RURAL WORK, HEALTH AND THE ENVIRONMENT: NARRATIVES OF FLOWER GROWERS IN THE FACE OF SOCIAL AND ENVIRONMENTAL RISKS

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Introduction

Throughout the twentieth century, and particularly from the 1950s onward, human interventions in the environment have resulted in a more intense and extensive degradation of ecosystems than during any other period in history (MEA, 2005). The aggravation of natural and climate disasters, issues related to food security and the loss of biodiversity, among other factors, challenge our ability to understand problems and make human intervention more difficult, increasing uncertainty regarding the present social and environmental crisis.

Currently, the predominant production processes in rural areas are an emblematic example of the changes in life support systems (MEA, 2005). The model of commercial farming, based on agribusiness conceptions and involving the mass use of chemical products - in particular pesticides and synthetic fertilizers - has had an increasingly destructive effect on ecosystems and the quality of life and health of local communities. This model concentrates both land and income in the hands of the few. It requires a considerable amount of energy and water, causes the destruction of landscapes, soil erosion, the depletion of water reserves, a loss in biodiversity, pollution of surface and underground waters, as well as placing farmers in the hands of multinationals, threatening food sovereignty. Furthermore, it results in health effects of both producers and consumers (ABRASCO, 2012).

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If in Brazil farming and agricultural production make a significant contribution to the Gross Domestic Product (GDP), economic results are not reflected socially. Moreover, they have a negative impact on the working conditions and health of rural workers, and on environmental degradation (DIAS, 2006).

Within this context, in 2008 Brazil became the world's greatest consumer of pesticides (ANVISA, 2009) and 2009 saw a record volume in the consumption of these products in the country: just over a million tones (SINDAG, 2010). The sum total of pesticide sales in Brazil in 2011 reached US$ 8.5 billion, almost three times the value of sales in 2003.

The harmful effects of pesticides can affect directly or indirectly humans. Those most directly exposed to the damaging effects of pesticides are rural workers. Researchers estimate that, in developing countries alone, approximately twenty-five million workers are contaminated by pesticides per year (PERES; MOREIRA, 2003). Communities and consumers living far from the areas of production are indirectly exposed by consuming contaminated food or water, as well as by the pollution of air, soil and biological systems (ABRASCO, 2012).

Research carried out in the Região Serrana (a mountainous region) in the state of Rio de Janeiro reveals a particularly high usage of pesticides, which can reach the equivalent of 56.5kg per rural worker per year - five times higher than the average for the southeastern region of Brazil and eighteen times greater than the state average (MOREIRA *et al.*, 2002). Furthermore, Peres e Moreira (2007) indicate that a survey carried out by the Rio de Janeiro State Agricultural Research Agency (Pesagro-Rio) demonstrated that of the thirty-two most used pesticides in the Região Serrana, seventeen are heavily restricted in other countries and eight have already been banned.

The region has a rugged landscape and is noted mainly for its vegetable production, which supplies the whole state. In this region, there is a significant number of family farms, mainly smallholdings (between one and twelve hectares in size) where mixed cropping (polyculture) and the extensive use of the family workforce in agricultural production predominates (PERES; MOREIRA, 2007). According to Peres e Moreira (2007), this type of nuclear set-up presents challenges associated with tackling environmental and health issues related to pesticide use, because in addition to the social and environmental impacts mentioned above, entire family nuclei are exposed to the poisonous effects of these products.

Flower production dominates in the mountain municipality of Nova Friburgo. It holds second position in the national floriculture ranking, only behind Holambra (São Paulo state).

Within this context and taking into account the recent social and environmental transformations in Rio de Janeiro's Serrana region (as a result of the 2011 disaster), this article presents and discusses the main results from analytical research into flower production processes in Nova Friburgo's rural areas, focusing on understanding the perceptions and attitudes of flower growers in face of the risks associated with their work.

The area of study

The field research was carried out in two of Nova Friburgo's rural communities - Stucky and Colonial 61 - which, together with Vargem Alta, make up the main floricultural production centers in the municipality. These localities were chosen mainly because they comprise a smaller group of flower growers (nearly forty) when compared to the municipality's largest area of production (Vargem Alta, where there are nearly two hundred and ten growers), allowing for closer contact with the subjects of this research.

