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Sovereignty and Security in the Anthropocene
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ISA Peace Studies Section - Environmental Studies Section

Food Sovereignty

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Abstract

Regressive globalization and global change have created new threats for global and local food security. Reductions in crop yields, drought and floods have limited food supply, while the demand for biofuels, food imports in China and India, and speculative practices by agribusiness increased. World food stocks dropped to minimal levels and food prices escalated. Poor people cannot afford the needed food staple, while multinational enterprises have significantly raised their profits. This combination has created new risks for countries depending on food imports that are affected by climate change and poverty.

In Mexico, food prices rose by 63% in 28 months while minimal salaries grew by 4% annually. Declining income and higher production costs forced 500,000 peasants to abandon their land in 2007. Confronted with these challenges, peasant organizations promoted 'food sovereignty'. They exchanged drought-resistant seeds, improved sustainable agriculture with bio-fertilizers, built rain-collecting ponds and offered the surplus in local markets at affordable prices. They challenged the speculative and productivity oriented food security approach and proposed a strategy of 'food sovereignty', with an integral management of land, water, productive and consumption processes, local food culture, nutrition, education and adapted technology, combined with environmental services, land and water harvesting and greenhouse-gases mitigation.

Keywords: food security, food sovereignty, food supply, food demand, food prices, global environmental change, Mexico, peasant organizations

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1. Introduction

In the early 21st century, more than 2 billion persons depend on food self-sufficiency and another billion peasants suffer from eroded and polluted land, are unable to satisfy basic human needs, and are often forced to migrate to shanty towns or to cross illegally the borders to industrialized countries in search of jobs and quality of life (Scheingart, 2006; Oswald, 2006a). Thus, in the author's understanding 'food sovereignty' goes beyond the concept of 'food security' developed by ONU organizations, but also beyond the physical conditions of production and market. It involves *social* (Campos, 1995; Strahm/Oswald, 1990), *cultural* (Arizpe, 2004), *economic* (Calva, 2008/a/b; Martínez, 2003; Cadena, 2003, 2005), *political* (Kaplan, 2003), and *identity* factors (Serrano, 2004; Flores, 2001).

On this dual political and conceptual background, this chapter explores food² not only as a security issue of intake of nutrients (Oswald, 2005), but it forms part of a holistic understanding of life and a constituting element of any civilization. Thus it includes networks of connectedness, belonging, and relationships of trust, reciprocity, cooperation and exchange. It creates social benefits and risk reduction, but also innovative activities through a wider access to information and learning. It is a basic condition for life and development and a process of anchoring of personal and group identity, where social relations reaffirm the integration of a person inside a community with clear rights and obligations, such as access to land, credit, technology, training, market, life quality and rituals. Besides guaranteeing the physical and cultural survival, food also creates new opportunities for people-centered poverty alleviation and new understanding of 'rurality' and 'rururbanization'. In the second part the article explores the conceptual differences between food security and food sovereignty and related it with survival strategies. It explains the present situation of world hunger as a result of regressive globalization, where, international trade, subsidies in industrialized countries, food aid and non-commercial barriers avoid an integral development with food sovereignty for the developing countries. This hypothesis is explored in the case of Mexico a country with important natural, social and cultural resources, but still with a significant level of undernourished children and an increasing number of obesity among the people.

In the concluding part three models of food management are explored: the productive one developed through the 'green revolution paradigm' and the 'life science model' recently proposed by multinational enterprises (MNE). Both are evaluated in relation to the 'green or organic production approach'. The three paradigms are compared and related to its repercussion on environmental, gender, and human security (HUGE; Oswald 2001, 2006, 2009), where 'food sovereignty' is related with some traditional models of self-sufficiency such as the proposed by Julius Nyerere in his 'ujamaa'

² *Food* is the generic term used for vegetal and animal nourishment as a whole, in parts or its different versions (flowers, fruits, leaves, roots, milk, eggs, muscles, kidney, blood, etc.). It can be distinguished from nutrition, which is the process through which food is absorbed and transformed. Food intake is a biological necessity, determining the quality of life and health of a human being, and its nutritional requirements vary according to age, sex, physical activities, climatic factors, and health conditions. *Nutrition* refers to the process of absorption of food by living organisms'. It starts with ingestion, continues with digestion, where the proteins are transformed into amino acids and keeps on with the absorption of nutrients in the intestine. Once integrated into the blood, they are assimilated by the body and transformed metabolically in each cell. The last phase is the excreta of faecal material and urine, where also toxins are eliminated from the body.

philosophy, the Mexican ejido policy and by ecofeminists (Mies, 1998; Shiva/Mies, 1997; D'Eaubonne, 1974). It was taken up by *Via Campesina*, the most important world peasant movement and developed into a 'food sovereignty' paradigm (CLOC, 2004). This approach is able to link up small producers from South and North, East and West, and to produce enough food for a livelihood with dignity for everybody. This approach integrates democratic land reforms, local market structures, green agriculture, and natural seeds as the patrimony of peasants and indigenous communities, with a culturally diverse livelihood mostly in hands of women (Shiva 2008, 2009).

2. Some Conceptual Proposals

Food security, according to FAO (2003) gradually emerged in the mid-1970 when the initial focus was on:

food supply problems – of assuring the availability and to some degree the price stability of basic foodstuffs at the international and national level. That supply-side, international and institutional set of concerns reflected the changing organization of the global food economy that had precipitated the crisis. A process of international negotiation followed, leading to the World Food Conference of 1974, and a new set of institutional arrangements covering information, resources for promoting food security and forums for dialogue on policy issues (ODI 1997).

Focus was put on productivity, within a frame of green revolution paradigm, independent of social, environmental, and political costs. However, the problems of famine, hunger, and food crises obliged the FAO (2003) to recognize that vulnerable people are greatly exposed to famine:

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern.

Confronted during the 1990 with new models of fast food and food propaganda, people began to suffer more from obesity, cardio-vascular accidents, diabetes and cancer. Food security again shifted to healthy and innocuous food, able to maintain a person vigorous and active. Nevertheless, FAO confronted still with 825 million hungry people with 80 per cent of the poor living in rural areas food insecurity was defined as:

Rural development is critical for improving food security. The traditional agriculture sector has low productivity due to the lack of investment, inadequate water supply and scarce arable land. Rapid depletion of groundwater resources may be the most serious problem facing the countries (FAO, 2006: 20).

