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Food security, risks, scales of production – challenges to sanitary regulation

Segurança alimentar, riscos, escalas de produção - Desafios para a regulação sanitária

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ABSTRACT

The aim of this article is to contextualize the difficulties concerning the sanitary legalization of craft and small-scale food production in Brazil, which have become the subject of the National Policy for Food and Nutrition Security. We focus on a sanitary regulation standard from the Brazilian National Sanitary Surveillance Agency (Anvisa) called RDC 49/2013, which addresses small productive segments. Our method was to analyze documents from official agencies and social organizations as well as theoretical bibliography on the subject. We relate these difficulties to changes in food systems and the international concerns about sanitary risks, pointing to complex relations between culture, risks, technoscience and development models, as well as to the strong economic interests that challenge the improvement of public health and food security. We conclude considering the need for an integrated and contextualized analysis of risks in the case of small-scale production, processing, distribution and consumption of food, favoring production models and patterns of food consumption that are fair, democratic, environmentally sustainable, and that have the appreciation of life and health as their main focus.

KEYWORDS: Food Security; Food Safety, Sanitary Regulations; Public Policies; Family Farming; Development; Risks

RESUMO

Neste artigo temos como objetivo contextualizar as dificuldades para a legalização sanitária das produções de alimentos artesanais e da agricultura familiar no Brasil, que tornam-se objeto de intervenção tanto da Política Nacional de Segurança Alimentar e Nutricional quanto de uma regulamentação da Agência Nacional de Vigilância Sanitária - Anvisa específica para estes setores, a "Resolução da Direção Colegiada Número 49", de 2013 (RDC nº 49/2013). Tomamos como método a revisão de documentos produzidos por agências estatais e organizações sociais, assim como bibliografias teóricas relacionadas à temática. Buscamos relacionar as dificuldades existentes com as transformações nos sistemas alimentares e com o aumento nas preocupações com os riscos sanitários a nível mundial, apontando a complexa interrelação entre cultura, riscos, tecnociência e modelos de desenvolvimento, assim como a presença de fortes interesses econômicos, que desafiam a promoção da saúde pública e da segurança alimentar (*food security*). Concluímos refletindo sobre a necessidade de uma análise mais integrada e contextualizada dos riscos no caso da produção, processamento, distribuição e consumo de alimentos em pequena escala, que favoreça modelos de produção e padrões de consumo de alimentos ao mesmo tempo mais justos e democráticos, ambientalmente sustentáveis e que tenham a valorização da vida e da saúde como eixos principais.

PALAVRAS-CHAVE: Segurança Alimentar e Nutricional; Normas Sanitárias; Políticas Públicas; Agricultura Familiar; Desenvolvimento; Riscos

INTRODUCTION - CONTEXTUALIZING THE PROBLEM CONVERGENCE BETWEEN FOOD AND NUTRITIONAL SECURITY AND SANITARY SAFETY INCLUSION POLICIES

In August 2014, a public meeting of the Collegiate Board of the National Sanitary Surveillance Agency (Dicol/Anivsa) in Brasília (capital of Brazil) received an audience that is somewhat unusual in these spaces, normally occupied by people connected to large companies. Men and women, representatives of peasants, family farming and traditional rural populations, brought to Anvisa a petition[1], signed by more than 70 organizations from different regions of the country, with demands related to two major types of problems: the risks posed by pesticides and the need for specific sanitary food standards for the products of family agriculture. The petition established a link between these two questions:

> "The quality standards expressed in sanitary norms reinforce a logic of exclusion, that reinforces concentration on a large-scale, standardized agro-industrial production model with the intensive use of chemical inputs (agrochemicals, additives, preservatives, etc.)."[1]

The talks between these productive segments and Anvisa began in 2011, when the agency joined the Brazil Without Extreme Poverty[2] plan and created the Project for Productive Inclusion with Sanitary Safety[3]. One of the main results of the project was the approval of the Anvisa's Collegiate Board Resolution number 49, in October 31, 2013 (RDC 49/2013)[4,5]. The resolution aimed at the "sanitary regulation of the individual microentrepreneur, the rural family enterprise and the jointly liable economic enterprise", in a participatory process with unprecedented involvement of various government sectors and organized civil society[6]. Establishing specific sanitary standards for these small-scale production sectors, for the first time Anvisa recognized – as its then chairman emphasized at the time of signature of RDC n. 49/2013 – that it is necessary to "understand and treat different sectors differently, because the environment of the microentrepreneur and the small farmer clearly and naturally present very different risks from those related to large-scale producers (...)" [6].