Methodology

The research was carried out using a qualitative approach, in which the narratives of the subjects analyzed were used as the main means to highlight the plurality of perspectives present in the community. This work is based on two important assumptions. First, narratives are a fundamental means by which individuals organize their understanding of the world and make sense of past experiences, through sharing them with other individuals (GIBBS, 2009). Second, as argued by Douglas and Wildavisky (1982) in a seminal book on the social and cultural theory of risks, perceptions and attitudes are directly related to ways of life and work. Thus, how people choose to organize themselves socially predisposes them to opt for particular risks in detriment of others, beyond and above social organization forms.

Data collection involved semi-structured interviews (twenty in total), descriptive observations and field diary (MINAYO, 2008) as well as the collection of secondary data. The collection of secondary data was based on a bibliographical review and the analysis of existing technical and scientific research carried out in the area, and from public databases available on the subject. Additionally, data on flower production in the municipality was accessed directly from Nova Friburgo's Municipal Department for Agriculture and Rural Development. Furthermore, the minutes from meetings held by the *Association of Growers, Residents and Friends of Stucky and Colonial 61* (APROMASC), since its establishment in 2004, were also consulted.

After presenting the study objectives and the signing of the Informed Consent Forms[i], twenty flower growers were interviewed. Interviews with all forty growers in the relevant localities were initially planned. However, due to the difficulties in accessing the chosen rural areas in the months following the 2011 disaster, this group was reduced to twenty growers.

In total, eighteen male and two female growers were interviewed. The ages of the research subjects varied between twenty-four and seventy years (as illustrated in *Chart 1*). With respect to education, the majority of those interviewed (fourteen) had up to five years of schooling (*Table 2)*. In addition, all of those interviewed had worked in flower production for at least five years.

Chart 1. Distribution of interviewees by age and gender

Age	Male	Female	Total
21-30 years	5	0	5
31-40 years	6	1	7
41-50 years	1	1	2
51-60 years	3	0	3
61-70 years	3	0	3
Total	18	2	20

Chart 2. Distribution of interviewees according to education and gender

Years of schooling	Male	Female	Total
Up to 5th grade of primary school	13	1	14
Up to 8th grade of primary school	2	0	2
High school incomplete	1	0	1
High school complete	2	1	3
Total	18	2	20

The field work was carried out in 2011between the months of June and November. The interviews were recorded and transcribed, and this material was reviewed to establish recurrent or contradictory patterns, relevant themes and other guiding elements.

For data analysis and grouping, *operational categories* and *analytical categories* were defined (MINAYO, 2008) which established associations between the narratives of those interviewed, contributions from existing theory, data from documents studied and the researcher's own observations/reflections.

Results

Characteristics of the local work

The flower growers interviewed are native to Nova Friburgo and grow flowers on small rural properties (which they usually own), mainly using family members to carry out the work. The decision to farm was a natural choice, following on from previous generations as, for all those interviewed, land cultivation is a family tradition. Furthermore, the growers interviewed (or their family elders) tended to have worked at some stage in vegetable farming before migrating to flower production (its period of greatest expansion in the area began in the 1990s).

The field work revealed that flower production gained new converts and continues to expand largely due to its advantages over vegetable production: it requires little land and has a short production cycle, allowing for quick capital turnover.

The development of flower production in the communities studied is seen by the growers interviewed as a decisive factor in the improvement of living standards of local families. As we will see in excerpts from some narratives, flower production allowed community members to purchase goods, alter consumer patterns and gain access to certain services.

> "What happened is that this was a very poor neighborhood, and then after ten, twelve years of flower production, it became a much richer place in every sense [...] everyone was able to buy their car, buy their house." (Flower grower, 27-years-old)
> "Things radically changed for the better. [...] Buying power, today almost everyone has a motorbike, has a car. Thank God, we're able to eat things which people didn't eat before. [...] There's access, all of a sudden, to health plans." (Flower grower, 41-years-old)

Although considered a more attractive option than vegetable production, growing flowers does involve an exhausting work schedule. The growers are involved at every step of the production cycle, from planning production, preparing the land, planting, fertilizing, irrigating, monitoring pests, applying pesticides, pruning, soil-rotation, controlling artificial light (for species requiring this resource) to the harvest, selection, packaging, transportation and finally, sales. Against this backdrop, it is important to highlight that growers must cope with a number of variables in order to bring products to the market on a weekly basis, and that they do so purely by way of mental calculations (in other words, without the use other aids such as written projections or spreadsheets). And the greater the number of species grown, the greater the number of variables, since each species has its own growing characteristics. At the properties visited, the number of species grown varied between three and eleven.