The Forum for Food Sovereignty in Rome in 2002 with an important participation of social movements and people from developing countries opposed this technological approach and defined:

Food sovereignty is the right of people, communities, and countries to define their own agricultural, pastoral, labour, fishing, food and land policies which are ecologically, socially, economically, and culturally appropriate to their unique circumstances. It includes the right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies.”

The increase of food prices during 2007/2008 threatening the Millennium Development Goals (MDG) obliged scientists and politicians to modify the dominant paradigm and to rethink the concept of 'food sovereignty', including a critical response to their past

development and modernization policies. But food security, as defined by FAO, did not include social and cultural factors of food and nutrition, nor land rights, seeds, credits, family ties, social relations of productive and consumption pattern together with communitarian cohesion. As food represents this holistic experience where different senses intervene (smell, flavor, touch, view) it cannot be reduced only to its physiological process. Each civilization has developed a culture of traditional, ritual and food specialties linked to religious and civil events. Different diets and food preparation, but also taboos, ceremonies and habits, are able to reinforce the cultural and territorial identity of people.

Therefore, *Via Campesina* understood 'food sovereignty' as "the right of peoples, communities, and countries to define their own agricultural, labor, fishing, food and land policies, which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce (and transform) food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food producing resources and the ability to sustain themselves and their societies" (*Food Sovereignty: A Right For All*, Political Statement of the NGO/CSO Forum for Food Sovereignty, Rome, June 2002).

Via Campesina, social movements, ecofeminists and indigenous organizations developed further their concept of food sovereignty and understand it as an integral process of production, commercialization, transformation and intake related to the family and community culture of food, proper of any region, social class and nations. Their understanding of food sovereignty includes:

- a) local production and trade of agricultural products with access to land water, native seeds, credits, technical support and financial facilities for all participants;
- b) inclusion of the indigenous, women, and peasants in regional and national rural policy and decision-making processes related to agriculture and food sovereignty;
- d) women are the main food producers worldwide³ and they are often in charge of transformation and local trade. Women and girls need access to land, credit and basic production at home and in the community. This process of food sovereignty is able to overcome the violent and unjust patriarchal structures within families, communities, social organizations, countries, and global economic systems and increases livelihood for marginal communities;
- e) the basic right to consume safe, sufficient, and culturally accepted non-toxic food, locally produced, transformed and sold, since food is more than intake of proteins and calories: it is a cultural act of life;
- f) the rights of regions and nations to establish compensations and subsidies to get protection from dumping and artificial low prices as a result of subsidies in industrialized countries;
- g) the obligation of national and local governments to improve the food disposal of its citizens through stimulus of production and transformation of food, subsidies, and economic programs to achieve food sovereignty in basic crops; discounts in urban poor regions, able to guarantee the basic food basket; popular kitchens;

³ In most countries of Sub-Saharan Africa (SSA), women represent: 33 per cent of the rural labour force; 70 per cent of paid rural daily work; 60-80 per cent of self-subsistence crops and local sale; 100 per cent of food transformation; 80 per cent of harvest, transportation from the fields to the community and food storing; 90 per cent of weaving and hooking; 60 per cent of market activities (FAO/SDWW, 1999: 2).

- h) governments should guarantee an adequate nutrition above all for babies, infants, and pregnant women, offering food supply for poor people, food in schools, and special food for undernourished babies and pregnant mothers;
- i) establishment of governmental food stocks to compensate bad harvests and the importation of basic crops from the world market, and when countries are threatened by famine get the advice and support from the World Food Program;
- j) clean water and sewage facilities to eliminate parasites, viruses, helminthes, protozoa⁴ and water-born illnesses;
- k) links among environmental services, agriculture, territorial planning and democratic participation in a democratic decision-making process to guarantee the livelihood and dignity of the most vulnerable in rural areas.

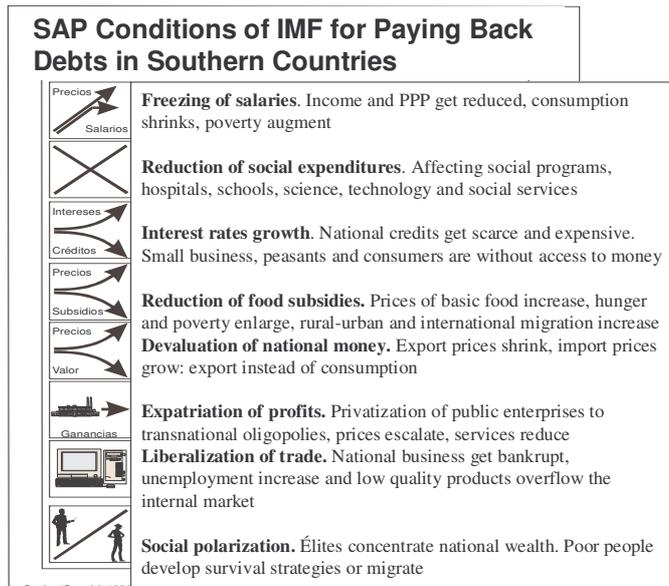
They create opportunities for rural population to stay on their field without pressure for migration and family disintegration. The sum of these processes reinforce for each citizen the basic rights of life, but also the right of non-migration, thanks to sustainable life with dignity in its own communities and countries. There is a basic right to food recognized in the Universal Declaration of Human Rights in 1948. It is also included in the International Covenant on Economic, Social and Cultural Rights of 1976:

“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food...” (Universal Declaration of Human Rights, Art. 25.1)

Consequently the right to food and food sovereignty is an integral component of social and human rights, based on existing international law and protected by a legally binding framework in international law. However, regressive globalization⁵ (Kaldor/Anheier/Glasius, 2003; Held, McGrew, Goldblatt, Parraton, 1999; Oswald, 2008a) and global environmental change (GEC; Brauch et al., 2008) have created new threats for global and local food security. Reductions in crop yields, drought and floods have limited food supply, while the demand for biofuels, food imports in China and India, improvement of live conditions in Latin America and North Africa. The present global economic crisis with great unemployment and strong devaluation of the money in most of the developing countries due to speculative practices of international capital is obliging the national economies to accept Structural Adjustment Policies (SAP) imposed by the International Monetary Fund (IMF), increasing the precarious life conditions of the most vulnerable (see graph 1).

⁴ Helminths are worms and their eggs living inside of a human organism or animals. Protozoa are single cell organism able to divide within a host organism. Malaria is caused by protozoa called *Plasmodium*. Other frequent protozoa parasites are Giardia and Toxoplasma.