In Brazil, in the largest cities we can find the same global trends of increased consumption of processed products[7,8], with standardization and increasing concentration of food production, processing and distribution[9]. In the small and medium-sized cities the situation is different: there are several remaining cultures and food habits connected to short and local food supply chains, with close relations between production and consumption[10]. It is worth remembering that municipalities with less than 50,000 inhabitants, with traits that can be considered as "essentially rural"[11], account for approximately 90% of the total Brazilian municipalities and about a third of the national population[12]. These circuits involve a wide variety of animal and vegetable products, including semi-processed and processed foodstuffs, different types of flour, cheeses, meat and fish products, oils and fats, fruits, vegetables, spices, extractive products, nuts, preserves and sweets in general. Several of these products express cultural identities and are related to the natural resource base and regional biodiversity[10,13,14].

Additionally, there is also a great variety of craft food processing techniques in Brazil, some of which are "native" and millennial (as in the case of cassava flour and by-products)[15]. Some arrived with the settlers and immigrants, but were adapted over the centuries, like various types of artisanal cheeses[16,17,18]. Some of these techniques and products have been the object of recognition and appreciation, both by the Institute of Historic Heritage[13] and by Geographical Indication labels[19], creating new possibilities of marketing in tourist circuits and in the so-called "niche markets" for higher income populations. The arrival of some of these products in the main regional urban centers has also occurred in popular marketplaces, through rural-urban migrations, as is the case of *queijo de coalho* (a traditional raw milk cheese) that happens in the state of Sergipe[20].

Small-scale producers use very simple installations and equipment, which are generally not accepted by sanitary food regulations. In short food supply chains the closeness between small-scale producers and consumers means that food arrives fresher, with less processing, fewer preservatives and other chemical substances that are necessary for large-scale products transported over great distances[21]. Therefore, legal norms often hinder access to craft or small-scale processed products and favor the supply in the formal and institutional markets of ultra-processed food products[6].

The petition presented by social organizations to Anvisa, already mentioned, as well as other previous documents, reports that the requirements for health legalization impose costs that are too high for small-scale production, creating barriers to marketing. To be economically feasible, adaptation to legal sanitary standards requires a growth in scale, bringing the artisanal producers closer to the industrial processes. Some get to this point, but at a high price. Another consequence is that these norms in several cases clash with the culture, values and perceptions of local populations (producers and consumers)[1,22,23,24].

The difficulties for sanitary legalization of products from family and traditional agriculture gained more visibility (and legitimacy) after some government public policies that seek to include family farming products and local or regional circuits in government food purchases, such as the Food Acquisition Program (*Programa de Aquisição de Alimentos* - PAA) and the National School Feeding Program (*Programa Nacional de Alimentação Escolar* - PNAE)[25,26]. These programs are part of the National Policy on Food and Nutrition Security (PNSAN) and are considered "strategic" and "structuring", because they enable us to attack structural causes that lead to famine and poverty[29,30]. They aim reconnect local small producers and consumers and reinforce family farming, developing economic activities

that promote equity and social inclusion, with greater environmental balance, since both generate employment, income and provide quality and diversified food, with less use of chemical inputs[6,10]. They meet another concern of the PNSAN, expressed in the Food Guide for the Brazilian Population[27], which is to reduce the consumption of ultra-processed products, identified as one of the causes of health problems like high blood pressure, diabetes and cardiovascular diseases[28].

Although craft food and family-based production is an important component of the expression of Brazilian cultural diversity and despite its economic and social importance[10], institutional purchases of food produced locally by family farmers and different rural populations find barriers because of sanitary surveillance exigencies[22]. In this sense, the Project for Productive Inclusion with Sanitary Safety and RDC n. 49/2013 of Anvisa[5] is joining forces with Food and Nutrition Security Policies that are aimed at the recognition of small-scale food products and local and regional circuits[6]. These are the issues that appear in the petition presented by the social organizations to Anvisa[1].

