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Instituto de Manejo e Certificação Florestal e Agrícola (Imaflora)  
University of São Paulo (USP)  
Entropix Engineering Company

# **Impact of Sustainable Agriculture Network (SAN) certification on coffee farms**

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Case study in the southern region and cerrado areas of the  
State of Minas Gerais, Brazil

Ana Carolina B. de Lima, André Luiz Novaes Keppe, Roberto Palmieri, Marcelo  
Corrêa Alves, Rodrigo Fernando Maule and Gerd Sparovek



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## Authors

Ana Carolina B. de Lima, André Luiz Novaes Keppe, Roberto Palmieri, Marcelo Corrêa Alves,  
Rodrigo Fernando Maule and Gerd Sparovek

## Translation

Amantino Ramos de Freitas

## Graphic Design

Priscila Mantelatto  
Simoni Picirilli

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\* The full report, with detailed methods and results, is available at [www.imaflora.org.br](http://www.imaflora.org.br).

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# 1 Introduction

## 1.1 Coffee in Brazil

Coffee is an agricultural crop of historic importance for the Brazilian economy. Today Brazil is the largest producer in the world. According to the Brazilian Institute for Geography and Statistics (Instituto Brasileiro de Geografia e Estatística - IBGE), total harvest for 2007 is estimated to be around 36.73 million 60-kilogram bags. The largest portion of coffee producing areas in Brazil is concentrated in two regions of the State of Minas Gerais: in cerrado<sup>a</sup> areas and in the southern region. The southern region of the State of Minas Gerais has mountainous terrain; its natural ecosystem originally was part of the Atlantic Forest biome. Since the nineteenth century, it has been traditionally recognized as a coffee producing region. In contrast, coffee cultivation in the cerrado areas of the State of Minas Gerais was introduced much later, in the 1970's. These newer production areas are characterized by their large sizes, usually with favorable terrain amenable to machine cultivation and harvesting, but requiring irrigation.

The assessments made in this study are concentrated in the two regions mentioned above due to their geographic representativeness and their economic importance in the

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<sup>a</sup> The cerrado is a tropical grassland savanna located in Brazil's central high plains region, covering an area of 650 million hectares, about 23% of the country's territory (NT).

coffee production context of Brazil, and also because they have extensively adopted certified production systems.

## **1.2 SAN agricultural certification**

Socioenvironmental agricultural certification is a marketing tool created in the context of the increasing importance of environmental and social standards in agricultural production. The way it works is by informing consumers that the product they buy comes from socially and environmentally responsible sources. The Sustainable Agriculture Network (SAN) adopted the RAC (Rainforest Alliance Certified) label to identify products and certified operations based on its Sustainable Agriculture Standards, which are the result of internal discussions, public consultations and a review of similar standards. This Network was established by not for profit entities from eight Latin American countries in view of the highly negative impacts of most agricultural production systems of the region.



In Brazil, SAN certification has been growing at a fast pace. Between 2007 and 2008, certified cultivation areas grew more than 87%. The main product of these areas is coffee, which represents 85.6% of the total certified area of the country (RAINFOREST ALLIANCE, 2008). Certified coffee tells consumers that the coffee they buy comes from sources under agricultural management that, according to

well established standards, is economically viable, socially beneficial, and environmentally adequate.

At a time of increasing importance and growth of socioenvironmental agricultural certification, knowing the real impacts of the SAN certification is precious information. Not only for consumers of certified products, but also for the players directly involved in the certification process, such as certification and accreditation organizations, financial agents, producers, and representatives of the public sector.

### **1.3 Impact Assessment**

Impact assessment uses methods that allow for the separation of the various effects caused by the treatment under consideration, which in the present case is SAN certification, on one or more variables affected by its action, isolating these effects from the changes caused on the same variables by sources other than the treatment itself. Certified operations, at some moment or period of time, adopt a set of procedures and techniques on their productive process that are the result of incentives or requirements imposed by certification. However, these procedures and techniques are equally influenced by specific or incidental factors that also affect non-certified operations. Impact assessment enables us to isolate the effects of such circumstantial factors, thus making it possible to evaluate the effect of certification alone.

Impact assessment was used in this study to evaluate the effects of SAN certification. In order to achieve this

objective, certified and non-certified coffee production operations of similar characteristics were compared and the differences between these two groups were considered to be the isolated effect of the SAN certification. These differences were assessed with respect to social and environmental aspects.

## **2 Method**

### **2.1 Sampling design**

The impact assessment described in this report involved surveys in eight SAN-certified and eight non-certified operations, chosen at random. Each operation consisted of one or more coffee producing farms under a single administration. Three certified operations and three non-certified operations were surveyed in the southern region of Minas; five certified operations and five non-certified operations were surveyed in the cerrado areas of the State of Minas Gerais.

### **2.2 Sources of data**

The sources of data on certified as well as on non-certified operations were the same: field observations, satellite images, and interviews based on structured questionnaires.

Field observations included visits to Permanent Preservation Areas, Legal Reserves, operational infrastructure of the coffee producing areas, and determining

geographic coordinates by means of navigation GPS for georeferencing maps and satellite images. Geoprocessing techniques were used to quantify the extension of the preservation areas (Permanent Preservation Areas – PPAs, and Legal Reserves - LR) of the coffee producing operations and to compare them with the situation of the water basins where the operations were located.