According to the growers, pesticides are applied between one and three times a week, depending on the species and the time of the year. Pesticides are also purchased on a weekly basis, generally in their own properties during the regular visits of commercial representatives from the agrochemical industries. The flowers are predominantly sold at the Guanabara State Supply Centre (CADEG), located in the capital of the state of Rio de Janeiro.

Another important issue raised by those interviewed is that, although the growers are members of professional associations since 2004, currently, there is a lack of dynamism and low participation rates. Interviewees point to the following reasons to possibly explain this period of low social mobilization: (i) the current president of the association is not from the area. Therefore, he is not recognized as a true representative of collective interests, and (ii) management changes to the *Municipal Department for Agriculture and Rural Development,* which is described as having previously been active in the community and involved in constant rural expansion activities, but is presently portrayed by interviewees as being distanced from rural affairs.

Occupational, social and environmental risks

The occupational hazards most commonly mentioned in growers' narratives were as follows: chemical risks (exposure to synthetic pesticides and fertilizers); physical risks (such as exposure to solar radiation) and risks related to the organization of work (such as labor division and intensiveness of the work).

> "Farming is very difficult, it's sun, it's rain, it's poison, thorns..." (Flower grower, 38-years-old)
> "With flowers, it's a constant battle, it's tiring. We often don't even have a weekend or a day off, we don't have anything." (Flower grower, 29-years-old)

The selling stage, which involves travelling to the CADEG centre, is considered to be very tiring. Growers start their journeys in the evening, after a normal day of work. They need to have their products arranged and on display in the flower warehouse by two o'clock in the morning, when the market opens and the flower trading starts. The return journey to Nova Friburgo only takes place after twelve o'clock the following day. This schedule is repeated up to three times a week, and sometimes family members take turns in order to prevent exhaustion.

Specifically regarding chemical risks, as shown in *Chart 3*, the study found that three of the seven most commonly used pesticides among the flower growers interviewed (*Dithane, Antracol* and *Infinito)* contain toxicological class I or II - that is, they are extremely or highly toxic to human beings - and five of the seven most commonly used pesticides (*Dithane, Decis, Vertimec, Infinito* and *Nativo)* contain environmental class I or II - they are either highly or very dangerous to the environment. Furthermore, two of the seven most commonly used pesticides (*Vertimec* and *Cefanol*) contain active ingredients which are currently subject to a toxicological reassessment by the Brazilian National Health Surveillance Agency (ANVISA).

Chart 3 Pesticides most commonly cited by interviewees and their classification

Number of interviews in which it was cited	Classification (trade name, active ingredient, action, chemical group, toxicological group and environmental group)
15	**Trade name (active ingredient):** *Dithane* (Mancozeb) **Action:** fungicide **Chemical group:** *Alkylene bis* (Dithiocarbonate) **Toxicological class:** I (extremely toxic) **Environmental class:** II (very dangerous product)
10	**Trade name (active ingredient):** *Antracol* (Propineb) **Action:** fungicide **Chemical group:** *Alkylene bis* (Dithiocarbonate) **Toxicological class:** II (highly toxic) **Environmental class:** IV (slightly hazardous product)

10	**Trade name (active ingredient):** *Decis* (Deltamethrin) **Action:** Insecticide **Chemical group:** *Pyrethroid* **Toxicological class:** III (moderately toxic) **Environmental class:** I (highly dangerous product)
10	**Trade name (active ingredient):** Vertimec (Abamectin) **Action:** Insecticide **Chemical group:** *Avermectin* **Toxicological class:** III (moderately toxic) **Environmental class:** II (very dangerous product)
8	**Trade name (active ingredient):** *Infinito* (Fluopicolide / Propamocarb hydrochloride) **Action:** Fungicide **Chemical group:** *Benzamide* / *Carbamate* **Toxicological class:** II (highly toxic) **Environmental class:** II (very dangerous product)
5	**Trade name (active ingredient):** *Cefanol* (Acephate) **Action:** Insecticide **Chemical group:** *Organophosphate* **Toxicological class:** III (moderately toxic) **Environmental class:** III (dangerous product)
5	**Trade name (active ingredient):** *Nativo* (Tebuconazole / Trifloxystrobin) **Action:** Fungicide **Chemical group:** *Triazole* / *Strobilurin* **Toxicological class:** III (moderately toxic) **Environmental class:** II (very dangerous product)

Source: Pesticide classification based on AGROFIT - phytosanitary system for pesticides, from the Ministry of Agriculture, Livestock and Food Supply (MAPA).