⁵ Regressive globalization is understood in this context as a doctrine, rooted in the confidence of the efficacy, institutional building and moral authority of US power, allied with transnational capital in the sphere of communication, military, commerce, finance, and productive system. Using the term democracy and progress it is promoting a liberal global world order, favouring international capital and transnational productive systems. In the poor countries this process creates greater poverty, technological dependency, debts, massive rural migration and often loss of food sovereignty, while a small elite benefits from this alliance.



In this critical conditions, international organizations (FAO, World Bank, IFPRI) have directly linked ‘food security’ to the wider concept of ‘human security’ (Annan, 2005; Brauch 2008; Brauch/Oswald/Mesjasz/Grin/Dunay/Behera/Chourou/Kameri-Mbote/Liotta, 2008). ‘Freedom from want’ requires sufficient food (‘food security’), fertile land to produce it (‘soil security’) and water (‘water security’), but also prices covering production costs and support for poor people (economic security; Mesjasz, 2009). Human security includes not only quality of life, a decent livelihood, health, safe development (Álvarez/Oswald Spring, 1993) and stable productive conditions for almost half of the world population living in poor rural and urban areas, but concrete policy to overcome the marginal conditions of poverty and to orient the survival strategies into dignified livelihood.

Most of this survival strategies are in hands of women⁶ and horizontal and vertical integration of micro-business chains with micro-credit and technical improvements, enclosed under the term

⁶ Without governmental support, during this crisis situation traditional networks broke apart and women above all organized themselves to survive. After an illegal occupation of risky land in urban marginal areas, they built shelters from precarious materials (waste), picked up from landfills (Scheingart, 2006; Cantú, 2003; De Mattos, 2003). Chronic unemployment and missing opportunities for cash obliged them to get temporary precarious jobs. Simultaneously, they sold any unnecessary goods and borrowed from family members, neighbors, and from the corner shop. Soon, these possibilities disappeared due to the persistence of economic crisis, and food became scarce. Then, e.g. in Mexico City women organized themselves, picking up half-perished products from the garbage of the central market and transformed these products into food in collective popular kitchens.

Collective community work (kitchen, child rearing, pressure on public functionaries) was organized through a system of rotation. United, they fought for basic services (electricity, water, roads, security, health and community centers; Rosiques, 2003) and the legalization of land and services. Due to lacking cash and jobs, they struggled also for public subsidies and poverty alleviation programs (Ramírez, 1991). Besides all these activities, women still found time for some temporary paid work as domestics, washing or ironing; others generated services, handicrafts, food selling, etc. to be able to maintain their families. Children, grandparents, and sometimes husbands supported these complex strategies, where poverty of time was the highest cost paid by women (Damian, 2002).

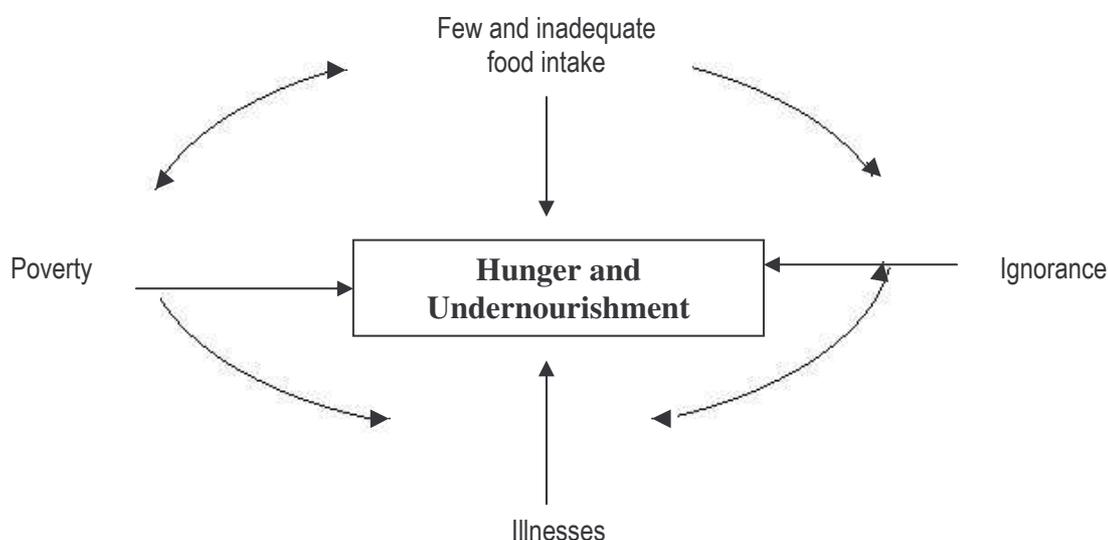
‘economy of solidarity’ or ‘social economy’ is permitting these highly vulnerable social groups to overcome their precarious life conditions and to escape the vicious circle linking hunger and undernourishment with poverty and ignorance (figure 2). In Mexico City, the manifold survival strategies (Oswald, 1991, 2008) may be synthesized in the following scheme:

1. Massive rural migration to urban slums
2. Illegal occupation of marginal and risky land
3. Construction of shelter with precarious materials from waste
4. Chronic unemployment of men and lack of cash
5. Selling unnecessary goods
6. Credits from family members, neighbors, and local shops
7. Economic crises deepened and food became scarce
8. Collection of perished fruit and vegetables
9. Collective popular kitchen
10. Rotation of women in collective community work (kitchen, child rearing, paid jobs)
11. Common struggle for basic services (electricity, water, access, community centre)
12. Communal organization for the legalization of land and services
13. Struggle for public subsidies and poverty alleviation programs
14. Temporary paid work
15. Multiple informal activities: services, handicraft, food, washing, ironing, services, prostitution
16. Social organization against organized crime and gangs
17. Empowerment and fight against interfamilial violence
18. Social and economic consolidation of the neighborhood and the families

Chávez, Ávila, Shamah (2007) related hunger and undernourishment with the poverty trap, including ignorance, illnesses and few or inadequate food intake, weakening the immune system or inducing obesity with degenerative illnesses such as diabetic and cardiovascular problems (figure 2). These authors analyzed the food transition in the Mexican diet from traditional corn and bean intake to a modern food pattern that is rich in carbohydrates, fat and sugar, thus inducing illnesses, excess of weight, and hypertension which starts in the womb of mothers, creating chronic malnutrition and later obesity and associated epidemics. This phenomenon exists worldwide and has contributed to a deterioration of food, livelihood, and health security.