The interviews were carried out with the owner or the person in charge of the operation, permanent workers (including farm dwellers, workers involved in the application of agrochemicals, minors, i.e., workers less than 18 years old) and temporary workers (including farm dwellers and minors). The main data collected on socioenvironmental aspects were related to: preservation of native vegetation, water resources conservation, residue management, training and capacity building, working conditions, and application and handling of agrochemicals.

### **2.3 Data Analysis**

The data collected during the field observations and interviews were analyzed by means of statistical tests within the SAN system, in order to identify the differences between certified operations and non-certified operations; these differences were considered to be the certification impacts.

The analysis and the critique of the data were carried out in two ways: *individual* and *combined*. In the *individual* analysis, variables were divided in two groups according to the region under consideration, southern Minas and the

cerrado areas of Minas Gerais, and analyzed individually. Chi-square (90% confidence interval) statistics were calculated for nominal and ordinal variables, and the difference between certified operations and non-certified operations was used to indicate the impact caused by certification. For interval and rational variables, the presence of certification impact was verified on the basis of the following statistical parameters calculated for certified and non-certified operations: mean, standard deviation, and limits of the confidence intervals.

Due to the small number of repetitions, it was not possible to divide the data of the combined analysis according to the two regions surveyed. In this analysis, similar variables of different data sources were grouped in order to maximize positive aspects and minimize the negative aspects of their respective prerogatives. The prerogatives of this combined analysis were the following:

- i) during the *field observations*, the researcher was able to verify that a certain situation occurred in the field. However, not all types of situations could be observed during the data gathering period; therefore, such information has a high credibility but has limited coverage;
- ii) during the *interview with the owner or the person in charge of the operation* one could expect that there could be a tendency to stress favorable conditions and/or to omit improper situations or situations that could

imply violation of legislation or of SAN certification standards;

- iii) during the *interviews with permanent and temporary workers* a wide range of information, which included subjective opinions and judgment of situations that had occurred in the operation, was taken into consideration. However, the large number of interviews carried out with workers helps to lessen the importance of biased or unrealistic opinions on the final results, thus reflecting situations that can be considered real or that are the perception of the majority of the persons interviewed.

Therefore, in the combined analysis, the impact of certification was determined mainly on the basis of the data gathered during the field observations. The interviews with the owner or person in charge of the operation and with workers were taken into consideration according to the criteria described in the appendices, whenever field observations were lacking.

As a synthesis of the assessment, in addition to the indication of the type of impacts caused by certification, whether positive or negative, the general situation with respect to each item analyzed in certified operations was classified as *excellent, good, fair, poor, or very poor*.

### **3 Results\***

#### **3.1 SAN certification impacts on the aspect *knowledge of workers***

Chart shows the greater impact of SAN certification in the cerrado areas of Minas Gerais, as compared to southern Minas, especially with respect to the workers' knowledge about agrochemicals. The differences observed are due to the qualitative differences of certified operations in conveying technical information to their workers. The quality of the training and capacity building programs in the two regions was excellent, which excludes the possibility of this difference being a result of the training approaches used by each group of operations. A possible explanation could be that the well established tradition of coffee cultivation in the southern Minas region could represent an obstacle to workers to adapt to new techniques and to incorporate new knowledge in their daily labor routine.

**\*More details on the method used are presented in the appendix. The full report is available at the Imaflora website ([www.imaflora.org.br](http://www.imaflora.org.br)).**

**Chart 1: Impacts and similarities of SAN certification between certified and non-certified operations with respect to the item workers' knowledge**

Workers' knowledge	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Knowledge about the ideal situation on the margins of water springs, rivers, and other bodies of water <sup>a</sup>	☺	EXCELLENT <sub>b</sub>	☹	GOOD <sup>b</sup>	-
Hazard of agrochemical use to the environment <sup>a</sup>	☺	GOOD <sup>b</sup>	☹	FAIR <sup>b</sup>	-
Danger of touching plants after the application of agrochemicals <sup>a</sup>	☺	EXCELLENT <sub>b</sub>	☹	GOOD <sup>b</sup>	-
Meaning of safety intervals for agrochemicals <sup>a</sup>	☺	GOOD <sup>b</sup>	☺	GOOD <sup>b</sup>	✓
Identification of agrochemicals' safety intervals <sup>a</sup>	☺	GOOD <sup>b</sup>	☹	POOR <sup>b</sup>	✓
Identification of the color of the label of the most toxic class of agrochemicals <sup>a</sup>	☹	EXCELLENT <sub>b</sub>	☹	FAIR <sup>b</sup>	✓
Training and capacity building <sup>a</sup>	☺	EXCELLENT <sub>b</sub>	☺	EXCELLENT <sub>b</sub>	✓

☺: Positive impact of certification; ☹: Negative impact of certification; ☹: No impact; XXXX: No data available for comparison; ✓: Explicitly required by SAN

### **3.2 SAN certification impacts on the aspect *preservation of native vegetation and conservation of water resources***

