

Productive Restructuring and 'Standardization' in Mexican Horticulture: Consequences for Labour

HUBERT CARTON DE GRAMMONT AND
SARA MARÍA LARA FLORES

In this paper we discuss how the establishment of strict quality and food safety norms for horticulture to satisfy the current consumer demands has forced enterprises to invest in modifying their productive processes. In the light of the unavoidable trend in favour of consumers, we analyze the precarious situation of farm workers, a situation that is not in tune with the concept of decent work promoted by the International Labour Organization or with the Social Accountability Standard promoted by the United Nations. We conclude that the enterprises have achieved major progress in productive restructuring to comply with quality standards, but at the expense of their workers' salaries and living and working conditions. This contradiction between the well-being of the consumer and the misery of the worker is a fundamental characteristic explaining the current success of globalized agro-food systems.

Keywords: productive restructuring, standardization, food safety, precarization, farm workers

INTRODUCTION

Agro-food systems have become a major object of study in developed countries as consumers begin to question their rationality in terms of caring for the environment and health. Some authors have even considered Nature as part of economic and social development (Marsden 1999). The new demands of consumers in rich countries have exerted pressure on states and international organizations to create regulations that force enterprises to produce healthy food and to care for the environment. Friedmann (2005) argues that these regulations, compulsory in the framework of international trade, are increasingly strict and cover a growing number of products. For this reason, the current 'ecological niches' would tend to disappear. Thus, Friedmann sets forth the possibility of strengthening 'green capitalism' and proposes the need to abandon the idea of a dual agro-food system: one of quality for the rich and another less healthy for the poor masses.

The growing concern for food safety, from a matter of civil society, quickly became a priority for public policy. In three decades this concept has become very

Hubert C. de Grammont and Sara María Lara Flores, Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México, Cd. Universitaria, CP04510, México DF, México. e-mails: hubert@servidor.unam.mx and saralf@servidor.unam.mx

stringent. At first, it indicated simply the absence of chemical or microbiological contamination, but now possible links between foods and certain diseases (cancer, diabetes, etc.) or risk factors (such as cardiovascular disorders) are studied. Nutritional factors also come into play, focusing on prevention (for example, obesity or anaemia) and promoting health (vitamin content). Wilkinson (2002) observes that quality is associated with the consumption of non-industrialized products, particularly fresh organic fruits and vegetables, which approximates the concept of food to that of medicine. In this sense, he refers to 'functional food'. He adds that end foods are increasingly valued for ingredients that determine their quality in terms of promoting health. This has created an environment favourable for the adoption of advanced biotechnologies that incorporate greater medicinal properties. Thus, today, food safety has become one of the most important items on the agenda of research related to agro-food systems in developed countries.

In Latin America, the food problem is linked more with poverty than with health. Studies of agro-food systems have focused on other topics, such as the processes of concentration of production, reduction of salaries together with an increase in productivity, mobility, flexibilization and precarization of agricultural labour, as well as concerns derived from the operation of these productive systems relative to territorial re-ordering, social differentiation and heterogeneity, emergence of new social actors in the countryside, development of multiple activities and de-agrarianization, among other aspects (Aparicio and Benencia 1999; Bendini and Steimbregger 2003, 2005; Lara 1998, 2008a, 2008b; Lara and C. de Grammont 1999; Neiman et al. 2001; Venegas 1992; Bendini et al. 2006; Radonich and Steimbregger 2007; Seefoo 2005; C. de Grammont and Martínez 2009).

One topic that has received little attention in both developed and developing countries is the impact of technologies imposed by standardization of farm produce, particularly fruit and vegetables, on work processes and labour and living conditions of the workers. This is the topic we will analyze in this paper.

The changes that have occurred in the sphere of labour due to productive restructuring and flexibilization have led to the development of new concepts that reveal how labour conditions have deteriorated because of job precarization. This deterioration has been analyzed by several authors (Castel 1997; Gorz 1997; De la Garza 2001), who include in its manifestations an increase in unemployment, precarization of working conditions and inadequacy of classical systems of social protection. In short, they pose that the collapse of salaries is an irreversible process that 'de-stabilizes' the few stable workers left and makes the working class as a whole vulnerable (Castel 1997, 413).

The situation of workers, very particularly in agriculture of poor countries, has reached an extreme, such that international organizations have taken action. The International Labour Organization (ILO) promotes the concept of 'decent work', for workers in both the regular economy and those who work in non-standard modalities, considering the need to create conditions in which men and women can have opportunities of finding employment under principles of freedom, equity, safety and human dignity (Anker et al. 2003). This supposes creation of sufficient jobs, job safety, hygienic conditions, social security, income security and freedom of association, as well as eradication of child labour (Ghai 2003). Also, the United Nations, through the founding of Social Accountability International, set forth the

Social Accountability Standard, known as SA 8000, which is based on the international standards of human rights, including the Universal Declaration of Human Rights and the Convention on Rights of the Child. The principles on which this norm is substantiated are prohibition of child labour and forced work, security and health of workers, freedom of association and the right to collective negotiation, just working hours and fair salaries, elimination of cruel disciplinary and discriminatory practices in the workplace, and respect for the environment.¹ However, the quality and food safety norms are compulsory for export to the North American market, while the Social Accountability Standard and those proposed by the ILO are voluntary.

In our paper we endeavour to demonstrate, based on the case of Mexican vegetable production, that agricultural modernization through technologies that are less harmful for the environment and healthier for the consumer goes hand in hand with devaluation of labour and deterioration of the working and living conditions of the labourers, of whom more is now required to perform their jobs. We argue that the development of intensive agriculture, devoted to growing quality produce that a major fraction of consumers currently demands, is sustained by the use of a labour force that works under conditions of extreme precariousness in spite of the notable increases achieved in the productivity of their work. We first show that fresh vegetable production, particularly in the state of Sinaloa, responds to international quality standards which guarantee compliance with the food safety norms demanded by the US market through the US Food and Drug Administration (FDA) and Customs Service. Secondly, we show that, to do so, enterprises have modified the organization of work and modes of hiring to the detriment of their workers. While some enterprises have become concerned about following norms of social responsibility and for applying for certification in the matter, they still constitute notable exceptions. The living and working conditions of agricultural workers are worsening and are far from those described by 'decent work'. Undoubtedly, the impressive success of agro-food systems worldwide is accompanied by deepening poverty of their labourers (Klein 2009).

CHARACTERISTICS OF THE HORTICULTURAL SECTOR AND ITS ENTERPRISES

The Horticultural Sector

During the second half of the 1980s, intensive export horticultural production saw a new growth phase. This process is due to several combined structural and circumstantial factors, such as adhesion to GATT, application of neo-liberal structural reforms, signing of the North American Free Trade Agreement (NAFTA), and the devaluation of the Mexican peso in 1982 and 1994.

