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# **Population and Sustainable Consumption in Brazil\***

Donald Sawyer

## **Abstract**

Initially, this chapter analyzes how international literature and agreements have dealt with the subject of population and consumption patterns, pointing out gaps and fallacies. Although consumption causes environmental degradation in the North and poverty causes degradation in the South, there is also over-consumption among high-income groups in the South as well as very significant consumption of the middle classes. Income redistribution and reduction of poverty would not necessarily have net positive effects on the environment. In this context, population growth is important, but it can best be approached by promoting reproductive health. Thus, sustainability requires the explicit pursuit of sustainable consumption patterns in the South as well as the North. Recent trends in Brazil are examined, with regard both to population (growth, distribution and composition) and consumption, and prospects for the next decade are explored. How the subject is dealt with by the research community and in Brazilian public policies is also discussed. Some examples of practical experiences with regard to sustainable consumption are presented. Finally, attention is turned to the possibilities of a transition to more sustainable consumption patterns in Brazil, without first going through unsustainable patterns, and some alternatives for research, public policies and citizen action are identified.

## **1 Introduction**

Since 1992, the theme of production and consumption patterns has been a frequent presence in debates on sustainable development. However, discussions rarely progress from rhetoric to concrete proposals for action. Few scientists or activists have much to say about what could be done, other than reducing the over-consumption of the industrialized countries in the Northern Hemisphere. The difficulty of defining what to do, especially at the local scale, increases when developing countries are involved and when the issues of consumption and population are combined (Martine 1993a, 1993b, Sawyer 2001a). A study of the Brazilian case, that has certain prominence in the international context (Hogan 2001), may shed some light to help inform decision-making in Brazil and in international negotiations.

Without ignoring production, this chapter grants priority to consumption, which ultimately refers to what in Marxist analysis would be reproduction of the population or of labor power (Sawyer 1986). The Marxist tradition gives priority to production as the ultimate determinant of social life, while neoclassical

economists believe that production responds to the market and to consumer decisions, that are supposed to be sovereign. For present purposes, it is presumed that there is two-way interaction between production and consumption and that consumption, although largely determined by production, is not a simple reflection of productive structure. Final consumers, firms and government buy or refrain from buying goods and services taking into account various economic, political and cultural criteria, thus providing feedback that influences productive structures. It should also be noted that consumption is the opposite of saving, that could be invested to transform productive structures.

Introducing environment into the analytic framework reinforces the importance of consumption. When one attempts to establish some hierarchy in the multiplicity of causal factors of environmental impacts, consumption patterns, that are in large part determined by North-South relations, can be considered the deepest root cause of unsustainable development (Sawyer 2001a:282).

Following the definition of sustainable development, the new paradigm that emerged at the end of the twentieth century (World Commission 1987, United Nations 1992), the simplest form of defining sustainable consumption would be consumption that permits meeting the needs of present generations without harming future generations. It includes acquisition, use and disposal of products and services, at various stages of the product life cycle. It should be noted that development and sustainability refer to economic and social collectivities, while consumption by itself can refer to individuals or families. Thus, sustainable consumption is necessarily systemic and refers to collective patterns.

The present analysis takes into account patterns of consumption on the part of population and its repercussions on the consumption of firms and government. Population, i.e. families or individuals, consumes through the market or domestic production (self-consumption). The environmental impacts of final consumption are more or less direct. The impacts of domestic production are direct, while goods and services obtained through the market, purchased from firms, embed a series of indirect impacts or externalities resulting from use of raw materials and energy during production, transport and commercialization, along the whole productive chain. In addition to these impacts, population generates various indirect environmental impacts through the goods and services supplied by the government, such as education, health, transportation facilities and street lighting. All the direct and indirect impacts of consumption should be taken into account in an analysis of sustainable development.

The environmental impacts or pressures of anthropogenic origin considered in the present analysis include consumption of renewable and non-renewable natural resources (raw materials, land, forests, water and energy); loss of biodiversity and habitats; emissions of gases that provoke the greenhouse effect or depletion of the ozone layer; water, air, soil and sound pollution and overcrowding or congestion, among other possible impacts (see Sawyer 2001:283-4). The importance of considering the joint impacts should be stressed, especially with regard to ecosystemic functions, which maintain the conditions for reproduction of all life forms, and to inter-relations with social systems. When impacts are considered in a fragmented way, one loses view of socio-environmental interdependencies.

This chapter examines recent trends and future prospects of population and consumption in Brazil in the last and the current decades. The remainder of the chapter begins with brief comments regarding international perspectives on population and consumption. Recent trends in Brazil are then summarized, regarding both population (growth, distribution and composition) and consumption, as well as prospects for the first decade of the current century. How the subject is being dealt with by the research community and Brazilian public policies is discussed and some examples of practical experiences with regard to sustainable consumption patterns are presented. Finally, the possibilities of a transition to more sustainable consumption patterns in Brazil are examined and some alternatives for research, public policies and citizen initiatives are identified.

## **2 International Perspectives**

International perspectives on population and consumption are strongly influenced by a vision that is partially true, but overly simplified, that environmental degradation is caused by consumption in the North and poverty in the South (e.g. Leonard 1989, United Nations 1992, Martine 1993a, 1993b, Stedman-Edwards 1998). A dichotomy is posited between kinds of degradation driven by consumption and by poverty, in different hemispheres. In a less simplistic vision, it is recognized that there is also over-consumption among high-income segments in the South. In short-run cycles, degradation in the South is supposedly caused or exacerbated by economic crisis. The fallacious conclusion that it is drawn from this distorted view, at least implicitly, is that poverty reduction and economic growth would be positive for the environment and that environmental and social actions can run parallel to each other (Sawyer 1993, 2001a).

This half-truth masks reality and decisions based on it may produce unexpected and counter-productive results. In spite of some positive results, mainly on the social side, the reduction of poverty or resumption of economic growth would not necessarily have net positive effects on the environment, since increased consumption would inevitably involve greater consumption of raw materials, energy, land and water (withdrawals from nature) and greater pollution of the air, water and soil (return of residues to nature). It would be more correct to consider the balance of all the various impacts. The inconsistency of the alignment of the dichotomies between consumption/poverty and North/South can easily become a pitfall in the definition of public policies (Sawyer 1993, 2001a).

According to the well-known formula that also considers affluence and technology, population growth is important for sustainable consumption to the extent that it influences the total environmental impact of a society (Ehrlich and Ehrlich 1970, Harrison 1992). Population growth is more important in the South, where it is faster. However, the size and growth of population is disconnected from environmental impacts in most analyses of sustainable development, especially in the South (Sawyer 1993, Martine 1993a, 1993b, Hogan 2000).