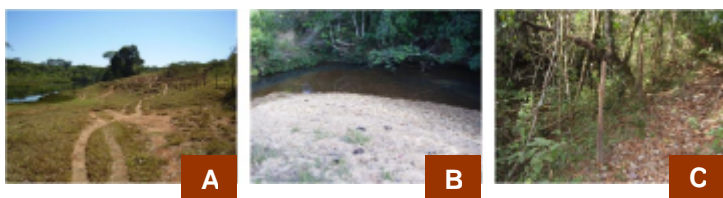
SAN certification resulted in various positive impacts on the preservation of native vegetation and on the conservation of water resources, especially with respect to the following items: i) conservation of PPAs and areas with native forests; ii) official annotation of Legal Reserves (LRs) at the Deeds Office Registry, and ii) reforestation with native species (Chart ).

Geoprocessing<sup>c</sup> did not reveal certification impacts on the conservation of native forests on PPAs nor on the entire area of the operation. However, in the southern region of the State of Minas Gerais there was a tendency of coffee producing operations to follow the percentage of the Atlantic Forest remaining on their respective water basins and, by and large, certified operations were located in water basins with larger proportions of Atlantic Forest fragments.

In the cerrado areas of Minas Gerais, while certified operations followed the proportion of native forests of their water basin, non-certified operations showed a decrease in the proportion of native forests. This finding is an indication that in certified areas the conversion of native vegetation for agricultural or ranching purposes was discouraged.

Figure 1 shows three situations of PPAs found in this study: PPA under intensive use (A); PPA with native

vegetation, but with access of cattle to water sources (B), and PPA with native vegetation and no access for cattle (C).



**Figure 1: Examples of PPAs found in the study**

Geoprocessing data suggests that the impacts on PPAs may be linked to long term rehabilitation plans. The positive impact on PPAs was confirmed by means of combined analyses (for agricultural use) and, although there were no impacts on items referring to threats to biodiversity and soil conservation, the conditions for those aspects in certified operations were classified between good and excellent. This indicates that, in the long run, the impacts of SAN certification may be even larger.

The only aspect where no impact of certification was observed, and the respective situation was classified as fair, was with respect to the use of timber forest resources due to the fact that there were some indications of such use.

**Chart 2: SAN certification impacts with respect to the item preservation of native vegetation and conservation of water resources**

Preservation of native vegetation and conservation of water resources	Impact	Quality	SAN requirement
Use of PPAs for agricultural purposes <sup>d</sup>	☺	EXCELLENT <sup>h</sup>	✓
Use of PPAs for cattle raising <sup>d</sup>	☺	EXCELLENT <sup>h</sup>	✓
Reforestation with native species <sup>e</sup>	☺	EXCELLENT <sup>h</sup>	✓
Occurrence of fire in 2007 <sup>d</sup>	☺	GOOD <sup>h</sup>	✓
Use of timber forest products <sup>d</sup>	☺	FAIR <sup>h</sup>	✓
Hunting of wildlife <sup>f</sup>	☺	GOOD <sup>h</sup>	✓
Trapping of wildlife <sup>f</sup>	☺	EXCELLENT <sup>h</sup>	✓
Contour planting <sup>e</sup>	☺	EXCELLENT <sup>h</sup>	✓
Terracing of slopes <sup>e</sup>	☺	GOOD <sup>h</sup>	✓

Infiltration trenches for erosion control <sup>a</sup>	☺		GOOD <sup>b</sup>		✓
Land use planning	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Declaration of official annotation of Legal Reserves (LRs) at the Deeds Office Registry <sup>g</sup>	☺	GOOD <sup>i</sup>	☺	EXCELLENT <sup>i</sup>	✓

☺: Positive impact of certification; ☹: Negative impact of certification; ☹: No impact; XXXX: No data available for comparison; ✓ : Explicitly required by SAN

### **3.3 SAN certification impacts on residue management in the operations studied**

SAN certification had positive impacts in all aspects of residue management in the operations surveyed, such as management of residues from processing coffee beans, residues from agricultural machinery, and domestic residues from dormitories and houses (Chart 3).

For residues from coffee processing, certification contributes to the environmentally adequate management of water used in washing beans, either by sedimentation lagoons or other methods of treatment and recycling.

Agricultural machinery washing and refueling are done on paved surfaces equipped with a system for containing spills that could cause contamination of soil or water. This is the way residues from those operations are controlled.

With respect to domestic residues, despite the fact that some inadequate practices are still present in certified operations such as garbage disposal by burning or by dumping it outdoors, certification also brought some positive impacts. For example, the burning of garbage occurs in all non-certified operations and in only half (four) of the certified operations.<sup>k</sup>

With respect to sewage disposal, the positive impact was the predominant presence of septic tanks in certified operations and their total absence in non-certified operations.

The data collect in this study show that the SAN-certified operations are concerned with the management of residues on their estates and are seeking solutions that are environmentally adequate.

