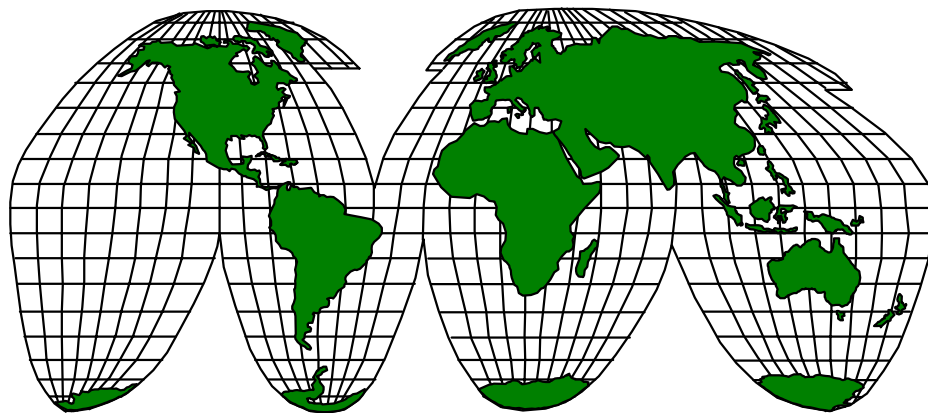


RAMÓN TAMAMES
Full Professor of Economic Structure,
Autonomous University of Madrid.
Jean Monnet Chairholder, European Union

**WORLD ECONOMIC AND
ENVIRONMENTAL ORDER**



UNITED NATIONS, UNESCO

Eolss forerunner volume

MADRID

NOVEMBER 2000

(Final amended, December, 4 version)

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SUMMARY

In this chapter on “financial resource policy and management: world economic order”, we can follow the path of globalization, that is to say, a progressive economic way taking into account environment all over the world. In that perspective, nowadays appears the concept of *New Economy*, as a part of a general framework where international economic organizations and multinational enterprises play an increasingly important role, alongside with the planet superpowers: USA, the European Union, and Japan, all of them having special responsibilities as the core of the advanced nations.

Against that general background, Bionomics offers strong links between Economy and Ecology, to overcome present difficulties related to the biosphere deterioration and the mass poverty in less developed countries. In that sense, a target to achieve is a new sustainable growth model, in which *homo ecologicus* can design the methodological approaches to create better relations between mankind and nature. That means the necessity of respecting ecological equilibrium, so that productive system and income distribution perform in better conditions for everybody. Principles that must be completed with a more efficient mechanism the deliverance of aid, by advanced nations to developing countries, i.e., setting of new conditionalities based on democracy, public honesty, and general awareness in favor of sustainable development and betterment of its social impacts.

Furthermore, to improve the new framework and to reach a more adequate international economic and financial order, it will also be necessary to reinforce global institutions, so that we can one day reach the real performing of a *Government of the Biosphere*. In that direction, an outline of a new organism –the *United Nations Council for Environment Security* (UNCES)— is offered, in the aim of co-ordinating present efforts by current institutions, and for developing new initiatives to foster sustained development.

Summing up, with a more accurate knowledge of reality, specific reforms, and the better use of international institutions, we could preserve, with increased results, the rights of coming generations, according to a new *business and financial ethics* that combines productivity and profit spirit with two main principles to be observed: synchronic solidarity with developing countries and diachronic responsibility regarding coming generations.

KEYWORDS

Barriers to commerce, Bionomics, Brundtland, CSD (Commission on Sustainable Development), conditionality, consumerism, consumption, cycles, dematerialization, Earth Summit, eco-eco model, Ecology, Economics, FAO (Food and Agricultural Organization), globalization, IMF (International Monetary Fund), Malthus, multinational enterprises, natural resources, New Economy, NGOs (Non-Governmental Organizations), nuclear winter, Rio-92, sustainable development, UNCES (United Nations Council for Environmental Security), UNDP (United Nations Development Program), UNEP (United Nations Environment Program), WB (World Bank), WTO (World Trade Organization).

1. GLOBALIZATION: CYCLES AND INEQUALITIES

World economic and financial order is at present –in the current globalization's era— one of the main topics in any kind of surveys relating international politics, economics, finance, and not the least, environment; with an increasing interest in all purposes linked to natural resources, especially in the framework of globalization and sustainable development. And it is with that background that we are going to see along this chapter the various aspects of the present scenario.

1.1. Fewer and lower barriers

As a matter of fact, *globalization* is nowadays one of the most used words to define current economic conditions, because the fact is that barriers to the interchange of all kinds of products and services have been deeply reduced. E.g., customs duties are at their lowest level everywhere, and in the European Union, by far the biggest world trade block, the *Common External Tariff* (its acronym, TARIC), has diminished to an average two per cent *ad valorem* (Agriculture aside) since, the Uruguay Round decisions were finally enacted (2000). And the same thing has happened to services and capital movements for which the great majority of obstacles have been removed.

Moreover, integration projects are gradually promoting not only new customs unions, free trade areas, preferential agreements, better regional infrastructures –so that all economic flows become easier—, but also monetary coordination going from *currency boards* in progress all over the world –through dollarization (or *eurozation* since 1999)—, in a sustained and generalized trend to monetary unions, to stabilize international payments, and thus supply better guarantees to foreign investors.

1.2. A non synchronized cycle

But the foreseen *economic oneworld situation* that favors business and transactions does not mean that economy is moving everywhere on the path of a synchronized cycle, since there are great differences among the various groups of nations, and even inside each of them.

In other words, whereas the industrial North according to IMF officials is advancing on the basis of continuous institutional and structural reforms and new technologies, very bad conditions –as we shall see afterwards in a more detailed scope— still prevail in Russia and

other states of the previous Soviet-system. And a great part of the so called *Third World* is even worse positioned.

Definitely, business cycle is not synchronized. And probably this *multi-case* situation will continue to be normal in the medium and long terms. So that income levels instead of being reduced between most and less advanced countries, will be maintained and even show a bigger gap in the future.

1.3. Global elite, middle classes and publicity

But different cycles do not prevent globalization from integrating consumer markets around the world, and opening new opportunities everywhere, including investment and finance, and accelerating a constant flow of new products, in the context of a fierce competition with increasingly aggressive advertising.

As a matter of fact, local and national boundaries are breaking down in the setting of social standards and aspirations in consumption. As market researches show, it is possible to identify *global elites* and *global middle classes* who follow the same consumption styles, showing preferences for *global brands*. There are also *global teens*—some 270 million between 15 and 18 year olds in 40 countries in 2000— inhabiting a *global space*, a single pop-culture world, soaking up the same videos and music, and providing a huge market for running shoes, t-shirts and jeans. What are the main consequences thereof?

First, a host of consumption options have been opened for many consumers, but many are left out in the cold, through lack of enough income, as pressures for competitive spending mount.

Second, protecting consumer rights to product safety and product information, has become more and more complex. Increasingly, new products with higher chemical content, such as foods and medicines, are coming on the market; and therefore, when information is not adequate, or safety standards are not strictly enforced, consumers can suffer; for instance, from pesticides that are poisonous, milk powder that is contaminated, etc.

At the same time, the consumer receives a huge flood of information through commercial advertising. An average US citizen, it is estimated, sees 150,000 advertisements on television in his or her lifetime. And advertising is increasing worldwide faster than population or income.

Worldwide advertising spending, by the most conservative reckoning, is now \$435 billion, and its growth has been particularly rapid in developing countries. In 1986 there were only three developing countries among the 20 biggest spenders in advertising. A decade later there were nine. And in spending relative to income, Colombia ranks first with \$1.4 billion, 2.6 per cent of its GDP (1998).

2. NEW ECONOMY: MYTH OR REAL SUCCESS?

The above related economic differences among nations and the various consumption patterns, are easily noticed when we see what is happening in the USA and the European Union; after a *boom* decade in the first case, and after not less than five years in the latter. This is something that is generally attributed to the so called *New Economy*.

2.1. The longest prosperity period

In the United States, the country has experienced during 1992/2000 the longest period of economic prosperity since the end of World War Two, with an average of 4 per cent in terms of GDP.

Other aspects of the US economy are equally brilliant, with almost full employment of resources and less than 4 per cent of jobless working population (lower than Japan, and the lowest level for 30 years). Being also most remarkable that the mentioned figure is far below what until a few years ago was considered as the NAIRU level (*non accelerating inflation rate of unemployment*, according to Milton Friedman), *fixed* at a mark of 5.5 per cent of the working population.

During the last decade of the 20th century, the US recovered its role of *world economic locomotive*. Therefore, if we are going to consider, in next paragraphs, the US experience to some extent, it is not only as the significant horizon of the biggest existing economic power, but also as some kind of *benchmarking*, i.e. a reference for emulation by the European Union (EU) and other parts of the world.

2.2. Factor X

Obviously, the origins and the persistent strengths of growth in the USA are a subject of passionate discussions among theoreticians, as far as they are dealing with a situation not previously described in conventional text books. In other words, what is happening cannot be

judged according to already obsolete patterns, but by means of new and more imaginative approaches.

Precisely that is what Mr. Alan Greenspan, the Chairman of the *Federal Reserve System* (the FRS, or *the Fed*), tries to clarify when he refers to what he calls *X factor*, in the aim of offering a global explanation of the US economic *success story* since 1990: in spite of which there is not significant concern on any inflationary push (excluding the effects of the oil prices rising since 1999). Partly because *soft landing* policies have been implemented, namely by means of interest rates rises by the FRS.