According to the principles established at the International Conference on Population and Development in Cairo in 1994, environmental impacts due to

population growth could be approached by promoting reproductive health and reproductive rights, that are more acceptable objectives than demographic goals. Nonetheless, when public policies are formulated and budgetary resources are allocated, it would be useful to understand the relevance of population growth for sustainable development.

Existing unsustainable patterns and the perspectives of growth of both consumption and population make the explicit search for sustainable consumption patterns in the South imperative, without waiting for the problem to be solved in the North. In spite of all the attention given to sustainable development since the Conference of Rio de Janeiro in 1992, this imperative is far from being assimilated by scientists, governments and public opinion.

The issues of sustainable production and consumption and its relations to population have been on the official international agenda since 1992. The eighth principle of the Declaration of Rio de Janeiro establishes: "To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies" (United Nations 1992:9).

Agenda 21, the basic reference for implementation of sustainable development, deals with production and consumption patterns in a cautious way in Chapter 4, limiting its recommendations to greater efficiency in the use of energy and resources; minimizing the generation of wastes; assisting individuals and families to make environmentally sound purchasing decisions; exercising leadership through government purchasing; moving towards environmentally sound prices and reinforcing values that support sustainable consumption (United Nations 1992:40-42). Agenda 21 is comprehensive and multidimensional, but was not translated directly into policies and programs, except with regard to such global issues as climate, biodiversity and ozone depletion (Viola 1996). There was no convention on the subject of consumption and production, nor it is part of the mandate of the Global Environment Facility, that implements the international conventions and agreements (GEF 1996).

The Plan of Action of the Cairo Conference, held in 1994, that established a new paradigm for dealing with population and development, again called attention to unsustainable patterns of production and consumption and the need to combat over-consumption. The action plan urged governments "to modify unsustainable consumption and production patterns through economic, legislative and administrative measures, as appropriate, aimed at fostering sustainable resource use and preventing environmental degradation", but it did not foresee more concrete goals or actions, nor did it mention causal links between population and environment (United Nations 1994:15-16, FNUAP 1995).

In the field of research, the identification of tendencies toward lower intensity of energy, raw materials or pollution in more advanced stages of development raised hopes of overcoming the impacts of consumption by means of increased investment and technological change (Mueller 1998, Banco Mundial 2000, Brown 2001:89-110, Tolmasquim and Cohen 2001). According to this approach, environmental degradation was supposed to follow an inverted U-shaped curve (i.e., a Kuznets curve) according to the level of development or

Gross National Product (GNP). The main flaw in this optimistic reasoning is that, in most cases, it refers to impacts per unit of input, i.e. rates, not the total aggregated impact, an absolute value that continues to increase when total consumption grows. Lower rates are useful but do not solve the problem of total impact. Nor is material production replaced by services. To the contrary, they are added on.

Significant progress on sustainable consumption was made in some developed countries in the 1990s, especially in Scandinavia and Holland. The main advances occurred in Holland, where analyses were made of the impact of the country's consumption by means of calculating "ecological footprints", which show the total amount of natural resources it consumes, including resources in countries of the South (van Brakel 1999). This approach set an example for some other European countries. Denmark is considered to be a leader in the promotion of practices of sustainable consumption (Brown 2001:222, Novaes 2002). Norway established a specific center (GRIP 1996) and led international discussions on the subject, supporting a seminar on production and consumption patterns in Brasília in 1996 together with the Ministry of the Environment (MMA 1996, Ribemboim 1997).

Multilateral initiatives regarding sustainable production and consumption took place in the Organization for Economic Cooperation and Development (OECD) and the Commission of Sustainable Development (CSD) of the United Nations, but the delicate nature of the subject in developing countries led to emphasis on studies and indicators, with few concrete results (Robins 1996, Brandsma 1997).

Issues of population and consumption, dealt with in an integrated way or separately, have become part of the conflict between North and South, that replaced the previous conflict between East and West. Many governments of the North, especially the current government of United States, are contrary to any restriction to their own economic growth. Apparently, this conflict, that it is becoming more profound, will constitute the central axis of the Johannesburg summit, where the South is expected to demand of the North lower consumption levels, financial aid, technology transfer and access to markets. The outlook at the moment is for Rio+10 to be primarily a North-South conflict, with polarization between groups defending poverty reduction and environmental protection.

For Johannesburg, non-governmental organizations (NGOs), mainly of the North, are active participants. Consumers International has stimulated the debate on sustainable consumption (e.g. Consumers International 1997), as has the Consumer Unity and Trust Society (CUTS), of India. The Northern Alliance for Sustainability (ANPED) points to "the key role of NGOs in overcoming obstacles to sustainable consumption such as lack of awareness, information, understanding and acknowledgement of the driving forces of consumption; promotion of consumerism by marketing and the mass media; inadequate corporate accountability; political resistance to developing national public policies and lack of cooperation between governments and NGOs" (Waiting 2002).

In spite of the global dispute, the issue of what to do at the local level, after Johannesburg, with or without the support of the North, remains completely open. Brazil is in a favorable position to set an example about how to achieve sustainable

consumption, without first passing through unsustainable patterns already reached by the North. It is also in a favorable position to influence international negotiations, in Johannesburg or afterwards, together with other important Southern countries, like India, China and South Africa, as well as Latin America and the Caribbean and the G-77. Choices about the route to follow could be informed by better analysis of the current situation and probable future trends.

### **3 Recent Trends of Population and Consumption in Brazil**

This section summarizes some of the main demographic and consumption trends in Brazil in the last decade in order to characterize the situation at the turn of the century. It also points out what Brazil has in common with other countries and notes some of its specific characteristics.

The trends are identified without any attempt to analyze their causes, which involve complex interplay. Although the main determination of demographic patterns and of consumption takes place at the macro or structural level, there is also feedback from population dynamics and market processes to the productive structure and the class structure, as mentioned above. Furthermore, as seen below, there are also direct interactions between population and consumption.

#### *3.1 DEMOGRAPHIC TRENDS*

The 1990s witnessed the intensification or reversion of some of the previous demographic patterns and tendencies. This item identifies new population trends, as well as those already under way in previous decades, that can be considered most important for consumption, with regard to its level (total consumption) or its patterns (distribution among products and population groups).

Fertility, in decline in the whole country since the 1960s, is now close to the replacement level, with a total fertility rate of 2.2 children per woman. Mortality continued the decline begun in the 1940s, with life expectancy now at about 70 years (Berquó 2001). The two declines were already well under way before 1990. The fertility decline can be considered spontaneous in that it happened without public policies of family planning, while the mortality decline was intentional, especially with regard to infant mortality, although this effect was also due to fertility decline and to general programs of health and sanitation.

For families, reduced fertility meant a pattern of few children, typically two, that corresponds to new consumption patterns granting more weight to quality than to quantity and larger investments in each child. Besides the reduction in the size of nuclear families, there was also a corresponding reduction in the number of consanguineous relatives (brothers and sisters, uncles and aunts, nephews and nieces), i.e. shrinking of the kinship networks that in the past were sources of both help and family commitments.