The significant growth of fruit and vegetable production can be illustrated by the following data. In 1960 vegetables were harvested on an area of 257,557 hectares,

¹ Private organizations, such as the Institute of Entrepreneurial Social Responsibility, also promote this norm in the private sector. Today, the need to create territories with social accountability, and not just the certification of single enterprises, has been proposed.

by 1980 the area had increased to 303,606 hectares, and in 2006 there were 576,557 hectares under horticultural production. In the first 20 years it grew 46,513 ha, but in the following 26 years it increased 272,951 hectares, nearly six times more. While in 1960 it accounted for 1.8 per cent of the total cultivated area, in 2006 it occupied 2.8 per cent of the total. In 1980, 73 per cent of the total area under horticulture was irrigated, while in 2006 the percentage increased to 80 per cent (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación 2008). Fruit production has also had important increases in area. In 1980, fruit accounted for 4.8 per cent of the total cultivated area; by 2006, production had extended to 6.3 per cent. However, because fruit trees are perennial plants, it is much more difficult to modernize in order to suit market demand. Fruit crops also generate a high demand for labour during harvest. Other crops that have undergone certain growth in area are fodder (from 15.1 per cent to 25.7 per cent), but here cultivation is highly mechanized and demands little labour. In contrast, the area devoted to cereals, dry legume, industrial crops and tubers has decreased.

During the same period, vegetable yields have increased significantly. Particularly high growth rates have been seen in the ten most important vegetables,² except for carrots whose yield has remained constant. These increases are highly variable among the regions and enterprises of the country but are much greater in the highly developed production regions where vegetable agro-export enterprises are located.³ The largest and most modern enterprises have introduced production techniques in greenhouses that allow them to achieve better fruit quality, because of absolute control of pests and diseases, and yields of up to 300 tonnes of tomatoes. In contrast, in regions where production is sold on the domestic market, national or regional, yields remain moderate: in Veracruz and Morelos average yield is 20 tonnes, in San Luis Potosí 26 tonnes, and in Chiapas 28 tonnes (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación 2008).

Production of fruit and vegetables as export crops has also grown in importance.⁴ In 1993, fruit and vegetables made up 57.9 per cent of the total export value of the agriculture-forestry sector (42.4 per cent vegetables; 15.5 per cent fruit), while in 2006 they accounted for 73.7 per cent (50.4 per cent vegetables; 23.3 per cent fruit). During this period, the mean annual increase in the value of fruit exports was 27.6 per cent and that of vegetables was 23.0 per cent (SAGARPA 2008).

Although it is often believed that the sector depends on foreign direct investment (FDI), it is domestic investment that is largely responsible for its growth (C. de Grammont 2007). Between January 1999 and June 2003, FDI was 70,891 million

² The most important vegetables (broccoli, zucchini, onions, dried chilli peppers, Serrano chilli peppers, sweet corn, cucumbers, tomatoes, tomatillos and carrots) generated 85.6 per cent of the total value of vegetables in 2006, while tomatoes accounted for 32.5 per cent and Serrano chilli peppers for 16.8 per cent of total. This concentration of the value of production is due not only to the increase in productivity, but also to a significant portion of the tomato and chilli production that is exported to the US, frequently fetching higher prices than on the domestic market.

³ Current mean national yields of tomato is 26 tonnes per hectare, but it is 62 tonnes in the Valley of Culiacan (Sinaloa), 46 tonnes in San Quintin (Baja California), 38 tonnes in Sayula (Jalisco), 45 tonnes in La Paz and Los Cabos (Baja California Sur) and 32 tonnes in Michoacán, thanks to the modern technology adopted in these regions.

⁴ Rello and Saavedra (2007) mention the importance of fruit and vegetable production not only for export, but also for the domestic market. In 1980, 84.7 per cent of the production was sold on the domestic market, while in 2003, the percentage was 74.6 per cent.

dollars, but only 181 million was invested in the agriculture-forestry and fishing sector, that is 0.25 per cent of the total FDI.⁵ The bulk of this percentage came from the US (97.6 per cent) while the Netherlands invested 1.2 per cent, and other countries 1.2 per cent. Most of this investment was channelled into pig production (68.9 per cent), followed by vegetable and flower production (24.6 per cent), fruit production (3.1 per cent), tobacco (1.2 per cent), and other crops (2.2 per cent), essentially in Sonora (65.0 per cent) and less in Sinaloa (22.9 per cent), Querétaro (4.6 per cent), Jalisco (2.4 per cent), Colima (2.0 per cent), and other states (3.1 per cent).

In terms of the enterprises, 270 in the agriculture-livestock-forestry-fishing sector have received FDI: 150 are agricultural (110 vegetable; 17 fruit), 56 are livestock enterprises (21 poultry; 11 pig farms), 10 forestry and 54 fishing. Of the 150 agricultural enterprises, 106 are associated with US capital and over half are located in the Northwest, Bajío and West (22 in Baja California Sur, 16 in Baja California, 12 in Sonora, 8 in Sinaloa, 12 in Guanajuato, 11 in Jalisco).

A study conducted in the most important export regions of the country (Sinaloa, Sonora and Baja California) found that 70.8 per cent of the enterprises operate on domestic capital, 27.1 per cent have mixed capital (Mexico and US), and only 2.1 per cent have completely foreign capital, essentially from the US. It is in the Culiacán Valley, Sinaloa, where most of the agricultural enterprises with foreign capital are found (Avendaño 2004).⁶

The constant increase in cultivated area, yields and value of fresh vegetable exports reveals an intensely dynamic sector in which direct foreign investment is not important. Except for some joint investments in cutting-edge technologies for greenhouses, most of the vegetable export enterprises are sustained with Mexican capital, accumulated throughout the twentieth century and achieving its greatest dynamism in the last four decades (C. de Grammont 1990).

Nevertheless, one trait of the horticultural sector is that its growers, especially small growers, are highly dependent on intermediaries, both domestic wholesalers and foreign shippers. Rello and Saavedra (2007) believe that this has meant a change of governance in the agro-food chain, strengthening large shippers of the central wholesale markets as well as foreign import enterprises and supermarket chains. This has all led to greater concentration of the production and to the hegemony of the shippers, who determine the quality standards for the agro-food chain.

The Export Agriculture Enterprises

It is the fruit and vegetable sector to which the most modern agricultural enterprises of the country belong. These enterprises are capable of competing with their

⁵ In the same period, investment in the food processing industry was 3,922 million dollars (5.5 per cent of the total FDI).

⁶ With a sample of 51 fresh vegetable export enterprises, this author found that medium-size companies (employing 101–500 workers) predominate in the sector (62.7 per cent), while large companies that have over 500 workers comprised 25.5 per cent of the sample. Small companies, with 31–100 workers, accounted for 11.8 per cent. In the Culiacan Valley, however, large companies predominate.