Furthermore, these popular colonies have not only been hazard-prone but also exposed to organized crime and gangs. Thus, only a strong social organization permitted them to fight against public insecurity, where often the police was involved in illegal activities. The sum of these complex actions empowered women, and therefore they were also able to fight against interfamilial violence. As a result these women were often abandoned by their partner, and as heads of household they had to struggle for the future of their children (INEGI, 2005).

Figure 2: Vicious circle of hunger, undernourishment, poverty, and ignorance. **Source:** Chávez/Ávila/Shamah (2007: 208).



In synthesis, hunger is a complex interrelation where poverty is reinforced by ignorance and propaganda in the mass media, inducing people to buy junk food with their limited money. Unhealthy food creates further health problems above all for children, limiting their brain and bone development and adversely creating modern illnesses and degenerative processes from childhood on, while the traditional diseases from polluted environment and undernourishment coexist and reinforce the adverse development conditions for these vulnerable groups.

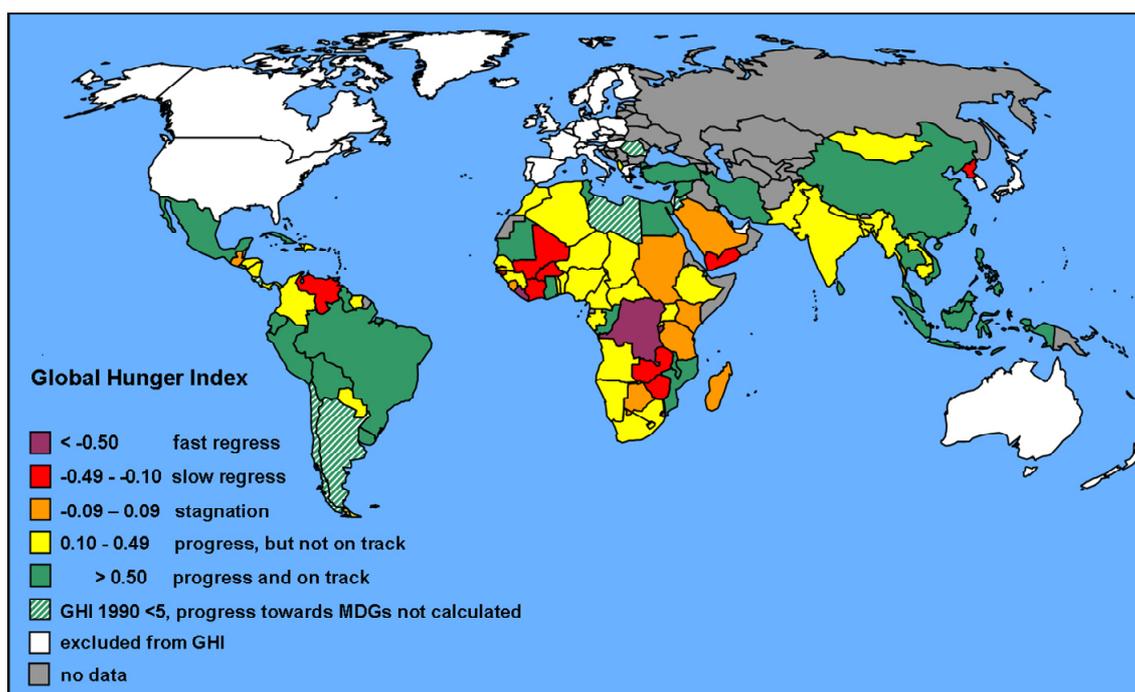
3. Hunger in the World

During 2007/08 world food stocks dropped to minimal levels and food prices escalated. Poor people cannot afford the needed food staple, while multinational enterprises have significantly raised their profits through speculative practices. This combination has created new risks for countries, especially those affected by climate change and poverty. During 2007/08 the increase of basic food prices has changed the process of diminishing famine and poverty, and 40 million new hungry people are reducing the possibility of most developing countries with substantial importation of basic food the possibility to achieve the MDG. FAO warned that 963 million (9 December 2008) suffer from hunger and during 2008 the World Food Programme (WFP) gave assistance to 86.1 million people in 80 countries. Rajendra Pachauri highlighted "the importance of lifestyle changes" and insisted that "vegetarianism is a beneficial gate into a more humane future: It helps the hungry. It helps the environment. It helps us all".

In 1996, in countries with a high *human development index* (HDI) the intake of nutrients represented 3,347 calories (11.6 per cent more than in 1976) and 102.7g of proteins (a 13 per cent increase); in countries with a medium HDI the intake was 2,696 calories (26.9 per cent increase) and 69.6g of proteins (33.7 per cent increase) and in countries with low HDI the intake was 2,145 calories (1 per cent less) and 51.0 g of proteins (4.4 per cent less). Another indicator of life quality is the birth weight. In industrialized

countries in 1997 seven per cent of babies had low weight, 17 per cent in countries with medium development and 20 per cent with low HDI (UNDP, 1999: 172-175). According to UNDP (2006), still 46.8 per cent of children below 5 years were undernourished in poor countries and 14.7 per cent in medium HDI countries. These processes are expressed in the Hunger Index summarized in figure 3.

Figure 3: The Global Hunger Index Progress towards the MDGs. **Source:** IFPRI (2007). The map is in the public domain; at: < <http://www.ifpri.org/media/20071012GHI/GHIMap07hr.jpg> >.



There exist also regional and social differences. Food production has augmented, but at the same time poverty, hunger, and preventive illnesses (HIV/AIDS) increased in several countries, above all in *Sub-Saharan Africa* (SSA). This region has at its disposal today 20 per cent less food than 25 years ago, despite the population increase (UNDP 1998, 1999, 2000, 2001). The SSA countries produced between 2002 and 2003 about 22.89 million tons (mt) of cereals; a small increase compared with the 21.55 mt of the previous year. This production is insufficient to feed the population and 15.2 million people are threatened by famine or require international food support. Causes are complex: in the former grain reserve of the region in Zimbabwe a corrupt government rules; in Congo a civil war is ongoing; and Namibia is confronted with a severe desertification process. In general, severe droughts and disasters have affected food production in many countries, but also the international trade rules (Calvo 2000) are unequal for Africa (Turner, 2003) and are reducing the terms of trade in favor of industrialized countries. This global food pattern is result of complex and multicausal processes, where local and global activities get negatively reinforced, and where *Free Trade Agreements* (FTA), indiscriminate openness of agricultural markets in the South, SAP imposed by IMF (Strahm/Oswald, 1990; Stiglitz, 2002), failed policies by the World Bank (mega-projects of dams and irrigations districts, and modernization of agriculture in hands of agribusiness) are creating hunger.