Mr. Greenspan explains what the new development scheme with the help of what he calls the *X factor*, i.e. a complex of various pieces; a rather exciting *economic puzzle* rather than a *policies mix*:

- First of all, comes *the continuous and strong supply of new manpower* at comparatively low wages for all kinds of activities; thanks, in great measure, to the big immigration flows coming from Hispanic American and Asian countries. This helps to refrain salary raises.
- *Huge imports of commodities* and other inputs at very low prices, because of the rebated tariff following the already mentioned Uruguay Round; and also thanks to other reasons: The general deflationary trend prevailing almost everywhere –until 1999, when oil prices started to jump-- and the Dollar's strong appreciation.
- *The deregulation policy* initiated long ago (1980s) with *Thatcherism* and *Reaganomics*, and deepened afterwards. With a final result: enterprises are looking –anyway, anytime, anyhow— for bigger market stakes, through all kinds of efforts, and investments, aimed to cut prices, always trying to raise productivity and improve their position in terms of international competitiveness.
- *Much better financial opportunities* after the long term fall of interest rates; only refrained since 1999, because of the already mentioned purposes of *soft landing*. Anyway, capital flows continue to enter massively in the U.S. from the rest of the world, to invest in industries and services; and –lately in a growing proportion— in financial markets. This is something that can be explained because of the interest rate spreads: 6.50 per cent in the USA, 4.75 in Europe, and 0.5 in Japan (as November 2000).

- The income rise in the U.S. and the above mentioned inflow of external capitals have contributed to generate *huge market profits*, especially along the *equities boom*, as reflected in the evolution of main indexes as Dow Jones of the New York Stock Exchange (NYSE) and Nasdaq. What certainly entailed a very strong *enrichment effect* (although others more pessimistically call it *financial bubble*): a lot of people have at present the feeling that their personal or corporate wealth has much increased, which in turn originates bigger investments that feed further GDP growth.
- *Great productivity gains*, at an average 2 per cent annually during the nineties, *vis-à-vis* only 1 per cent in the eighties. The main spring of that trend being the ubiquitous and accelerated introduction of new technologies, mainly in the fields of computers (hard and software), telecommunications, internet; and also in aspects of management, like reengineering, human capital improvement, empowerment, benchmarking, total quality methods, leadership. And not the least, a better understanding by the great corporations of macro policies, international relations, environment, etc.

Summing up: Things have changed in the USA, so that the most enthusiastic observers of the so called *X factor* –or enlarging the scope, *The New Economy*—, are forecasting a very long cycle of prosperity. Even *sine die* according to the euphoric point of view of those who are *announcing a new age*. *Newagers* do not hesitate to prophesize a continuous boom of some twenty more years (!). But of course, cycles are not going to disappear. Although, for sure, they could become smoother because of the service sector prevalence, a healthier public sector structure and the coordinated policies held in the international institutions.

3. THE DIFFERENT BEHAVIOR OF NATIONS

At the end of the year 2000, the main risk for world economy is centered on the fear of a possible outbreak of inflation; in the case that oil prices could climb permanently to levels higher than 30 US\$ per barrel. That is why *soft landing policies* try to prevent an excessive overheating of the economy.

3.1. Advanced countries

In the USA since 1999, indicators show that prices could rise quicker; a trend that, as we have already seen, has been countervailed, in order to cool down the economy, by the raising of interest rates.

In the case of the EU, a most important event –a real landmark in its economic history, as many observers stress— is contributing to the quest for simultaneous stability and growth: the definitive birth, first of January, 1999, of the European Monetary Union (EMU), whose Central European Bank (CEB) is currently conducting the common monetary policy of the 11 countries integrating the Eurozone with consequences not yet fully available until 2002, when euro shall become a real fiat currency.

Along the same line of conservative behavior, one must emphasize the importance of fiscal and banking measures adopted in Japan to overcome the financial difficulties affecting its economy since the beginning of the nineties. And being true that the citizens of the old *Empire of the Rising Sun* are far from having solved everything, the fact is that they have started changing.

3.2. Russia

At this point we should remember that breaking many of the globalization postulates, the *Russian crisis* of 1988 –the Ruble's devaluation and the debt *moratoria*— was a very difficult event, not only for Russians themselves, but also for the rest of the world. And afterwards, being true that improvements around the globe are in some way reaching Russia –especially because higher prices of oil and gas and the *competitiveness effects* of the Ruble's devaluation— the core of the ex-Soviet Empire still shows many of the worst economic conditions in terms of market restrictions and the lack of real business ethics; still existing, additionally, deep monetary instability and the most extensive lack of budget discipline.

And going deeper, we can say that the main problem in present Russian economy and society was the systematic looting of the country's international reserves by the Mafia-like structure of the banking system; so that an estimated amount of between 100 and 150 billion dollars could virtually be deposited in Switzerland and Cyprus, and a long list of other tax havens, instead of being a part of the Central Bank's reserves.

3.3. Latin America

But globally speaking, the most difficult moment in recent times for economic stability came, when it was thought that Asian and Russian crisis would infect Brazil –interest rates were at the end of 1998 over 40 per cent in order to stop the loss of international reserves—, with a subsequent *Latin American domino effect*: a series of devaluations that could have hindered any possible mid-term recovery.

However, an international aid package was geared to help the largest South American country, with a total provision of 41.5 billion dollars, channeled by the IMF. Thus, for a few months, the *Real*, the Brazilian currency, was not devaluated, and the contagion did not progress, at the moment, any further. And even if, in the end (May 1999) the *Real*'s devaluation became inevitable— to adjust the successive exchange fixings to effective purchasing power—, the already foreseen measures were at work, preventing further deterioration, except in countries like Ecuador and Peru, where political complications contributed to further deterioration.

3.4. Third World

In the so called Third World, many situations of natural disaster appear from time to time darkening the general outlook. This is what happened with hurricane *Mitch* in 1999 in Central America, that left a long and dramatic trail of destruction. And while there were many important displays of international solidarity, which were translated into significant aid, there are no doubts as to the need of a special plan for the region; which has to include the cancellation of external debt; assuring, at the same time, fresh capital flows to help to push the GNP up.

Things are even worse in Africa: war, hunger, disease, dictatorships, and corruption are common in most countries of the continent. And these problems are not going to be solved either in the short or in the medium term. In that sense, the *South Africa Conference on AIDS* of July 1999, showed the deepness of a crisis which is not purely the dramatic extent of the new plague, but also the negative synergy of many structural problems. Such as those aroused by the keenest observers on the dramatic *affair* of the criminal network linking diamonds with extended civil wars and general devastation, namely in countries like Liberia, Sierra Leone, Congo, and Angola.

But, Murphy's Law –things developing in a bad way can still worsen—does not necessarily always work. That it is why we could say that the world economy is now (2000) in much better form. In that sense we can remember Michel Camdessus' expressions (at a financial meeting in Madrid, 1999) when he criticized the "ominous predictions made by birds of ill omen" during the second phase of the Asian crisis. Because contrary to the current gloomy predictions, emerging countries that were harshly hit by turbulences –the previous *Asian tigers* namely— have recovered in a very encouraging way. That is how it went in Singapore, Taiwan, South Korea, Thailand and Malaysia. The case of China being clearly encouraging looking the future with really revolutionary adjustments, in its path of reforms to become a member of the World Trade Organization (WTO).

Furthermore, we cannot be too pessimistic since international solidarity has improved. Financial assistance by advanced countries (in 1999 there were 25 northern industrialized nations participating in the aid packages organized by the IMF) has worked through a triple system: IMF's members fees raised, new amounts of special drawing rights (SDR) were issued, and the promotion of a very important increase in the participation of *New Accords* in order to obtain larger loans (NABs) to help countries in the worst difficulties. But of course, we are not going to support the idea, either, that we are facing a rose-colored future. Many difficulties are to be overcome in a planet that in 1998 attained the figure of six billion inhabitants, of whom 2,400 million live daily on less than two dollars.

4. REFORM PROGRAMS

At any rate, the international aid as at present is not sufficient to solve crisis, namely in what refers to the distribution methods.

We must assume that it is necessary to enter into a new stage, to create new and better framework conditions: what currently is being called *the new international financial architecture*. Something that in plain language means a more robust financial system, in order to elude systemic crises, and to prevent, *asymmetric shocks*.

4.1. New arrangements

On this point, the International Monetary Fund (IMF) has specified the arrangements to be introduced in at least seven concrete areas:

- 1) *Codes of good practice* so that the largest players in international economic activities –personal cases as those of Bill Gates, George Soros, and many multinational enterprises—, who behave as *21st century barons* or *sovereign states* in a world of highly developed technology, will have to accept internationally pre-established constrictions in order to avoid monopolies or prevent major market distortions.
- 2) *Information systems* to assure true *transparency* of all the important international issues; fighting therefore the *syndrome of ignorance*, that could end up blocking any kind of provisions to build new and more accurate information networks.
- 3) *Continuity in the ordered release of capital investments on an international scale*; that is, within a framework of greater caution and guarantees.
- 4) *Reforms in the national financial systems* with more rigorous rules and supervision for credit institutions. In the aim of preventing *crony capitalism* that in so many cases is the origin of bad credits and subsequent defaults. In that sense, the job is being done by IMF and the Bank for International Settlements of Basle, also known as the *Central Bank of Central Banks*.
- 5) *Market devices to stimulate the increased participation by the private sector* in crisis prevention and solution, in such a way as to keep the IMF from absorbing the entire effort. So that instead of being a *lone and global lender of last resort*, it can become a *forewarned guarantor*, making possible, in that way, the incorporation of private financial contributions in much larger amounts.
- 6) *Formulation of fair social policies* with aid to the most vulnerable groups, so that the effects of globalization do not prey upon those who have the least. And at the same time with more rigorous conditions to push environmentally acceptable patterns.
- 7) *The international institutions' adaptation to the new financial universe* and especially the IMF. A topic deserving a more extensive examination, to be paid in what remains of section 4.