Table 1. Area devoted to export crops and number of production units that produce for export by interval of area, 1991

<i>Farm size category (ha)</i>	<i>Area devoted to export agricultura (ha) (2)</i>	<i>% area devoted to export agricultura by interval of area</i>	<i>No. export agriculture enterprises (3)</i>	<i>% export agricultura enterprises by interval of area</i>	<i>Mean area cultivated by export agricultura enterprises (2/3)</i>
National	445,942	100	11,712	100	38
Less than 5	11,300	2.5	4,291	36.6	2.6
5 to 20	43,743	9.8	4,422	37.7	10
20 to 100	77,378	17.3	1,920	16.3	40.3
100 to 1000	217,185	48.7	983	8.3	221
More than 1000	96,337	21.6	96	0.8	1003.5

Source: VII Censo Agropecuario, INEGI (1991). Table prepared by the authors.

direct rivals in the US.⁷ They have successfully managed to penetrate the world market thanks to the use of cutting-edge technology, new forms of management and organizing work, their incorporation in complex trade circuits, and timely supply of labour through intermediary networks that deliver cheap, abundant labour, mostly migrant farm workers (C. de Grammont and Lara 1999). These processes have driven up not only the value of production but also the productivity of labour, and consequently, the enterprises' profits.

Recent statistics are not available to make a balance of the situation of agricultural enterprises. The latest source is the 1991 Agricultural Census since the 2001 census was not taken. The available data reveal that, by that time, large and very large enterprises (100–1,000 hectares and more than 1,000 hectares) covered 70 per cent of the area cultivated (Table 1). Both our fieldwork and the results of other studies (Avendaño 2004; Maya 2004) show that since 1991, the sector as a whole has been fortified. The large enterprises increased their domination of the productive chain, and small- and medium-size enterprises grew, or at least modernized their technology and use of labour to respond to quality demands of the market.⁸

The export agriculture sector comprises very large enterprises that some authors have defined as 'Californian' because of their likeness to the American entrepreneurial model. The state of Sinaloa is outstanding for the size of its enterprises, its cutting-edge technology and production volume; other outstanding states are Sonora, Baja California, Michoacán, Jalisco and Tamaulipas.

In the state of Sinaloa, where in 1991 there were 590 fresh vegetable enterprises cultivating around 25,000 hectares, we can find a diversity of types, from small family businesses to large capitalist enterprises. However, only a hundred of them

⁷ The data included in this section were retrieved from <http://www.sagarpa.gob.mx:80//sistemas/siacon>, accessed 18 February 2007.

⁸ The first data of the VIII agricultural census, conducted at the end of 2007, indicate that 3,312 enterprises export, most of them to the US.

have their own packing sheds, and so the rest are forced to sell them their production; that is, they are inserted into the productive chain through the large enterprises. Avendaño (2004) confirms this situation. The bulk of the enterprises analysed by this author are grower-packers; more than half of them use the services of a shipper and export their produce through a broker, and 20 per cent market their own produce directly by installing their own shipping company or through alliances with US shipping companies.

The largest fresh vegetable producing-exporting enterprises have their own distributors in different parts of the United States to supply directly end markets, supermarket chains or fresh vegetable processing plants. Others have fused with wholesalers and distributors that place their production on North American markets, while the rest, the majority, consign their produce to brokers located at points along the US border, notably at Nogales and MacAllen through which most of the vegetable exports transit.

Up to this point the data presented have shown that the vegetable productive chain is dominated by large agro-exporters with Mexican capital that produce the bulk of the production, integrating small- and medium-size growers who serve to buffer the risks of overproduction in the context of a highly competitive and volatile market. In the aspect of marketing, only the largest have their own distributors in the United States; the rest market through American shippers or brokers. However, in the domestic market, the same large enterprises are those that, for around 20 years, have controlled distribution of vegetables through the Central Wholesale markets (*Centrales de Abasto*) of Mexico City, Guadalajara and Monterrey (Echánove 2002). 'Supermarketism' has acquired importance in the domestic distribution of produce, and it is important to point out that most of the supermarket chains buy 80–90 per cent of their vegetables at these wholesale markets, while the remainder is bought directly from growers (Schwentenius and Gómez-Cruz 2006).

Three conclusions are derived from this situation: (1) the large Mexican enterprises are capable of directly penetrating the US market, (2) the same enterprises also control the domestic supply, and (3) the supermarket chains in Mexico, most of them with American capital, depend on the supply controlled by Mexican capital. We can see that there is a very complex relationship among the different capitals that operate in this agro-food chain.

THE PROCESS OF 'STANDARDIZATION': FROM THE CONCEPT OF QUALITY TO THE CONCEPT OF FOOD SAFETY

A significant part of the investment in vegetable production has to do with complying with the international norms that guarantee quality of the produce. Allaire (2005) states that besides commercial opening, globalization also means de-territorialization and de-sectorization that, in some way, brings growers and end consumers closer through new 'standardizing' initiatives (for example, fair trade or organic products). The author argues that innovation in food products is not only linked to fashion, but also responds to the 'new demands of society' because of the individualization and personalization of the demand for services, as well as the constitution of a reflexive consumer subject who is concerned about moral

economy. In this sense, the author follows up on the distinction made by Lash and Urry (1994; cited by Allaire 2005) regarding the information the consumer should have: that based on the aesthetic content of foods from symbolic or cultural criteria and that which should specify its quality relative to established norms. In the second case, objective information is needed to 'trace' the products, that is, information that contributes knowledge about its intrinsic composition and the conditions and external effects of its production.

In 1979, numerous regulations that existed in many countries were systematized within the framework of GATT with the Agreement on Technical Barriers to Trade. This agreement was revised in 1994 during the Uruguay Round, and when the World Trade Organization (WTO) was created, it became compulsory for member states. The agreement essentially refers to technical regulations, standards and packing procedures, trade marks and labelling, but also alludes to food hygiene and phytosanitary problems (sanitation, absence of toxic pesticide residues, etc.). However, its main weakness is that there is no effective institutional framework for its application. Gradually, the WTO has updated the Agreement to implement increasingly strict sanitary norms. Currently used is the concept of food safety developed by the Codex Alimentarius Commission (a mixed FAO–WHO commission), which defines it as 'the guarantee that a food will not harm the consumer when it is prepared or ingested in the way it was destined to be used'. This presupposes that measures of hygiene are established all along the productive chain, from the field to the consumer, to eliminate pathogens, which in the vegetable productive chain are essentially salmonella and hepatitis.