This critical situation worsened due to subsidies for agricultural products by industrialized countries, corrupt national governments, and local elites⁷, financial monopolies, exports of prime materials at international prices below production costs, debt payments, bank rescues, patriarchal structure inside families and society, lack of peasant support for organic agriculture, and low agricultural wages. With deteriorated and marginal land, polluted resources and high prices for agricultural inputs, often peasants are obliged to leave their community and migrate to megacities or illegally to industrialized countries in search of better livelihood, often at the cost of family disintegration and threats to life and dignity during the process.

4. The Mexican Case of Loss of Food Sovereignty

Mexico is a country threatened by climate change, desertification, exposed to SAP with a great dependency in its economy of the USA and still with an important number of hungry people. In Mexico food prices rose by 63% in 28 months (2006/07/08), while minimal salaries grew by 4% annually. Declining income and higher production costs forced 500,000 peasants to abandon their land in 2007. From Mexico the crisis spread all over LA, Africa, and to several Asian countries. The affected nations were obliged though draconic policies of SAP to pay back at any cost their debts, and as a consequence public support and subsidies were drastically reduced and rural policy concentrated on export products in hands of local landlords and transnational contracts. The adjustment costs of this failed policy were transferred to the workers and peasants, and later to the middle classes, which resulted in massive unemployment, loss of *purchase power*, increasing prices of the basic food basket, the elimination of controlled prices in basic products, a growing monopoly in the trade system, and a reduced purchase power parity (PPP) (Castillo, 1991; Oswald, 1991; Calva, 2003, 2008a/b; Strahm/Oswald, 1990). Keynes' limited 'welfare state' collapsed. Without governmental support and high inflation, only complex survival strategies integrating the whole family were able to compensate for the loss of PPP. Poverty doubled in LA⁸ and the structural inequality avoided an improvement for poor people (CEPAL, 2005).

Mexico is today one of the most unequal countries, with one of the richest man in the world (Forbes, 10 August 2007). During the 1980's its model of import substitution and stable development was replaced by a neoliberal globalization process (Klein/Fontan/Tremblay, 2003). After joining NAFTA in 1994, the effects in rural areas and for

⁷ An aggravating phenomenon for food insecurity is social inequality. Latin America is the region with the highest social gaps. This is a result of the appropriation of surplus by the military, political and economic elites, using repression, in alliance with transnational capital, The Catholic Church and the mass media were instrumental in creating a clientelist and corporative model of government. CEPAL (2004, 2007) compared the economic growth between 1960 and 1980 of 5.5 per cent/year with that of the neoliberal phase from 1980 to 2000 of 2 per cent when the IMF applied SAP programmes, consolidating the exclusive model of development (UNDP, 1990-2005). Most affected by these developments were peasants and indigenous people during these crises years, which were often pushed from their land and natural resources by TNE that imposed a model of capital intensive production when the country had enough human power. As a model of this unsustainable agribusiness a modern chicken farm must produce yearly about 240,000 birds. After paying credit and inputs to the TNE "this prodigious (and inhuman) production left the farmer only US\$12,000, or five cents/bird" (Gorelick, 2000: 5).

⁸ During three decades of crises, the popular sector of Mexico lost 80 per cent of its PPP and the relation of wealth between capital/work of GDP increase from 50 per cent to 85 per cent in favour of capital. This process reduced the workers' capacity to negotiate labour conditions and salaries, and the survival problems pulverized the labour struggles of a whole century (Bank of Mexico, 2006).

the peasant economy were disastrous. The wealth has been even more concentrated (table 1). Women have developed survival strategies for their children and elders, and often they have to pay the debt for the illegal crossing of their husbands. Also feminization of agriculture rose to 35 per cent (INEGI, 2006). Food imports affect both countries: the USA due to pollution of agrochemicals to raise yield productivity, and Mexico due to payment of US\$72 billion for food importation and job creation in a foreign country (INEGI, 2005). Only a small elite representing 0.23 per cent of the population benefits from this type of modern rape capitalism, owning 40.3 per cent of national wealth and 78 per cent of financial savings.

Table 1: Social Vulnerability and Internal Gaps in Wealth and Income in Mexico.
Source: INEGI (2005) and Bank of Mexico (2004).

Concept	% of population	% of national wealth	% of financial savings
Very rich	0.23	40.3	78.0
Poor	52.7	18.4	10.0

The effects of free trade, promoted by business monopolies, and the rapid openness by government without compensatory processes permitted an evaluation a decade later. The results are complex: economic growth was below one per cent; the employment policy was unable to offer to more than one million young people a job and the new employments are precarious, without social protection, and with 'white' trade union leaderships that are favoring enterprises. About half of the labor force is (self-) employed in the informal, often illegal sector, salaries declined by 60 per cent since 1982 and during a decade of NAFTA by 23 per cent. The indigenous and peasant economy is in crisis with half of the 80 per cent of poor people living in perverse poverty. More than one million peasants have left agriculture since the signing of NAFTA, and poverty is affecting half of the population (Wise, 2003; Nadal/Wise, 2004; Ackerman, 2005; Calo/Wise, 2005).

Half of Mexican children suffer anemia and 56 per cent of the indigenous children are severely undernourished⁹ (INNSZ, 2005). The indicator of municipal nutritional risk with 14 variables indicates that 70 per cent of the municipalities in the rural areas with a population of 30 per cent have severe undernourishment as a result of regional and social inequality (figures 4 and table 2). The severe undernourishment hardly declined since 1989 due to inflation and economic crises, while the concentration of wealth owned by tiny elites has increased dramatically.

Nevertheless, these global data do not reflect the existing regional and social disparities. Table 2 explains the level of marginality of Mexican municipalities where 54 per cent have high levels of poverty. This marginality is directly linked to hunger and low school achievement, mortgaging the future of indigenous and peasant children. There is also a

⁹ The indigenous population is especially marginalized. Only 20 per cent have water connections in their houses, 17.2 per cent have no electricity, 31.3 per cent have no schools; 19.9 per cent of men and 12.3 per cent of women have only a basic education, and only 8.1 per cent live more than 65 years. Mexico has a rich cultural diversity with 85 indigenous languages, where Náhuatl, Maya, Mixteco and Zapoteco represent 51.4 per cent. Nevertheless, languages such as Cucapa, Papago and Kilwa are spoken by less than 500 persons and are on the verge of disappearing (INEGI, 2000, 2003).

direct relationship among a high level of undernourishment, low size or weight for children under 5 years, with low income in rural marginal municipalities.