Another important issue relating to chemical risks is the fact that floriculture is an activity recognized to require high levels of pesticides in order to achieve production levels in line with commercial quality standards. However, it is not subject to the same rigorous residue control procedures which apply to food production.

In addition, the proximity of growers' homes to flowerbeds causes concern in terms of chemical contamination of the area within and surrounding their houses. Even the small vegetable gardens on the properties are surrounded by flowerbeds.

The study also revealed that personal safety equipment is under-used (interviewees indicated that either none or only part of the equipment is used during the spraying of pesticides) and that pesticide packaging disposal procedures are inadequate (respondents pointed to delays in packaging collection by commercial representatives from chemical industries).

Risk perception

During the interviews, nearly half of the flower growers (nine growers) identified the use of pesticides as being the most negative or worrying aspect of their professional activities. Among the remaining respondents, the most negative aspects of their work were identified as being the exhausting length of the working day, allowing little time for relaxation and leisure (for five growers) and the high cost of pesticides (for two growers).

The remaining four respondents claimed not to experience any negative aspects in relation to their professional activities. Nevertheless, the use of pesticides was invariably mentioned by all the growers for a number of reasons, both in interviews where they were singled out as being a central concern and by all other producers.

An attitude of underestimating or putting risks into perspective prevailed among interviewees in relation to the possible health problems caused by pesticides. Statements mainly (i) indicated that the potential health problems are related to the sensitivity of a rural worker's organism; (ii) associated the occurrence of health problems with an individual grower's working methods, and (iii) downplayed the toxic and hazardous nature of chemical products.

> "Some people were no longer able to work with the chemicals. [...] But these are people who really react badly to the poison. Some people start spraying and immediately get a headache, this shows that it disagrees with them." (Flower grower, 70-years-old)
> "It depends on how you work, I think that it can cause [some health problems], but if you are careful... [...] It also depends a lot on the person's state of health, on the person's body. There are people who work for their entire lives and never have a problem; then there are others who have never worked with these chemicals, and it's more complicated for them." (Flower grower, 61-years-old)
> "Dithane, Manzate are weak, they just strengthen the plants, protecting them from disease" (Flower grower, 70-years-old) [Both products mentioned by the producer fall into toxicological class I (extremely toxic) and environmental class II (very dangerous product)]

The product whose toxicity was most underestimated or downplayed was the herbicide glyphosate (popularly known as "mata-mato" [weed-killer]). During the field work, the application of glyphosate by the flower growers, using a backpack sprayer without any sort of protective equipment, was frequently witnessed. When questioned, the responses further reinforce the popular belief in Brazil that this is a "weak" product (LONDRES, 2011).

On the other hand, some of the respondents - normally the younger growers - expressed concern regarding the development of future health problems.

> "It's very poisonous, a lot of pesticide, it's vicious stuff [...] to fight plant disease and, over time, this can cause harm." (Flower grower, 26-years-old)

With regard to experiences of intoxication, accounts were generally described in the third person, indicating that those situations were experienced by other individuals rather than the respondent.

Only one producer revealed that she had suffered health problems as a result of pesticide intoxication, to the point that she was medically advised to stay away from flower growing activities. Through her experience, this producer revealed important gender differences with respect to the use of pesticides.

> "Men say we're fussy, but unfortunately the smell of that stuff is unbearable. I think it's much easier to grow flowers now than it used to be when we grew vegetables, which was really hard work. But it's just that unfortunately the pesticide disagrees with me. [...] The men don't take [the risks of pesticide] seriously, but as a woman, I'm very scared. [...] For a man to go to the doctor, he practically needs to have one foot in the grave." (Flower grower, 48-years-old)

In this sense, handling pesticides is considered to be an essentially male task. And although women actively take part in various phases of production involving contact with pesticides (for example, when monitoring plants after chemical spraying, during harvest, and while separating and tying the flowers), there is a prevailing lack of visibility regarding the exposure of these women to pesticides. Furthermore, women are regarded by rural men as being fragile and not resistant enough.

Another behavioral aspect noted during the field work is that, in all properties, there is a tendency to spare the older growers the task of spraying pesticides. As growers get older, they work with species which require less pesticide, and younger growers take up their old positions.

Regarding the use of personal safety equipment, the growers pointed out various limitations in the protection offered by the equipment (above all in relation to the permeability and fragility of the materials), in addition to the fact that protective equipment is uncomfortable and not user-friendly.