4.2. New allocations and conditionalities

As it has been reiterated by everyone from the Secretary General of the United Nations to the Pope, as well as the Directors of the IMF

and the World Bank (WB), it is increasingly evident that globalization must be accompanied by measures designed to combat not only unequal development, but also the creation of social outcasts and other scars that continue to come to light.

Specifically, regarding aid in favor of less developed countries, it is clear that bigger allocations by the advanced nations to the developing countries is necessary. Average official aid is still far from the target of 0.7 per cent GDP that was fixed at the meeting of the UNCTAD in New Delhi, 1968.

The equivalent of 0.7 can be calculated if we remember that in rough numbers, the USA and the EU have GDPs of some ten trillion dollars each, Japan some four trillion more and the rest of the advanced countries two more. That is to say, all together, 26 trillion, the 0.7 per cent of which should be 182,000 million dollars.

To go from the present aid level of 0.3 (78,000 million) to 0.7 (182,000 million), could require a real effort to convince all the potential donor countries. But it cannot be said that this amount is impossible to get step by step, specially in a period when, as we have seen in section 2 of this chapter, forecasts regarding the future are rather brilliant.

The real problem would be to organize the distribution of such a huge contribution, to prevent the present mechanisms of looting and squandering of aid funds. New organizational systems are urgently needed, so that help effectively reaches those who really need it, and in the best conditions to improve situations without any major disruptions. All that implies a new way of *conditionality*, such as demanding from the receiving countries a democratic structure, and much more public honesty on the part of the people charged with managing international aid.

This is exactly what Chris Patten –the EU's Commissioner for Foreign Affairs— was speaking about in his address to the European Commission in May 15, 2000, when he said that such conditions should be a *sine qua non* for the purpose of avoiding the scandals of aid, which is filtered for the *preferential* benefit of all kinds of mafias, dictators, war lords, state bureaucracies, etc.

4.3. Globalizing institutions

It is also becoming clearer that a globalized economy needs a parallel increase in *institutional globalization*. And in this point, we are

facing a problem beyond the reform of the IMF/WB system. A new spirit has to be introduced in the *Group of Seven (G-7)*, keeping in mind that their almost unlimited functions –which they have taken upon themselves to become a real *world economic governing body*—, has to *return* in one way or the other to the United Nations system in the future.

In that sense, a pragmatic first solution could be to include in the G-7 (or G-8 with Russia) the presence of the Secretary General of the United Nations. With capacities at least on a similar level to the already granted to the President of the European Commission, who since a few years ago is regularly attending the G-7's annual meetings. And a subsequent measure could be that UN representatives be present, as well, at the lower level meetings of ministries and *sherpas* of the G-7.

Neither can we forget WTO, as a major and growing organization. Especially when almost all agree that the Seattle Conference (December, 1999) was not so much a fiasco, but a good opportunity to appraise the real difficulties to overcome in the path towards the *Millenium Round (2001-2004)*; from which could emerge the real *Magna Carta of Globalization*, with a more *human side*.

To sum up, IMF, WB, WTO, UNCTAD, and also the more environmentally minded UNDP, UNEP, CSD, are to be strengthened to cope with the rising globalization patterns that are shaping our present planetary inter-connections. And for sure, a new focussing of G-7 must be provided, to transform it –with new member States representing the not so rich areas—in some kind of executive committee of the UN, to tackle in a more informal and pragmatic way the urgent problems affecting world general interests. Of course, we do not forget the necessary reform of the *Chart of the UN*, especially in what refers to the Security Council. But that is a question that by fart goes out of the boundaries of this part of EOLSS.

5. NATURAL WORLD RESOURCES AND BIONOMICS

In the previous sections we have referred mostly to economic and financial resources, as magnitudes that can be homogenized in monetary units. But there are other resources of major importance for the current human life that cannot be accounted for so easily, because they are neither commodities –quoted daily in world markets— nor macroeconomic aggregates well defined in social accountancy.

5.1. Finite resources

Natural resources, as everybody knows, are finite, limited both in quantity and quality, something that has only been appreciated since very recent times. In that sense, 1972 was a historical milestone, not only because of the conclusions achieved at the first *United Nations Conference on Environment*, in Stockholm, but also due to the report to the Club of Rome on the *Limits to Growth*.

Both occasions were *unique*, on the assumption of the *Only One World* principle (according to Barbara Ward and René Dubos *dictum*). And in that context, during the following three decades, everything has evolved confirming the previous concerns on world environment and resources management. The rate of population growth has declined only in a minimum proportion, while technologies have become more and more powerful, with increasing capacities to deteriorate nature.

At present, we are facing a very difficult situation: economic welfare and consumerism are both going up in the developed countries, with all kinds of negative externalities in city areas: Traffic congestion, various forms of urban poverty, organized crime and so on. Meanwhile, more serious difficulties arise in developing nations, with dramatic problems on management of natural resources such as structural famine or malnutrition, deforestation, desertification. While there are other major problems affecting both advanced and less developed countries, such as , overfishing, acid rain, global warming, ozone layer depletion, etc.

5.2. The role of multinationals

The above related questions are linked to the current world economic and financial order; in the sense that globalization has become the common framework. So that even the smallest and less advanced countries have to join it; and not only in connection with the United Nations agencies and regional organizations, but mainly through the network of the activities deployed by multinational enterprises (MNEs), many of them behaving like real *sovereign states* (Anthony Sampson *dixit*), as far as they have the power to make decisions affecting a lot of people that has not any say on fundamental topics.

Those MNEs capacities have been largely discussed particularly in the negotiations held at the *Multilateral Agreement on Investments* (MAI), inside OECD, WTO and UNCTAD; with the result, until this moment, of no agreement at all, because of the reluctance of the poorest facing the richest, afraid as they are the first that the MAI could mean a total control by the MNEs without much respect for wealth distribution and ecological equilibrium.

5.3. A new deal from Bionomics

It is hardly surprising then that nowadays the main question is a methodological one: how to introduce new rules in the global behavior, so that *Ecological Economy*, or *Bionomics*, can be considered the real basis and tool for the future conservation of biosphere.

Bionomics has to keep an eye on all kinds of possible environmental impacts of any policy; becoming in that way a real and permanent appraisal of the *nature / economy* relations, impregnating deeply, in every respect, the economic attitudes with ecological principles. So that real sustainable development can be considered the great design looking towards the future.

Therefore, a *new deal* on financial resources policy and management must be adopted, with two great targets in mind: the *synchronic* feeling on the necessity of helping now, at present, less developed *countries* to encourage their development on a sustainable basis, supporting them with economic resources and technologies coming from advanced nations; and some kind of new *ecological diachronic ethics*, regarding the moral debt of present mankind with coming generations, in order to keep ecological equilibrium.

6. THE BIOSPHERE AS A GLOBAL ECOSYSTEM

The world where we live can be referred to as a *spaceship*, which will have between 9.000 and 12.000 million *travelers* in the second half of the 21st century. Those figures are highly credible since at the beginning of the third millennium the speed of population growth is still high: every passing year, the Earth admits new *entries* of human beings that are comparable, in size, to the planet's inhabitants in the first century B.C., according to some historical estimates.

With such a huge and growing population, we have to bring face to the real challenge: we are living on a threatened biosphere which is

the only *available habitat* to all humanity and the other living beings: a thin layer wrapping the Earth, not more than 50 km in height, which amounts to only 0.9 per cent of the planet's 6,500 km radius, where all known life has been born and is now evolving, from viruses and bacteria to the millions of animal and vegetable species that make up the intricate life fabrics with only one external input, i.e. solar energy.

Those present biosphere conditions cannot be considered everlasting, since there are major threats working against the basic equilibria. And in spite of some important shifts in public opinion, even today a collective sense pervades society, assuming that we live safely; and trusting that such *status quo* could continue indefinitely, not assuming the real situation; the current process of destruction of nature. That is the great challenge *vis-à-vis* our common future.

In those conditions, warnings about the affliction of biosphere are by no means a recent phenomenon. Economists, biologists, town planners, ecologists, historians, etc. have, for more than a century, been marked by growing concerns about man's contribution to the degradation of nature in the only planet that until now is known to bear life. But being very serious those testimonies and evidences, it can be said that the worst of the possible evils is still there, even if in the last few years progress has been made to eradicate it. We refer, of course, to atomic danger.

6.1. Atomic danger: from nuclear winter to detente

The eventuality of a *Third World War* (based on *mutual assured destruction*, MAD) was seen in 1985 as a "working hypothesis", highly probable in geostrategic studies. The macabre term *megabody*, was then devised as a unit of measurement to refer to a million deaths in an hypothetical large-scale nuclear war.