Responding to the demands for changes in this reality, a guideline has been included in RDC n. 49/2013 aimed at "protecting craft production in order to preserve traditional customs, habits and knowledge in the perspective of multiculturalism, traditional communities and family farmers"[4,5,6]. However, the implementation of this guideline is one of the major challenges, both with regard to the classification of risks and guidelines in relation to good food production practices and requirements with regard to facilities, tools and equipment, as well as packaging and forms of marketing. In all these aspects, there are important differences between the perception of specialized technicians (whose training is generally geared towards work in larger industries) and the social and cultural references of the population. This challenge is revealed both in products of plant origin (inspected by Anvisa and covered by RDC n. 49/2013) and in products of animal origin, regulated by the Ministry of Agriculture, Livestock and Supply (MAPA)[13].

We will then seek to reflect on the background questions that lead to these difficulties. Although RDC n. 49/2013 is more comprehensive, we will focus only on sanitary food regulation in this article.

GLOBAL FOOD SYSTEMS, HEALTH CRISES AND INCREASED INTERNATIONAL CONTROLS ON FOOD SAFETY

The twentieth century witnessed major changes in the forms of production, processing, storage, transportation and distribution of food, after the development of new scientific and technological possibilities[31]. Increases in production and productivity scales, associated with long marketing channels and strategies to increase the durability and practicality in dealing with food, led to changes in production systems, marketing modalities and food preparation and consumption, with a growing dissociation of food over time (seasonality of production) and space (place of production)[7,9]. Genetic improvement aiming at productivity increases in large-scale mechanized plantations led to strong environmental changes and increasing use of chemical substances (such as fossil fuels, chemical fertilizers and agrochemicals). This whole process reinforces the formation of globalized food systems, with a growing concentration and oligopolization of food production and marketing in the hands of large corporations, which in the process of aggressive market competition seek to find cheaper solutions and ingredients, constantly redefining the limits of the "acceptable". Food itself is transformed in this process, producing more and more "imitations" of the original food[7,9,32].

After the Second World War, the Food and Agriculture Organization of the United Nations (FAO) addressed international concerns about famine and food security, related to aspects of availability, access and stability in food supply. Food security was related to nations, both for internal food production self-sufficiency and for supplementing domestic production by importations[7,33]. Protectionist practices adopted by developed countries have made agriculture one of the most difficult matters in international rounds of trade negotiations of the General Agreement on Tariffs and Trade (GATT)[34]. Since the 1990s, the occurrence of food-related sanitary crises with international repercussion, such as "mad cow disease" (bovine spongiform encephalopathy), "bird flu" (avian influenza), "swine flu" and others, highlighted the importance of food safety, which gained prominence in food security questions, in particular in developed countries[7,34].

The importance of food safety is due to the immediate and serious consequences of these sanitary crises in the economic order[34]. In 1995, with the creation of the World Trade Organization (WTO), the Codex Alimentarius became a reference for the arbitration of sanitary controversies in global food trade. The Codex Alimentarius is a set of technical standards, procedures and practices for food safety, to protect consumers' health and ensure fair practices in international food trade. National legislations were increasingly pressured to adopt the Codex food safety and quality standards and regulations, which were more stringent and valid on an international level. This increased pressure for the implementation of sanitary food control systems at regional and local levels, which are considered essential to ensure the quality of food available in international trade[34,35,36,37,38,39].

The decisions about food safety risk assessment and management are increasingly transferred to international spaces, which has implications for the sovereignty and democracy of nation-states, particularly for peripheral or developing countries[38]. In terms of global trade, it has advantages for countries that are able to invest in the adjustment to the international sanitary standards imposed[34]. In a world context of strong economic and trade liberalization, the growth of measures to protect and control the sanitary quality of food increases the possibilities of a disguised protectionism. In this context, the objectives of sanitary surveillance – risk reduction, health protection and quality of life – suffer strong influence and pressure

from political, economic and ideological interests. That is reproduced internally in each country, through the regulatory agencies. In this way, a set of norms, rules and parameters established at an international and apparently neutral level can favor a concentrated logic and the expansion and conquest of new territories by the large corporations[9,34,38,39,40,41]. Non-alignment of national legislation with the new international rules can result in reduced access to world exports and food markets. In that context, technical positions interested in increasing exportation and international trade look at the diversified local food systems of developing countries as a potential risk for industrial production. The vast majority of them are informal and non-inspected, exposing consumers to potential food safety risks and hampering the implementation of effective rules and controls[34,35]. This vision is internalized by the professional staff of national sanitary control agencies. That is noticeable in Brazil, in Anvisa and in the systems of inspection of animal products by the MAPA.

