is the basis for the implementation of sustainable agricultural practices and also that farmers who implement them live in greater harmony with nature. These practices help to protect the environment and natural resources, and to use non-renewable resources and other resources in the property in an efficient way, integrating cycles and biological controls when possible.
Factor 4	**Paradigm:** This factor expresses the view that sustainable agricultural practices have not been adopted by conventional agriculture, even presenting reduction in the use of chemical fertilizers as an advantage.

Source: Prepared by the authors

According to the factors observed, it is understood that students' attitude toward sustainable agriculture can be attributed to these four factors: i) economic and

operational feasibility; ii) adoption and contribution; iii) environmental balance; iv) paradigm.

The first highlighting that sustainable agricultural systems is only feasible with the obtainment of economic levels of productivity, with viable production systems in agronomic, social and ecological terms. The factor called Feasibility shows that students realize that these practices can be applied in any rural property, generating economic gains.

The second factor related, Adoption and Contribution, shows the idea that the use of agriculture and livestock facilitates the implementation of sustainable agriculture, retaking the concepts that were forgotten with the intensification of agriculture, that in the late nineteenth and early twentieth century more intensive production systems were developed, bringing changes such as the reduction of the relative importance of crop rotation; the progressive abandonment of the use of green and animal manure on soil fertility; the separation of vegetable and animal production, and mainly the absorption of some process stages of agricultural production in the industrial sector. It also shows the potential that pest methods used in sustainable agricultural systems have to control other pests, and that these systems must produce food supply for the world population.

The third factor is related to the environmental balance, which is a key pillar of sustainable agriculture. This factor shows that students are aware that the basis for sustainable agriculture is directly linked to living in balance and harmony with the environment, and that they should make efficient use of resources in implementation, contributing to sustainability.

It is expected that students with graduation in agronomy have in their curriculum subjects focused on environmental education. The term environmental education is used to describe a process of understanding and clarifying the value of the environment and the importance of environmental resources to encourage people to use them more sustainably.

Regarding the implementation of sustainable agricultural practices related to the factor four, it is perceived that they are being adopted slowly, but it is not related to lack of knowledge. In a joint analysis to factor three, it can be understood how these activities are more specific and require a greater commitment of the farmer. Also, the implementation may not be very fast.

The last factor, Paradigm, expressed the view that sustainable agricultural practices have not been adopted by conventional agriculture, even presenting reduction in the use of chemical fertilizers as an advantage. This factor relates to the economic view that says sustainable agriculture is a synonym of production maintenance and profit of production physical systems, if possible with low external inputs. Students have the perception that even with the advantage of using less chemical fertilizer when sustainable agricultural practices are adopted, conventional agriculture is resilient in its adoption.

4. Conclusions

The objective of this research was achieved when it was possible to identify which factors are related to the future farmers attitude to provide sustainable agriculture. The observed factors are related to viability, adoption and contribution of sustainable

agricultural practices, environmental balance, and the paradigm of sustainable agricultural practices.

Through the analyzes that were carried out, it was found that students identify the importance of sustainable agricultural practices and understand the concept, mainly related to the pillars of sustainable agriculture, the balance with the environment, rational use of non-renewable resources, and economic and social viability of these practices. Through this research, it was possible to perceive that students associate the aspects of sustainable agriculture with environmental balance and natural resources, and that through these practices the farmer can have environmental and also economic benefits.

Therefore, from this research it can be expected that the behavior of the current agronomy students as farmers and future agribusiness professionals, may contribute to the sustainability of agriculture in the long term.

In terms of study limitations and recommendations for future research, it is suggested that this research be applied in an even larger sample, not only with students from agronomy courses, aiming to verify whether the factors found are the same, with the use of other scales to measure students' attitude toward sustainable agriculture.

Finally, considering the importance of developing more sustainable behaviors aiming long-term agriculture and food production for the world population safely and in harmony with the environment, it is expected that undergraduate and technical courses in the agriculture field provide students with sufficient learning, so that they may adopt sustainable agricultural practices in the future.

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