In spite of rapid fertility decline, Brazil's rate of natural increase is now 1.3% per year. The current annual increase of 2.2 million people is significant for the growth of consumption, especially when there is increase in per capita levels.



Now, due to continuity of economic crisis, the growth of GNP is close to the natural increase of the population, which translates into insignificant increase in per capita income, if there is any at all.

Even when the total fertility rate declines rapidly, population growth has inertia and proceeds in waves. After the wave of youth entering in the labor market, consisting of children of the generation born when the fertility was still high, in the 1950s and 1960s, there is now a wave of these young adults' children entering school age, made up of the grandchildren of the generation born when fertility was still high.

The most noteworthy fact regarding population composition was that fertility and mortality decline resulted in aging of the population, which can have significant influence on consumption patterns. The previously broad base of the age pyramid is becoming as narrow as the middle (Berquó 2001:16, Hogan 2001:22-3). A population in which half of the total is less than 15 years old obviously has a consumption profile different from a population with only one quarter of the total in this age group. Adults and the elderly consume more than children, although children also drive consumption and, nowadays, demand more sophisticated products than in previous generations.

Another significant demographic change occurred in average household size. Between 1991 and 2000, the average number of people for household, that was over 5.0 in 1960, dropped from 3.9 to 3.8. This is due not only to fertility decline, but also to growth of the proportion of households headed by women, now about 25%, and the tendency for the elderly to live in households separate from their adult children (Gois 2002a).

To understand consumption, note should also be taken of the continuous entry of women into the labor force, in order to maintain or increase family consumption and cope with the wage squeeze and new consumption needs, with or without male partners and children. This movement of women from the home to the workplace, under way since the middle of the last century, resulted in more complete mercantilization of domestic production, so that reproduction increasingly takes place through the market.

Reduction in household size, increase in the proportion headed by women and residential separation among generations, in other words, pulverization of family units, also meant an increase in consumption needs because of reduction of domestic economies of scale. Concretely, each additional household requires common consumer goods for kitchens and living and dining rooms, such as refrigerators, stoves, tables, chairs and sofas. These households also require additional water and energy.

At the same time, there is growing liberalization of family relationships and greater independence of women and children from the family economic unit typically headed by men (Gois 2002a). Thus, consumption becomes increasingly individualized.

The trends of spatial distribution of Brazil's population and its temporary mobility have been considered more important for the environment than its size and growth (Hogan 2001:36). There have been important changes in migration and mobility patterns in recent years.

With regard to urban-rural distribution, the level of urbanization increased from 75.5% in 1991 to 81.2% in 2000, although significant parcels of the population continue residing in small towns (Veiga 2002). With the creation of new municipalities, the urban network became more dense, to the point that the average distance to a city (any municipal seat) it is now only 22 km. (Sawyer 2001b). As a consequence, urban-industrial consumption patterns became widespread, besides penetrating the countryside.

High rates of migration of Brazil's population decreased in the 1990s (Cunha and Azevedo 2001). In 1996, there were 4.1 million interstate migrants in the previous 5 years (since 1991), just 2.6% of the total population, compared with 5.0 million, 3.4% of the total, in 1991 (ABEP 1998). In the Northeast, traditionally the main source of inter-regional migrants, migration to capital cities largely replaced migration to the Southeast and Amazônia. There was also return migration, especially from the Southeast to the Northeast. Greater residential stability of population can influence the identification of Brazilians with their places of origin or current residence.

While migration defined in terms of permanent change of residence decreased, it seems clear that temporary mobility increased, although few data are available (Hogan 2001). Circulation between cities and the countryside, among more and less developed areas and even among different countries, including the United States, Europe and Japan, ends up influencing patterns of consumption of migrants and their home communities in the sense of creating new aspirations and incorporating modern goods and services into their lifestyles.

Not all demographic changes indicate homogenization of the patterns of consumption to conform with the modern urban-industrial model, in which reproduction depends almost entirely on monetary income. Surprisingly, the indigenous population more than doubled in the 1990s, surpassing 700,000 in 2000 (IBGE 2002, Carla 2002). In this period, the traditional populations of rubber-tappers, Brazil-nut gatherers, *babaçu* coconut cutters, fishermen, descendants of runaway slave communities and other groups whose livelihoods depend directly on extraction of natural resources also reaffirmed their presence (Diegues 1999, Almeida and Cunha 2001). Agrarian reform, that involved distribution of land to more than 500,000 families, contributed to urban-rural movement and new rural settlements (Malin 2002). Family farming became the responsibility of the new Ministry of the Agrarian Development (MDA) and its National Program of Strengthening Family Farming (PRONAF). Thus, if there is not a movement of counter-proletarianization, at least there is persistence of groups whose consumption differs from the modern pattern and whose reproduction is not totally integrated into the market, but depends to a significant degree on a wide variety of sources of non-monetary income derived directly from nature.

### 3.2 CONSUMPTION TRENDS

Recent consumption trends and future prospects should be examined in the light of pre-existing patterns, many of which Brazil shares with other developing countries, although it has some noteworthy particularities.

### 3.2.1 STRUCTURE OF CONSUMPTION

In first place, it should be pointed out that consumption patterns in Brazil derive from a colonial heritage that can be summarized in terms of the “*bandeirante* spirit.” Apparently unlimited natural resources and the transitory nature of settlement led to a culture that values rapid and predatory accumulation of wealth, with little or no concern for the degradation of nature or people (Morse 1965, Wegner 2000).

In spite of this common tradition, marked differences in consumption patterns exist. Throughout Brazilian history, in accordance with the class structure, a double pattern of consumption was established. In the post-war period, with very unequal distribution of income, the process of import substitution development depended on consumption by a privileged minority that constituted a market for deluxe durable goods produced with imported technology, imitating the consumption patterns of developed countries, while the majority eked out existence with low levels of consumption (Tavares 1972, Furtado 1972). Thus, Brazil reproduced internally the distance between center and periphery or between the First and Third Worlds, now called North and South.

Excessive consumption of the élites of the South is recognized internationally, but Brazil is distinguished for being world champion of income concentration. A small number of people holds a disproportionately large portion of the country's wealth and income (Lahóz 2002). There are now about 90,000 millionaires in Brazil (Sanchez 2002). Consumption by the élites, that often have several houses and cars, swimming pools, fancy appliances and numerous domestic servants, as well as traveling frequently, is more extravagant than consumption in developed countries.

In fact, however, the situation is not as simple as the dualist model suggests. In the first place, there is a vast middle class in Brazil. Furthermore, the lower-income strata, including workers and the lower middle class, at least in the urban areas of the developed regions, have access to a wide range of consumer goods (Wells 1976). The greatest risk unsustainable consumption resides precisely in the upper- and lower-middle strata.

