Sustainable development and institutional change: the role of altruistic behavior

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Abstract

Assuming that the environmental challenge will not be met without changing the present logic of the process of capital accumulation and its corresponding consumption patterns, the paper discusses how such a radical change could happen. The analytical model proposed by D. North to explain the historical process of institutional change that gave birth to the phenomenon of fast economic growth is used as a "backbone" to build an alternative model. Although making room for altruistic and/or irrational behavior, the North's model rests on the (neoclassical) assumption that changes in relative prices (or the willingness to pay) play a role as an independent variable inducing institutional change. The paper argues, however, that uncertainty and scientific controversy prevents the ecological awareness aroused by environmental damages, and the corresponding changes in the willingness to pay, from playing such a role. Instead, the paper proposes an alternative model where an altruistic behavior – the solidarity towards future generations – plays the role as an independent variable. It discusses also what are the objective conditions that could make it possible for altruistic behavior to have such a role.

Key words: Sustainable development; Institutional change, Altruistic behavior.

Resumo

Supondo que para enfrentar o desafio ambiental será necessário mudar a atual lógica do processo e acumulação de capital e seus padrões de consumo correspondente, o trabalho discute como tal mudança radical poderá ocorrer. O modelo analítico proposto por D. North para explicar o processo de mudança institucional que deu origem ao fenômeno moderno do crescimento econômico rápido é usado como suporte para a construções de um modelo analítico alternativo. Embora no modelo de North haja espaço para comportamentos altruísticos ou irracionais, ele permanece preso à hipótese (neoclássica) de que são as mudanças nos preços relativos dos fatores de produção que jogam o papel de variável independente na indução da mudança institucional. No caso da problemática da sustentabilidade esta hipótese é ainda mais limitada e improvável, na medida em que a incerteza e a controvérsia científica impedem que a elevação da consciência ecológica provocada pela escassez crescente de bens e serviços ambientais possa jogar tal papel. O trabalho propõe um modelo analítico alternativo, onde o comportamento altruístico – a solidariedade em relação às futuras gerações – joga o papel de variável independente. Se discute também quais seriam as condições objetivas que possibilitariam tal comportamento altruístico cumprir este papel.

Palavras-chave: Desenvolvimento sustentável; Mudança institucional; Comportamento altruísta.

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Introduction

The concept of "strong sustainability", postulating the existence of absolute limits to the expansion of the economic system, has huge economic, institutional and cultural implications. To begin with, it amounts to the admission of stopping economic growth. Although this situation doesn't imply the absence of development,[2] it does demand a stabilization of global consumption of energy and raw materials as to keep the scale of human activities compatible with the carrying capacity of the planet.

Independently, however, of how big this scale can be, the stabilization of per capita consumption of natural resources itself runs against the present logic of the capital accumulation and its corresponding life styles. These life styles are natural resources intensive and they reflect the "ethos" of societies where "possessing" is better than "being" (Sachs, 1993). So, there is a auto-reinforcing mechanism between the logic of capital accumulation and the cultural values conditioning the auto-satisfaction feelings of the social actors which must be broken if sustainable development should prevail. A new set of cultural values with its corresponding institutional framework is needed, in which the accumulation of "spiritual" wealth produced by cultural and social activities[3] replaces the accumulation of material wealth as the societies' emulating goal. How could one describe such a process of institutional change?

The analytical model proposed by North (1990, 1993) to explain the process of institutional change that gave birth to the phenomenon of fast economic growth (section 1), i.e., the emergence of a set of institutions that created an efficient structure of incentive to the pursuit of material wealth, is very insightful and can help us to understand a process of institutional and cultural change that has the same nature, although running in the opposite sense: the emergence of a new set of institutions aiming at the creation of a structure of incentive to the search of "spiritual wealth".

For North the social efficiency of the new institutional framework allowing for fast economic growth resulted from the **unexpected** consequence of incremental institutional changes introduced by competing economic agents in their struggle to

(2) But something like Daly's steady state economy (EEE). See Daly (1996).