> "We always wear old clothes underneath, as the product quickly goes straight through [...] These clothes [overalls] provide only slight protection, very slight indeed. All you need is some clothes only used for doing that one job." (Flower grower, 26-years-old)
> "It may be protective clothing, but I reckon it does very little protecting. [...] If you're spraying, for example, a rose, and you catch the plant and your clothes tear. It's not worth buying." (Flower grower, 29-years-old)
> "The liquid seeps through and when you see it, you're already wet. It's worse, sometimes, than just normal clothing." (Flower grower, 24-years-old)
> "You look like an astronaut working on a farm." (Flower grower, 27-years-old)

Furthermore, various accounts also reveal the importance that the growers place on the senses (above all smell) as "a means to identify the toxicity" of pesticides. Products with stronger odors are considered by the growers as being more toxic and get special attention in terms of the protective measures taken.

> "I'm going to be honest with you, you can put that mask on, but it's useless for some pesticides. You can put on that one with two air filters, but the smell still gets through. [...] There's a chemical which is in powder form and which, God forgive me, is even worse than that smell you get when you arrive in Rio de Janeiro. That one's sickening, you can put on any type of mask you like, that one will get through it. [...] With these products, you need to take even more care." (Flower grower, 25-years-old)

With respect to identifying the possible environmental dangers related to the contamination of water, soil and air by pesticides, in most cases interviewees tended solely to focus on taking care with packaging (the care taken with storing empty packaging until commercial representatives return to take it away).

When asked to reflect on possible alternatives to using pesticides, all interviewees described the use of these chemical products as a necessary evil, arguing that production would not be possible without chemical pest control. Some respondents even made reference to the responsibility researchers from the chemical industries have in developing pesticides which are more efficient and less aggressive to human health and the environment.

> "Without using pesticides, nothing will grow." (Flower grower, 33-years-old)
> "In our field [flower production] it's really difficult to imagine an alternative. It's so difficult because everything is infected with pests." (Flower grower, 35-years-old)
> "The only option is for us to carry on the way we do. It's not us who will change this, it's them. The laboratories are always doing new research, they take one product off the market and replace it with another." (Flower grower, 70-years-old)

Nevertheless, the use of greenhouses (capable of reducing pesticide use by up to 50%, according to estimates from the very same flower growers), also appears to be a possibility for interviewees, although not particularly feasible due to the large financial investment needed.

The January 2011 disaster

In January 2011, the Região Serrana (a mountainous region) of Rio de Janeiro experienced what is considered to be the greatest natural climate disaster in the country's history. Nova Friburgo was the worst affected municipality.

Within this context, although the areas covered by this study are not among those most affected by the tragedy in Nova Friburgo, the effects of this event marked the lives of the populations of Stucky and Colonial 61. The disaster had such a widespread effect that, although it did not constitute the focus of this research, it needed to be covered and incorporated into the study.

In the interviews, the significance of this event stands out due to its unprecedented consequences in the area.

> "What happened was really ugly. It was raining for a fortnight, a gentle rain, just soaking the earth. Then, by the end, the earth was heavy, sodden, and suddenly there was that strong shower that night [the night of 11th and 12th January 2011], which didn't even look like rain [...]. Places that people didn't even think could collapse, collapsed. [...] and this was the rain that God gave us. There was a blackout, telephones went down. We couldn't see a thing apart from when lightning struck. [...] From these quarries round here, all we could hear was a noise which sounded like the world was about to end. It was rocks smashing into each other, there was such a din. And when it fell on the plants below, on the woodland, it destroyed everything, all those trees. That really scared everyone. It was so dark, you couldn't see anything. And the water carried on rising, rising. [...] Thank God here nothing too serious happened to my home. [...] It wasn't actually too bad around here, there were other places where entire hills collapsed. [...] We pray to God that nothing like this ever happens again." (Flower grower, 70-years-old)

There were no victims among the family members of those interviewed, just financial losses. To manage the losses and restart production, the flower growers interviewed made use of their personal savings. And subsequently, from July 2011 onwards, those who had significant material losses registered to receive financial aid from the World Bank.

Respondents expressed considerable dissatisfaction with regard to the measures taken by the municipal authorities after the disaster. Despite recognizing the degree of damage caused, they questioned the delays in the action taken, the poor quality of services provided by contracted third parties, the use of funds received by the municipal authorities and the lack of dialogue with the communities when setting priorities.

On the other hand, the accounts confirmed a strengthening of both community ties and cooperation mechanisms employed by the local population after the disaster.

Regarding the possible causes of the disaster, interviews suggested that the phenomenon of January 2011 is considered as an essentially natural event. No mention is made of possible human interference.