The "harmonization" of the national sanitary systems with the Codex international standards has a strong impact on craft and family producers, since national laws regulate not only export markets, but also internal and local markets[18]. These pressures are reflected in Brazil in the difficulties related to sanitary regularization reported in the petition delivered by the peasants and family agriculture representatives to Anvisa[16].

The standards and technical criteria guiding these rules are aimed primarily at avoiding or preventing contamination in large-scale processing and advocating increasingly automated structures, equipment, tools and forms of processing, which are expensive and economically unfeasible for small-scale producers[21]. Industrial logic and non-differentiation of production scales into sanitary standards leads to a process of illegalization (and criminalization) of foods previously traded informally. Thus, food that circulates widely in various local and regional markets of the country, with no evidence of public health problems, are considered to be "unfit for human consumption" based on laboratory analyses[18,21].

In addition to criminalizing and excluding from the formal market those that are economically unable to access them, some sanitary requirements for the legalization change the production processes, altering and decharacterizing craft products that were habitually consumed and used as ingredients of traditional local recipes. For example, this is what often happens with the requirement of pasteurization for craft cheeses traditionally made with raw (unpasteurized) milk[13,17,42,43].

Disputes and controversies around definitions of risk and quality standards for dairy products provide illustrative examples of both the intervention of large corporations in definitions of sanitary safety standards/parameters and how international sanitary legislation can benefit large-scale production supply chains based on long-distance trade and giant agri-food sectors, harming local markets and short food supply chains. Ploeg (2008)[9] reports the attempt by a multinational company specialized in UHT milk to embrace the Italian market of fresh milk, highly valued by consumers for its lactic flora and flavor, locally called "live milk". This large company devised a strategy for acquiring milk in Poland, processing it in Germany and selling it in Italy under the name of "fresh blue milk", investing huge amounts in advertising and changing Italian legislation. In addition to the strategies to confuse consumers, the author draws attention to the increase in health risks that this set of technological operations involves. A financial breakdown of this multinational led to a loss of economic and political power and "blue fresh milk" was eventually banned in Italy, but if it had come about, it could have disrupted a whole system of local cooperatives[9].

An article by the international Non-Governmental Organization (NGO) Grain[44] points out the strategies of large agribusinesses to discredit the "popular dairy chains" that exist all over the world and are responsible for important percentages of milk consumed by low-income populations. These chains pass through local traders who source and take fresh milk directly from small producers to consumers at cheaper prices than milk processed and packaged by plants, in a market that moves huge volumes of resources and feeds millions of people. Large corporations have built a view of "unpasteurized" milk as "unsafe," "unhealthy," "unhygienic," and "low quality," ultimately as a risk to public health. They accuse this sector of selling adulterated milk when it is known that milk adulteration also happens (and is perhaps even worse) in large industrial chains. Grain stresses the importance of defending these "popular dairy chains" and recognizing that they have their own health regulation systems, based on local knowledge and codes of trust that are particular to each culture. It also opposes arguments that these chains would have "low efficiency" because they involve disperse small producers and cows of low productivity. It points out the economic, social, environmental and health benefits of local and smallholder-based production and the negative impacts of the large-scale animal production model, with genetic improvement aimed at high productivity, anchored in protein foods and in breeding in large industrial farms with more frequent milking, which makes cows more susceptible to wounds and diseases, increasing the use of drugs and impacts on the nutritional quality of milk. It also denounces the strong interests of the animal health market, including vaccines, antiparasitics, antibiotics and food supplements[44].

The simple requirement of pasteurization of all dairy products, strongly recommended by the Codex Alimentarius and irrefutable for the majority of specialized professionals, may lead to the exclusion and disorganization of local markets, imposing industrial milk as the only option allowed to be legally marketed[44]. Mandatory pasteurization and the risks involved in raw milk are the focus of strong international controversies[45,46,47,48,49], which are reproduced in Brazil[16,18]. Even in countries in the North, where processed dairy products are dominant, informal markets for the direct purchase of organic or raw milk, as well as raw milk cheeses, are being expanded by people seeking "live food" produced outside the industrial system. Paxson (2012), analyzing the (re) emergence of an informal market for craft cheeses made with raw milk in the

United States, calls these people (producers, scientists, traders and "gourmet" consumers) post-pasteurians, "because they believe that not all microorganisms are bad, that many are part of human life, and that cultivating a diversified intestinal flora and fauna enables the human body to protect itself from disease"[46 50].