Among those who took on the problem with calm, rational foresightedness, and scientific endeavor, particular attention has to be shown to the professors and other experts that took part in the *Congress of Scientists*, in Washington DC, October 1983; when the so-called TTAPS Model (the S after its most famous promoter, Carl Sagan) was first introduced, to simulate a picture of what a *nuclear winter* would look like: the dimming of solar light as a result of the suspension of particles in the air, as a consequence of the burning of cities and forests, all together leading to the *longest night* lasting various months, inducing the equivalent of a fifth ice age, and thus the possible disappearance of life, at least as we now know it.

However the *Spirit of Reykjavik*, which arose out of the first official encounter between Presidents Gorbachev and Reagan in the Icelandic capital, during the autumn of 1986, began to change things radically: the growing threat of confrontation which had led to the deployment of *Euro-missiles*, the announcement of the US Strategic Defense Initiative (*Stars War*), and the Soviet counter-initiatives, were matters that had become too serious to be ignored anymore.

In the succeeding *Washington Treaty* of December 1987 (the famous *NIF Accord*), agreement was achieved to eliminate medium range nuclear vectors thus consolidating the first hopes of *detente*, for it opened the course of further negotiations on global disarmament. So, the sinister prospect of the nuclear winter and its potentially disastrous repercussions, became an increasingly distant prospect. The *new rationality in a world without wars* began to be sketched as a more and more credible possibility. Certainly with ups and downs, but in spite of it in a very positive trend of peaceful purposes.

Of course, *perpetual peace* –as Immanuel Kant asked for in 1795— is still not yet assured, because as a few say “one needs enemies in order to survive”. In other words, we are not at the end of the history of war, because mankind –still devastated by minor but terrible local wars—, is still waging a real *world war*, this time against nature. In that conflict, threats are still most impressive as we shall remark in the following items.

6.2. Major threats and changing patterns

Certainly, with the disappearance, or at least the decrease of nuclear risk, our planet is now certainly less threatened than it was during the first tense half of the eighties of the 20th century. But in a sense, this assertion is somewhat presumptuous, in view of the fact that ten or twenty years, or even half a century, is a very modest period of time for a planet some 4,500 million years old. And where humanity's existence amounts to *only* between two to four million years, and where written history has been going for not more than seven millennia.

6.2.1. Some specific problems

We shall try just to mention –they are broadly explained in other chapters of EOLSS— the six main macro-ecological problems, which affect basic elements of the Earth's equilibrium as a whole: 1) depletion of the ozone layer; 2) destruction of the Amazon and other tropical

rainforests; 3) deforestation in temperate zones through acid rain and forest fires; 4) accelerated desertification; 5) greenhouse gas emissions which entails climatic changes; 6) production of all kinds of wastes to be recycled.

Deterioration of renewable resources —water, soil, forests, fish, biodiversity—, can be deeply appreciated with the few following quotations:

- Twenty countries already suffer from water stress, having less than 1,000 cubic meters per capita a year, while water's global availability has dropped from 17,000 cubic meters per capita in 1950 to 7,000 today.
- A sixth of the world's land area —nearly 2 billion hectares— is now degraded as a result of overgrazing and poor farming practices.
- The world's forests —which bind soil and prevent erosion, regulate water supplies and help govern the climate— are shrinking. Since 1970 the wooded area per 1,000 inhabitants has fallen from 11.4 square kilometers to 7.3.
- Fish stocks are declining, with about a quarter of them currently depleted or in danger of depletion, and another 44 per cent being fished at their biological limit (cod, hake, sole, turbot, herring, etc.).
- Wild species are becoming extinct 50–100 times faster than they would naturally, threatening to tear great holes in the web of life.

6.2.2. Unawareness and unsatisfactory of education

Environmental unawareness is also a very serious topic, since little or nothing can be done if most of the people continue not to care believing that our own personal fate does not affect the whole of humanity or vice versa, thus contributing to the destruction of *our hospitable habitat* (as the *Summit of Earth* described it in 1992).

In educational centers all over the world the most diverse subjects —and sometimes even picturesque as well as grotesque— are minutely studied. A great irony moreover, because instead of emphasizing the global issues, *patriotic values* —in the ultra-nationalistic sense— are still very influential and highly esteemed. By contrast, it is much rarer to talk about *Gaia*, or of the notion of *Mother Earth* as the symbol of biosphere. And that lack of environmental consciousness appears in the fact that a great majority of the people are not too much interested in caring for public property, in preserving natural open spaces, or in the perpetuation of endangered species.

The real day to day fact is that almost everyone protests when something affects their own small, and sometimes rather miserable patches of ground. Although it is quite clear that we, all together, are actively assaulting environment in all sorts of ways: family excursion to the mountain; the so frequent "devil may care" attitude, which pervades in the cities; not to mention the waste involved in the everyday consumerist use of natural resources.

Education about environment could do much to remedy the prevailing carelessness, especially if well founded on new ethics, the already mentioned *diachronic solidarity* with generations to come. This indeed is part of the ecological response to the problem.

6.2.3. Consumerism habits

Consumption per capita has increased steadily in industrial countries (about 2.3 per cent annually) over the past 25 years, spectacularly in East Asia (6.1 per cent) and at a rising rate in South Asia (2.0 per cent). Yet the developing regions are far from catching up to levels of industrial countries, and, for instance, consumption in Africa is lower than before: the average household today consumes 20 per cent less than it did 25 years ago.

Distribution and not production capacities is the real drama. The poorest 20 per cent of the world's people have been left out of the consumption explosion. Well over a billion people are deprived of basic consumer needs, and specifically, of the 4.4 billion people living in developing countries, nearly three-fifths lack basic sanitation, and almost a third have no access to clean water. A quarter do not have adequate housing. A fifth have no access to modern health services. A fifth of the children do not attend school to grade five. About a fifth do not have enough dietary energy and protein. Micronutrient deficiencies are even more widespread. Worldwide, two billion people are anemic, including 55 million in industrial countries. In developing countries only a privileged minority has motorized transport, telecommunications and modern energy.

Inequalities in consumption are stark. Globally, the 20 per cent of the world's people in the highest income countries, account for 86 per cent of total private consumption expenditures. And the poorest 20 per cent, only get a minuscule 1.3 per cent. Still more:

- The richest fifth consume 45 per cent of all meat and fish, the poorest fifth 5 per cent,

- id consume 58 per cent of total energy, the poorest fifth less than 4 per cent,
- id have 74 per cent of all telephone lines, the poorest fifth 1.5 per cent,
- the richest fifth consume 84 per cent of all paper, the poorest fifth 1.1 per cent,
- the riches fifth own 87 per cent of the world's vehicle fleet, the poorest fifth less than 1 per cent.

7. TO END MAN'S WAR AGAINST NATURE

Relating to the above mentioned problems of opulence of the richest and misery of the poors, we must emphasize something very meaningful: when the United Nations were formally created in 1945 the world had just emerged from the most devastating war in history. It stands to reason that the *UN Charter*, drawn up in San Francisco in July of that year, gave priority to the creation of a Security Council, to avoid further conflicts and to settle, through negotiation and arbitration, the conflicts between member States. No wonder that in the *World Carta Magna* environment issues were not under any special focus.

7.1. Main features and tensions

But since 1945, everything has been re-evaluated, and now, in the first decade of the 21st century, while there are still, for sure, a great number of problems waiting to be solved all over the world, the attitude to the ecological field is, fortunately, very different, at least regarding a growing minority. There is a changing atmosphere, that makes possible to talk in terms of the quest for a *new rationality*. Nevertheless –again against the rose-colored horizons—, some serious features still appear as contrary to those purposes:

- The heightening of tension between North and South over the plundering of natural resources; it is after all a paradox that the North preaches ecological conservatism, but continues all the while contributing to nature's destruction in the South.
- The loss of biodiversity through the rapid extinction of species, because of the continuous reduction of their natural habitats in favor of the ever growing human population.
- The risks to human health, which spread increasingly because of the deterioration of the quality of life in many urban spaces, and even

more in rural areas which suffer from many sorts of environmental damage.

7.2. Milestones to a worldwide philosophy

Facing all the above mentioned items of man's war against nature, it is clear we need some kind of *oneworld philosophy*, i.e., the approach to environmental problems with an overall perspective. In that sense a series of milestones can be recorded along the last 30 years.

- The United Nations Stockholm Conference on the Human Environment, held in 1972, and its immediate consequence the creation of the United Nations Environment Program, UNEP, with its *siège* in Nairobi, where programs on a *World Strategy for the Conservation of Nature* were deployed.
- The First Report of scientists of the MIT for the Club of Rome, *Limits to Growth*, also in 1972, which stressed that all kinds of development have consequences to be foreseen as a premise to prevent farther deterioration of the Earth.
- The survey conducted by the Environmental Protection Agency (EPA) of the USA, on the situation of natural resources, *Global 2000* (a real world diagnosis), published in 1980 as a very outstanding proof of President Carter's concerns on environment.
- The proposals of different Non-Governmental Organizations (NGOs), such as the World Wild Life Fund (WWF), the International Union for the Conservation of Nature (IUCN), Friends of the Earth, Greenpeace, etc. And, of course, the other hundreds of thousands smaller ecological organizations, which are monitoring a broad variety of local problems; quite in accordance with a most operative criteria: "to think globally, to act locally".
- The *Brundtland Report*, prepared by the UN World Commission on Environment and Development, and published in 1987, which updated many of the previous concerns about the biosphere situation. Being its major issue the notion of *sustainable development*.
- The calling of an Inter-Governmental Conference on Ozonosphere, The Hague 1988, which raised the possibility of creating a higher

world authority for atmospheric matters, and especially for the preservation of the ozone layer.