*SAN – certified operations*



*SAN – non-certified operations*



**Figure 2: Examples of domestic residues in certified operations (A) and (B) and non-certified operations (C) and (D)**

**Chart 3: SAN certification impacts with respect to the item residue management**

Residue management	Impact	Quality	SAN requirement		
Disposal of the water used in washing coffee beans <sup>i</sup>	☺	EXCELLENT <sup>n</sup>	✓		
Management of residues when fueling agricultural machinery <sup>j</sup>	☺	EXCELLENT <sup>n</sup>	✓		
Management of residues from washing agricultural machinery <sup>j</sup>	☺	EXCELLENT <sup>n</sup>	✓		
Garbage disposal <sup>l</sup>	☺	FAIR <sup>m</sup>	✓		
Domestic residues	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Disposal of sewage from dormitories <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	XXXX <sup>o</sup>	XXXX <sup>o</sup>	✓
Disposal of sewage from homes <sup>a</sup>	☺	FAIR <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓

☺: Positive impact of certification; ☹: Negative impact of certification; ☺: No impact; XXXX: No data available for comparison; ✓: Explicitly required by SAN

### **3.4 SAN certification impacts and similarities between certified and non-certified operations on the length of time worked at the operation**

The time during which workers keep their jobs at the operations was considered a positive aspect, since they can receive continuous training and are able to develop more solid relations with their employer and with the community. The data showed a positive impact on this aspect for permanent and temporary workers of the cerrado areas of Minas Gerais, thus pointing to better working conditions despite the fact that the period of data collection coincided with the harvesting season.

In southern Minas there was no impact on this issue. The research team interprets this difference between the two regions as resulting from the fact that southern Minas coffee producing operations are characterized by their smaller sizes (where certified producers stand out for their size and entrepreneurial activities) in such way that the atmosphere of trust and closeness with owners is highly praised (Chart 4).

In certified operations of southern Minas, 96% of temporary workers did not live on the farms, and about 70% of those 96% had only worked for the certified operation during the year the research was carried out. In contrast, for non-certified operations 54% of temporary workers lived on the farms (usually they are relatives of permanent workers). According to the information obtained during the interviews,

all temporary workers had been working for more than a year in the non-certified operations.

**Chart 4: Summary for the item Workers' Profile**

Worker's profile	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Length of time worked at the operation for permanent workers <sup>a</sup>	☺	FAIR <sup>b</sup>	☹	GOOD <sup>b</sup>	-
Length of time worked at the operation for temporary workers <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☹	GOOD <sup>b</sup>	-

☺: Positive impact of certification; ☹: Negative impact of certification; ☺: No impact; XXXX: No data available for comparison; ✓: Explicitly required by SAN

### **3.2 SAN certification impacts and similarities between certified and non-certified operations on working conditions**

SAN certification had highly important impacts on working conditions at coffee production operations, it not only ensured legal rights for workers, but also provided them with better housing and safety conditions at the work place. The two regions showed similar impacts for the working condition aspects analyzed in this study (**Error! Reference source not found.**).

Some of the examples of the impacts caused by certification in the two regions are formal labor contracts for hiring permanent and temporary workers, and the use of full PPE by workers.

With respect to the conditions of houses and dormitories for workers, certification brought positive impacts on two main issues: water treatment for human consumption and adequate isolation of plantations when agrochemicals are applied. On this last issue, inadequate situations still can be found but a positive impact could be observed, which shows that there is a commitment on the part of certified operations with respect to this issue.

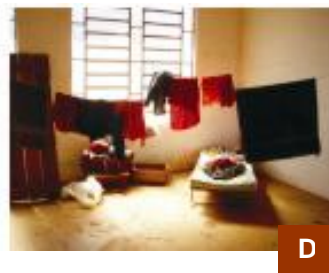
In workers' dormitories, again a positive impact of certification could be observed with respect to their cleanliness and places for workers to keep their personal belongings. The only aspect that did not show any impact of certification, and where conditions were not close to the

ideal situation, was with respect to the basic furniture available to workers in the dormitories (refrigerator, stove, and television).

*SAN – certified operations*



*SAN – non-certified operations*



**Figure 3: Examples of conditions of houses and dormitories for workers in certified operations (A) and (B) and non-certified operations (C) and (D)**

**Chart 5: SAN certification impacts and similarities between certified and non-certified operations with respect to working conditions**

Working conditions	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Hiring of permanent workers <sup>g</sup>	☺	EXCELLENT <sup>i</sup>	☺	EXCELLENT <sup>i</sup>	✓
Hiring of temporary workers <sup>g</sup>	☺	EXCELLENT <sup>i</sup>	☺	EXCELLENT <sup>i</sup>	✓
Hours worked by permanent workers <sup>p</sup>	☺	EXCELLENT <sup>q</sup>	☺	EXCELLENT <sup>q</sup>	✓
Hours worked by temporary workers <sup>p</sup>	☺	GOOD <sup>q</sup>	☺	EXCELLENT <sup>q</sup>	✓
Salary of permanent workers <sup>p</sup>	☺	EXCELLENT <sup>r</sup>	☺	EXCELLENT <sup>r</sup>	✓
Salary of temporary workers <sup>p</sup>	☺	EXCELLENT <sup>r</sup>	☺	EXCELLENT <sup>r</sup>	✓
Lighting in homes <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	-
Basic furniture in homes <sup>a</sup>	☺	FAIR <sup>b</sup>	☺	FAIR <sup>b</sup>	✓
Hot water in bathrooms <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓

Water treatment for human consumption <sup>a</sup>	☺	GOOD <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Wasteful use of water <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	☹	EXCELLENT <sup>b</sup>	-
Distance and isolation of plantations <sup>a</sup>	☺	POOR <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Payment for housing and electricity <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	☹	EXCELLENT <sup>b</sup>	-
Contacts with nearby towns <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	☹	EXCELLENT <sup>b</sup>	✓
Place to keep personal belongings <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	XXXX	XXXX	✓
Cleanliness of restrooms in dormitories <sup>a</sup>	☺	GOOD <sup>s</sup>	XXXX	XXXX	-
Lighting in dormitories <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	XXXX	XXXX	-
Furniture in dormitories <sup>a</sup>	☹	VERY POOR <sup>b</sup>	XXXX	XXXX	✓
Sufficient number of toilets in dormitories <sup>a</sup>	☹	GOOD <sup>b</sup>	XXXX	XXXX	✓
Hot water in bathrooms in dormitories <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	XXXX	XXXX	✓
Water treatment for human consumption in dormitories <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	XXXX	XXXX	✓
Wasteful use of water in dormitories <sup>a</sup>	☹	GOOD <sup>b</sup>	XXXX	XXXX	-

Distance and isolation of plantations <sup>a</sup>	☹	VERY POOR <sup>b</sup>	XXXX	XXXX	✓
Payment for housing and electricity in dormitories <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	XXXX	XXXX	-
Contacts with nearby towns <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	XXXX	XXXX	✓
Use of full PPE <sup>a</sup>	☹	EXCELLENT <sup>b</sup>	☹	EXCELLENT <sup>b</sup>	✓

☺: Positive impact of certification, ☹: Negative impact of certification, ☹: No impact, XXXX: No data available for comparison, ✓ : Explicitly required by SAN

### **3.6 SAN certification impacts and similarities between certified and non-certified operations on the use and handling of agrochemicals**

The impacts of SAN certification with respect to safety in the handling, use, and care during the application of agrochemicals were significant. The use, washing, and storage of adequate PPE were also positive impacts detected in both regions studied. However, there was no impact of certification with respect to the washing and disposal of empty agrochemical containers because, according to declarations by the majority of workers of certified and non-certified operations interviewed by the research team, these activities are already properly carried out (Chart 6, Figure 5).

It is worth mentioning that, although there were some differences in relation to the item “care to avoid contamination during application”, all the other aspects related to the use and handling of agrochemicals were quite similar in the two regions studied. This indicates a standardization of SAN certification with respect to this aspect.

#### **Storage**

*SAN – certified operations*



*SAN – non-certified operations*



**Figure 4: Storage of agrochemicals in certified operations (A) and non-certified operations (B)**

**Use and washing**

*SAN – certified operations*

*SAN – non-certified operations*



**Figure 5: use and washing agrochemicals in certified operations (A) and non-certified operations (B)**

**Chart 6: SAN certification impacts and similarities between certified and non-certified operations with respect to the application and handling of agrochemicals**

Use and handling of agrochemicals	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Agrochemical storage <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Use of full PPE by workers applying agrochemicals <sup>a</sup>	☺	GOOD <sup>b</sup>	☺	GOOD <sup>b</sup>	✓
Washing of PPE <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Storage of PPE <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Washing of empty agrochemical containers <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Disposal of empty agrochemical containers <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓
Care in avoiding contamination during the application of agrochemicals <sup>o</sup>	☺	FAIR <sup>s</sup>	☺	POOR <sup>s</sup>	✓

	Impact	Quality	SAN requirement
Conditions of agrochemical warehouses <sup>1</sup>	☺	GOOD <sup>n</sup>	✓

☺: Positive impact of certification; ☹: Negative impact of certification; ☹: No impact; XXXX: No data available for comparison; ✓: Explicitly required by SAN

### **3.7 SAN certification impacts and similarities between certified and non-certified operations on workers' nutrition and access to health care**

With respect to food and nutrition aspects, the data gathered showed that certification did not have impact on the basic diet of workers and their families. For workers of certified and non-certified operations, the minimum condition of three meals a day for the worker and his family was adequately met.

As in the previous case, there was no impact of certification with respect to access to health care; both types of operations, certified and non-certified, always had a vehicle ready for emergencies and medical assistance whenever necessary. However, the impact brought about by SAN certification was the need for less medical assistance in the two regions studied (Chart 7).