Paxson[50] depicts the controversies surrounding the sanitary food regulation of this new market in the USA. On one hand, these post-pasteurians want to invest in the potential collaboration between humans and microorganisms, and, on the other hand, the Food and Drug Administration (FDA), responsible for health regulation in the United States and with a strong influence on the Codex Alimentarius and on the world of food safety, operates in a hyper-hygienic pasteurian social order, associating raw milk with biological risks due to the possible presence of potentially pathogenic microorganisms, suggesting the medicalization of food and the act of eating. By shedding light on the controversies among scientists on the hazards of raw milk cheeses, the author points out the complexity of microorganisms' behavior and how sanitary standards are not completely rational and exempt from values[46,50].

These examples indicate that sanitary regulation of food markets constitutes a field of disputes of interest between different stakeholders, with different values and objectives, connected to development models. Thus, negotiations around sanitary rules and standards are not confined to science, public health or hygiene interests. We should engage in negotiations on the values that will regulate markets and determine which producers and products should and can be included[51].

RISKS, SANITARY CRISES OF FOOD AND DEVELOPMENT MODELS

If, on the one hand, the food-related health crises of the 1990s have increased fear and aversion of microorganisms, resulting in increasingly strict sanitary standards and global controls aimed at ensuring safety in long-term marketing chains and production and industrial processing of large-scale food, on the other hand, the succession of "food alerts" has contributed to reinforce the mistrust and confusion of the population with regard to the food chain itself, revealing (and bringing into the public debate) aspects of the chain of food production previously unknown to consumers, or at least aspects that were not widely discussed[7]. People are beginning to associate "sanitary crises" and the emergence of new pathogens with the so-called "environmental technological risks"[52]. These crises are now associated with the model of industrialization and mass food production, as well as the way in which agribusinesses are forced to operate in an environment of global competitiveness with highly concentrated markets[9].

For example, controversies among scientists in the "mad cow disease" crisis brought to light changes in large meat production chains after the late 1970s, when the industry started to use animal protein-rich feeds from viscera and various residues (brain, spinal cord, intestine, spleen) not used for human consumption[7,52]. It is worth noting the enormous change brought about by technoscience in the feeding of these animals, which are originally herbivores.

Likewise, the emergence of avian and swine flu is associated with the breeding of poultry and pigs on huge industrial farms, where a stockpile of feces and tens of thousands of animals are concentrated side by side, with their immune systems weakened by the conditions of stress in which they are bred. The continued circulation of viruses associated with the use of antibiotics increases the chances of mutations and the emergence of new viruses that are more efficient in human-to-human transmission[53].

In parallel with the fear of microorganisms, there is an increase in perceptions of more general health risks related to environmental crises and globalized development models, which also involve "ethical" crises in the pursuit of competitiveness at any cost[9,52]. There are complaints that the interests and the economic and political power of globalized companies seek to obstruct independent scientific research[9]. The very belief in the unlimited powers of science and technology is shaken and distrust is growing over genetically modified food and chemical contaminants[53]. Although there is scientific knowledge about the direct and isolated effects of chemicals, little is known about the health effects of different interactions between different products, or even their long-term effects. New food engineering technologies emerge at high speed and from different sources, so it is very difficult to keep up with appropriate laws and control systems[54]. There is also the production by laboratories of new formulas and chemical substances that may circumvent existing control systems and detection techniques, such as laboratories producing new forms of growth hormones to replace the banned versions[9].

In this context, there are no easy solutions to ensure the health of the population and there is criticism of the solutions that lead to a real "hunt for microorganisms", because they only work on certain focuses[52]. Some authors warn that we must understand how health risks are generated within a broader system of settings related to a "global ecological crisis" involving political, economic, social and cultural elements[9,55,56]. Risks are increasingly associated with business opportunities, involving different industrial complexes, such as agricultural, pharmaceutical and medical-industrial[52,44]. Thus, in order to ensure global health, we must look at the broader picture of the economy, capitalist industry, war complexes, pathogens and medicine[55,56].