(3) As put by Gorz (1991), many of them are values considered "feminine", as sensibility, imagination, love, conviviality, dreams, resulting from activities of a sort of that Adam Smith would call non productive because nothing is produced that could be used to buy a same amount of work.

realize the potential of gains associated to relative price changes and to the technical progress they induce. Now, on the contrary, the new set of institutions that are necessary to deal with environmental issues should be the **expected** consequence of incremental institutional changes induced from the outside of productive organizations by relatively autonomous altruistic changes in people's cultural values. The clues of how it could be possible are discussed in section 2.

Section 3 goes further into the analysis of the evolution of the societal context in the last decades which is helping to create the objective conditions for this new institutional framework to evolve, highlighting the emergence of a new institutional device – **the precautionary principle**, which will play a very important role in this process. Finally, some concluding remarks will sum up the main aspects of the contribution this paper is intended to offer.

1 North's model

According to North, formal and informal institutions emerge as a structuring response to the uncertainties the decision makers face in dealing with the complexities of human interaction due to their limited perception and computational capacity of mind. Those institutions are molded by the mental constructs (cultural values) developed to decipher that complexity (reducing the transaction costs) and they provide the society's structure of incentive which will direct the way individuals acquire knowledge and use it in their productive activities competing one another. The reaction of economic agents inside their organizations (firms) – before the profit-making opportunities brought by technical progress and changes in relative prices of production factors – makes the informal institutions pass through incremental alterations that eventually also changes the formal ones.

The incremental character of this process is due to the increasing returns resulting from economies of scope, complementary interactions and net externalities of an institutional matrix; for that reason too this process is highly path dependent. The followed path, however, could not have been the most efficient one, since the markets are not complete, the information feedback is fragmented and the transaction costs are significant (Arthur, 1994).

Actually, as put by North, institutions usually are not created even to be socially efficient, but to serve the interests of those having enough bargain power to

create the new rules, although altruistic motivations are not totally excluded. In fact, they are needed to reduce the transaction costs in human exchanges. However, under certain **circumstances**, the private goals of those social actors with enough bargain power to alter the institutions produce institutional solutions that eventually become socially efficient. In other words, socially positive changes in an institutional path result from the **unexpected** consequences of the choices made. These circumstances, in turn, are not entirely fortuitous but conditioned by preexistent cultural values and institutions.

However, in the historical cases he analyses, he doesn't explore the role of these circumstances responsible for the social efficiency of a new set of institutions in the long run. He focus on the inducement mechanisms of institutional change, pointing changes in relative prices of production factors as the independent variable in this process. He recognizes, however, that linking complex institutional changes to changes in relative prices amounts to a vast over simplification. Changing relative prices are filtered through preexisting mental constructs that shape people's understanding of those price changes. The ideas, and the way they take hold, play an important role, although it is not clear the relative importance of each of them, that is, relative prices or ideas.

The emergence of capitalist institutions out of feudalism, for instance, would have been induced by changes in relative prices of land and labor. The growing scarcity of land and abundance of labor progressively rendered feudal institutions less efficient as they had been a response to an opposite factor endowments: minutiae regulations (community rights) to ordain the use of abundant agricultural land and forests and serfdom relationships to guarantee a regular offer of human resources that were scarces. As labor becomes abundant capitalist wage relationships emerge as a more efficient institutional arrangement. The same is true as land becomes scarcer: the previous institutional arrangement (community rights) becomes less efficient and new institutions are required to realize the gains from the productive potential associated to the new agricultural technologies induced by this change in land endowment.

Thus, the economic agents went on pushing for incremental changes in the informal institutions regulating their interactions in order to take advantage of the potential gains associated with the technical progress induced by changes in relative prices. Progressively formal and informal institutions regulating the productive activities are transformed as, for instance, in the case of the substitution of money payments, in the manorial system, to the old practice of payments in products or in

working time ("corvée"); or, as in the case of the professional guilds, where the difficulties to change institutions from inside were bypassed by the "putting out system". Eventually, this process of incremental institutional changes created the preconditions to a more radical one, that would abolish the religious, social and esthetical constraints feudal societies had imposed upon economic activities.