However, since almost all of the Mexican vegetable exports (90 per cent) are destined for the US market, the strictest and most unavoidable requirements are those imposed by the US government: stricter in the level of compliance to the applied criteria, and unavoidable because of iron institutional control exercised to assure regulations are applied. In 1997, the United States announced its own initiative, the Produce and Imported Food Safety Initiative under the responsibility of the US Department of Agriculture (USDA). The initiative raised the standards applied to both domestic agricultural production and imported produce, becoming more complex over time. As a consequence of the September 11th attack in 2001, the US Congress passed the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, better known as the Bioterrorism Act. This act took effect on December 12, 2003, and its execution is the responsibility of the Food and Drug Administration and the US Customs Service, which are the USDA and the Department of Homeland Security. It raises the levels of protection with respect to food safety with more controls (in particular, laboratory analyses for phytosanitary control), and makes compulsory two requirements: registration with the FDA and electronic notice previous to each shipment of merchandise. In practice, this forces the enterprises that want to export to the US and do not have their own office in that country to contract an American agent, who may be their broker or distributor, or an importer resident in the US (Avendaño 2004).

The most important measures implemented by the Bioterrorism Act are found in the *Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*. The mission of these measures is to maintain produce free of contamination by human or animal faeces during the journey from the field to the packing plant, prevent

contamination from mud, require hygienic and sanitary practices on the part of workers during production, picking, sorting, packing and shipping. They can be summarized in two principles: Good Agricultural Practices and Good Manufacturing Practices.

The Security and Prosperity Partnership of North America, signed by the presidents of the three NAFTA countries in April 2005, reinforces this tendency. Strictly speaking, it is a programme of good wishes since the respective congresses were not even consulted, but the backing of transnational companies clearly indicates their intention to totally control food production. One of the working groups constituted to give continuity to the project, the Agriculture and Food Group, has as its objectives to strengthen food safety, to improve coordination among laboratories involved in inspection, and to increase cooperation in regulating agricultural biotechnology.

Food safety norms pose greater challenges for growers in terms of technological changes in the field and packing houses, new forms of organizing work, and greater investment. Indeed the challenges are so great they might be considered technical barriers to trade, a form of protectionism (Avendaño et al. 2006).⁹ Mexican producers have always had difficulties in adjusting to norms of product quality, presentation and aesthetics, which have led to numerous conflicts with North American distributors. In addition, their delay in adjusting to the new food safety regulations resulted in several crises provoked by contamination of food from Mexico (Maya 2004; Avendaño 2008).¹⁰ To remedy this situation, the Ministry of Agriculture, Livestock, Rural Development, Fishing and Food (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación* – SAGARPA) in 2003 created the General Office of Food Safety: Agriculture, Aquaculture and Fishing (*Dirección General de Inocuidad Agroalimentaria, Acuícola y Pesquera*), which grants official certification to producers who comply with international norms of food safety. This certification serves to recommend the producers who hold it, but it does not eliminate control exercised by the US government (Marañón 2008).

Undoubtedly, the role of consumers has been important in sensitizing enterprises to nutritive quality and environmental protection. However, they were forced to incorporate health norms when the Food Safety Initiative and the Bioterrorism Act of the US became the most important barriers to Mexican exports to that country (Maya 2004).

Today, enterprises devoted to biotechnology have taken advantage of the possibilities opened up by food safety: increasing interest in obtaining plants resistant

⁹ These authors calculate that investment costs attributable to complying with food safety norms oscillate between \$50,000 and \$2 million, according to data given by enterprises.

¹⁰ Avendaño (2008, 93) identifies three key moments that have negatively affected sales on the international market: in 1997, detection of hepatitis A in Mexican strawberries closed the borders to this fruit, giving way to Guatemala as the supplier to the US; in 2002, an outbreak of salmonella in the US attributed to cantaloupe exported by Mexico prohibited imports from Mexico, and Guatemala and Honduras again took advantage of the situation; in 2003, Mexican green onions blamed for another outbreak of hepatitis A caused another crisis in the sector, but since Mexico supplies 86 per cent of this product consumed in the US, the problem was solved rapidly. Besides these moments, in June 2008 a new outbreak of salmonella from eating tomatoes and chilli from Mexico, or Florida, unleashed still another crisis. These events reveal the fragility of the fresh produce market in today's context of globalization, in which quality criteria are imposed to protect the health of consumers.

to diseases and pests or with new nutritive or medicinal components. Thus, a new juncture appears between the agroecological perspective and food safety, where the development of local capacities of growers and fair treatment of consumers confronts another perspective controlled by transnational producers of Genetically Modified Organisms (GMOs) aiming to dominate the production–consumption chain of guaranteed hygienic agricultural products.

'STANDARDIZATION' AND PRODUCTIVE RESTRUCTURING

Standardization, which enterprises have had to accept if they want to export, has led enterprises to reorganize and incorporate new procedures to comply with the specifications established by law to permit 'traceability' of their products. Since 1998, large fresh vegetable enterprises of northwestern Mexico have received training in food safety to identify possible consumer health risks and the critical points of risk control. At the same time, distributors and consumers gather information about products and the production and labour conditions where they are produced in order to ascertain whether they respond to the quality standards defined by global markets.

In effect, Avendaño (2004) has found that with the implementation of the Food Safety Initiative, most of the enterprises she interviewed (88.2 per cent) reported having made changes to modernize their productive process, both technological and organizational changes. The most important costs were those of installing sanitary infrastructure for workers, agricultural machinery, storage facilities for chemical products, water treatment plants, post-harvest handling and cold rooms. The Bioterrorism Act has also provoked higher costs by requiring specialized personnel (technicians and engineers) and their training, computer equipment and electronic communications as well as a representative of the enterprise in the United States. The most onerous of all of these expenditures is the cost of worker training, which becomes acute because the poor working conditions cause a high turnover rate, and the enterprises are not able to capitalize on their investment.

In addition, the cutting-edge enterprises, those that become global, transnationalized and integrated into complex consortiums, radically changed their technology and abandoned the Green Revolution paradigm. The guiding principles of these new technologies are cost reduction, increase in labour productivity, and incorporation of the notion of 'quality' and 'food safety' to be able to launch their produce into market niches (Lara 1999). Outstanding among these technologies are GMOs, no-till farming, plasticulture and fertigation, as well as, most recently, production under protective structures: shade nets or greenhouses.¹¹ The use of these new

¹¹ Production under greenhouses is that which requires the highest initial investment, but it is the most efficient and secure from a food safety standpoint. Due to Mexico's excellent climate, greenhouses were introduced late. This sector has grown from less than 50 hectares in 1991 to more than 3,400 hectares in 2005. Tomatoes are the main vegetable crop grown in greenhouses. The USDA calculates that the volume of tomatoes produced in Mexican greenhouses and exported to the US increased from 3,728 tonnes in 1999 to 58,357 tonnes in 2003. It is also estimated that 80 per cent of the total area of greenhouse production is in soil, while 20 per cent is done with different systems of hydroponics. More than 70 per cent of the area has automated systems and 90 per cent use plastics as cover (Montoya 2001; Steta 2003). The increase in cultivation under protective structures is due to the high yields, up to 45 kg/m² of tomatoes (Steta 2003), better quality and

technologies has allowed growers to have produce that ripens uniformly and has a longer shelf life and to produce under more hygienic conditions in which contact with soil or pathogenic agents can be prevented.