TECHNOSCIENCE, SOCIETY OF RISK AND SOCIAL CONSTRUCTION OF RISKS

In order to ensure that health concerns are above economic and political interests in decisions that may have a strong impact on international trade, one of the principles and premises of the Codex Alimentarius is that its standards, codes of procedure, guidelines and recommendations should be based on "purely scientific aspects"[34]. To a large extent, the main scientific bases

for definitions of food safety are referenced in technical and quantitative studies on risks: identifying risks, determining the level of acceptability of risks, managing and communicating risks to consumers become essential elements for the establishment of consumer health protection standards[36,37]. However, socio-anthropological studies increasingly share the idea that, far from being scientifically neutral and quantifiable, risks are social constructs and the relationships between risk, technology and culture are intricate[57].

Technical and quantitative risk studies began in the 1950s, within different disciplines and fields of knowledge, such as economics, engineering, psychology, toxicology, epidemiology[57,58]. Already in the 1960s, methods of these approaches were adopted as central to USA regulatory procedures for both food and public health, subsequently influencing international standards and criteria. This technical-quantitative approach considers risk as an adverse event, a physical attribute with certain objective probabilities of causing harm, which can be estimated through quantitative calculations of levels of acceptability that allow establishing standards, through several methods (statistical prediction, probability estimation of risk, risk/benefit comparisons, psychometric analysis). In 1969 the concept of "acceptable risk" was formulated, based on the relationship between risks and benefits. Risk management is one of the strong aspects of this technical approach, providing quantifiable elements for the formulation of public policies on risk regulation and control, insofar as it allows us to establish priorities. Risk communication, considered as a rational parameter to be achieved through the diffusion of information, has always been a challenge. Its objective is to reduce the distances between the perception of experts and that of lay people. In these approaches, lay people tend to be identified as passive recipients of independent stimuli, perceiving risks in unscientific, poorly informed, and irrational ways, not corresponding to the "real" risks analyzed and calculated by science[57,58].

From the 1970s and 1980s on, environmental critics and industry sectors have begun to criticize these methods. In part, in response to these questions, quantitative methods continued to be developed with increasingly sophisticated probabilistic resources. The identification of risk factors is thought of as the possibility of predicting an undesirable event before it occurs. There is a shift from hazardous to risky conditions: a hazard is not proven, but a combinatorial factor is built which makes it more or less likely. Technological infrastructures were developed to allow us to circulate and correlate information in order to construct all the possible and imaginable risk profiles. There is a great increase in the sensitivity to hazards, which are seen everywhere and need to be known, detected and prevented[57,58]. This risk thinking promotes an unprecedented form of surveillance, the "remote management of the population", from a cloud of statistical correlations[59]. Technological culture assumes risk aversion as an "ethical" imperative, with emphasis on scientific expertise and technological control[52].

At the same time, some studies in the field of anthropology begin to question the scientific nature of risks, pointing out the cultural nature of all definitions of risk, as well as the plurality of rationales of social players in dealing with risks, imposing their own meanings to the phenomena. They point out that individuals are active organizers of their perceptions, leading to the dilution of differences between lay people and experts[57,60]. Significant divergences of opinion within the scientific community on the most appropriate methods to estimate risks, desirable safety margins, and on how to interpret the evidence and uncertainties of results are also emerging. The impossibility of knowing everything in relation to risks means that there is no guarantee that the risks that people seek to avoid are effectively those that would cause them more damage in an objective way. The attention that people pay to certain risks rather than others would be part of a socio-cultural process, which hardly has any direct relation with the objective nature of the risks: common values lead to common fears, as well as an implicit agreement on what not to fear. Risk choices are linked to choices of how you want to live. Risks are perceived and managed according to particular forms of social organization and cannot be treated in a neutral way, with only quantitative methodological tools[57,58,60]. Also, cognitive psychology begins to study "perceived risks" issues, pointing out elements that would lead lay people to give different importance to equivalent risks[57].

From the 1980s and 1990s on, the term "risk" became more present in almost all institutionalized discursive fields in modern Western societies, with an important role of the mass media in "production of risks"[52,58,59]. Beck (1992)[61] and Giddens (1990)[62] have substantially changed the debate about risks, pointing out the environmental and technological risks as central and constituent elements of contemporary societies[61,62]. The progress generated by the development of science and technology comes to be considered as the potential source of self-destruction of industrial society, producing new risks of a global nature with short and long term effects on people, animals and plants (global warming, pollution of water resources, food contamination, ozone hole, radioactivity, etc.)[57].