Discussion

Pesticides are depicted as a central element in production. When not directly associated to health and environmental concerns, they are still mentioned in all narratives, whether due - among other factors - to their high cost, the "convenient" home visits of commercial representatives, the fact that floriculture is recognized to be an agricultural activity requiring high levels of pesticide usage, or in terms of greater productivity. Therefore, in all cases, ambiguities and dilemmas relating to the use of pesticides are found in the discourse and practice of the rural workers interviewed.

On the one hand the risk of chemical contamination is partially understood by the flower growers and on the other hand rural workers develop adaptive strategies when faced with risks (reinterpreting risks, underestimating them, putting them in perspective or even denying them) so that their professional activities can continue. This is an example of what Giddens (1991) calls pragmatic acceptance, as the focus on survival results in a "numbness" by which recognizing the existence of risks means accepting not only that things may turn out badly, but also that nothing may be done to prevent this (p.112 and 137). According to this view, pragmatic acceptance involves a continual process of relativization in which risks are displaced to other places and other people.

As pointed out above, a form of recurrent relativization found in the narratives was that the risks of chemical contamination are associated to the way each producer works. The discourse of interviewees reflected the notion that pesticides can be used safely. In other words, they reproduced the theory put forward by the agrochemical industry and even technical experts and certain groups of researchers (LONDRES, 2011) that if rural growers follow the manufacturers' official recommendations, there is no risk of human intoxication or environmental contamination. Therefore, negligence (or the "misuse" of pesticides) by rural growers is expressed in the accounts of respondents as the cause of health risks and environmental harm.

The shortcomings of this conception have been debated by various researchers, arguing that it is the result of a "simplistic and Manichaean" approach (SOBREIRA; ADISSI, 2003; GUIVANT, 2000). This notion of the appropriate use of pesticides relies on complex operational guidelines - related, among other factors, to the product chosen, the dosage and the general conditions for application - which in practice are almost impossible to follow to the letter. Furthermore it also disregards both the vulnerability of users and the varying professional circumstances in which these chemicals are used. In practice, this notion only serves to pass sole responsibility for the risk of human and environmental contamination, and resulting negative impacts, onto the rural workers.

Another type of relativization frequently expressed in the narratives draws a direct link between the risk of chemical contamination and the individual characteristics of each producer (such as age and gender, for example). These characteristics are assumed to make certain people more or less vulnerable to pesticides.

This relativization is borne out of the assumption that human genetic and physiological variety determines differences in sensitivity levels to chemical substances in general. However, growers' perceptions move beyond this assumption and are far closer

to a social construct that establishes that certain people are not vulnerable to pesticides, whilst others are unable to adapt to them because they are weaker - as outlined by concept of *selective vulnerability* proposed by Fonseca *et al.* (2007). This notion was reinforced in the interviews, mainly in relation to those women and men who do not habitually handle pesticides and are referred to as being more vulnerable.

In this context, the present research corroborated other studies (PAULILO, 1987; BRUMER; ANJOS, 2008) in relation to gender issues in rural areas: women tend to occupy a subordinate position, in which their work is undervalued (generally being classified as "light" and looked upon as just "help"), resulting in their occupational exposure to pesticides being invisible. In the case of flower production, women (as well as taking care of household tasks and the children) normally participate in the harvest, separation, counting and packaging of the product, as well as growing flower varieties which demand greater care.

During the field work, it was observed that women accept this socially constructed type of subordination and devaluation. The women themselves characterize their work as "help". Indeed, this fact is also partly responsible for the low representation of women among the interviewees. Many did not agree to take part in the research, claiming that their husbands should be consulted instead, as men knew more about production, while they, as wives, just "helped out".

In addition, another interesting element present in the accounts of interviewees suggests that growers are selective in relation to evidence of pesticides hazards. Features which are easily captured by our senses, such as the smell of the product, are given greater priority in relation to taking protective measures. Growers consider products with a stronger odor to be more toxic. In other words, frequently growers in this study directly related the toxicity of the products to what their senses could perceive (particularly through smell and sight - the latter generally related to apparent effects of pesticide intoxication, for example, skin reactions). This results in growers exposing themselves more to products which are not "felt" to be toxic.