Figure 4: Comparison of national surveys on food, nutritional stage of children below 5 years of age, measuring size and weight in relationship to age. **Source:** National Nutritional Survey (INNSZ, 1974, 1979, 1989, 1996).

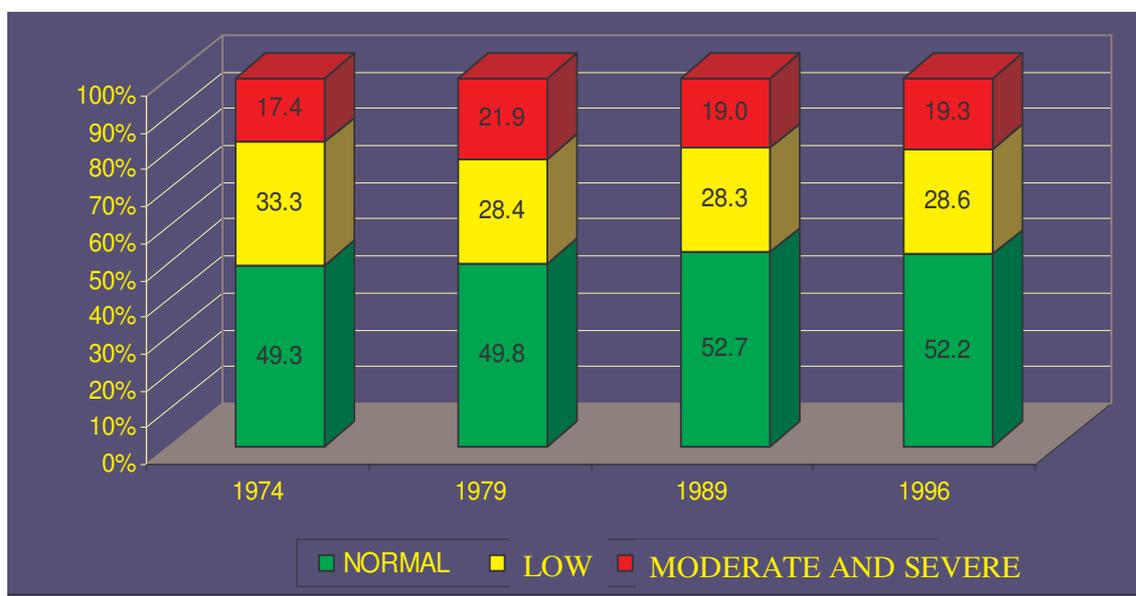


Table 2: Nutritional Priority in 2,443 Municipalities in Mexico. **Source:** Chávez/Ávila/Shamana (2006); based on the National Survey of Nutrition (INNSZ, 2005).

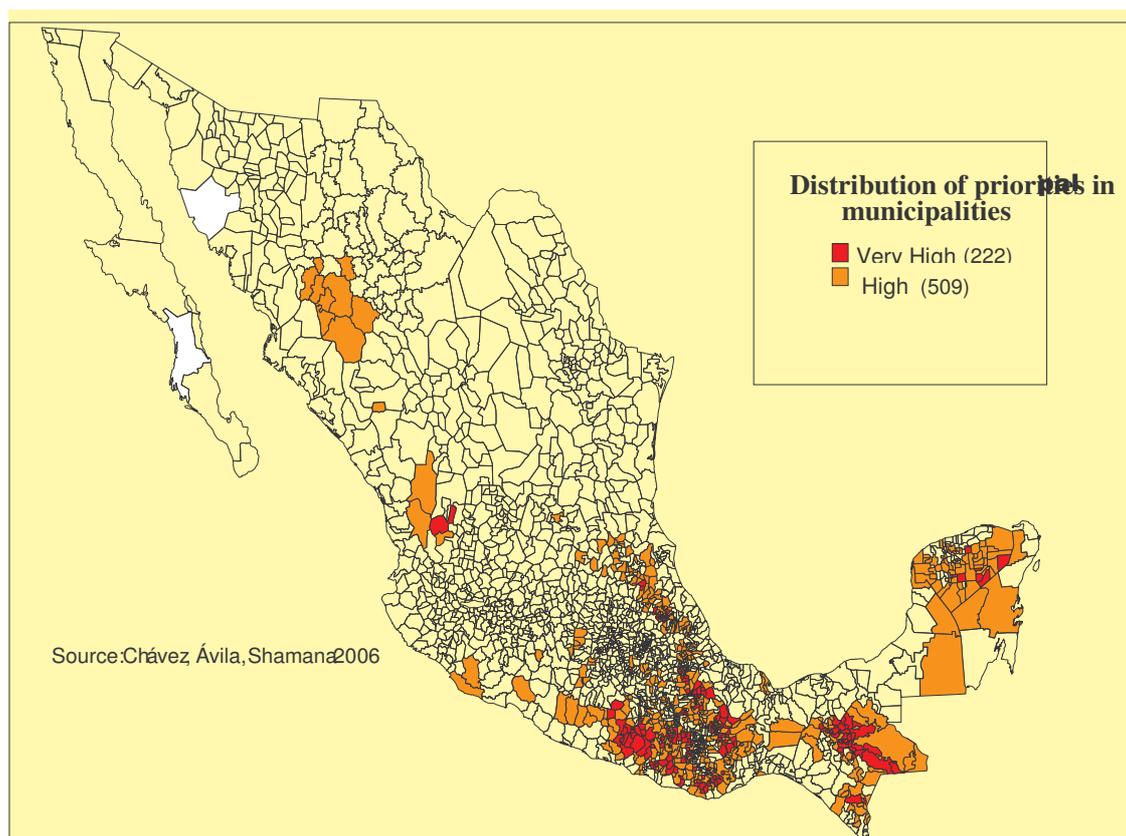
Level of marginalization	Municipalities Number	%	Level of undernourishment	Low size/children, Number	%	Affected municipalities
Very low	247	10.1	Very high	50	100	222
Low	417	17.1	High	40	49.9	510
Medium	486	20.0	Medium	30	39.9	365
High	906	37.9	Low	20	29.9	737
Very high	387	15.8	Very Low	10	19.9	369
Total	2,443	100.0	Without priority	0	9.9	240

Marginality and undernourishment are geographically located in the south of Mexico, where poor peasant and indigenous survive, and also in some indigenous municipalities in the north (figure 5). In the last survey on nutrition (2005), the northern states had improved their food access (except the indigenous Tamaulipas) and the traditional poor states in the south, Chiapas, Oaxaca, Guerrero, Veracruz, Yucatán, Hidalgo, Puebla and Campeche, are getting worse (INNSZ, 2005a). Regional inequalities are often triggered by internal and interfamilial social and gender discrimination. These processes further aggravate the existing perverse poverty among the most vulnerable within poor families.