**Chart 7: SAN certification impacts and similarities between certified and non-certified operations with respect to workers' nutrition and access to health care**

Workers' nutrition and access to health care	Minas Cerrado Areas		Minas Southern Region		SAN requirement
	Impact	Quality	Impact	Quality	
Number of meals for children less than 11 years of age <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	-
Number of meals for individuals older than 11 years of age <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	-
Satisfaction with meals and quality of food diet <sup>a</sup>	☺	EXCELLENT <sup>s</sup>	☺	EXCELLENT <sup>s</sup>	-
Medical appointments <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	-
Health care procedures and patient transportation in emergencies <sup>a</sup>	☺	EXCELLENT <sup>b</sup>	☺	EXCELLENT <sup>b</sup>	✓

☺: Positive impact of certification; ☹: Negative impact of certification; ☺: No impact; XXXX: No data available for comparison; ✓: Explicitly required by SAN

### **3.8 SAN certification impacts and similarities between certified and non-certified operations with respect to the work of adolescents**

The analyses proposed in this study for looking into the work carried out by teenagers less than 18 years of age were hampered by the insufficient number of interviews to allow for adequate statistical analysis. However, from the information gathered in some of the interviews, it is possible that the hiring restrictions imposed by Brazilian labor laws are a deterrent to the use of young age workers in coffee producing operations.

### **3.9 SAN certification impacts and similarities between certified and non-certified operations with respect to financial aspects**

The impacts of SAN certification on these aspects were hindered by the impossibility of taking into consideration the vast range of coffee types and quality classifications. In addition, there were difficulties in obtaining production and processing costs and in systematizing these data.

However, by comparing the means and the ranking of the values obtained, it is possible to suggest that certification might represent a difference in the sale price, especially with respect to coffee types with higher market values. The results of this financial impact show a trend that must be confirmed by detailed studies on costs and sales' revenue for certified and non-certified operations.

## **4 Conclusions**

This study was important for validating the method of impact assessment, using treated and control operations, in order to determine the effects generated by socioenvironmental certification of coffee producing operations in the cerrado areas and in the southern region of the State of Minas Gerais. The success of this assessment method allows us to recommend it for application in the evaluation of the impacts of socioenvironmental certification in other regions in Brazil, and in other countries with coffee producing operations certified by SAN.

A more robust method may be achieved by the use of the panel technique, i. e., by gathering data on the treated and control groups in different periods, thus eliminating the influence of seasonal effects and allowing for the follow-up of changes occurring with certified and non-certified operations over time. To accomplish this objective it would be necessary to repeat the same data collection and subsequent analyses, in order to confirm the effects of socioenvironmental certification.

One problem found in identifying the impacts of SAN certification was the presence of certified operations with more than one certification label, since the impacts evaluated by this method may also be the consequence of other types of certification.

The main shortcoming of this study was the impossibility of identifying more precisely the financial impacts on the sale of certified coffee. In future studies this shortcoming may be

corrected on the condition that there will be greater cooperation on the part of the coffee producing operations in providing access to detailed information on their costs and revenues, and also on analyses about the complexity of coffee production and trade activities. This means obtaining more information on markets according to the high variability in coffee processing, types and quality classes of coffee.

Some differences between certified operations and non-certified operations may have been hidden by the high standard deviation and the small size of the samples of the operations, as in the case of data gathered per operation. Still, the results showed that socioenvironmental certification has generated *positive impacts on the coffee producing operations in cerrado areas and in the southern region of the State of Minas Gerais* on the following items analyzed:

- Knowledge of workers about the safety interval between the application of agrochemical and harvesting;
- Training and capacity building;
- Protection of PPAs;
- Reforestation with native species;
- Official annotation of Legal Reserves (LRs) at the Deeds Office Registry;
- Use of less toxic agrochemicals;
- Storage of agrochemicals;
- Conditions of agrochemical warehouses;
- Use of PPE in applying agrochemicals;

- Washing PPE used in the application of agrochemicals;
- Disposal of the water used in washing coffee beans;
- Disposal of domestic garbage;
- Disposal of domestic sewage;
- Hiring of permanent and temporary workers;
- Water treatment for human consumption;
- Protection of homes against contamination during the application of agrochemicals;
- Use of PPE by operators of agricultural machinery;
- Routine medical appointments.

Positive impacts were identified only in the cerrado areas of Minas Gerais for the following items:

- Knowledge of workers about legislation on activities that are allowed on the margins of water springs, rivers and other bodies of water;
- Knowledge of workers about the hazards that agrochemicals present to the environment;
- Knowledge of workers about the hazards of touching plants after the application of agrochemicals;
- Identification by workers of the safety intervals of agrochemicals;
- Care during the application of agrochemicals;
- Job security of permanent and temporary workers;
- Maximum workload for permanent workers.

Data on workers' dormitories were collected only in the cerrado areas and the positive impacts were detected on the following aspects: i) sewage disposal; ii) place for keeping personal belongings; iii) restrooms' cleanliness; iv) water treatment for human consumption, and v) protection of the dormitories against contamination during the application of agrochemicals.

Because certified and non-certified operations were equally placed in conditions considered in this study to be fair, good, or excellent, it was not possible to detect impacts on the following items:

- Knowledge of workers about the toxicity of agrochemicals;
- Washing and disposal of agrochemical empty containers;
- Fire occurrence in 2007;
- Use of timber forest resources;
- Hunting and trapping activities on the rural estate;
- Soil conservation;
- Workload for temporary workers;
- Salary of permanent and temporary workers;
- Housing conditions for workers: lighting, furniture, hot water in bathrooms, payment for housing and electricity;
- Basic food diet for workers and their families;

- Health procedures and patient transportation in emergencies.