In many aspects feudal organizations and institutions represented a sort of organizational and institutional expression of society's non economic and/or altruistic motivations. As noted by Bloch (1949), feudal institutions were the result of a social pact between landlords and serfs which, in its origins, emerged as a auto-defensive reflex that united warlords and peasants in their struggle for survival in an "infinitely troubled period". Preexisting cultural values (Christianity) had presided over the fusion between the Germanic customary laws and the juridical legacy of the Roman Empire in the constitution of the new set of feudal institutions.

The end of feudal labor and land use regulations, based on community rights, and its replacement by capitalist regulations, based on private property rights, have provided a new structure of incentive, economically more efficient, to realize the potential of gains associated with technical progress. During a long period this new structure of incentive would be characterized by the prevailinness of a strictly economic rationality, unbounded by any constrains on human and nature exploitation. The technological dynamism under these new institutional arrangements springs, however, to a great extent, from certain cultural values and political institutions peculiar to Western Civilization which are shared both by medieval and capitalist societies.

The first one is its anthropocentric vision of human's place on earth derived from Judeo-Christian cosmology (White, 1968), that put man in the center, as created by God and entitled to use all the other creatures and natural resources on his behalf. Mokyr (1990) notes also that as invention represents a game against nature, it is more likely to occur in societies where the prevailing system of beliefs rises the propensity to change production methods, i.e., the willingness to challenge and to manipulate the physical environment. In this sense, the anthropocentric philosophy of Judeo-Christian religion represented an exceptional mentality change in history.

Feudal institutions based on those cultural values had already created a singular structure of incentive to realize the potential gains of technical progress, when compared to those ones of other contemporary civilizations , as not only did they stimulate the technological creativity (inventions), but also a kind of creativity

having an economic expression (innovations) as it reduced the toiling of work and raised the ordinary folk's material welfare.

In classical antiquity the organizational and institutional structures were efficient in providing the conditions for commercial expansion. But the economic growth they promoted was limited and beneficial only to a small elite. The evidences prove that classical civilization had the intellectual potential to create complicated technical devices, but only a small part of this potential was realized and translated into economic progress. The Islamic Civilization, in turn, collected and applied the cultural achievements of other civilizations, but was not capable of adding much new to the existing stock of ideas. As a result, its technological dynamism was short lived and had little economic expression. Or still China, where its intellectual sophistication and institutional framework were efficient in providing the incentive to a steady economic expansion induced mainly by population growth, but also benefiting only a small elite. Its great inventiveness didn't have much economic expression either.

The second one, which most of historians have considered[4] as having played an important role in European technological dynamism, was the territorial partition and, within states, the division of power between the center (the crown) and local seigneurial authority, implying multiple sources of decision-making. This fact represented a stimulus for innovation as it make it possible for innovative people to bargain their ideas with competing rulers. As noted by Landes (1995: 36), "fragmentation gave rise to competition, and competition favored good care of good subjects. Treat them badly, and they might go elsewhere". Landes notes also that the contest for power in Europe gave rise to another specifically European phenomenon that was the commune, a semi-autonomous city, which played a decisive role in the process of technical and institutional change.

A major difference, however, opposing feudal institutions to capitalist ones can be found on the role played by non-economic motivations in each of them. As signaled by Gorz (1991), modern societies were born precisely from the abolishing of all the previous non-economic constraints (religious, cultural, esthetical, and social) on the strictly economic rationality. Eventually, in the realm of labor/capital relationship, some of these constraints were forced in again so that the laws and regulations could establish limits to the exploitation of the working class (defense

(4) See Jones (1993), Mokyr (1990), Landes (1997), Rosenberg & BirdsellL (1986), Mcneill, (1990), among others.

of children labor, limits to working hours, minimum wage, holidays, etc.).[5] The more balanced income distribution resulting from that reaction has played, as is now largely acknowledged, a decisive role in sustained economic growth. The environmental challenge brings the prospect of deepening much further this process of reintroducing formal and informal constrains on the prevailing economic rationality.