Marketing professionals divide the population into classes A, B, C, D and E, with proportions of 5%, 19%, 31%, 33% e 12% (Gueirreiro 2001). Even supposing that 60 million Brazilians are totally or partially excluded from the consumer market (class E and part of class D), a generous estimate, there are more than 100 million people of the middle and upper classes (A, B, C and part of D), a number that is larger than the entire population of many developed countries. The consumption of housing, energy, automobiles etc. by this mass of consumers has greater impact in environmental terms than the wasteful consumption of a small elite, and its consumption is growing. In spite of the social exclusion of class E, there was inclusion of the lower middle classes through market processes and social policies. For these reasons, although it is useful for stressing the country's marked inequality, the dualist model is not appropriate for the analysis of consumption patterns and their environmental impacts in Brazil.

Some critics call attention to the consumerism of the Brazilian middle class, that is noted for showing off the acquisition of real estate, new automobiles, color televisions, sound systems, cellular telephones, video cassette recorders, DVDs, *griffe* clothes, cosmetics, beverages, pets etc. Advertising in the media generates preferences for superfluous goods that confer status, even when inconsistent with income. The middle class goes frequently to shopping centers that in the 1990s multiplied in almost all cities above 100,000 inhabitants. They buy imported products, whether they are legal or not, and bring suitcases full of purchases when they travel abroad. In sum, even without the exaggerations, a significant part of the Brazilian population, except class E, incorporated new "consumption needs." Televisions in the slums are one of the most notorious examples (Pádua 1999).

Such consumerism has economic and cultural explanations. On the economic side, it should be noted that, in spite of high interest rates, Brazil lacks well-developed financial markets that offer secure alternatives with financial return. Brazilians do not have habits of saving, preferring consumption or investment in real estate. On the cultural side, institutions have been mistrusted since the colonial times and slavery, which lasted until 1888. People with money rush to buy consumption goods when they suspect that a package of economic measures will be decreed. According to critics like Furtado (1972), the consumerism of the élites has a colonialist cast. Conspicuous consumption is seen as standing for progress, while low consumption levels are deprecated as a synonym of backwardness.

Consumption patterns in Brazil are remarkably different from one place to another. The largest macro-regional differences are those between the Northeast and North, on the one hand, and Southeast and South, on the other, with the Center-West in an intermediary position (Gazeta Mercantil 2002). There are also significant intra-regional and intra-state differences, among micro-regions and municipalities, as can be seen in maps of the municipal distribution of income (IPEA et al. 1998), consumption potential (Torres 1999) and census data on number of telephones, televisions, bathrooms etc. (ISPN 2000). Usually, consumption is more concentrated in and around capital cities.

The consumption of automobiles in Brazil is emblematic of unsustainable consumption. The annual growth of the fleet of vehicles is 4%, more than double the annual growth of population. Investments in public transportation, on the other hand, were modest in the last decade. Public investments in transportation were directed primarily towards facilitating exports, especially roads, many of which were privatized (Toledo 2002).

This bias in transportation toward exports and automobiles has impacts on consumption of space, air pollution and traffic accidents, *inter alia*. It should be noted that transportation based on automobiles becomes practically irreversible when it determines patterns of location of residences, businesses and other services, which become extremely rigid.

On a wider scale, the consumption of space, previously concentrated in the largest cities, now involves extensive horizontal expansion of urban peripheries (sprawl) and the multiplication of medium and small urban centers (Egler 2001).

The upper and upper-middle classes also build second houses, for weekends or vacations, along beaches and in the mountains.

The extensive consumption of space for housing has consequences for access to water and sewerage. In 1991, 86,3% of the urban households had access to the public network of water supply. In contrast, only 49,0% of urban households were connected to the public sewerage network. A very small part of the sewerage collected in Brazil is treated. Many cities discharge the sewerage collected directly into rivers, in addition to harmful industrial residues (Interior 2002). Thus, rapid growth of the consumption of water is not being accompanied by adequate disposal of the served waters.

The coverage of garbage collection is also low (Novaes 2002). An estimated 228,000 tons of garbage are collected daily, an average of 1.34 kg. per inhabitant, while only 40,5% have appropriate disposal (IBGE 2002). The composition of the garbage includes increasing proportions non-biodegradable residues such as metals and plastics (PET bottles, plastic bags and cups, non-recycled glass, disposable diapers, batteries with heavy metals etc.). Selective garbage collection is incipient in Brazil (Mandarino 2002).

In the area of energy, per capita consumption increased from 35.2 to 40.5 units between 1992 and 2000 (IBGE 2002, Almeida 2002). The 1990s were marked by the privatization of electric power companies. The crisis in 2001, that led to rationing in most of Brazil, changed consumer behavior. The government's response to the crisis was to construct thermoelectric power plants. In the countryside, rural electrification moved forward, reaching 3,000 of Brazil's 5,507 municipalities with at least partial coverage. Isolated initiatives of renewable energy appeared, with wind and photo-voltaic energy, as well as solar heating of water (Vianna 2001).

In the most rural regions, there is continued expansion of the agricultural frontier, which is now urbanized, resulting in uncontrolled deforestation in Amazônia and in the Cerrado region of central Brazil (MMA 2001, Becker 2001, Sawyer 2001b). This expansion is a result of both domestic consumption and the expansion of exports.

In agriculture, where indirect impacts of the final consumption of food products are felt, use of fertilizers and pesticides became more intense. In 1992, 69.44 kg of fertilizers per hectare were sold, an amount that grew to 128.83 kg in 2000. In the case of pesticides, use grew from 2.27 kg/ha in 1997 to 2.76 kg in 2000 (IBGE 2002).

With regard to food, meals purchased away from home became commonplace for all classes, except the poorest. There was multiplication of restaurants serving buffets of food sold by weight and fast-food chains and franchises, many of which provide delivery at home or in the work place.

Most of the timber extracted from Brazilian forests is for the internal market, for construction and furniture, or for use as firewood or coal, that still constitute a significant part of the Brazilian energy matrix.

In sum, the Brazilian consumer market is so large that, in addition to attracting foreign investment in the areas of automobiles, gasoline and pharmaceuticals, it is now also attracting sizable investments in retail trade, food

services, telephones and commercial banks. This market is not restricted to a small élite.

### 3.2.2 RECENT CHANGES IN CONSUMPTION PATTERNS

In the 1990s, there were some changes in consumption patterns in Brazil. At the more general level, there was an increase in the consumption of the low-income strata after the Real Plan of 1994, due to redistribution resulting from eliminating the inflationary tax. The effect was one-shot, in the middle of the decade. Subsequently, access to credit facilitated by economic stabilization stimulated the consumption of durable goods (Lahóz 2002).