These authors and several others who succeeded them (in the areas of sociology and anthropology) began to analyze the limits of the technical analysis of the risks, pointing out that the scientific formulas on risk estimation take implicit social, cultural and political definitions. Relationships between risks and market opportunities are also explained. Technical definitions of risks can define who is the winner in economic terms, involving interests of companies, industrial sectors, scientific and professional groups. What is desirable or acceptable in terms of risk is imbued with value judgments[7,52,57,60,61].

A "food system paradox" emerges in this context. The progress made by science and technology strengthens the belief that everything can be achieved, enabling the emergence of the "zero risk" myth. But on the other hand, there are new hazards associated with large-scale production and processing. At the same time that food supply is increasing, famine continues to grow and uncertainties and questions about what we eat and the "risks" (thought as potential health damage) that the food may contain are increasing. Controversies between "experts" (scientists, specialists, technicians, etc.) become more frequent than

agreements, which casts doubt on their credibility, since they appear to the population as opinions influenced by interests[52].

Each person understands risks according to their social position and their "system of values and beliefs", organized in complex social and cultural systems. These can vary according to gender, age, social class, occupation etc. What is the object of fear and uncertainty for some is not for others. For example, for hungry people, food safety is not the main concern[7].

Technoscience itself has multiple roles in the production of risk: it generates risks because of the transformation of nature, but it also produces and reproduces risks by generating knowledge about them. Risk does not exist without representation and the "presence" of risk is not completely objective: it must be mediated in some way. Risks can be understood as "virtual objects", whose presence depends on "technologies of revelation". The formation of risk as a virtual object is a political process, with ethical implications beyond the domains of technoscience. Risks are inextricably linked to processes of meaning and value. Individually, each risk can have a rational etiology and can be reasonably explained, predicted and undergo interventions. However, taken as a cumulative and complex phenomenon, risks become less reasonable. Excessive surveillance and monitoring may induce a culture of risk aversion riddled with paranoia and neurosis[52,58].

CHALLENGES OF SANITARY SURVEILLANCE IN RELATION TO SHORT FOOD SUPPLY CHAINS AND TRADITIONAL FOOD

In the second half of the twentieth century there were movements in the opposite direction: on the one hand, the belief in a science that is better able to control risks is growing, and studies in this sense are growing[57]. On the other hand, there is an increase in the perception of the technoscientific evolution itself as an element that increases unpredictable risks[7,52,54]. On one hand, health crises generate fears and unleash international sanitary norms and "hygienic packages" that reinforce large-scale industrial standards. On other hand, they are associated with globalized development models, which also involve environmental and ethical crises (of seeking competitiveness at all costs), increasing criticism of the excludent and concentrated (power and income) nature of these models[18]. In spite of the abundance of food produced, the number of people suffering from famine and malnutrition in the world is maintained (and even increasing), in addition to the emergence of new health risks[7,33]. There are negative social impacts (exclusion of small producers and low employment generation), environmental (pollution, depletion of natural resources and threatened biodiversity), health (poorly balanced food standards) and cultural (cultural diversity impairment)[9,33].

By not differentiating scales and production models, by isolating and making risk analyses outside a context, legislation on sanitary food surveillance reinforces industrial patterns of consumption and "represses" food cultures and livelihoods of peasant populations around the world, serving as an element of repression and pressure on local food markets. Thus, through perverse mechanisms, attempts to control sanitary food crises (or to regain control and confidence towards industry) end up leading to economic concentration and reinforcement of industrial development models that engender the same risks.

In Brazil, such background leads to reactions that demand the creation of sanitary standards for small-scale production. As a major exporter of primary agricultural goods, the Brazilian surveillance systems face foreign and domestic pressure to internalize international sanitary norms and standards. A major challenge arises to create new parameters and sanitary models that can strengthen development models and food consumption patterns that are at the same time fairer and more democratic, environmentally sustainable and valuing life and health as their main pillars.