- The *Fourth Environmental Program* of the EC (1987-1992), in line with the environmental objectives of both the *Single European Act*; and the subsequent creation of the *European Agency for the Environment*, with *siège* in Copenhagen.
- The proposal made by the Austrian Chancellor in October 1989, to create a world network of "Green helmets" to help resolve international ecological catastrophes.

8. THE RIO-92 SUMMIT OF THE EARTH. BIONOMICS AT LARGE

The aforementioned approaches to a new world philosophy could be enlarged with many other meaningful decisions. But the important thing to emphasize *hic et nunc* is that most of the ideas prevailing in those statements were brought to the 1992 Rio Conference, i.e. the *Summit of the Earth*.

8.1. Preparing the Summit

The 42nd session, 1987, of the General Assembly of the United Nations gave an enthusiastic reception (Resolution 42/187) to the already quoted *Brundtland Report*. In that same session, a *Environmental Perspective for the year 2000 and beyond*, prepared by the UNEP, was adopted.

As a continuation of those efforts, in the following 43rd session (1988), the General Assembly considered that 20 years after the Stockholm Conference on the Human Environment, it was necessary to hold a second meeting. In that direction, the final decision was taken in December 1989, (Resolution 44/228) and a date for the United Nations Conference on the Environment and Development (UNCED) was set for the 2nd of June 1992, accepting the offer of the Brazilian Government so that Rio de Janeiro was granted the privilege of being the seat for the second ecological world forum.

In the same resolution 44/228 the great issues to be discussed were settled; the global objective being to maintain environmental quality, and at the same time to promote sustainable development in all countries. Nine different subjects were formally identified:

- 1) Protection of the atmosphere: climatic change, deterioration of the ozone layer, and air contamination.
- 2) Preservation of Earth's resources: measures against deforestation, soil erosion, desertification and droughts.
- 3) Conservation of biodiversity.
- 4) Protection of fresh water supplies.
- 5) Conservation of oceans, seas and its shores, and a more rational use of its live resources.
- 6) Environmental management to watch over dangerous biotechnological waste, including toxic waste.
- 7) Prohibition of illegal trafficking of toxic products and waste.
- 8) Improvement in the quality of life and human health.
- 9) Raising of the life standards and of the working conditions of poorer people, by acting against environmental deterioration.

8.2. UNCED's decisions

According to the previous terms of reference, UNCED's agreements covered the following topics:

- a) The *Earth Charter*, containing the principles of behavior for States and peoples in everything concerning, simultaneously, environment and development; so as to ensure the viability and the future integrity of the Earth as a *hospitable habitat* for human beings and all the other forms of life.
- b) Two treaties about legal measures to protect atmospheric conditions, to prevent *climatic change*, and to safeguard *biodiversity*.
- c) *Agenda 21* which is a working program for the international community from 1992 into the 21st century, including objectives, cost estimates, priorities, and responsibilities.
- d) *Additional financial resources* to be implemented through the existing international organization.

- e) *Transfer of technologies*, so to help especially less developed countries.
- f) *Reinforcement of institutional processes* to acquire a bigger awareness of ecological problems.

The *Earth Summit* was a real test on the worsening of the situation. And it can be said that the approved *Agenda 21* was only a very weak commitment for real change. That was again appreciated when the contracting parts of the *Commission for Sustainable Development* (CSD) –created by *Rio-92* itself— met in New York City in December 1997 (*Rio + 5*), to stress that things had not really improved; they even showed a further deterioration.

And similar comments can be made on the topic *global warming*, when climatic changes were studied successively in Kyoto (1997), Buenos Aires (1998) and Stuttgart (2000). Although at the end some agreements were reached on CO₂ emissions, to settle them, in 2012 on the same level as in 1990. Some details on a few topics, in the following section 9, will help.

9. EMISSIONS AND WASTES THAT POLLUTE THE EARTH

Pointing out some data, we can say that runaway growth in consumption in the past 50 years is putting strains on the environment never before seen:

- The burning of fossil fuels has almost quintupled since 1950, generating the already mentioned global warming.
- The consumption of fresh water has almost doubled since 1960.
- The marine catch has increased fourfold.
- Wood consumption, both for industry and for household fuel, is now 40 per cent higher than it was 25 years ago.

But the present reality also offers some space for hope, since much-publicized fears that the world would run out of such non-renewable resources as oil and minerals, have proved false: new reserves have been discovered. Besides that, demand's growth of physical goods has slowed in the advanced countries, and consumption has shifted in favor of less material-intensive products and services (miniaturization and recycling).

Besides that, energy efficiency has improved, and technological advance and recovery of raw materials have boosted efficiency in its use, in a path that can be called *dematerialization*. In other words, the per capita use of basic materials such as steel, timber and copper has stabilized in most OECD countries, and even declined in some countries for some products.

But although material resources may not be running out and dematerialization is working, waste is mounting, both toxic and non-toxic. In industrial countries per capita waste generation has increased almost threefold in the past 20 years, new methods and bigger allocations being needed in due course to deal with this problem.

Pollution and waste exceed the planet's sink capacities to absorb and convert them. The use of fossil fuels is producing gases that change the ecosystem, since annual carbon dioxide (CO₂) emissions quadrupled over the past 50 years.

Therefore, *global warming* is the great problem, threatening to play havoc with harvests, increase the frequency of storms and droughts, accelerate the extinction of some species, spread infectious diseases, and possibly cause sudden and savage flips in the world's climate.

10. THE TWO MALTHUS LAWS

In the middle of the incertitudes of the more or less official approaches to sustainable development, some theoretical research, or at least some reflections, could be useful to the enquiry on why things are happening in their present way. And in that direction, when we try to take account of the real *state of the art* –with the inexorable ticking of the world's demographic clock in the background—, it is not surprising at all that they comes again some old discussions about the *population law* of Thomas Robert Malthus (1766-1834).

Refocusing Malthus theories, we can characterize them as *Malthus first law*; following with our own ideas on what we shall call the *second Malthus law*, i.e. the interpretation of the macroecological consequences of forecasts initially raised in the more limited scope of population growth and food resources.

In very simple terms, Malthus first law can be expressed in the following way: through time, population grows geometrically, while the

quantity of food and other sustenance available does so arithmetically. This pattern of different rates, unavoidably creates a gap that at its peak encourages the *struggle for life* so that only the fittest survive. But in the end subsequent adjustments correct growth in such a way that population figures ultimately tend to stabilize, or even begin to fall.

10.1. First law and *homo technologicus*

As a matter of fact, Malthus first law still clearly operates in some places, particularly where demographic explosion has not been accompanied by sufficient technological advances to meet the rising demand for food and other stuffs. Famine and starvation still exist in some less developed countries or regions thereof, especially in sub-Saharan Africa, and even in Latin America. In these areas, population growth rate exceeds the increase of food supply.

On the contrary, in the industrialized world, and in many parts of the Third World, there is enough to live on, thanks to technological progress, and in some Asian countries partly because of Borlaug's *Green Revolution*.

In short, for the majority of the world's population, the predictions made in the light of the first Malthus law have not become real. Technological advances have reduced, *sine die*, the impact of the presumed decreasing yields, which constituted the basis (jointly with population growth) of such forecasts. Has it been an all-out a victory for *homo technologicus*? For sure, although poverty in the Third World still demands all kind of efforts in the direction of deeper redistribution.

10.2. Malthus second law and *homo ecologicus*

Taking account of the fact that the great demographic explosion is still working and that the newest technologies are of greater impact on nature, it should be accepted as a true proposition that the relationship between population and the future is increasingly reliant on the biosphere's capacity to keep acceptable equilibrium *vis-à-vis* the different human activities.

We cannot simply cut down on our food, something that it is most important in early societies, for the simple reason that if you do not eat, you cannot live. In the long run however, when food is basically assured, the ruthless aggression which the rapidly expanding population exerts on the biosphere, becomes more worrying. Because human

population growth fosters the destruction of the environment, unless new ecological methods are adopted.

Therefore, what the *Malthus second law* means for us is that human population growth is breaking ecological equilibrium which have, up to now, regulated the Earth's ecosystem as a whole. Thus, the *instinctive* way in which the natural environment was able to regulate itself (the *Gaia hypothesis*, Lovelock's idea) is becoming more and more difficult; i.e., the capacities of natural regeneration are exhausting, as far as *Gaia* is not capable anymore of regenerating. Almost every natural cycle is being degraded.

We can now try to get an operative conclusion: the rapid development of technology had the effect of canceling the relevance of Malthus' first law, so that after all, there is enough food for everyone (the problem, we emphasize it again, is redistribution). In a similar trend, what derives from the second Malthus law is the following: it is not inevitable that nature be degraded *ad infinitum*, since human can be capable of regulating the present modified eco-systems, and so to stop the potential disaster of an ecological holocaust. Therefore, we must embrace the lessons of the past, and if *homo technologicus* cancelled – except in a few places— Malthus first law, the advent of *homo ecologicus* could possibly repel the second.