In this context, Beck (2010) argues that the dangers of modernization tend not to be perceived by the human senses:

> Factors which damage the health and destroy the environment can often not be discerned by our touch or sight [...] Many new risks (nuclear or chemical contamination, toxic substances within food and civilizational diseases) completely escape immediate human perception. (p. 32)

Another interesting point relating to the visual aspect is the ambiguity between the undeniable beauty of the flowerbeds - in all their shapes and colors - and the invisibility of toxic agents which are responsible for attaining commercial quality standards. How far does beauty also serve to camouflage the danger? In various accounts, growers praise the perfect appearance of the flowers, emphasizing the beauty which the growers' flowerbeds bring to the communities.

A central feature present in all the interviews, and a determining factor behind the growers' acceptance of their hazardous circumstances, is the economic transformation - driven by floriculture - which has benefited the lives of families and the communities studied as a whole. In this sense, a cost-benefit ratio is established, through which the risks involved become acceptable when considered alongside the possible benefits they can bring. In other words, the advantages gained - particularly those related to the improvement in family living standards - are a fundamental reason for the "voluntary" acceptance of the risk of pesticide contamination.

During the interviews, a determinist attitude towards the use of pesticides was constantly stressed by growers. As a rule, accounts stated that without using pesticides there would be no harvest. This determinism blurs the boundary between pragmatic acceptance as proposed by Giddens and the so-called *chemical fatalism* school of thought, as proposed by Guivant (1998). This conception points not only to the pragmatic acceptance of pesticide use, but to the exclusion of alternatives that could phase out their use.

The same author argues that it is crucial that alternatives are perceived to be available, in order for the environmental harm to be socially recognized as relevant. Given that "when people find themselves in situations where alternatives are difficult to visualize, they tend to deny that they are affected at all" (GUIVANT, 1998, p.28).

Finally, the flower growers interviewed find themselves immersed in a situation which demands further research, due to the recent social and environmental changes in the area caused by the disaster which took place in this mountainous region in January 2011. Although Stucky and Colonial 61 were less affected than other localities in Nova Friburgo, the unprecedented scale of this episode has had a significant impact on the lives of the local population.

In relation to establishing potential causes for the 2011 disaster, the perception of a "natural phenomenon" prevailed throughout the discourse of interviewees. No associations to man-made activities were established. This perception prevailed in the mass media and became commonly accepted, disseminating the belief that most of the areas which suffered from landslides contained untouched, virgin vegetation.

Conversely, the report published a month after the disaster by the Ministry for the Environment (MMA) (BRASIL, 2011), evaluating the area affected, provided relevant information concerning the scale of human activities in these localities, showing that 92% of the landslides occurred in areas which had undergone some type of man-made alteration.

Post-disaster, all interviewees expressed strong feelings of insecurity and uncertainty at the prospect of another rainy season. As a backdrop to this situation is a context in which public prosecutors investigated suspected irregularities on the part of municipal authorities with respect to the use of federal funds which had been allocated for the recovery and reconstruction of the municipality; these investigations subsequently resulted in the removal of the mayor. In this context, this insecurity and uncertainty were accompanied by accounts indicating distrust and dissatisfaction in relation to the work carried out by the local authorities.

On the other hand, whilst trust in the local authorities has diminished, community relations and ties seem to have been strengthened. After the initial shock, solidarity and cooperation mechanisms were two of the different types of social responses developed by individuals and communities which suffered the impact of the disaster.

As observed by Giddens (1991), notions of security, uncertainty and trust are intimately related, given that the former involves belief in the continuity and constancy (certainties) of the surrounding social and material environment and requires confidence in people or things (objects and products). In this case, distrust of a local authority which was apparently close to the growers, but at the same time weak and absent, contrasts with trust in the global and distant power of the chemical industries, which are strong and constantly present through their commercial representatives, who provide security and sell the "certainty" of a better life. It is within these relations of trust and distrust that the perceptions of uncertainties and insecurity thrive: in relation to disasters over whose origins the growers consider they have no control and in relation to the dangers of pesticides over which each grower believes they have some level of control.

Conclusions

This study observed locally how social and environmental impacts associated with agricultural production are characterized as a complex problem of collective and environmental health, where chemical contamination is one of the main causes.

In this case, within the context of flower production in the two chosen localities in Nova Friburgo, the study showed how a group of rural workers are found to be significantly vulnerable to the harmful effects of pesticides. Furthermore, it underlined the key role played by risk perception in mediating growers' knowledge about the risks associated with their work and their behavior when faced with these risks.