Actions in this direction converge sanitary inclusion programs and national security policies. The process of construction of RDC n. 49/2013 pointed to the possibility and potential of social participation in the regulatory processes, usually restricted to the technical-scientific field[6]. The inclusion in Anvisa's strategic planning of a specific guideline aimed at strengthening mechanisms for social participation, through mobilization and articulation of social movement networks and civil society organizations around the problems related to sanitary norms. This brought innovation to the National Sanitary Surveillance System (SNVS), with the construction of participatory spaces, which remain in the later phase of implementation of RDC n. 49/2013, allowing us to reduce the resistance within the technical staff of the SNVS and to change their vision with regard to traditional and small-scale producers. This leads to paradigm changes in the way these agencies operate, switching the police-like and punitive positions that characterize their work, and finally paving the way for the construction of a regulatory sanitary model that can be more inclusive[7].

The analysis of international sanitary crises considering health care and protection indicates no easy solutions that cannot be given only through scientific knowledge[52,54,55]. Great challenges emerge due to the large range of production scales and major differences between marketing channels, from the nearest and most direct to the most distant ones. Another question is the incorporation of innovation in technological and industrial techniques in small-scale and craft productions, from production to processing. This includes the use of additives, chemical inputs and substitutes to lower costs and compete with industrial products. We believe that some clues to address these issues can be found in Porto's principles for a "political ecology of risks" and for the construction of a "proposal for integrated and contextualized analysis of risks in vulnerable contexts, aiming to promote health and environmental justice"[56]. This author identifies the limits of science to deal alone with the risks to human health and the environment arising from the technological complexity and the model of socioeconomic development under way[55,56]. Traditional science tends to disregard uncertainties (technical, methodological and even

epistemological), the importance of values, and the plurality of legitimate perspectives in risk assessments and decision-making. The field of public health must overcome the reductionism of the biomedical paradigm, incorporating social, cultural and economic elements in the risk analysis, seeking to overcome the dichotomies established between the technical, the human and the social spheres, embedded in discourses and practices of technical-scientific analysis of the risks[55,56].

In order to defend life and democracy, the paths to a new methodological construction of risks need to be based on an integrative perspective of diverse fields of technique and science, including as a fundamental basis, knowledge outside the academic world, built on the experience of those affected by the problems[54,56].

Risks need to be understood as social constructs and as multidimensional and cyclical phenomena. For their understanding, global and local levels must be taken into account, considering the development model, the structures of power, the values and intentions that produce decisions and actions. Human health itself needs to be comprehensively rethought, taking into account ethical, social and ecosystemic aspects, overcoming the biomedical paradigm that defines it as a denial of disease and death. In this sense, it is important to develop participatory methodologies that enable us to contextualize the risks in each situation and understand the local dynamics, their interfaces with global dynamics and the singularities, through the exchange of information, points of view, experiences and expectations among the various involved social actors[54,55,56].

The activities of estimating, managing and communicating food risks need to be performed as complex actions that deal with a plethora of perspectives, involving potential conflicts of values and interests. The very definitions of food risk and quality need to encompass the public interest, scientific knowledge, and the various forms of knowledge arising from experience. This includes experiential or situated knowledge of populations, affected by decisions regarding policies and actions in the field of health. In this sense, it is important to increase participatory processes in regulatory decision-making at all levels, such as taking into account the know-how of craft producers in the organization of good manufacturing practices, respecting traditional buildings, facilities and equipment. Many craft products present in different food cultures appeared in close interaction with the environment and have developed empirically and from their experience fairly safe forms of food preservation. The vast majority of these techniques were developed before the existence of modern science and were later proven based on scientific knowledge. The social, economic and environmental context, as well as the experience of producers and the history of (often centennial) production, needs to be taken into account in the construction of legislation.

CONCLUSIONS

This article is based on the challenges to implement a Brazilian sanitary legislation regarding guidelines for the protection of small-scale food production. These guidelines converge with actions of national food security policies that aim to recognize food culture and stimulate local and regional circuits of production, distribution and consumption. From a bibliographical review, we point out that food sanitary regulation is associated with development models that are not disconnected from economic interests, values and culture that inform scientific research and definitions of quality and risks. The difficulties in legalizing traditional, artisanal and small-scale producers are related to changes in global food systems and to the occurrence of international health crises, which have led to the growing importance of food safety in global trade. International rules geared towards large-scale and long distances have become the reference of national laws and regulate also domestic and proximity markets. We emphasize that risks are social constructs and the multiple roles of technoscience in the production of risks. We also argue about the need and importance of participatory processes in the regulatory decisions on sanitary food regulation.

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Conflict of Interest

Authors have no potential conflict of interest to declare, related to this study's political or financial peers and institutions.