2 Altruism, environment and institutional change

In North's model, as described above, the dynamic role in the process of institutional change is played by the economic agents inside their organizations competing with one another to realize the potential gains associated to relative prices changes and to the technical progress they induce. And, in the case of feudalism/capitalism transition, the evolving institutional framework led to the abolishing of non-economic constraints to the individual pursuit for material wealth. The institutional change required to tackle the environmental challenge implies just the opposite, i.e., the reintroduction of non-economic constraints upon the process of capital accumulation on behalf of the poor and of the future generations. For that reason, the new set of socially efficient institutions in need to deal with environmental issues can not be the result of "unexpected consequences of incremental institutional changes introduced to serve the private interests of those who have the bargain power to make the rules". On the contrary, they should be the **expected** consequences of incremental institutional changes induced from outside the productive organizations by relatively autonomous altruistic changes in people's values. How could it be possible?

In our opinion, there is no alternative for a broad and deep environmental educational movement. As a general requirement this movement needs to be fed by a regular flow of information showing as clearly as possible the environmental costs of economic growth. This regular flow of information includes the improvement of the information systems, the making of national environmental accounts and sustainability indicators. It must also appeal to both altruistic and utilitarian motivations and to what could be called a psychologically conditioned motivation.

(5) As noted by Daly (1996), some of those laws and regulations are, under new guises, based on medieval principles, as the scholastic theory of "fair price".

Utilitarian motivations are important, as they can be worked out to improve ecological awareness, but they are not enough. In developed countries utilitarian motivations prompted by the environmental impacts as water and air pollution gave birth to important technological and institutional innovations which have reduced and/or eliminated them and other environmental problems. Many neoclassical economists point out those cases as the evidences of their postulates on human economic behavior and on market capacity to deal efficiently with the scarcities of all kinds of goods and services, since the necessary adjustments had been made. As put by Arrow et al. (1995), however, these market oriented mechanisms operating as a tool to improve the quality of the environment have been efficient in dealing only with environmental problems that bring about direct impacts on the quality of life of the people concerned (sulfur gazes emissions, sewage in the water, etc.), excluding those whose impacts hit people living in other places (poor countries) or who will live in the future. So, altruistic motivation such as those represented by the solidarity to other people (synchronic solidarity) or to future generation (diachronic solidarity) are needed precisely because the most important global environmental problems have no direct impacts over the populations which are the most responsible for them.

As to what we called psychologically conditioned motivations, the argument was developed by Siebenhuener (1998). According to him, evolutionary psychology, a new discipline that developed out of evolutionary biology and anthropology, has shown that the biological and – in many parts – psychological constitution of modern man was formed around 40.000 years ago, when humans were hunters and gatherers. The way human beings react emotionally, their sexuality and desire for purposeful activity would be established at that time as well as their feelings towards non-human nature. There are several mental "programs" of short-cut reactions in cases of danger, hunger, thirst, love and others. These feelings and patterns of reactions are not submitted to the control of man's conscious thinking. In many respects nature arise man's feelings of sympathy, beauty and peace. These and other feelings have proven to be helpful for the survival of human beings, and they are inherited from their ancestors. Nevertheless, these genetically marked protective or cherishing feelings towards nature would have been covered or suppressed by certain cultural "achievements" or personal experiences and they could be reactivated through education.

But, as Siebenhuener (1998) admits, the reawakening of these psychologically conditioned feelings are not enough either, mainly where they

concern the situations where one has to face the renunciation of material wealth in exchange for immaterial goods. It must also be taken into account that the prevailing analytical vision of conventional economics – denying, in one hand, the existence of natural limits to economic growth and, on the other hand, stressing the efficiency of market mechanisms to deal with environmental problems – represents one of the most conspicuous "cultural achievements" covering and/or suppressing these "genetically marked feelings".[6] That vision plays a role of an intellectual justification to a non sustainable behavior. So, these are cultural facts that contribute to hamper people's potential willingness to change their life styles by reducing material consumption.

Norgaard (1994) traces a broader picture of the cultural values of western civilization, encompassing the conventional economics vision – the modernism,[7] which ordain the interactions between social structure and environment, and that wouldn't leave much room for hope that substantial changes occur in people's behavior in developed economies. There would be evidences suggesting that the co-evolution of modern knowledge and social structure have been a process of mutual reinforcement between the organizational structure and the patterns of thought. So, there would be a vicious cycle that could only be broken from abroad as the local experiences in societies not yet contaminated by modernist ideas and where the prevailing values are not associated to mercantile actions.