Some of the enterprises, concerned with preserving their prestige, have also demonstrated their concern for respecting the Social Accountability Standard, whose observance is voluntary (Marañón 2006). This standard refers to human rights, labour rights and sustainable production. Nevertheless, each actor has his own interpretation of the norm and adjusts it to local conditions. The vegetable enterprises, forced to comply with international quality standards, offer training to certain types of workers, but the bulk of the farm labour is retained under precarious, non-hygienic living and working conditions in which basic services (potable water, sanitary installations, showers, etc.) are insufficient for the population of migrant workers who come to these regions looking for work. In the following sections we will examine this situation more closely.

PRODUCTIVE RESTRUCTURING AND LABOUR PRODUCTIVITY

Modernizing and restructuring the enterprises has had a strong impact on the demand for labour in quantitative terms (number of workers required to cultivate a hectare of vegetables), in terms of worker profile (sex, age, ethnic group, etc.), and in terms of qualifications. The strongest impact, however, has been on work intensity and productivity, with no impact in terms of improving working conditions. To achieve these changes, the enterprises had to adopt new forms of management (Lara 1998; C. de Grammont and Lara 1999). The case of standard-type tomatoes is a good example of how labour productivity has increased.

Before, to harvest a hectare of standard-type tomatoes yielding 21 tonnes required up to eight pickings. With the new technologies only three pickings are sufficient to harvest more than 30 tonnes per hectare. Thus, the same number of migrant workers can harvest a larger volume in a shorter time. Large enterprises, where tomato yields in the field shot up to 80 tonnes and more, had to double or triple the number of farm workers for the harvest (C. de Grammont 1999).

We can measure the increase in labour productivity with the coefficient of 'technical efficiency', which represents the amount of produce obtained for each work day. Although it is quite difficult to obtain data from the enterprises, we were able to calculate the coefficient in the case of tomato production in Sinaloa. In 1985, 264 work days per hectare were needed during the growing cycle to obtain 22.6 tonnes of tomatoes, resulting in an efficiency coefficient of 85.6 kg per work day. Ten years later, in 1995, 259 workdays per hectare were needed to obtain 34 tonnes, for a 'technical efficiency' of 131.2 kg. This meant an increase in labour productivity of 65 per cent (C. de Grammont 2007). In the same period, we calculated that the real value of the wages earned by these workers decreased 50 per cent (Table 2), while the National Accounts estimated that farm wages at the national level decreased 45 per cent.

better control to assure food safety, as well as to the possibility of non-seasonality, permitting year-round production. This has enabled the large enterprises to stop their search for climate niches, which before were necessary for all-year production.

Table 2. Evolution of real wages in the cultivation of one hectare of tomatoes in the Valley of Culiacán, Sinaloa, 1985–1995 (1994 = 100)

<i>Years</i>	<i>Total work days</i>	<i>Real labour costs (pesos 1994)</i>	<i>Variation in real wages (%)</i>	<i>Accumulated variation in real wages (%)</i>
1984–85	264	6,162.5	–	–
1989–90	258	4,307.5	–30.1	–
1995–96	259	3,413.7	–20.7	–50.8

Source: Confederación de Asociaciones Agrícolas del Estado de Sinaloa, Depto. de Estudios Económicos, Costos de Producción, 1985 a 1996 (typed manuscript). Prepared by authors.

Table 3. Evolution of labour costs as percentage of total costs of production of a hectare of tomatoes in the Valley of Culiacán, Sinaloa, 1985–1995

<i>Years</i>	<i>Total work days</i>	<i>Labour costs</i>	<i>Other costs</i>	<i>Total costs</i>	<i>Labour costs as % of total</i>
1984–85	264	2,199	6,085	8,284	27
1989–90	258	2,332	10,759	13,091	18
1995–96	259	5,415	28,256	33,671	16

Source: Confederación de Asociaciones Agrícolas del Estado de Sinaloa, Depto. de Estudios Económicos, Costos de Producción, 1985 a 1996 (typed manuscript). Prepared by authors.

Because of the increase in labour productivity and the decrease in real wages, labour costs dropped from 27 per cent of the total tomato production costs to only 16 per cent (Table 3).

This situation becomes acute with the adoption of greenhouses, a new technological leap. Again, in the state of Sinaloa, Steta (2003) calculates that in 2002–2003 greenhouses covered an area of more than 500 hectares (with a further 117 hectares under construction), but if we consider all of the protective structures (tunnels, shade netting, etc.), the total area of cultivation under protective structures was 630 hectares. Even though production costs increase markedly with the type of technology, the increase in productivity makes this alternative very attractive, as can be seen in the next table: one hectare of shade netting increases gross profits by 56 per cent over the best field technologies, while profits from greenhouse production increase by more than 500 per cent (Table 4).

The National Job Survey indicates that farm wage workers improved their incomes from 2000 to 2008: in 2000, 31 per cent of farm workers had incomes that were lower than minimum wage, 53 per cent earned one to two times the minimum wage, 11 per cent earned two to three times the minimum wage and 5 per cent earned more than three times the minimum wage. In 2008 these percentages were 19 per cent, 45 per cent, 27 per cent and 7 per cent, respectively. A superficial reading of these data could give the impression that salaries have improved. However, in the light

Table 4. Tomato production costs in Sinaloa using different cutting edge technologies, 2001

Production system	Yield (kg/m ²)	Production cost/kg (dollar)	Sale price/kg (dollar)	Difference/kg (dollar)	Gross profit/ha (dollars)
Open field	9	0.45	0.58	0.13	11,700
Shade netting	14	0.51	0.64	0.13	18,200
Greenhouse	22	0.55	0.87	0.32	70,400

Source: Montoya (2001). Table constructed by authors.

of our field data we can affirm that the increase in income is due to the generalization of incentives for productivity, wages set by piecework or task assignment ('*a destajo*'), among other wage modalities that tend to increase labour productivity, but without the legally established measures for job protection.