In the last decade, consumption of proteins increased, while the carbohydrate consumption decreased. Now, Brazil is in fourth place in the world in the consumption of beef, with an average of 39.7 kg per inhabitant per year, just behind Argentina, Uruguay and United States (Burgierman 2002:44). It should be noticed that in terms of hectares of land used per nutritional unit, raising of livestock, including chickens and pigs, requires larger areas than grain crops, leaving larger "ecological footprints", and that cattle-raising was the main cause of the deforestation in the Amazon and the Cerrado (Egler 2001).

As in developed countries, Brazil witnessed a movement in favor of healthy lifestyles, which involve rejection of pesticides and genetically modified organisms in food, physical exercise and concern with fitness (Sawyer 2001a:291). In the same way, the anti-smoking campaigns of the Ministry of the Health produced effects, as had in previous decades the campaigns for breastfeeding. Such changes of health and nutrition behavior may "contaminate", in the sense of positive spillover, behavior with regard to consumption and environment (Guivant 2001).

Telecommunications (Siqueira 2002) and computer technology (MCT 2001a), that were revolutionized in the 1990s, reduced the need for people and goods to move around as frequently. It should be noted, however, that the use of Internet does not necessarily reduce paper consumption, as one could imagine, since there can be more printing when the volume of information increases at a dizzying pace.

In the 1990s there was also significant growth of do-it-yourself construction on the part of "ants" (*formiguinhas*), a name given to low-income families that became important buyers of cement and other construction materials after the Real Plan. However, an enormous housing deficit persists in the country, and 24 million people live in overcrowded residences (IBGE 2002).

In recent years, some cities of the Southeast and the Northeast faced rationing of water. Besides the effects of less rainfall, the reservoirs may be receiving less water in the dry period because of other uses of water upstream and the acceleration of runoff by agricultural land uses in place of forest cover. On the other hand, underground water is being consumed beyond its recharge capacity (Luiz 2002). Proposals to divert waters from the San Francisco and Tocantins rivers to the driest parts of the Northeast appeared during the 1990s. The most important recent development regarding water resources was the Law of Waters

approved in 1997. Watershed committees will charge fees for the use of water, that has become an economic good. Evidently, charging fees can influence consumption.

The crisis of energy in the middle of 2001 showed that it is possible to reduce excessive consumption up to 20% under duress. At the same time, however, it also made evident the limits to such reductions, which stabilized at about 10%. The experience suggests the need of material incentives or some coercion to achieve relatively modest reductions.

Another recent novelty is the growth of a national "green" consumer market, following the lead of developed countries. There is now a consumer market for natural, organic or phyto-therapeutic products such as fruits and vegetables that are pesticide-free, energetic drinks such as *açaí*, medicinal plants and natural cosmetics, in addition to growth of ecotourism. This trend is in part a return to nature by consumers who resist the artificiality of urban-industrial life, and in part a globalized counter-culture, but it is limited to élites with money.

In some cases, consumers seek environmental and social certification provided by independent organizations like the Biodynamic Institute (IBD) and the Forest Stewardship Council (FSC). The Brazilian government is also considering official forms of certification. Companies, in turn, are increasingly adopting international standards such as ISO 14000 in order to be able to compete globally. It is not evident, however, that willingness to pay on the part of consumers is as concrete in practice as it seems to be in opinion surveys (Simões 2001).

In part in response to consumers, but also because they seek new ways to make money, some leading businessmen have begun to speak of "sustainable business" (see Almeida 2002) and even of "turning back from the industrial revolution" (José Roberto Marinho, mentioned in Studart 2002:61).

One of the positive points regarding recent consumption trends was reduction in the consumption of chlorofluorocarbons (CFCs), gases blamed for destruction of the ozone layer. In the 1990s, Brazil accompanied the tendency observed in the rest of the world (Banco Mundial 2000). Between 1997 and 2000, there was a reduction of 21% in emissions (IBGE 2002, Gois 2002b, Barbosa 2002). It should be remembered, however, that the elimination of CFCs was not due to changes in consumer behavior, being a result of an intergovernmental agreement called the Montreal Protocol, signed in 1987. This convention was effective because it did no harm to industrial competitiveness, but only involved changing the process of manufacture of refrigeration equipment and aerosols.

In spatial terms, there are signs of weakening of the expansion of the agricultural frontier. Although deforestation continues at levels of about 20 thousand km<sup>2</sup> a year, about a third of the total area which has been cleared in Amazônia, 570 thousand km<sup>2</sup>, was subsequently abandoned (INPE 2002, IBGE 2002). This can reflect a trend towards spatial re-concentration of agricultural activity as it undergoes modernization and follows the same spatial trend as industry (Sawyer 1984,1985), as well as coming up against ecological limits to agriculture in the humid tropics, where heavy rainfall limits productivity (MMA 2001).

According to several studies, there was reduction of the number of people living in misery during the Fernando Henrique Cardoso government (1995-2002), without, however, significant change the concentration of income (Lahóz 2002). Overall, however, the most important fact of the decade seems to be that there was not larger growth of consumption because of the economic crisis (Gazeta Mercantil 2002). The 1990s were not much better than the so-called "lost" decade of the 1980s.

In the last three years, there has been an increase in the federal government's monetary transfers to the poor, such as payments for children who stay in school, food for mothers and children, the Program of Eradication of Child Labor, Young Agents and financial aid for purchasing bottled gas, in addition to already existing rural welfare payments, regardless of previous contribution (FUNRURAL). In 2002, the transfers began to be made by means of magnetic "Citizen's Cards" (FHC 2002). These monetary transfers, of low value per beneficiary, increase the consumption of the poorest strata, without significantly altering the distribution of income.

Another approach with less impact, already used, is for the government to guarantee access to essential goods and services, such as education and health, that thus do not depend on income and markets. In the recent period, the range of goods and services guaranteed by the government or at least considered as economic and social rights in international forums started to include energy, water, housing and food.

In sum, in the last decade social inequality went through some marginal adjustments that decreased poverty and guaranteed the minimum rights of citizenship. The market was held in check, while direct or indirect transfers of government resources and the informal economy assured the maintenance of the status quo, without much change in the concentration of wealth and income and without much concern for environmental sustainability.

### *3.3 INTERACTIONS BETWEEN POPULATION AND CONSUMPTION*

A variety of direct interactions can be observed among the size, distribution and composition of Brazil's population, on the one hand, and its levels and patterns of consumption, on the other, mediated by the class structure, the market and public policies. Some examples of those interactions follow.

One example of the influence of population on consumption is the fact that rapid growth of the number of households implies greater consumption of durable goods, as well as water and energy, as mentioned previously. In the same direction of causation, aging of the population contributes to increased consumption of durable goods, as a result of accumulation over the life cycle. Except for the very old, senior citizens generally have more income and accumulate more wealth than youth.