The food perspectives for the future are uncertain, and will most likely get worse due to the massive use of corn and oil seeds for biofuel. Furthermore, confronted with climate change, disasters and greater drought, Mexico must take its food security problem

seriously, especially if the USA and Canada that presently provide more than 16 million tons of basic grain should become food insecure. Therefore, the term of ‘food power’, created in 1972 by Henry Kissinger, may generate structural instability, migration, and social riots.

Figure 5: Map of municipalities in Mexico with high and very high needs for nutritional attention. **Source:** Chávez/Ávila/Samanah, 2006; based on the National Survey of Nutrition, 2005.



5. Three Models of Food Production with Differential Effects on Social Vulnerable

Related to the conceptualization of food security and food sovereignty and the development of food insecurity in Mexico, a country with high potential of development, but weak governmental and economic structures, three models of food production and commercialization have evolved: a) the *productivity model* based on the green revolution policies; b) the *life science model* that relies on modern biotechnology, genetics and MNE; and c) the *traditional organic or green agricultural model with environmental services*. Each of them has differential effects on social groups and affects adversely vulnerable countries and people.

5.1 The ‘Productivity’ Model

Mexico was the birth of green revolution and government has promoted during the last five decades monocultures, intensive use of chemicals, veterinarian drugs, improved seeds, machines, fossil energy, and irrigation systems; a type of industrialization of

agriculture. This system provided urban areas cheap and homogenous food, but relied on high government subsidies, especially in industrialized countries and transferred the accumulation of rural areas to industrial zones, leaving poverty in the countryside. The production was controlled by agronomists, veterinarians, and the chemical industry. The Ministry of Agriculture managed natural resources such as soils, water, forests, flora, fauna, and fish. Health and environment concerns were marginal. Food is not treated as a cultural good or as a patrimony of thousands of years of human effort, but as a commodity. The limits of this model are imposed by negative effects on health (Gallaher, 2005), on the environment (scarcity in water and oil resources) and the destruction of the rural livelihood.

5.2 The 'Life Science' Model

In the 21st century a new model is emerging that establishes links among health, food production, and dietetic habits in form of organized clusters. Concrete genes are linked to specific illnesses and nutritional requirements (Nestlé, 2002), creating a scientific basis for life or a 'life science' paradigm (Lang/Heaseman, 2004). It refers to industrialized food as the balanced daily intake of proteins, carbohydrates, vitamins and minerals, all of them necessary for a healthy life. This model is demand-oriented and takes into account the consumers and their needs, while productivity is still important.

This *life science model* integrates the food chain in the form of clusters and relates it to production, transformation, and trade of food. It combines genetic research with field experiments, including biotechnology, engineering, nutrition, pharmacology, health, and mobile field labs controlled by multinational food chains. They offer clean, safe, and homogenous products that can stay for weeks on the shelves of supermarkets, thanks to *genetically modified genes and organisms* (GMO). Independently of an intensive propaganda in mass media, some undesired social, health and environmental effects can not be denied.

The 'life science' paradigm promotes a cornucopian vision of life where MNE resolves environmental, social, and health problems through science and technology. The present economic crisis shows the limits of the model, and it is horrific that thousands of peasants have committed suicide in India when GMO harvests failed and credits could not be paid back (Shiva 2003, 2008, 2009). With regard to food sovereignty there is no doubt. This model of production has enormously increased the costs of production (GM-seeds) and food prices, and created a monopoly of agro-chemicals and the transformation of basic food in the hands of MNEs. These processes are able to concentrate wealth within few hands, increasing poverty not only due to more expensive food, but also due to associated health problems.

5.3 'Green Agriculture' Model

The green model generates symbiotic relations and mutual dependence between nature and food production, and therefore uses soft methods of agriculture. It is regionally diverse and utilizes polycultivation, association of crops, rotation, mixed agriculture, bio-fertilizers, fixation of nitrogen from air to soil, bio-pesticides, traditional methods of soil conservation and food, integral management of water, plagues, and environmental services. Local agricultural production and trade, with access for peasants to water, seeds, credits, as well as technical and financial support could promote this model of

agriculture. This green model takes women peasants as key elements for food issues and agricultural consolidation. It encourages the participation of vulnerable (indigenous, women, and peasants) in the national and regional definition of rural policies. It can guarantee women access to land for production and livelihood, and through empowerment they can overcome the violent and patriarchal structures inside families, regions, countries, and the global economic system. It includes the right to peasant organizations to develop their own model of food sovereignty. They are now struggling for their right to produce and consume healthy, permanent, and culturally accepted food which is locally produced, sold, cooked, and consumed. When livelihood in villages and countries is guaranteed public resources for poverty and hunger alleviation can be reduced and reallocated for other development purposes, creating stable social relations synergies and cooperation where safe food and the environment improve public health and cultural diversity at the local level.

This third model reflects the food sovereignty debate. It understands food in a holistic way, where livelihood, sustainability, and culture are the driving elements to maintain the genetic diversity for future generations, offering healthy nutrition and establishing a direct relation among productive, commercialization, and consumption cycles. It represents also an alternative for almost 3 billion peasants, small farmers and marginal urban dwellers who still depend on their ancient technology. They carefully selected the seeds from the former year that were and are able to guarantee the next harvest. It consolidates the basic right to consume safe, sufficient, and culturally accepted toxic-free food that is locally produced, transformed, and sold.

6. Conclusions

Both the 'productivity' and the 'life science' paradigms have led to higher green house emissions. Aquifers have collapsed in India, Mexico and other semi-arid countries. Through genetic pollution both models have been destroying the biodiversity of southern countries. Thus, with regard to food security, but also for the survival of humanity and nature, the present understanding of food security has failed to combat hunger. It has rather increased the threats and risks of more serious famine not only in Africa, but worldwide. Imposing food security instead of food sovereignty, and destroying the traditional green production, could become a boomerang also for northern and developed countries.