Of the items for which there was no difference between certified and non-certified operations and for which both groups were in situations considered poor or very poor, the cerrado areas had just one: dormitory furniture. For southern Minas those items were: i) workers' knowledge about the hazards that the use of agrochemicals represent to the environment; ii) identification by workers of the safety intervals for agrochemicals, and ii) care to avoid contamination during the application of agrochemicals. In southern Minas, the lack of job security for temporary workers was observed as a negative impact.

It may be assumed that in the long run the coffee producing operations surveyed in this study may have other impacts not yet identified, especially in the case of certified operations for which some actions are related to future results. This is probably true for some issues, such as protection of PPAs and reforestation with native species on PPAs, which in the long run contribute to increase the area of native vegetation on the PPAs.

There are also identified impacts that help in the long run to maintain other impacts. For example, better job security of workers in the cerrado areas of Minas Gerais in certified operations, when combined with a better knowledge on agrochemicals on their part, will maintain or improve such knowledge. On the other hand, less job security of workers

in non-certified operations diminish the long term returns of the resources invested in training and capacity building.

Therefore, the results confirm the importance of Socioenvironmental Certification for promoting biodiversity and natural resources conservation, and human development in the short and long run, this way fulfilling the expectations of consumers that opt for SAN-certified products.

However, the differences between operations in the same region and the differences between regions indicate that there is no fixed pattern of impacts generated by Socioenvironmental Certification. Considering that both regions studied are in the same state and have been certified by the same institution, if the study could be expanded to other regions, including other countries certified by other SAN members, one could assume that the differences between regions and operations would be even greater. However, these differences may be quite often the result of regional cultural peculiarities and not really the result of certification actions. Following this line of reasoning, the identification of impacts may guide the work of certifiers as to the aspects that should be emphasized in the different regions.

Such variation may also be partially explained by the fact that Socioenvironmental Certification standards allow operations to be certified when they reach a score of 80% or more, on the condition that they meet all critical criteria and 50% in each principle. Therefore, an operation where all 90

criteria are applicable could not be in compliance with 18 of them and still be certified. A continuous improvement plan shall mandate that such operation eliminate all non-compliances within a two-year period, or within a period agreed with the certification team (IMAFLORA, 2005).

Knowledge about the regions where the operations are located, the detailed description of criteria, and the establishment of a reference framework for defining the plan for continuous improvement may be a substantial contribution to reduce the differences between certified operations and to enhance the positive impacts generated by Socioenvironmental Certification, duly adapted to each region.

## **5 References**

IBGE. Available at: <http://www.ibge.gov.br/home/estatistica/indicadores/agropecuaria/lspa/default.shtm>. Accessed on Oct. 5, 2007.

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## 6 Appendices

<sup>a</sup> Individual analysis of the ordinal or nominal variables obtained from workers' declarations during the interviews.

<sup>b</sup> Quality of the certified operations based on the percentage of positive workers' declarations according to the following scale:

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
81 to 100%	61 to 80%	41 to 60%	21 to 40%	0 to 20%

Items involving more than one variable (basic home appliances: refrigerator, stove, and television), quality was based on the “worst” classification among the respective variables.

<sup>c</sup> When geoprocessing was analyzed, the PPAs considered were only those on the margins of rivers and lakes. Analyses were carried out for each operation, characterized by one or more farms under a single administration.

Two certified operations were excluded from the analysis: one for lack of sufficient geographic coordinates to allow the identification of its areas, and the other due to its location.

<sup>d</sup> Combined analysis among the various sources of information: interviews with the owner or the person in

charge, interviews with workers, and field observations. The criteria used for determining the use of PPAs for agricultural or cattle raising purposes, occurrence of fire on the PPAs, occurrence of fire (accidental or intentional) in pastures and plantations, and consumption of timber forest products are presented in table 1.

**Table 1: Criterion I for combined analysis**

<b>Field observation</b>	<b>Reply from the owner or person in charge</b>	<b>Number (n) and percentage (P) of workers' declarations</b>		<b>Result assigned to the operation</b>
Yes	Indifferent	Indifferent	=	Yes
Indifferent	Yes	Indifferent	=	Yes
No	No	$N \geq 5$ or $P \geq 50\%$	=	Yes
No	No	$0 < N < 5$ and $0 < P < 50\%$	=	There are indications
No	No	$N = 0$ and $P = 0$	=	No

° Combined analysis among the various sources of information: interviews with the owner or the person in charge, interviews with workers and field observations. The criteria used were: reforestation with native species, contour planting, terracing etc. They are presented in Table 1.

**Table 1: Criterion II for combined analysis**

Field observation	Reply from the owner or person in charge	Number (n) and percentage (P) of workers' declarations		Result assigned to the operation
Yes	Indifferent	Indifferent	=	Yes
No	Yes	$N \geq 2$ or $P \geq 50\%$	=	Yes
No	No	$N \geq 5$ or $P \geq 50\%$	=	Yes
No	Indifferent	$0 < N < 5$ and $0 < P < 50\%$	=	There are indications
No	Indifferent	$N = 0$ and $P = 0$	=	No

<sup>f</sup> Combined analysis between two sources of information: interviews with the owner or the person in charge and interviews with workers. During the field observations, there was no data collected on hunting or trapping of wildlife. The criteria used to define whether or not there were trapping or hunting activities on the operation are listed in Table 2.