11. THE ECOLOGICAL ANSWER: THE UNIFIED FIELD OF ECONOMICS AND ECOLOGY AND THE *ECO-ECO MODEL*

After the previous reflections we must ask ourselves about the means to solve the world main environmental problems. The answer is very clear: through an *ecological approach*, combining it as much as possible with the working of economy and society.

For the vast majority of people, Ecology is a relatively new science. However it was *founded* long ago, in 1868, when Ernst Haeckel (1834-1919), Charles Darwin's main German disciple, first employed that neologism to describe the new field of knowledge concerning the links and interactivities of a certain population with its environment; an environment consisting, from the human point of view, of other animal populations, vegetable life, as well as the non-biotic reality (soil, water, air, etc.), i.e., all the available natural resources.

In the path to a certain unity, or at least proximity of Ecology and Economics, we ought remember, that etymologically speaking, Ecology

means the “study of the household”, and therefore it is closely related to that of Economics, as the “administration of the household”.

In that parallelism, it can be useful to remember here that Economy, at first, embodied the administration of home economy, but afterwards its concept was extended to reach *political economy* (the structure of all activities inside the *polis*, the city) and then *macroeconomy* (the analysis of the great economic magnitudes, like GDP, GNP, Public Sector, etc. of a larger space, a nation, the international reality). Now, Economics needs to enlarge its focus once again, to encompass the *greater house of nature*, making common cause with Ecology; among other things because nature it is the basis of all life, and therefore of all human activity.

Indeed, by admitting the ecological focussing, Economics –as the science which refer to relations of production and exchange in a context of scarcity (*of means*), and with lot of potential possible purposes (or *ends*), becomes incomparably broader: it comprises the study of relations not only between human aggregates, but also between men and non-human populations (animal and vegetable life), including the non-biotic world (territory, water, climate, etc.)

At present, that could be an operative conclusion: it is no longer acceptable to divide Ecology and Economics into separate compartments. There is one broad sphere inside which intrahuman relations are working, while at the same time humanity is linked to the rest of nature. In that sense, if at the turn of the 18th century with the 19th the activists of the *dangerous sect of economists* were attempting – as Joseph Schumpeter wrote—“to reveal to humanity the hidden underlying conflicts”, today the aim of the not less suspicious sect of *economists / ecologists* is to reveal the inner character of humanity's conflict with nature. As a result of that new conception, those who underestimate the intricate and ubiquitous link of Ecology with Economy, are like the poor minded people to whom the Spanish poet Antonio Machado referred as “despising all that they ignore”.

Furthermore, it is clear that interrelationships of scarcity, conflict, and equilibrium identified by the Ecology (much broader in character than those set down in economic theory according to Robbins *et alia*) are not mere speculation. And to substantiate this point we can try to explain what could be called *the eco (nomy) eco (logy) model*.

11.1. Eco-Eco model and sustainable development

Alongside the conventional productivism of growth on any cost, basing it only on profitability criteria, we can outline an *ecology / economy alternative* (that supports the concept of *sustainable development*), to which we shall refer as the *eco-eco model*. Its theoretical framework can be sketched in a number of basic statements.

1. Under the prevailing systems of production, capital which is consumed (that is, the use of non-renewable resources) is erroneously measured as *mere consumption of income*. This makes conventional measurements of the social product –GNP, GDP, National Income etc.— seriously challengeable. And such measurements contribute heavily to the erosion of environment, since they do not foresee any kind of compensation for what really is consumption of capital. This is particularly true in the case of oil – and other mineral resources— which will not last indefinitely.
2. In the production process, the deterioration of natural resources – polluting clean water in rivers and lakes, damaging clean air, etc.— has to be prevented through the *internalization of nature costs*; i.e., computing those natural capital losses as real expenses in the firm's accountancy. In that way, investments have to be promoted so that damaging practices against nature can be stopped. Otherwise, *ecotaxes* will be necessary to punish polluters and non-polluters indiscriminately.
3. The internalizing of costs for nature conservation, is relatively straightforward in principle. If in the debit of a business account of results, or in the repayment of factors in the accounts of GDP, we specify expenditures attributable to work (salaries), reinvestment of capital (depreciation), to the buying of raw materials and energy, social security, financial costs, etc., there seems to be no reason for not calculating, or putting into the account –that is, internalizing— all that relates to the conservation of natural capital and to the improvement of the environment, when recovery of damages are still possible. Internalization has to be implemented through adequate implementation of the accountancy rules; something that still depends of national authorities, except in cases like the EU where supranational rules are already being settled.
4. Besides that, in traditional macroeconomic equations, all sort of productions are wrongly perceived as contributing to the general welfare; when, actually, a lot of productions have a *negative influence on the quality of life*, as well as in generating environmental hazards which will ultimately endanger the future of

the planet. If we had to measure what is ecologically good in real terms, we would have to detract build-up of armaments, the contaminating legacy of some industries, disruption of the environment arising from hard infrastructures, the annihilation of natural areas due to the ever-expanding urban sprawl, etc.

5. Internalization of costs, promotes a new *rationale*, indispensable, in terms of:
 - *Improving quality*, and prolonging product life; against the present productive / consumerist attitudes, in which everything has to break at some early point, so that new purchases can replace them.
 - *Energy saving*, in order to avoid the squandering which so irrationally takes place; particularly on the side of electrical companies, oil corporations, and other utilities, always anxious to increase sales figures and profits.
 - *Waste and rubbish recycling*, to put a stop to the poisoning of the Earth, and to guarantee the availability of raw materials into the future through recovery and reutilization.
 - To attend to the improvement of *quality of daily life*, remembering once again that it is necessary to produce and consume in order to live, and it is nonsense to live just in order to produce and to consume.
6. In any model of development, nature must be the *independent variable* par excellence. What exactly does it mean? That if national income and consumption growths can be handled according to demand forecasts, the resulting amounts must be conditioned to the prescription that nature capital (the collective patrimony for today and tomorrow) should not diminish.
7. *International cooperation*, involving some kind of executive authority on a global scale, has to be an indispensable tool to ensure the maintenance of many of the world's ecosystems. In that sense, as it is generally said: "Better to prevent than to cure".
8. On a more limited scale, *impact surveys* are necessary to simulate the possible effects of investments on the existing natural equilibrium, so that all projects that deteriorate ecosystems can be discarded.

9. Integrating the sums allotted to conservationism in all budgets, private business and public, a *Nature Budget* could be set up, to cover the whole consumption of nature capital.

10. The eco-eco model involves important criteria associated with the *Third World*: not to force its westernization, which would be a disaster because of consumerism and other kinds of excesses that would be followed by a real feed-back of environmental deterioration.

It remains to be said that the *eco-eco model* offers an alternative vision of economic calculation and behavior, applicable to each specific country. To extend this analysis to the level of a generalized forecasting, we shall bring up the proposal of the creation of the *United Nations Council for Environmental Security* (UNCES). But previously we have to refer to some specific techniques to link environment and development.

11.2. Environment and sustainable development in co-operation policies

As we have seen before, long-term economic development is perfectly compatible with environmental sustainability. But to ensure this in current policies, sustainability needs to be taken thoroughly into account when formulating economic targets and adjustments.

11.2.1. Poverty, WTO and PNUD

Developing countries can be integrated into the world economy through trade and regional economic integration. In that direction, the European Community (EC), has assured that negotiations in this area should take full account of the needs of developing countries and of the objective of sustainable development. Thus, the EC is seeking to include a trade and environment component in the next World Trade Organization (WTO) Round -the so called *Millennium Round* - with the aim of clarifying:

- The legal relationship between WTO rules and trade measures taken pursuant to Multilateral Environmental Agreements (MEAs). Consensus should be sought on the accommodation of these measures within WTO rules and on the types of multilateral agreements which constitute MEAs.

- The relationship between WTO rules and Non-Product Related Process and Production Methods requirements, and particularly WTO compatibility of eco-labelling schemes.
- The relationship between multilateral trade rules and core environmental principles, notably the precautionary principle.

Besides all that, in the more systematical exploring of the highly complex relationship between poverty and environment, the European Commission is actively participating with donor countries in two major initiatives. The first is connected to the *Initiative on Poverty and Environment*, launched in 1998, by UNDP and the Commission, whose target is to foster poverty alleviation through improvement of the environment and vice versa. The second program is being developed by the Commission as an active member of the Development Assistance Committee (DAC) Poverty Network, focusing on coherence of policies on food security, trade and debt.

Furthermore, an *Action Plan on Capacity Building for Poverty Reduction* is currently being prepared by the European Commission (EC) within the Lomé negotiation process with *Africa/Caribbean/Pacific Countries* (ACP). Lomé IV (1999) placed the environment at the center of EC/ACP cooperation, creating a special Title 1 to set out new environmental provisions. The general provisions of the Convention set the tone stating that cooperation shall "help promote specific operations concerning the conservation of natural resources, renewable and non-renewable, the protection of ecosystems and the control of drought, desertification and deforestation" (Article 14). This commitment should continue in future specific agreements, as environmental aspects are the third main horizontal axis in the new development partnership agreement with ACP countries.

We must refer also to the resolutions of the UN at the *Millenium Meeting* of October 2000 in New York, on the maximum level of Chiefs of State and Government, when general targets were settled to reduce poverty in the world.