CHANGES IN JOBS AND WORK

In Mexico, statistics do not reflect the migrant population that works in the vegetable harvest, principally because the migrants are from very small remote localities across the country. Estimations have been made by the enterprises themselves, contractors and institutions responsible for attending the migrant population. In 2003 the Programme for Migrant Workers (PAJA – *Programa de Atención a Jornaleros Agrícolas*), formerly National Program for Migrant Workers (*Programa Nacional de Jornaleros Agrícolas*), estimated the presence of 200,000 migrant workers in the state of Sinaloa during the peak harvest season,¹² an estimation that coincides with that provided in 2001 by the Migrant Health and Support Program of Sinaloa (*Secretaría de Salubridad y Asistencia* 2001). The State Commission on Human Rights of Sinaloa, however, in its 2002–2003 annual report, put the number at 120,000 migrant workers. In Sonora, the same programme calculated 80,000 migrant workers in the entire state, 45,000 of which were working on the coast of Hermosillo,¹³ while it is estimated that 25,000 workers arrive in Baja California Sur (*Programa Nacional de Jornaleros Agrícolas* 1999). In Jalisco, the National System of Integral Family Development (*Sistema Nacional de Desarrollo Integral de la Familia* – DIF) calculated that 8,571 migrant workers arrived in the state during the period 1999–2000, and 5,132 were concentrated in Sayula (DIF–Jalisco 2000).

In spite of the difficulties in giving precise numbers, it is evident that vegetable production in these regions has generated a major demand for labour,¹⁴ which has unleashed large currents of migrant labour, especially from the indigenous regions of the country. The dynamism of the vegetable and fruit sectors in the regions

¹² Information provided by Arturo López Ruíz, PAJA coordinator in Sinaloa.

¹³ Information provided by Rubén Ángel Pérez, PAJA operations coordinator, Hermosillo, Sonora, and Elsa Adela Gutiérrez Rentería, supervisor of social workers of the Costa de Hermosillo region, Sonora.

¹⁴ In the 1970s, the total number of farm workers in the country was estimated at 600,000. Today, official statistical estimations vary between 2 and 3 million (C. de Grammont and Lara 2004).

where export production is concentrated and the continuous increase in cultivated area and yields of both vegetables and fruit suggests that the demand for labour and the migratory flows will continue to increase.

Major changes are now occurring because the new technologies have altered growing seasons; they have particularly expanded harvests, which traditionally were seasonal. Large companies now harvest diverse produce throughout the year and, therefore, the demand for labour is also spread out over a longer period. Several authors have thus referred to the existence of a new mode of employment: 'permanently temporary' or 'intermittent' jobs, which encourage migrant workers to settle permanently in the region (Lara 2008b). Undoubtedly, transformations in the enterprises where they work lead to constant changes in the situation of migrant farm workers.

Historically, vegetable production in Sinaloa was structured around a gender- and ethnic-based division of work (Lara 1998). The local residents, recognized as neighbours of the enterprise administration, were hired to do the less arduous work, some with permanent more qualified jobs as machinery operators, mechanics or supervisors in the field or packing sheds. They did none of the field work, which is done under the worst conditions with the lowest wages. Also, the local women were traditionally hired for packing and for guaranteeing quality in sorting produce for export (Lara 1993, 1998). In contrast, all of the field work was done by migrants. Originally, the highly marginalized population from the Sinaloan mountains provided the necessary manual labour (planting, weeding, placing stakes and twine supports for the plants), while migrants from other states, mostly indigenous people from the states of Oaxaca and Guerrero, worked in the harvests for five months in the winter (December to April).

This work division has now been modified by the introduction of greenhouses and plasticulture production techniques; however, its discussion is not within the scope of this paper. Although there is still a gender- and ethnic-based division of labour, the new technologies and food safety demands for export produce have led the enterprises to look for new worker profiles, which will be discussed below.

New Forms of Hiring

So-called 'contractors' or 'recruiters' have been instrumental in making the labour supply coincide with the demand. They contract workers living in widely dispersed, geographically isolated localities, often separated by thousands of kilometres. Up to now their function has been indispensable for smooth operation of the enterprises, although the importance of their work is not reflected in their incomes.

Astorga (1985) summarizes the role of the recruiters as: (1) they hire the workers, (2) they supervise their transportation, and (3) normally, they also oversee the migrants' lives in the camps where they are housed, as well as their work in the fields. Each enterprise works with a fairly large number of recruiters, who usually live in the migrant workers' home communities. The process of recruiting is carried out through hiring networks located in different states of the republic and centres in a single enterprise. It is a pyramidal grid system controlled by the enterprise, which not only determines the living and working conditions (hours, wages and

forms of payment) but also the number of persons to be hired and when they must arrive. During the 1997–2000 harvest seasons, these recruiters mobilized 80 per cent of the migrant farm workers hired to harvest vegetables in northwestern Mexico, while the other 20 per cent arrived independently through social networks (C. de Grammont and Lara 2004).

Today, hiring labour is more complex. As seen above, new technology has eliminated seasonality of production and thus of labour demand. This has encouraged greater circulation of workers and a process of permanent settlement in the periphery of intensive agriculture, forming marginal neighbourhoods or *colonias* (Lara 2008a). Both processes have strengthened the migrants' social networks and enabled them to have access to information on the best job opportunities, even outside the agricultural sector, and direct contact with the enterprises.¹⁵ Several studies have shown that these networks function in diverse manners (Durand 2000), although reciprocity has often been named as the element of cohesion.¹⁶

Settlement of farm workers around the fields is not a new process, but has accelerated recently for two main reasons. On the one hand, the poverty and the lack of job opportunities in their home regions added to the unproductive plots of land they own give them no incentive to return. They prefer staying where they can find work all year, even when it is intermittent. On the other hand, moved by the Social Accountability Standard and the rules of fair trade, the enterprises have encouraged the process to evade the responsibilities involved in housing their workers.

A Profile of Migrant Farm Workers

Between 1997 and 2000, we conducted a survey among the migrant farm workers in the vegetable-producing regions of Sinaloa, Sonora, Baja California and Jalisco (C. de Grammont and Lara 2004). We found that most of the migrants were from the states of Guerrero (29 per cent), Oaxaca (24 per cent), Veracruz (17 per cent) and Sinaloa (14 per cent). Most owned a home in their home towns (76 per cent) and resided there most of the time (74 per cent). About half of the household heads were poor farmers who owned and worked a small plot (55 per cent), 0.5–3 hectares on average, on which they cultivated mainly maize and beans for home consumption. The other half headed families that continued to live in the country but had no land, and thus lived only from wage work.

Most of the surveyed migrant workers (84 per cent) migrated cyclically in a pendular fashion from their home towns to the work camps. Another group (16 per

¹⁵ According to information gathered during our recent fieldwork in the valleys of Sinaloa and in San Quintín, Baja California, an increasingly significant part of the settlers divide their time between farm work and construction work or informal commerce and services.