He sees the emergence of cultural affirmative movements as an exogenous factor that could give origin to a new set of values detached from de modernist vision. It is not clear, however, how those movements could influence the people's mind in developed countries; not even if they would prevail over modernist ideas being spreading into those more or less marginal regions or countries. In a more recent paper (Norgaard, 1998), he recognizes the need for a movement rejecting modernist values to develop from inside rich countries. He also hopes that the deterioration of the world situation, in social terms, could arise the sensibilities of people in those nations but, clearly, the negative factors he lists are overwhelmingly more important.

(6) In this respect Siebenhuener (1998) notes there is strong empirical evidence that studying economics leads to non-cooperative behavior.

(7) According to Norgaard (1994) modernism has 3 fundamental beliefs: 1) scientific and technical progress can guarantee greater control over nature and material wealth for all; 2) there is only one (scientific) response for complex problems as the environmental one 3) the cultural differences will fade away as people of different societies discover the efficiency of the rational Western societies.

In short, an education movement aimed at the substitution of a new set of environmental friendlier cultural values to the present one must also appeal to the feelings that are not utilitarian, neither genetically ingrained in people's mind, but altruistic ones, i.e., springing from ideals of justice and human solidarity. In all complex institutional change, as North admits, **ideas** play a role, some times a decisive one. To illustrate this point, North (1990) resorts to the classic case of the abolishing of slavery in 19th century. This major institutional change was induced by the growing abhorrence on the part of civilized human beings of one person owning another. Sowell (1994) credits the early development of those ideas about slavery to the Quakers. Eventually they spread to the other Christian congregations. Thus the Quakers gave birth to a process of reawakening the Christian conscience of justice and freedom that was covered by the intellectual justification of slavery.

For Daly (1996) religion must also play a decisive role as the main source of altruistically motivated actions favoring sustainability. He thinks most religious traditions give insights regarding stewardship. Concerning the western religious tradition, the most important religious insight that could inspire altruistically motivated actions is the idea of a God's world where human beings have the obligation to care for it. He points also to another insight that is not necessarily a religious one, but that would come easier to people who sees themselves more as creatures than as creators. This is what he calls a pre-analytic vision that sees the economy as an open subsystem of a large but finite, non growing, and closed ecosystem on which it is fully dependent for sources of low entropy raw materials and for sinks to absorb high-entropy waste materials.

Still, there is a great difficult in stimulating the arousal of people's altruistic feelings. It is related to the fact that the environmental impacts to be endured by future generations are elusive for themselves because of the scientific uncertainties inherent to the environmental assessment (scientific knowledge is controversial in essential aspects of the environmental issue – Godard, 1993). Volunteers involved with humanitarian organizations around the world know very well that to keep people contributing they must show as clearly as possible the results their money produced.

However, there are some facts that could created a more favorable mood for the necessary institutional changes to tackle environmental problems. They are societal problems which can favor the changes in life styles the resolution of the environmental challenge requires. Although the changes they prompt are not altruistically motivated, they contribute to the questioning of the prevailing

consumption patterns and life styles and the cultural values justifying them (the economic growth viewed as a necessary and sufficient condition for human well-being). As we will see below, some of these problems have already induced the development of a new institutional device, the **precautionary principle**, which will be a very import instrument to deal with global environmental problems.

As noted by Abramovitz (1993), these problems explain why the early criticisms about the evils of industrial societies became again acceptable by a growing part of public opinion in developed countries.[8] The first one results from the costs entailed by growth which are not measured in national accounts. The problem regards the environmental costs, but also those ones related to the complexity of modern industrial systems such as the quality of some crucial products (as food) and the drawbacks in the working process. People are pervaded by unknown substances that accumulate in the human body which can eventually bring life-threatening diseases; in the workshops they risk various kinds of injuries, including death. Thus, people in growing numbers sense that their bargain for food and jobs have become deceitful.

The second one concerns the evidences that growth affords but limited consumer's satisfactions and benefits to already affluent people. The intensity of both their needs and desires and the capacity goods have to satisfy them are affected by other people's incomes. As a consequence, a larger command of goods by average person, thus economic growth, doesn't mean a higher level of satisfaction, happiness, or welfare. In USA this evidence comes from repeated surveys carried out by Gallup Poll and the National Opinion Research Center showing that the growth of average income over time is not accompanied by an increase in people's awareness of happiness.