11.2.2. Sustainability policies

Responsibility for identifying and responding to environmental issues and for integrating environmental considerations into policies lies primarily in the *national strategies for sustainable development*, prepared by developing countries, whose main challenge is to ensure that the envisaged efforts are credible and transparent and that the

integration process advances at a steady pace. Three basic elements are essential in this respect.

- First and foremost, there must be political commitment to environmental integration at each level of the hierarchy.
- Secondly, the integration process needs to be firmly formalized in the organizational structure, and given sufficient institutional priority. In that sense, OECD, WB and the EU have decided to give to the integration process more weight and more visibility within their organizational set-up, and have created special units and high level to oversee the integration process.
- Thirdly, there must be sound management of the overall quality of the integration process. The most credible avenue in this respect is certification and accreditation of the environmental integration process, in accordance with an internationally acknowledged and standardized environmental management system. The most important of those systems, at present, are the *International Standardization Organization ISO 14001*, the *European Community Eco-Management and Audit Scheme*, EMAS. These two and the other environmental management systems are aimed at becoming a tool enabling an organization to control the impact of its activities, products or services on the environment.

11.3. Foreign direct investment (FDI) and the environment

FDI is an increasingly important *engine* for sustainable development in many countries. However, the potential environmental consequences of the elements of privately-supported capital flows (portfolio investments, and debt), as well as *Official Development Aid* (ODA), also need to be considered.

11.3.1. Positive influence and risks

Empirical evidence concerning the sign and the significance of the technology effects of increased FDI is rather limited. However, it is possible that the environmental performance of firms in many countries will be positively influenced by better access to foreign technologies associated with FDI; as well as by the increased exposure to foreign demand patterns that increased FDI implies.

But the main environmental opportunities associated with FDI arise from the fact that FDI promotes higher incomes, which could lead

to higher levels of investment in pollution prevention and control facilities.

The main environmental risks associated with FDI arise from two areas. First, higher incomes associated with FDI-induced growth may not *pull* ecological quality along fast enough, even implying a lower one in certain countries over potentially long time periods. Even where the link between higher incomes and quality is a positive one, it may not turn out to be strong enough to prevent absolute degradations in environment.

Second, there is the possibility that competitive pressures may tempt some companies or countries to engage in a *race to the bottom* in environmental standards. There will certainly be individual companies and sectors that will be *losers* in the economic restructuring likely to accompany expanded FDI flows. Firms whose economic position seems to have worsened may well blame FDI for this, and seek political intervention to protect the *status quo*.

11.3.2. Competitiveness, FDI, and nature

Available empirical evidence about the relationship between competitiveness, FDI, and the environment suggests that:

- Most investment location decisions are not made on the basis of environmental criteria. Environmental costs are typically a small element in these decisions.
- Most pollution-intensive FDI originating in industrialized countries is going to other developed countries, rather than to developing ones.
- There is no clear empirical evidence that high, or even relatively high, environmental standards have a systematic negative impact on competitiveness at either the macroeconomic or the microeconomic level. Most studies show insignificant relationships between stringent environmental regulations and competitiveness.
- Many firms are discovering that increased attention to environmental issues can actually increase their economic competitiveness (either via the reduced costs that *eco-efficiency* can bring, or via the increased revenues that selling to increasingly environmentally-conscious markets can bring).

- There is not much evidence of countries explicitly lowering their environmental standards in order to attract new FDI. Even where countries do react in this way, it is not obvious that they are being very successful.
- On the contrary, countries which operate transparent and efficient environmental programs are often quite successful in attracting new investment. Countries with high environmental standards are still the major producers and exporters of most environmentally-sensitive goods, and still have the highest living standards.
- Overall, therefore, there is not much empirical evidence of *pollution havens* affecting either FDI or trade flows on a systematic basis. In fact, *pollution havens* seem to be more often associated with protectionist economies than they are with environmentally-tolerant ones. If anything, the imposition of higher environmental standards seems more likely to generate a technological response, rather than leading to flights of capital.

11.3.3. Developing countries' attitudes

On the other hand, there is some tendency being observed to relax environmental standards in some countries, in order to attract certain types of FDI, or to promote particular trade policy objectives. This tendency will be most acute in those countries which are undercapitalized and fast-growing.

There is also some tendency for certain types of firms in specific industries to seek cost relief related to environmental parameters. This tendency will be highest in those industries whose products are undifferentiated, and which are most subject to small (and environment-based) cost differences. In assessing these claims, however, it is important to examine whether or not environmental costs are actually at the root of any competitiveness problems, or whether structural problems facing the firm/industry might be more to blame.

For all of the above reasons, the fear of a general *race to the bottom* in environmental standards, based on competitiveness concerns, may be somewhat exaggerated. There are some sectors of the economy in some countries where a *race to the bottom* may be occurring, but this does not seem to be the general case.

A more important question may be how international economic competition might be inhibiting a *race-to-the-top* (i.e. preventing

countries from raising environmental standards). For example, there is some evidence that countries sometimes do not implement new environmental policies out of a fear that their domestic enterprises will lose competitiveness.

12. THE BIOSPHERE GOVERNMENT

As a summing up of the whole chapter we shall put forward the possibility of creating the above mentioned *United Nations Council for Environmental Security* (UNCES), that could integrate in only one international organization most of the environmental competencies at present diluted in World Bank, UNEP, UNDP, UNCED, FAO, CSD, etc.

12.1. UNCES as a new executive body

Of course, such an idea can raise the question about the sense of creating UNCES, when a Security Council (SC) already exists inside the UN. But the real fact is that the SC acts according to a system of decision-making in which the five major powers (USA, United Kingdom, France, Russia and China) have, since 1945, retained their right of veto. Moreover, this situation is not apparently modifiable in the foreseeable future.

In that context, UNCES should be a debating forum within the UN, and besides that should have effective powers to adopt binding decisions for all countries in the world.

In order to have a smooth performance, UNCES should be composed of a representative of all member states, a Permanent Executive committee of not more than 15 members, and a Secretary General with executive powers.

UNCES would be the equivalent of a world government of the biosphere, with objectives like the following:

- To preserve the basic elements of the *greater ecosystems*, namely atmosphere, water, earth, flora, fauna and countryside; taking into account the issues that play so large a part in the performing of the global climate (Antarctica, Amazon, the ozone layer, the greenhouse effect, etc.).

- To secure the *rational use of resources*, renewable and non-renewable, so as to guarantee their availability in perpetuity; in particular promoting and developing all kind of techniques for a better use of non-renewable energy sources. That would include, of course, saving and recovery of resources, and recycling of all sort of wastes.
- To study *international migrations*, that cannot be resolved by decree. Only economic development concerted on a regional scale throughout the relevant countries, together with a significant amount of economic integration, will allow for the reasonable circulation of people.
- *To compensate governments* –Brazil, for example—, for the preservation of vast areas of virgin tropical rainforest which could remain as nature’s assets, beyond the reach of anarchic activity or destructive development. This means that it is necessary to convince both authorities and the people, in the sense that such behavior does not mean a surrender of sovereignty, but on the contrary, a real contribution to a global cause in favor of generations to come.
- To establish *ecotaxes* when necessary in certain sectors, to increase efficiency in the use of energy, to promote recycling, etc.
- To organize a *world market* for the *pollution rights* that could be created according to some proposals aimed to make much more expensive to pollute, in order, after a certain transition period, to attain minimal levels.
- To make general rules for specific problems like *forest* and *fishing* and to supervise the consequent national rules and its real application.
- *To protect natural areas* that should be named according to international, national or natural parks; conceived as a real ecological heritage of humanity. An idea on the lines of UNESCO policies.
- To emphasize *diachronic ecological ethics*, of concern for the world as it will be left to coming generations, and with the purpose of improving the quality of life.
- *To prevent both regional and international confrontations*, which can arise from the over-concentrated use of certain natural resources, solving them through arbitration.

- *To urge and promote research* into the techniques of environmental education, and to assist their introduction in underdeveloped and in industrialized countries.

In short, UNCES would aim to ensure the better conservation of the planet and the non human species, and to procure that a sense of harmony prevails between mankind and other living species, as well as the non-biotic world.

12.2. Previous attempts

The inside story of the Hague Conference in 1988 on the effects of chlorofluoro-carbons on the atmosphere is little known. At that meeting, the constitution for a *Higher World Authority for Atmospheric Problems* was discussed, and it was also drawn into the Conference's final statement. At an extended meeting of the conference, then French prime minister Michel Rocard, persisted with the idea of putting this authority into practice, and he got the support of the Norwegian government (which not uncoincidentally was then presided over by Ms. Brundtland).

However the difficulties which then arose with Mr. Rocard's initiative, spoilt a momentary inspiration that might have given rise to a significant advance. The undoubted good sense of the counteracting arguments did weak service to a great cause.

At about the same time in 1988, the Secretary General of the United Nations asked the Executive Director of UNEP, Mr. Mostafa K. Tolba, for a special report on possible guidelines to reinforce environmental action by the UN facing and to stress the problems of financial resources besides the transfer of technology to environmental and developmental projects. But the efforts by Mr. Tolba and his team were not supported at the *Summit of the Earth*.

12.3. UNCES inside the United Nations

At present, no international body provides systematic, overall attention to the environmental issue. UNEP is not a real UN agency, but merely a program, and for this reason it has limited resources and faculties. It was a great thing when it was launched in 1972, but now it is not the adequate organization. And something similar can be said about UNDP, UNEP and the CSD. And World Bank, FAO and UNESCO have still lesser competencies.