In the other direction of causation, from consumption to demographic dynamics, aspirations for consumption, intensified by mass media, are considered to have contributed to Brazil's fertility decline. In order to consume more, or at



least maintain existing levels during wage squeezes, families decided to have fewer children (Carvalho et al. 1981).

There are also more complex interactions. For example, the spatial redistribution of population and the integration of markets imply increased consumption of vehicles, highways and fuels for the circulation of goods produced for the national market, that increasingly replace domestic and local products. Also, to the extent that consumption competes with saving, resources for investment are scarce and the need for recourse to external savings (foreign loans) is greater.

The total needs of consumption of a large population almost totally integrated in the market and dependent on financial flows create economic and political tensions that lead to proposals for transformation, but insecurity leads to conservative solutions, that do not alter fundamentally the structure of production and consumption.

Rejection of inappropriate and counterproductive Malthusian responses (Hogan 2001) does not imply ignoring the environmental impacts of demographic tendencies with regard to population size and growth rates, that in turn have consequences for population distribution and composition. The Cairo conference showed that there are other ways to approach population growth, as there are various possible ways to approach consumption patterns.

#### **4 Research and Public Policies in Brazil**

Since the Conference of Rio de Janeiro in 1992, the manner in which issues of population and consumption in Brazil have been dealt with by researchers and decision-makers, in both government and civil society, has been a victim of the fallacy of considering environmental degradation in the South to be poverty-driven. As in other developing countries, it is politically difficult to deal with the environmental impacts of consumption.

The Brazilian Forum of NGOs and Social Movements for Environment and Development included production and consumption patterns as one of the chapters in the book it published at the time of the Rio+5 conference (Guimarães and Maia 1997). It granted attention that was absent from the book published five years earlier (Forum 1992), but did not deal with the issue of how to reduce environmental impacts.

In 1998, the National Confederation of Industries (CNI) included in its "Declaration of Principles of Industry for Sustainable Development" the goal of "Motivating the development and supply of products and services that do not produce inadequate impacts on the environment and community health" (CNI 1998). This was a declaration of intentions on the part of more progressive segments of industry. It is echoed by the Brazilian Business Council for Sustainable Development (CEBDS).

In São Paulo in 1999, the state Secretariat of Environment hosted an international seminar of the Group of Interregional Experts of the United Nations on Consumer Protection and Sustainable Consumption. The main concern was to revise of the United Nations Guidelines on Consumer Protection, which could not

be renegotiated, but some links between consumption and environment were recognized.

After the restructuring of the Ministry of Environment in 1999, the Secretariat of Quality of Life in Human Settlements (SQA) and the Secretariat of Policies of Sustainable Development (SDR) began to deal with several specific aspects of sustainable production and consumption (site of MMA). In July of 2002, the SDR promoted a seminar on sustainable consumption together with the Brazilian Institute of Consumer Defense (IDEC), a NGO that may be an important new actor in the area of sustainable consumption. It published an education manual for sustainable consumption in Brazil (IDEC 2002). The ministry's Secretariat of Biodiversity and Forests (SBF) deals with the sustainable use of biodiversity and equitable sharing of benefits, a theme that is tangential to sustainable consumption.

Since 1992, the "green" agenda has prevailed in the environmental area, with a strong conservationist bias, seeking to separate society and nature rather than promoting harmony. This resulted in the isolation of government agencies and NGOs concerned with environment in an "environmental ghetto", under excessive international influence regarding priorities and funding. The "brown" and "blue" agendas, referring respectively to the urban environment and water resources, that have more to do with Brazil's population, were secondary (Sawyer 2000).

An integrated vision of sustainable development was put forward by Brazilian environmentalist organizations and social movements, that propose a "socio-environmental" approach and advance the concept of "socio-biodiversity" (Forum 1992, Leroy 1997). This integration of social and environmental concerns is a characteristic that distinguishes Brazil from most other countries.

The Brazilian Agenda 21, that is being concluded in 2002, did not include the subject of consumption patterns in its design, which was organized around six themes. The theme of sustainable cities deals with specific matters such as public transportation and sustainable use of space, while the theme of reduction of social inequalities deal with poverty, albeit without an environmental focus (MMA 2000, Haddad 2001).

The project called "Democratic and Sustainable Brazil," carried out by a group of non-governmental and academic organizations with support from international sources, placed the subject of sustainable consumption explicitly on the agenda in Brazil (Pádua 1999, van Brakel 1999). However, the project's publications emphasize social justice and the North-South dimension, focusing on over-consumption of a small élite, without paying much attention to the inconsistencies regarding poverty and environment identified at the beginning of this chapter. They mention the idea of calculating the "ecological footprints" of consumption in Brazil, as was done in countries like Holland, but little was done in practice.

As in previous public opinion surveys in 1992 and 1997 (MMA 1997b), the 2002 study called "What Brazilians Think About Environment and Sustainable Consumption" indicated that a majority of people value sustainability in their discourse and show signs of sensitivity to sustainable consumption (Curly and Novaes 2002). The problem is that statements made to interviewers do not always correspond to changes in behavior (Simões 2001).

The proposal on **Environment and Quality of Life** prepared by the Socio-environmental Commission for the platform of the Workers' Party (PT) considers the unsustainable production and consumption models of the industrialized countries as something to be fought against at the international level, but does not recognize them as a problem to be attacked internally (SMAD 2002:10).

On the other hand, there are signs of official recognition of the problem of unsustainable consumption in Brazil, without falling into the distinction between consumption-driven degradation in the North and poverty-driven degradation in the South. When releasing the publication of **Indicators of Sustainable Development**, the President of the Brazilian Institute of Geography and Statistics (IBGE), Sérgio Besserman, commented: "The greatest attacks on the ecosystems of Brazil and of the planet come from wealth. The consumption pattern that exists in Brazil and in the world today is unsustainable" (Gois 2002b).

In spite of the signs of attention to the importance of the consumption patterns in Brazil, however, the Brazilian position for the Johannesburg conference seems to be one of resistance to the priority for fighting poverty, even when it is defended by the North. The official position, supported by many NGOs, is to stress environmental protection, while avoiding the subject of sustainability of production and consumption patterns, at least at home.

## 5 Future Prospects

The changes that occurred in population and consumption in the last decade signal some probable future trends that should be taken into account in decision-making in national and international forums in the future.

### *5.1 POPULATION AND CONSUMPTION PROSPECTS*

Future scenarios can be constructed on the basis of existing trends. According to projections, Brazil's population will stabilize at about 250 million inhabitants in 2050 (Carvalho 1999). The total increase of 80 million people in 50 years corresponds to average annual growth of 1.6 million people, a number that will be larger in the first decades of the century and will become smaller over time, with waves of cohorts of different sizes.