Abramovitz (1993: 335-339) proposes several mutually supporting explanations for that: *a) the income relativity of aspirations*, meaning that the satisfaction a person gets from his income depends not only on its absolute level but also on its relation to those of others in the same community; *b) habituation*, standing for some of modern psychology findings, namely, that people find stimulus in the *process* of satisfying a previously unfulfilled desire, which fades away as it is satisfied. It implies that a growing income is necessary not to increase the level of satisfaction, but to keep it at same place; *c) the rising prices of space*,

(8) Since Adam Smith economists and thinkers such as S. Mill, T. Veblen, K. Marx, even Pigou, have been pointing the evils and contradictions of the industrial and capitalist civilization as labor alienation, the vanities of wealth, the income relativity of aspirations, and so on. See Abramovitz (1993, chap. 12).

and time, signaled as the frustrations which are more truly economic (and not psychological) in origin because they come from the fact that a general rise of incomes brings on an increase in the prices of space and personal service. So, the average family with rising income cannot afford much more of those goods than they had before or not as much as they had imagined they would; or yet, even less they used to command.

The third one is related to the character of the technology and the character of the organization necessary to exploit it. Individuals are trained to perform narrow and repetitive tasks and, as genetically conditioned ants, endowed with appropriated personal attitudes and goals, led by a self-interested commercial drive to cooperate toward the grand unperceived end of producing a large GNP. Differently from the anthill, however, in the human's society the nicely articulated but unconsciously directed efforts of individuals do not lead to the preservation and improvement of the individual and/or the species. Instead they block the full development of the first and promote the destruction of the latter.

3 Altruistic motivations and the precautionary principle

In affluent societies the changing of people's risk perceptions brought by the growing complexity of industrial civilization gave origin to a historical process of institutional change concerning the social and juridical norms aimed at the handling of those risks. As noted by Godard (1997), the collective organization of risk prevention is inherent to the building of the modern welfare states. People are inclined to question the collective responsibility of the institutions or the State and also the personal responsibility of public agents.

During the 19th century the prevailing cultural values informed an institutional framework in which the moral obligation of each citizen regarding himself and the others was much more important than the juridical ones. As noted by Ewald (1997), due to the fact that this institutional framework was based on a liberal philosophy, it resorted lesser to the legal constraints than to the individual will and freedom. The legal obligations of each individual regarding the others were limited to the simple rule of not giving "offense to the brethren".

The virtuous citizen was that one who was responsible and prudent in the use of his freedom which meant to make the necessary arrangements to protect himself and his family from life hazards. As to the other citizens, he should not only

cause any harm, but also feel morally concerned to in the case of need and he should be willing to help. It was clear, however, for every person going through an unlucky event, i.e., having no other individual to be blamed on, that the society as a whole could not be responsible for. The victims, whatever the compassion feelings they could inspire, were always supposed to be the only actors of their destiny and to act accordingly by being **provident**.

In 20th century, under the Welfare State, the legal obligations tended to outweigh the moral ones. A set of new social rights evolve out of a growing feeling that each citizen had a sort of general right of being compensated for the damages which resulted from almost all kind of events in their lives. For Ewald (1997), this new way of thinking about the responsibility society as a whole should have for each individual results, in a great extent, from a scientific and technological *utopia* where societies would be endowed with a great capacity of self control, submitting power to knowledge. Through applied science it would be possible to establish a **prevention**[9] policy efficient enough to internalize all kinds of risks. Infectious diseases, crimes, poverty, etc. would be all measurable risks.

This societal evolution induced the emergence of a new institutional framework (social security systems) to make it possible to express the new feelings of social solidarity, based on measurable risks, which were substituted for the individual feelings of moral obligation. The accidents in the working process, for instance, came to be considered as measurable risk factors, not singular events resulting from individuals errors. This notion allows for a new juridical stance establishing the right to be compensated for the fact itself, independently of its causes (i.e. the personal responsibility of the individual involved is not questioned). In this sense the problem of equality has been reformulated in economic terms rather than in moral ones.