This research contextualized the main determining factors, both structural and others more specific to this process. It revealed that at the local level, relevant factors are: the contamination of the intra-family environment; a lack of technical assistance (commonly only received from representatives directly linked to the agrochemical trade); low educational backgrounds and a lack of clear information, limited to the labels and packaging of pesticides; the need for attaining high quality standards for flower production to be commercially viable; a lack of perceived alternatives to the use of these chemical products and a lack of control and supervision mechanisms.

At the same time, given these structural factors, flower growers in the localities studied are part of a complex national and global scenario in which the following aspects stand out: Brazil's world leadership in pesticide consumption since 2008; the government's national policies for promoting agribusiness production; the strong pressure of large industrial corporations linked to the chemical sector; the lack of official statistics reflecting the real scale of the problem in the country; the innumerable challenges relating to identifying and measuring the impact pesticides have on human health and the environment; the worldwide prevalence of an ideology targeting economic growth at any cost and finally, the increasing regularity of disasters.

It is within this large and complex context that the risks experienced locally by flower growers are situated. These risks need to be addressed through the simultaneous use of subjective and objective solutions to these problems. This may mean combining strategies of risk communication which take into account perceptions (risks, uncertainties and security) and trust relations between the various parties (DE MARCHI; RAVETZ, 1998; DI GIULIO *et al*., 2010), as well structural changes in the way life and work are organized, and finally, changes in the development model.

Note

i The research complied with Resolution 196/96 of the Brazilian National Health Council and was approved by the Committee on Research Ethics of the Sergio Arouca National Public Health School in 2011, registered under protocol number 98/11.

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RURAL WORK, HEALTH AND THE ENVIRONMENT: NARRATIVES OF FLOWER GROWERS IN THE FACE OF SOCIAL AND ENVIRONMENTAL RISKS

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Resumo: O artigo insere-se na discussão acerca dos impactos socioambientais gerados pelas práticas agrícolas convencionais, apresentando as principais conclusões de uma pesquisa que analisou o processo produtivo de flores em duas localidades do município de Nova Friburgo (RJ), com ênfase na compreensão das percepções e atitudes dos produtores frente aos riscos associados ao processo de trabalho. Adotou-se uma abordagem qualitativa, que priorizou as narrativas dos produtores de flores como o principal meio de aproximação da pluralidade de perspectivas destes sujeitos. Em relação aos procedimentos de coleta de dados, foram utilizadas: entrevistas semiestruturadas, observação descritiva e diário de campo, além do levantamento de dados secundários. As evidências recolhidas indicam que os agrotóxicos se destacam como elemento central da produção e estão permeados por ambiguidades e dilemas. Nesse contexto, os diversos fatores inter-relacionados que atuam como determinantes desta situação são identificados e debatidos.

Palavras-chave: Trabalho rural; Riscos socioambientais; Percepção de risco; Agrotóxicos.

Abstract: The article is part of the discussion about the environmental impacts generated by conventional farming practices. It presents the main conclusions of a research which examined the process of flower production in two localities of the city of Nova Friburgo (state of Rio de Janeiro), with emphasis on understanding the perceptions and attitudes of producers in face of the risks associated with their work. A qualitative approach was adopted focusing on the narratives of flower producers as the main form of more closely observing the plurality of their perspectives. Data collection procedures comprised semi-structured interviews, observation and descriptive field notes, and a review of secondary data. Findings indicate that pesticides stand out as a central element of production and that it is an issue permeated by ambiguities and dilemmas. In this context, the various interrelated factors that act as determinants of this situation are identified and discussed.

Keywords: Rural work; Social and environmental risks; Risk perception; Pesticides.

Resumen: El presente artículo trata sobre la discusión de los impactos sociambientales generados por prácticas agrícolas convencionales. Presenta las principales conclusiones de una investigación del proceso productivo de flores en dos localidades del municipio de Nova Friburgo (RJ), haciendo énfasis en la comprensión de las percepciones y las actitudes de los productores frente a los riesgos en el proceso de trabajo. Fue adoptado un abordaje cualitativo, que priorizo las narrativas de los productores de flores como principal forma de aproximación de la pluralidad de perspectivas de estos sujetos. En relación a los procedimientos de colecta de datos, fueron usados entrevistas semi-estructuradas, observación descriptiva, diarios de campo y el levantamiento de datos secundarios. Las evidencias indican que los plaguicidas son un elemento central de la producción y están permeados por ambigüedades y dilemas. En este contexto, los diversos factores interrelacionados que actúan como determinantes de esta situación son debatidos.

Palabra clave: Trabajo rural; Riesgos socioambientales; Percepción del riesgo; Plaguicidas.