**Table 2: Criterion III for combined analysis**

Reply from the owner or person in charge	Number (n) and percentage (P) of workers' declarations		Result assigned to the operation
Yes	Indifferent	=	Yes
No	$N \geq 5$ or $P \geq 50\%$	=	Yes
No	$0 < N < 5$ e $0 < P < 50\%$	=	There are indications
No	$N = 0$ and $P = 0$	=	No

<sup>g</sup> Individual analysis of nominal or ordinal variable obtained in the declaration of the owner or person in charge of the operation.

<sup>h</sup> Quality of the certified operations based on the percentage of positive results given to the operations in combined analyses (excluding indication of occurrences), according to the following scale:

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
81 to 100%	61 to 80%	41 to 60%	21 to 40%	0 to 20%

<sup>i</sup> Quality of the certified operations based on the percentage of positive declarations of owners or persons in charge of the operation according to the following scale:

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
81 to 100%	61 to 80%	41 to 60%	21 to 40%	0 to 20%

<sup>j</sup> Individual analysis of the nominal or ordinal variable obtained in field observations.

<sup>k</sup> Combined analysis between two sources of information: interviews with the owner or the person in charge and interviews with workers. During the field observations, there were no data collected on hunting or trapping of wildlife. The criteria used to define whether or not there were

trapping or hunting activities on the operation are listed in Table 3.

**Table 3: Criterion IV for combined analysis**

Reply from the owner or person in charge	Number (n) and percentage (P) of workers' declarations		Result assigned to the operation
Yes	Indifferent	=	Yes
No	$N \geq 5$ or $P \geq 50\%$	=	Yes
No	$0 < N < 5$ and $0 < P < 50\%$	=	There are indications
No	$N = 0$ and $P = 0$	=	No

<sup>1</sup> Combined analysis among the various sources of information: field observations, interviews with the owner or the person in charge, and interviews with workers. Criteria shown in Table 4 were used for the analysis of burning of garbage (solid waste), garbage disposed in the outdoors, and garbage buried.

**Table 4: Criterion V for combined analysis**

Field observations	Reply from the owner or person in charge	Number (n) and percentage (P) of workers' declarations		Result assigned to the operation
Yes	Indifferent	Indifferent	=	Yes
Indifferent	Yes	Indifferent	=	Yes
No	No	$N \geq 3$ or $P \geq 50\%$	=	Yes
No	No	$0 < N < 3$ and $0 < P < 50\%$	=	There are indications
No	No	$N = 0$ and $P = 0$	=	No

<sup>m</sup> Quality of certified operations based on the percentage of positive results given to the operations in combined analyses (excluding occurrence of indications), according to the following scale:

EXCELLENT	GOOD	FAIR	POOR	VERY POOR
81 to 100%	61 to 80%	41 to 60%	21 to 40%	0 to 20%

With respect to ways of disposing garbage, the worst classification was used among burning, leaving it in the outdoors, and burying it.

<sup>n</sup> Quality of certified operations based on the percentage of positive results of field observations, according to the following scale:

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
81 to 100%	61 to 80%	41 to 60%	21 to 40%	0 to 20%

<sup>o</sup> It was not possible to carry out the analysis of workers' dormitories in the southern region of the State of Minas Gerais due to their small number, which was insufficient for a valid statistical comparison between certified and non-certified operations.

<sup>p</sup> Individual analysis of interval or rational variables obtained from the workers' declarations.

<sup>q</sup> Quality of certified operations based on the average of the values declared by workers. Declarations on workloads of 44 hours per week (maximum legal workload, without overtime) or less were considered to be excellent; above this level, classification goes down in steps of 2%.

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
44 hours or less	44,1 to 44,9	45 to 45,9	46 to 46,9	47 or more

<sup>r</sup> Quality of certified operations based on the average of the values declared by workers. Declarations were considered to be positive when the worker received a monthly salary

equal to the national minimum wage (R\$ 370,00 in July/2007); salaries equal to the minimum wage were considered good; below this level, classification goes down in steps of 2%.

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
More than R\$ 370,00	Equal to R\$ 370,00	R\$ 369,99 to R\$ 362,60	R\$ 362,59 to R\$ 355,40	R\$ 355,39 or less

<sup>s</sup> Classification made by the workers themselves during the interview.

<sup>t</sup> Quality of certified operations based on the averages of the number of precautions taken, as obtained from the workers' declarations, according to the following scale:

<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
2.2 to 3.0	1.8 to 2.1	1.2 to 1.7	0.6 to 1.1	0.0 to 0.5



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The Overbrook Foundation

## INFORMATION

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Estrada Chico Mendes, 185  
p.o. box 411  
cep. 13426-420  
Piracicaba - SP - Brazil  
Tel/fax. +55 19 3414-4015  
[imaflora@imaflora.org.br](mailto:imaflora@imaflora.org.br)  
[www.imaflora.org.br](http://www.imaflora.org.br)

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