In the last quarter of the twentieth century, however, this institutional framework progressively became inadequate to handle with a new set of problems, mainly environmental ones, the nature of which prevented science from measuring the risks involved in. The notion of uncertainty was substituted for the notion of probability, which amounts to the admission of society's incapacity to prevent catastrophic irreversible losses. Science became increasingly questioned for the

(9) To Ewald (1997) the evolving of the idea of prevention received a burst with Pasteur's discoveries. They make it clear that, in one side, the welfare of each individual was dependent not only on the personal conduct but also on the other ones; on the other side, a prevention policy was possible as science would offers the means (vaccines).

doubts it raised rather than by the solutions it proposed which, in turn, induced society into a search for safety amid scientific uncertainty.

Amid these new societal problems, besides the environmental ones, it is worth mentioning two of them as particularly important and emblematic. They are the medical accidents and the potential of harmful consuming goods (food). Their importance lies in the fact that their nasty consequences became visible and that society came to realize that by their nature it will be very difficult to prevent them from occur again.

The case of aids infected blood in France illustrated the first sort of problem. It shows a very representative drama of modernity (Hermitte, 1997). It is representative because the origin of the disease (a natural and/or a human induced phenomenon associated to the destruction of natural habitats) and its spreading (due to cultural changes sexual practices and to the greater mobility of people which could have induced changes in virus ecology) have aroused scientific and moral controversy and also because of the health authorities' behavior before the scientific controversy about the ecology of the virus inside the human body (period of incubation) and the mechanisms of the virus transmission. Their behavior was characterized by the ambivalent attitude they assumed as they recommended certain new procedures in the blood collecting system (as the selection of blood donors according to their sexual lives records) but, simultaneously, they didn't care for properly enforce them. In almost all countries the health authorities have tried to conceal from people the most pessimist hypothesis about the disease that, unfortunately, was true.

The second problem was the case of the "mad cow" in England. It is also a very illustrating example of problem resulting from the complexity of modern industrial societies. The prevailing economic logic induced the firms in the agribusiness to the search for cost reduction innovations which were apparently justifiable in terms of the prevailing scientific criteria for establishing food safety standards. The case showed in a crystal clear and spectacular way a kind of relation of cause and effect which until so had been very difficult to prove. In the early 60's R. Carson in her "Silent Spring" had already described as a scientific hypothesis a similar kind of relation of cause and effect, namely, the effects of new chemical substances in nature and in human beings, but which one the "agribusiness establishment" has been largely capable of circumscribing and limiting its impact on public opinion and on authorities responsible for food quality.

The precautionary principle emerges, thus, out of this new context in which scientific uncertainty undermines the solidarity principle based on prevention, transforming the moral of individual providence into an ethic of collective action. The precautionary principle represents an important institutional device for societies to handle with this sort of problems and, specially, with the global environmental ones that have the potential to cause catastrophic irreversible losses but which, in turn, can not be estimated in probabilistic terms. It offers a way to deal with the bargain between real economic costs in the short run and virtual benefits expected from the prevention of uncertain environmental losses in the long run.

Concluding remarks

North's model offered a useful analytical structure to build an alternative model to describe the process of institutional change the environmental challenge requires. It allows for a better understanding of its peculiarities, specially that one concerning the role altruistic behavior should play: not just a factor limiting economic agents rationality as in conventional neoclassical analysis, nor a normal human behavior without which transaction costs would preclude any economic relationships from having a minimum of social and economic efficiency as understood by North.

The role of altruistic behavior is viewed as one of an independent variable pushing for incremental institutional changes which, eventually, would create a new institutional framework capable of constraining and directing the economic agents' actions towards a new path of sustainable development. The changes in cultural values which, in turn, would make it possible for altruistic behavior to play such a role must be induced by a broad and deep ecological education movement. History shows that non-economic motivation may emerge out of ideals or values societies have in deeper cultural layers.

The elusive nature of some of the most important global environmental problems, however, makes it more difficult for such an educational movement to stimulate the surfacing of those ideals or values. To succeed this movement will depend also on some less elusive societal problems which are contributing to the questioning of the prevailing life styles and their corresponding cultural values. These societal problems have already induced the emergence of a new institutional

device, the precautionary principle, which offers more objective procedural conditions for altruistic behavior to express.

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