Food is a cultural act of life and more than the intake of proteins and calories, productive processes and health. To overcome existing famine and hunger and offer humankind an opportunity to create justice and well-being all over the world by fulfilling the Universal Declaration of Human Rights in its Art. 25.1, organic agriculture is until today the only real possibility. Food sovereignty within the green paradigm represents the rights of people, communities, and countries to define their own ecological, social, economical, and cultural project of the future. Besides maintaining food as a pleasure of life, and not a threat to health and survival, it consolidates the world food culture and consumption for the future.

Is it a utopia to promote green agriculture in the 21st century? From 2000 to 2005 organic food production has grown by 20 to 30 per cent. In Germany organic food products grew annually by 15 per cent. A major increase has also occurred in the US where the *National Organic Programme* (NOP) supports small farmers and promotes

the certification of green agriculture where organic products grew from US\$1 to 13 billion from 1994 to 2003. In 2005 about 26 million hectares of land were certified and 560,000 farmers were affiliated.¹⁰

Via Campesina has campaigned against gene modified organisms and seeds and promoted laws favouring its alternative agricultural model. They insisted that environmental, cultural, and social factors are as important as the economy. Further, economic crises and increasing poverty in rural areas have created among peasants, the indigenous, and women a sense of security that they can manage their own food supply with regional resources and local seeds. At the international level, FAO has argued that food needs could be linked with a protection of the natural heritage within a market-based economy and economic incentives. But simultaneously, FAO has also promoted GMO seeds in diverse poor countries, and continues to support the 'green revolution' model. Many existing contradictions are inherent in both productive models, and reflect the struggle for hegemony and appropriation of surplus.

They can be synthesized as follow: the 'productive' model is unsustainable due to the scarcity and pollution of natural resources (water, soil, seeds, and loss of biodiversity). Ministers of agriculture have shifted slowly to the 'life science' model that is supported by ministers of trade who promote free trade and bilateral agreements. Health ministers have supported nutria-genomic research, biosecurity protocols and vaccines that are often produced from genetically modified plants. Productivity concerns dominate over inherent risks and threats for biodiversity and humankind, due to the uncertainty and insecurity of genetic manipulation and nanotechnology. Both could affect the essence of human beings and the future of life (Habermas, 2001). Both models induce a scenario of potential 'food war'¹¹ (Lang/Heasman, 2004), with multiple factors of aggravation: the quality and innocuous food demand, international commerce, governmental regulations, nutritional requirements, control of MNE, anti-monopoly laws in transportation, financial monopsony, security in food chains, supply of safe food products, coexistence of over- and undernourished people, environmental damages, science and technology in hand of MNE and a model of great food dependency and great risks. Arbitration among these many contradictions are often handled by experts associated with MNE and international organizations (FAO, WB, IMF, and WTO).

The data exposed show the limits of the productive model. Despite unimaginable advances in science and technology, hunger is still increasing and far from being eradicated. In synthesis, the paradigm of 'green revolution' and 'science of life' relies on governmental financial resources and MNE involvement; however, the consolidation of this model depends on the acceptance by consumers who are induced through advertisements to buy these products. Therefore, the competition among some MNE could leak information about damages in health through this model of food intake, and only impartial and strict governmental control can avoid a manipulation of consumers. But often the same pharmaceutical holdings are also selling medicaments, control hospitals through the stock market, and often repel demands to pay compensation for

¹⁰ See: Research and Market, 2005: *Current Organic Agriculture Market Worldwide: A Year in View, 2005*; at: <http://www.researchandmarkets.com/reportinfo.asp?report_id=302678>.

¹¹ The authors understand under food war the aggravation of the conflict where a vision between offer and demand of food, new scientific knowledge, unknown technologies, but also global and national policies linked to demographic changes and epidemiological transition could convert food in a generator of illnesses, as a result of private decision-making processes.

damages caused by unhealthy food. Their treatment (chemotherapy and radiotherapy) creates further collateral effects compensated with other expensive drugs. Their goal is the maximization of profits by taking away the surplus created by society.¹² These contradictions in the health, education, and food system were exposed by Ivan Illich (1976). The global deterioration of life quality and limited progress in hunger alleviation in most developing countries, as well as high levels of obesity and cancer¹³ in industrialized countries, offer organic agriculture an option for the future. Recent economic crisis is opening the corruption and interlinks among financial and governmental elites worldwide, but is also threatening the survival of poor people in the North and the South.

Therefore, food sovereignty is an alternative and offers nutritional, varied and healthy food, elaborated at home. The variety of food intake depends on the season and the region. Hunger can only be overthrown with an integral program where economic, natural, social, cultural and political capital are involved including democratic land reforms, credits, local markets and governmental supports for small agriculture and environmental services that improves ecosystem conservation. Small plots and orchards with mixed agriculture, aquaculture, rotation of crops and small livestock offer agro-ecological management, where the seeds represent the cultural patrimony of peasants, indigenous and women. They are yearly selected and reproduced and permit the integration of the extended family within an economy of solidarity, where local and regional markets promotes the small scale interchanges directly from farmer to consumer. This model increase natural, social, cultural and economic capital, but create also political stability, conflict resolution and governance. The horizontal and vertical integration of productive processes, reinforced by micro-credits and micro-insurance retain the accumulation in the rural areas, investing the surplus in family enterprises, able to improve the environmental and social conditions. The ecological footprint (Friend of the Earth, 1997) is minimal and the selling in local market avoids large-scale transportation and greater emissions of green-house gases. This model symbolizes an economic philosophy that maximize the social relations and the collective livelihood, where solidarity, poverty alleviation and complex economic strategies consolidate participative decision making processes and a model of direct democracy with care for the vulnerable and good governance.

Consequently, the small green production for poor people, peasants, women and minorities is organizing production (Barraclough, 1995, 1995a), selling and transformation of food; creates food diversity, and local markets increases local food security. More governmental support is still lacking, and also scientific and technological efforts to combine traditional and modern knowledge has to be developed, e.g. in New Zealand to improve yield and environmental services. There are enough universities that could support green models of production able to facilitate the creation of local jobs and offer young people an opportunity for employment and a decent life. However, the political and economic elites that benefit from the productive models are preventing an enhanced 'food security' combined with 'food sovereignty' and a dignified livelihood (Nord/Andrews/Carlson, 2004).

¹² The case of old people is often dramatic. They lose their savings for medical treatment and hospitalization. Once without resources they are abandoned and in the best case they go back to the traditional medical sector. However, governmental controls can further limit this alternative.

¹³ 45 per cent of deaths from cancer worldwide happens in the industrial countries with less than 20 percent of the total world population (Times, 15 January 2008:5)

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