In the next 50 years, spatial distribution of population should undergo regional de-concentration due to economic de-concentration and differentials in natural increase of population. The official level of urbanization is expected to reach 90% (Sawyer 2001b), but another 15% of the population may remain in small towns, with less than 20,000 inhabitants. This corresponds to a total of 25% or 62.5 million people residing outside of cities in 2050, a number that is globally significant.

The age composition will undoubtedly include more elderly people and fewer children. The elderly will probably reside increasingly in separate households and more children will live outside of "complete" households including father, mother and siblings. Smaller households will generate new demands for housing, energy, water and sanitation, while the new family composition will also result in greater governmental responsibilities for reproduction.

Equality may increase somewhat, but socioeconomic heterogeneity will persist. It is unlikely that employment in the formal sector, that incorporates technology which replaces labor, will grow at the same pace as the population. Unemployment and sub-employment will persist. The government may guarantee essential goods and services and maintain a social safety net, but will not eliminate inequality.

Even though the rich may get richer (Sanchez 2002), Brazil should increasingly be a middle class country, consuming at the limits of its purchasing power. Perhaps it can eradicate misery and mitigate poverty, without making consumption explode. Alongside mercantilization, there will probably be a popular economy of families inserted only partially into the consumer market, satisfying part of their consumption needs through direct use of natural resources. If it respects the limits of natural resources, which in Brazil are abundant, this self-consumption can be sustainable in economic and ecological terms.

In the institutional framework, the redefinition of rights of citizenship in the sense of incorporating consumption of essential goods and services, i.e. increasing State responsibility for reproduction, reinforces the link between population and consumption. The tendency is progressing so as to incorporate water, food, energy and housing as economic and social rights. The direct environmental impacts of guaranteeing these rights does not contradict the principles of sustainable development, defined explicitly in terms of meeting human needs. The point is to guarantee basic needs, not excess consumption.

The new rights, in turn, pressure public expenditures and the public deficit, contribute to the "Brazil cost" and intensify the need to export agricultural and industrial goods. Since Brazil tends to export products that are intensive in natural resources and energy and extensive in space (Torres 1993), this impact of population on the environment occurs in an indirect way, through pressure to export.

On the whole, these probable future trends imply constant increase of consumption of raw materials and energy, pollution of water, air and soil and increasing volume and more problematic composition of solid, liquid and gas residues. In the last decade, in spite of economic crisis and wage squeezes, consumption increased significantly. The constant increase of the impacts should continue even with greater efficiency and cleaner production processes, that will probably not be sufficient to compensate for the increases of consumption in absolute terms.

Even without increase of income, there will be larger per capita consumption of water and energy, resources that involve specific problems. Water can become scarce for human consumption, energy and irrigation, except in the Amazon. In the short and medium run, new energy will be generated more by thermoelectric than by hydroelectric plants. Thus, the Brazilian energy matrix, that stands out for its clean make-up, will become increasingly less clean.

Since consumption patterns have direct implications for the economy, it will not be as easy to decrease general consumption as it was to reduce the consumption of CFCs. What can be done is to decrease iniquity and reach greater balance and stability, without seeking total elimination of social inequality or inter and intra-regional inequalities. In addition to the semi-arid interior of the Northeast

and the interior of the Amazon, which are vast, one can expect persistence of pockets of low consumption such as the Ribeira Valley, the Jequitinhonha valley, northeastern Goiás and the Chapada das Mangabeiras. In a new equilibrium, with more equal national integration, the less favored regions could constitute consumer markets for the industrial park in the Southeast, especially in São Paulo, as long as the inhabitants of these regions have enough income to purchase the industrial products (see Cantanhêde 2002).

## *5.2 ENVIRONMENTAL IMPACTS*

In any future scenario, except economic collapse, coming decades will witness a considerable increase in total consumption, the composition of which will imply greater use of raw materials, land, energy and water, as well as larger volumes of residues put back into nature, including more dangerous and non-biodegradable substances. Although it is not appropriate to defend economic stagnation or social inequality, one can analyze and try to minimize the socio-environmental impacts of different consumption scenarios.

The environmental impacts of increases in consumption and changes in its composition can be partially compensated for by more efficient and cleaner production and distribution processes, green consumerism and recycling. However, it should be remembered that improved efficiency may lead to a net increase in consumption if it involves lower prices.

The main obstacle to this modern or post-modern solution is that this kind of compensation for increased consumption is not a priority for Brazilian government or society, nor it is now consistent with predominant neo-liberal principles. It would conflict with the concrete interests of both consumers and the productive sector, that usually prevail over abstract appeals for sustainability on behalf of future generations.

Furthermore, technological solutions are less viable than might be hoped. In the first place, developed countries resist the transfer of technology, that they now use to maintain their economic hegemony. At the same time, technological development in Brazil tends to give priority to publication over patents, high technology over appropriate technology, basic over applied research and productivity over sustainability, with little concern for environmental impact (see MCT 2001b). It is especially difficult to invest in technology when interest rates are among the world's highest.

The largest brake to or accelerator of consumption in coming decades will almost certainly be economic and unintentional. If economic growth returns to the levels that occurred during the "Brazilian Miracle", between 1968 and 1975, when growth rates were around 10% a year, or if there is a significant redistribution of income, social progress will take place at the cost of environmental sustainability. Moderate growth would be better for sustainability; rapid growth is not necessarily a pre-requisite for reducing inequality.

Conscious change in the direction of more sustainable consumption patterns may be facilitated if there is greater awareness of immediate environmental threats, for present generations, including children and grandchildren, rather

than threats to future generations. Immediate threats include the lack of water or energy, floods and landslides, traffic congestion, accidents with dangerous residues and the contamination of water and food.

At a more general level, conscious change requires recognizing the contribution to collective well-being of changes in individual behavior, something which is still culturally difficult among Brazilians, who are known for wanting to take shortcuts and win favors in the Brazilian way (*jeito*) and "take advantage of everything" (see DaMatta 1986). Another requirement may be to overcome the deep-rooted notion that modernity is sustainable and that tradition is a predatory colonial heritage (see Castro 2002).

## **6 Positive and Negative Experiences of Sustainable Consumption**

Some concrete examples of initiatives that contribute to sustainable consumption in Brazil may help identify possible paths to the future. Other examples of initiatives that do not contribute to sustainability can also be pointed out.