¹⁶ Durand believes that each network has its own story and operates at different levels. The first, where generalized reciprocity exists in the sphere of the family, no payment or return is expected for shared goods and services (housing, food, information, etc.). This type of solidarity is characteristic of rural societies and is present in the first phase of migration when a group of family members or friends first adventure into a new place. The second level is that in which balanced reciprocity develops, even where family members are concerned. In this case, compensation is expected; this is not necessarily monetary or immediate. On the third level, negative reciprocity, the service rendered must be paid immediately. This is a transaction outside the market, but requires a previously agreed charge. Recruiters, in fact, establish negative reciprocity, demanding immediate payment from their employers.

cent) had settled in a camp or *cuarterías*¹⁷ and, from there, migrated to work in other places in a circular cycle. Most of the latter worked in two regions, and a few in three. By that time, it was remarkable that a small group (3.8 per cent) did not have fixed residence and worked in four or more regions throughout the year (C. de Grammont and Lara 2004, 62–3). This group, which we call 'permanent migrants without fixed residence', essentially comprises migrants from Guerrero and Oaxaca, the states with the country's highest indexes of marginalization. The category has been observed in other Latin American countries where it is known as 'errantes' or 'wanderers' (Da Silva 1999). The social vulnerability of these migrants has drawn attention, given that their households reveal the adoption of new 'family configurations' (C. de Grammont et al. 2003), divided between two or more places, even on different sides of borders. Thus, their relationship with government, civil (civil records) or social welfare (school, health centres, etc.) institutions is extremely weak or sometimes non-existent. Consequently, they often lose their status as citizens: with no record of birth or officially recognized identification, they possess no document that allows them to be recognized as such.

Although more recent surveys or statistics are not available to enable us to contrast the above data with the current situation, our recent fieldwork in the states of Sinaloa, Baja California and Sonora, together with that of Velasco (2007), reveals that indigenous migrant farm workers do not return to their home regions: a growing number tend to settle in regions of intensive agriculture or to circulate through several agricultural regions looking for jobs.

With the 1997–2000 survey, we found that the migrating population essentially comprised entire families (71 per cent), although there were also groups whose members were distant relatives or from the same locality (8 per cent) as well as individuals, men and women, who were alone. The prevailing age range was 6–19 years (74 per cent). More than half (59 per cent) of household heads were between 15 and 34 years old. This is a very young migrant population capable of withstanding the enormous physical difficulties involved in migrating, such as the living and working conditions of the fresh vegetable enterprises. Approximately 10 per cent of the household heads were single women accompanied by their children, relatives or persons from their home villages; 40 per cent of the migrant workers were indigenous.

In Mexico, school attendance (elementary school) is compulsory up to 12 years of age, and so it is assumed that children younger than 12 should not work. When the entire family of farm workers migrates, however, we observed that 49 per cent of the children worked in the fields with their parents. Of the population between 12 and 14 years old, 92 per cent worked. Children younger than 12 accounted for 10 per cent of the workers and those younger than 14 were 22 per cent of the total. The current trend continues to show the presence of families of indigenous migrant workers and the predominance of a very young population.

Even though standardization of vegetable production to assure food safety supposes training workers to a certain degree, we found that most of the migrant farm

¹⁷ *Cuarterías*, located in settlements or neighbourhoods where part of the migrant population has settled, are structures with several rooms, some of which are rented to migrant workers who arrive in the region for seasonal work.

workers who intervene in the processes of agricultural production barely have any schooling at all. The survey shows that 68 per cent could read and write, but of the indigenous migrants from Guerrero only 55 per cent were literate, with an average of only 2.6 years of schooling, while of those from Veracruz, 81 per cent had 4.3 years of schooling. Illiteracy is notably higher among indigenous migrants and women who were household heads. Among those that can read and write, 54 per cent did not finish primary school. The average number of years of formal education for men was 3.4 years, while for women it was 2.3 years.

These are some of the characteristics of the migrant farm workers from highly and very highly marginalized areas, who travel to the vegetable-producing regions of Mexico in search of seasonal jobs in the large enterprises of the north.

LIVING AND WORKING CONDITIONS

The camps where the enterprises house migrant farm workers are close to the fields, that is, far from any town or city. These barrack-like *galerones* are built of cheap materials (often sheets of cardboard nailed onto wooden structures, or occasionally brick walls with tarred cardboard, asbestos or galvanized metal roofs, and cement or dirt floors). The *galerones* are divided into 4x4 rooms, which have no furniture or windows; a wood-burning open fireplace for cooking is located at the entrance. A camp can have from a few dozen to hundreds of these rooms. An entire family (4–6 persons) stays in one room; they sleep on the floor and keep their scarce belongings in cardboard boxes. When there is a major demand for labour, the company often assigns two families to a room. In some part of the camp there are sanitary installations. The latrines, taps and showers are usually insufficient to cover the needs of the people, so that they must sometimes bathe or wash clothes in the irrigation canals, which are polluted with fertilizers and herbicides. Drinking water is supplied via tank trucks (*pipas*). The owners justify these conditions by arguing that the migrants have the same living conditions in their home towns (which is not entirely true) and that they cannot invest more since it is a matter of provisional housing. Access to these camps is closely guarded by company employees. The unhealthy, overcrowded conditions tend to be extreme and provoke an intense climate of violence. Drug addiction and alcoholism are rampant, and violence is recurrent. The misery of these camps contrasts with the modern farming and irrigation systems in the fields. Only a few large companies with a sense of social responsibility have improved the living conditions of their workers.

Nevertheless, this form of accommodation in camps is giving way to settlements peripheral to the farm fields. In these settlements migrant workers can rent a precarious dwelling (*cuartería*) from workers who have already settled in the region. Even though this solution increases their expenses, many prefer this option because it allows them to be more independent of the companies. Furthermore, although their living conditions do not improve substantially, they manage to have greater mobility, since in the camps they are practically in forced confinement, constantly watched by company *camperos* and foremen.¹⁸

¹⁸ The *campero* is a person paid by the company to oversee the organization of the camps and regulate the entrance and exit to the site, which they consider the company's private property.

As for labour relations, no written contract mediates the relationship between the labourer and his employer. Quite often it is the camp overseers or recruiters who function as informal contractors. In this way, the companies easily elude labour laws. Wages are determined by piecework or task assignment (*a destajo*): by the piece or bucket of the harvested produce, number of harvested rows, etc. This is true even when they are hired for longer periods, which supposes total labour flexibility and great wage flexibility as well. In this way, the companies are able to intensify labour productivity: the whole family works, they work longer hours and they work faster. Occasionally, they must bring their own tools.

There is no job security, and workers are constant prey to unemployment. They have no job benefits such as sick leave or workers' compensation for injury on the job. Nor are there holidays, paid vacation or shares in profits, all of which are provided for in the labour laws regulating temporary work. Migrant workers receive no training to prevent job-related accidents, and their health is at risk from exposure to pesticides, which are used indiscriminately.

Fertilizers, herbicides and insecticides are used without minimal observance of the safety measures required by law to prevent human health risks. Seefoo (2005) raises the issue that while developed countries become concerned about the 'undesired effects of insecticides' when they realize that the consumer is not spared from ingesting poison when they eat fruits and fresh vegetables imported from tropical countries, field workers who apply these chemicals are doubly exposed. They handle the chemicals in concentrated form and they live in areas polluted by particles suspended in the air and water, contaminating the food they consume daily. In sum, this context, even in the most modern enterprises, is far from approaching the conditions proposed by the ILO as requisites for 'decent work' (Lara 2008b).

The *Procuraduría para la Defensa del Trabajo* (Office for the Defence of Labour) was constituted to ensure that employers fulfil their obligations, however this government organisation does not carry out serious campaigns in these vegetable-producing regions, in particular with regard to affiliation of migrant workers to the *Instituto Mexicano de Seguro Social*, the public health system; therefore, they must pay private health care or self-prescribe medication.

In legal matters, the situation of migrant farm workers is hardly better. When an offence occurs, which is relatively frequent due to the conditions of violence prevailing in the camps, judicial procedures are deficient and disrespectful of human rights. A large proportion of migrant workers are indigenous; that is, they do not speak, or barely speak, Spanish, but they are not properly assisted by translators to support them in their declarations, as required by law.

Even though child labour is prohibited, it has not been eliminated because families need to counter the effects of the decreasing purchasing power of their wages.¹⁹ In some regions the practice has decreased and occasionally eliminated by standardization imposed on the importers who face the pressures of the US

¹⁹ Despite the fact that special programmes for migrant children have been put into effect, their effectiveness is limited because there is no adequate infrastructure. Some schools function in the camps. Many instructors fail to attend and most of them are not adequately trained to attend this type of population. Furthermore, it is difficult for the children to learn after labouring eight hours in the open fields. Finally, different indigenous languages coexisting in the same camp make educating the children even more difficult.

government and nongovernmental organizations concerned with 'fair trade' and social accountability. To contribute to solving the problem, 15 years ago the Mexican government launched a programme that offered parents a food basket to compensate for the monetary income lost by the prohibition of child labour and a place in schools that attend this floating population. The programme's impact on eliminating child labour was less than that of the export enterprises' need for certification. They respond to food safety laws, which require personnel that are able to adequately follow standards to guarantee the hygiene of the produce, rather than to social accountability standards. Nevertheless, child labour is far from being eradicated as long as poverty of the rural families continues unresolved.

Although trade unions of farm workers operate in the main labour-attracting regions (Sinaloa, Sonora and Baja California), they are not relevant in the actual defence of the labour conditions of migrant farm workers.²⁰ Historically, the temporary character of their work made affiliation difficult, but now, we must add the itinerancy and instability imposed by the flexible forms of operation of the agricultural companies. Consequently, trade union activity in these regions has lost the effectiveness that at some point it had. As migrants settle in the peripheries of the vegetable operations, neighbourhood associations based on ethnic membership have grown in importance. Through these associations issues have shifted from improvement of the migrants' labour conditions to improvement of living conditions of the settled population (Rau and Lara in press).

To summarize, in the operation of the export vegetable enterprises, people work under extremely precarious conditions, making it evident that globalization of agro-food systems goes hand-in-hand with the 'crisis of labour *precarization*' (De la Garza 2001), a situation extremely difficult to revert.

CONCLUSIONS

The processes of globalization in agriculture have led to re-accommodation of the agro-food chains. We can observe a search for flexible integration expressed in alliances among enterprises, in the process of increasing concentration of capital causing spatial rearrangement of markets, in diversification and volumes of quality products to assure supply networks in addition to new managerial strategies to ensure competitiveness in a market that is strongly standardized by international regulations and consumer demands (Bendini et al. 2006). Simultaneously, globalization promotes an important increase in production scales and yields due to introduction of innovative technologies and new forms of organizing labour that tend to intensify productivity. This develops in a widespread context of mobilization and precarization of labour along the productive chains.

²⁰ In Sinaloa, we find the *Sindicato Nacional de Trabajadores del Campo, Similares y Conexos* (SNTCSC), affiliated to the *Confederación de Trabajadores de México* (CTM). In the valley of San Quintín, the CTM has the largest social coverage through the SNTCSC. Another union operating in the area is the *Central Independiente de Obreros Agrícolas y Campesinos* (CIOAC), whose main force is located in the states of Sinaloa and Baja California, specifically in the valley of San Quintín. And in Sinaloa, the *Federación Independiente de Obreros Agrícolas y Campesinos de Sinaloa* emerges as a branch of the trade union, proposing the constitution of the *Sindicato Nacional de Obreros Agrícolas, Similares y Conexos* (SNOASC).

In Mexico, export fruit and vegetable production by a domestic entrepreneurial sector had been working successfully for decades. The advent of NAFTA provided even greater impulse, resulting in considerable increases in cultivated area, yields, concentration of capital and restructuring the productive chain where distributors impose quality criteria that govern the productive processes. In particular, and because this production is destined mainly for the North American market, the sector has been forced to incorporate extremely strict safety norms to avoid constant barriers and bans on Mexican imports. As a result of several crises provoked by contamination by salmonella and other pathogenic agents, new productive processes and technological changes have been introduced. At the same time, regional inequalities have deepened and several areas have become marginalized. These, in turn, become net expellers of workforce, part of which become wage-workers in areas of intensive agriculture. In this way, highly successful agricultural enclaves have consolidated, attracting increasing flows of migrant farm workers.

Many authors (Da Silva 1999; C. de Grammont and Lara 1999; C. de Grammont 2007; Bendini and Radonich 1999) have highlighted that one of the negative effects of global marketing of this type of commodities is the intensive exploitation of natural and human resources needed to compensate the cost of introducing new technology to conform to international standards. In spite of increased productivity of their labour, migrant farm workers have not seen improvements in their incomes or living conditions, while low production costs have put a great number of small and medium farmers out of business. Thus, while the organized action of consumers, especially in developed countries, has played an important role in re-defining new cultural patterns, in particular regarding health and environment, those who labour to meet these demands are subject to unhealthy living and working conditions and are constantly exposed to agrochemicals and other pathogenic agents: a scandalous contradiction. The concern of consumers for healthy food produced under quality and food safety norms is not balanced by a concern for treatment of the workers under social accountability standards; assuring 'decent jobs' in the export agro-food sector does not seem to be so important.

In this article we endeavoured to underline this contradictory relationship between the search for better quality products for consumers and the persistence of living and working conditions that are unacceptable in a modern society. We highlighted the manner in which technological and managerial changes have accentuated the processes of job precarization and social vulnerability of wage workers, particularly migrant farm workers.

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