### *6.1 POSITIVE EXPERIENCES*

Recent positive examples of sustainable consumption that deserve attention, whether they are intentional or not, are:

- Savings of electric power of 20% during the crisis of 2001, that changed consciousness and behavior even after the end of obligatory rationing, when consumption remained about 10% lower.
- Charging fees for water in accordance with the new Law of Waters, putting an end to the notion of water as a free resource with infinite availability.
- Promotion of mass bus transit in cities like Curitiba and mass rail transit in large capital cities.
- National programs of use of alcohol as fuel for automobiles, both pure and mixed with gasoline, and use of bagasse as a source of energy in sugar cane mills.
- Rotation of permission to enter the center city for cars with even and odd-numbered license plates on alternate days in São Paulo, reducing traffic congestion and air pollution.
- Recycling of aluminum and paper, among the highest levels in the world (79,2% of the production of cans of aluminum), due to availability of low-income gatherers of recyclable material.
- Proposal of exemption for the Tax on Industrialized Products (IPI) for recycled aluminum, avoiding double taxation, as an economic instrument for environmental management.

- Selective garbage collection in cities such as Brasília, Porto Alegre and Curitiba.
- Grinding of used construction material for reuse in Curitiba and Brasília.
- Initiatives of organic agriculture, agro-ecology and agro-forestry in the whole country.
- Approaches of "coexistence with the drought" in semi-arid Northeastern Brazil.
- Approaches of "sustainable livelihoods" and sustainable use of biodiversity adopted by the Small Grants Program (PPP) of the Global Environment Facility (GEF).

Details about these experiences can be found in a survey taken at that time of the Rio+5 conference (MMA 1997a), in newspapers and magazines and other specific publications (ISPN 1999, Nogueira 2002).

## 6.2 *NEGATIVE EXPERIENCES*

Some examples of actions or omissions that do not contribute to or that go against sustainable consumption are:

- Government promotion of the automobile industry as a symbol of development.
- Construction of thermoelectric power plants instead of introduction of renewable energy (wind, biomass, photo-voltaic) and construction of hydroelectric plants, especially small hydroelectric projects.
- Absence of attention to sustainable consumption and production in environmental and other public policies.
- Lack of connection between issues of population and issues of consumption, environment or sustainability.
- Fragmented approaches to environmental issues, with predominance of the "green" agenda and conservationism over the "brown" and "blue" agendas, and lack of perception of socio-ecosystemic functions.
- All the candidates for President in 2002 defend resumption of economic growth in Brazil and increased exports, while none manifests concern with the environmental impacts.
- Blaming exclusively the industrialized countries for impacts of their consumption, without attention to national problems and possible local solutions.

## 7 Conclusions and Recommendations

The general conclusion that can be drawn is that sustainable consumption has still not received the attention it deserves at the international level, but especially in the South, in general. Brazil is no exception. At best, consumption is considered to be a problem of the North, which the North must solve, or of a small élite. Researchers, policy formulators and the public at large continue giving priority to reduction of poverty and resumption of economic growth, without taking into account their implications for sustainability and considering alternative strategies. Promoting sustainable consumption does not mean perpetuating poverty and avoiding growth, but rather drawing a distinction between meeting basic needs and supporting over-consumption. It means making economic growth and income redistribution more sustainable, with emphasis on quality instead of quantity. This requires recognition of links between population and consumption, which become more direct when socio-economic equality grows and when the State assumes greater responsibility for reproduction.

The fact that many of the recent trends in population and consumption are relatively spontaneous creates both opportunities and difficulties for policy initiatives (Sawyer 2001a:291-2). The success of such initiatives depends on understanding the spontaneous processes, their direct and indirect impacts and their interactions with public policies. Changes in consumer behavior depend on awareness and understanding, but many changes also require application of sanctions or use of economic instruments. The combination of moral and material incentives can work. For example, few people imagined in the 1980s that by 2000 safety belts would be widely adopted in Brazil, speed limits would be obeyed or pedestrians would be respected, but in parts of the country such behavior has changed significantly.

Changes in consumption cannot be isolated from changes in production. To some extent, the behavior of firms can be influenced by the consumers, through market mechanisms, but change depends, above all, on public policies and economic incentives, besides education and awareness. Education and awareness can be general or specific, but the incentives are necessarily specific and focused, requiring establishment and enforcement of norms for a wide variety of products and processes.

Sustainability will also depend on cooperation among public and private agents. The transition to more sustainable patterns implies incorporating demographic and environmental variables into planning, to the extent that it still exists in neo-liberal regimes in crisis, and into agendas of sustainable development, which are useful but non-operational declarations of intentions. Above all, it depends on the formulation and implementation of specific public policies, programs and projects involving civil society and the productive sector at various levels, from national to local. Some signs of recognition of interdependence, integration and multi-functionality have appeared (e.g. World Bank 1995, Pacheco 1998, Smeraldi 1999, MI 2000, 2002, Haddad 2001, Sawyer 2001a, Kinzo 2002, CNDRS 2002), but the forces that favor fragmentation and inconsistency among policies remain strong.



In this context, the following general and specific recommendations can be formulated regarding research alternatives, public policies and citizen action in the post-Johannesburg period:

In international negotiations, hold the North responsible for the impacts of its consumption, but at the same time propose appropriate actions in the South, incorporating sustainable consumption and production patterns in national and local agendas of sustainable development.

- Undertake integrated analyses of environmental impacts of population and consumption, not limited to their intensity, but including absolute aggregated impacts.
- Understand and seek to reduce the causes of socio-environmental degradation, instead of or in addition to targeting certain areas or species for special protection.
- Seek to "leapfrog" stages so as to reach sustainable consumption without first going through a stage of unsustainable patterns, which are difficult or impossible to reverse.
- Draw up an agenda of integrated inter-sectorial action, including other ministries and permeating government policies, with the participation of civil society and the private sector.
- Analyze and disseminate information on the environmental impacts that are embedded in the consumption of goods and services, both generally ("ecological footprints") and specifically, one by one.
- Establish levels of consumption of water, energy and space considered sufficient and sustainable and progressively tax or charge for the excess above those levels, differentiating between basic and superfluous consumption.
- Analyze practices of low consumption in less developed regions or micro-regions with a view to their sustainability and wider adoption, with respect for cultural diversity and without expecting generalized adoption of modern urban-industrial patterns.
- Stimulate the transition to the use of renewable natural resources and sources of renewable energy.
- Seek longer durability of consumer goods and stimulate recycling of paper, metal, glass, plastics and construction material.
- Promote mass public transportation and facilitate the circulation of pedestrians and cyclists.
- Use information technology to substitute for physical transportation of people and material and for a large volume of paper.

- Stimulate the sustainable use of biodiversity and sustainable livelihoods, with equitable sharing of the benefits.
- Transfer and develop national technology for sustainability in the tropics and in poor, remote regions, combining high technology and appropriate technology.
- Promote more sustainable patterns of urban and rural settlement, reducing distances between places of residence, work and other activities.
- Stimulate increased agricultural productivity and compliance with technical norms and environmental standards, so that farming and ranching occupy less space.
- Promote reproductive health and reproductive rights, not only for their own merit, but also because of their contribution to the sustainability of development.

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## Notes

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