Indeed, until very recently we have completely lacked a global perspective, for there has not existed an all-encompassing, far-sighted vision addressing the numerous environmental problems as a whole. The world may react immediately to situations like Bhopal, Chernobyl, the hurricanes in Bangladesh or the eruption of Pinatubo, etc. All in all, it means evident that there is a need for an international council like UNCES, open to the participation of all States.

Doubtless, UNCES is a utopia in the best sense of the word: it is an ambitious target, but it is not an impossible project to be achieved, because of its absolute necessity and inevitable character.

That the project will be difficult to be accomplished is only too apparent. The Council would after all entail the preparation, the negotiation, the signing as well as the ratification of a new world Treaty by a substantial number of countries, so as to be sure of world cooperation. And since the Treaty would involve significant transfers of sovereignty, it would not be even less easy to accomplish. But this is an idea that in some way has already been achieved (with real powers and an International Court to solve trade conflicts) in the case of the *World Trade Organization* (WTO) that was created after GATT's Uruguay Round was finished in 1995.

12.4. Looking at poor countries: an Agenda for action

Five goals to be taken into account by UNCES are really central regarding poor countries:

- To raise the consumption levels for 1.5 billion poor people—a quarter of humanity—who have been left out of the global expansion of consumption and are unable to meet their basic needs.
- To move to more sustainable consumption patterns that reduce environmental damage, improve efficiency in resource use and regenerate renewable resources (such as water, wood, soils and fish).
- To protect and promote the rights of consumers to information, product safety and access to products that they need.
- To discourage patterns of consumption that have a negative impact on society and that reinforce inequalities and poverty.

- To achieve more equitable international burden-sharing in reducing and preventing global environmental damage and in reducing global poverty.

12.4.1. To ensure minimum consumption

Strong public action is needed to meet the aforementioned goal. This means a mix of public provisioning in basic social services and an enabling environment and incentive system for private and voluntary action. It means:

- Strong public policies to promote food security—ranging from conducive monetary, fiscal, commercial and pricing policies to institutions and incentives to promote local production and distribution.
- Priority public expenditures for basic social services—education, health, safe water, basic sanitation. Not only should services be expanded, but access should be made more equitable. Studies in many countries show that access favors the better-off rather than the poor, and urban rather than rural populations.
- Infrastructure for transport and energy to provide affordable and efficient services for people, not just economic growth. This means, for example, public transport, paths for bicycles and pedestrians and energy from renewable sources in rural areas.
- Incentives to develop “poor people’s goods”—low-cost housing materials, energy-saving equipment and food storage systems.
- Institutions and legal frameworks that secure people’s rights to housing, to common property, to credit.

John Kenneth Galbraith wrote 40 years ago about private affluence amid public squalor. Far from narrowing, the contrasts have grown, and to them are added private and environmental squalor.

12.4.2. To apply environmentally sustainable technologies

Human development can be sustained with purposeful action. The challenge is not to stop growth. It is to change the patterns of consumption and production, using new technologies to achieve greater efficiency and to reduce waste and pollution. Many such technologies are already in production or on the drawing board.

12.4.3. To remove perverse subsidies

Most countries subsidize pollution and environmental damage directly and indirectly. Such *perverse* subsidies are particularly common in the sectors of energy, water, road transport and agriculture. Total subsidies worldwide in these four sectors are estimated at \$700–900 billion a year. They are also often distributionally regressive, benefiting mostly the wealthy—often political interest groups—while draining the public budget.

The absolute amount of subsidies is about twice as large in the OECD countries as in the rest of the world. In the OECD countries agriculture is most heavily subsidized (more than \$330 billion), followed by road transport (\$85–200 billion). In developing and transition economies the largest subsidies go to energy (\$150–200 billion) and water (\$42–47 billion). In the words of the Earth Council, “the world is spending hundreds of billions of dollars annually to subsidize its own destruction.”

Environmental taxes—charging for pollution, congestion and depletion —have proved highly effective in both industrial and developing countries. They have been widely used in Western Europe and are the well-accepted core of green tax reforms—, the Swedish air pollution tax and the Dutch water pollution tax, for example. But not just in Europe. Malaysia’s effluent charges and Singapore’s automobile taxes are well established and effective.

12.4.4. To strengthen public action for consumer education and information

The expansion of consumer choice has little significance if choices are based on wrong or misleading information. Strong public action to protect consumer rights is needed to offset vastly unbalanced information flows dominated by commercial advertisements. Consumer rights must be defended through:

- Strict standards for consumer health and safety.
- Product labeling about the content and proper use of products and their environmental and social impact.

- Information and awareness campaigns about potential health hazards, such as smoking tobacco and the improper use of feeding formula for infants.

Advertising can serve positive purposes, but controls are needed, especially on television advertising targeting young children. Sweden bans television advertising directed at children under 12.

12.4.5. To reinforce international mechanisms to manage consumption's global impacts

Environmental damage crosses borders. So do shifts in consumption patterns and habits. Poverty and inequality are issues of global magnitude and thus cannot be tackled by nations singly. They require international action.

International responsibilities for ensuring the sustainability of natural resource use have been debated in numerous forums. The Kuala Lumpur Meeting of the Parties to the Basle Convention on the *Ban on Hazardous Waste* agreed to ban the export of such waste to poor countries. Both the *Convention on Biological Diversity* and the *Convention on International Trade in Endangered Species of Wild Flora and Fauna* have been quite successful.

Although some of these agreements sometimes fall short of expectations and ideals, they are steps in the right direction. The recent Kyoto Meeting on the United Nations Framework Convention on Climate Change has set industrial country targets for emissions of carbon dioxide and proposed a Clean Development Mechanism to assist developing countries.

Both the financing and the institutional arrangement for this mechanism must be dealt with by the global community. Another problem that needs to be addressed: the continuing decline of official development assistance and the mounting unsustainable debt of poor countries.

12.4.6. To build stronger alliances among the NGOs movements

Consumer groups have been a powerful force for protecting consumer rights worldwide. They have helped remove unsafe products from the market and promote proper labeling and the supply of safe and low-cost goods.

Now consumers increasingly are using the power of their purses to push the interests of communities even halfway around the globe. Studies in Europe show that consumers are willing to pay price premiums of 5–10 per cent for products that are more environmentally sound (in production, operation and disposal).

Businesses are responding to consumer demand for cleaner, safer products. Evidence from Eastern Europe shows that firms exporting to the European Union tend to have cleaner production processes than firms that produce for the domestic markets, which are less environmentally demanding.

Conventional wisdom assumes that environmental damage is a necessary consequence of economic growth. This is wrong. Environmental damage is a drain on economic growth, and it is possible to pursue a path to growth that does not damage the environment.

Poverty eradication, environmental sustainability, consumer rights protection—all these build on one another. Eradicating poverty does not require growth that ignores consumer rights or destroys the environment. Quite the opposite. Protecting consumer rights and protecting the environment are necessary for eradicating poverty and reducing inequalities.

There is great potential for building closer alliances among the environmental movement, the women's movement, the movement for children, consumer groups and pressure groups against poverty. Already their central concerns show great convergence. Stronger alliances are needed—and possible—if each movement emphasizes the common need for human development. United and mobilized together, these groups can achieve much more.

12.4.7. To think globally, to act locally

The growing number and strength of consumer and environmental movements around the world—including the 2,000 town and city *Agenda 21s* that have been prepared—, reflect the commitment of people to taking collective action. Many opinion surveys show that people place a higher value on community and family life than on acquiring material possessions. And many people are asking how they can give more emphasis to human concerns.

Some 100 countries have prepared national human development reports, assessing their present situations and drawing conclusions on

actions to achieve more human patterns of development. Most of these plans have analyzed needs in the critical areas of education, health and employment, often linking them with opportunities for generating resources from reduced military spending.

These initiatives in many cases are the outcomes of successful alliances of the government, institutions of civil society and international organizations.

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ACRONYM GLOSSARY

ACP: Africa/Caribbean/Pacific Countries
CEB: Central European Bank
CSD: Commission for Sustainable Development
DAC: Development Assistance Committee
EC: European Community
EMAS: European Community Eco-Management and Audit Scheme
EMU: Economic and Monetary Union
EPA: Environmental Protection Agency (USA)
EU: European Union
FAO: Food and Agriculture Organization
FDI: Foreign direct investment
FRS: Federal Reserve System (or *the Fed*)
G-7: Group of Seven (or G-8 with Russia)
GATT: General Agreement on Tariffs and Trade
GDP: Gross Domestic Product
GNP: Gross National Product
IMF: International Monetary Found.
IUCN: International Union for the Conservation of Nature
MAD: mutual assured destruction
MAI: Multilateral Agreement on Investments
MEAs: Multilateral Environmental Agreements
MIT: Massachusetts Institute of Technology
MNEs: multinational enterprises
NAIRU: non accelerating inflation rate of unemployment
Nasdaq: National Association of Securities Dealers' Automated Quotations
NGOs: Non-Governmental Organizations
NIF Accord: National Ignition Facility Accord.
NABs: New Arrangements to Borrow.
NYSE: New York Stock Exchange
ODA: Official Development Aid
OECD: Organization for Economic Cooperation and Development
SDR: special drawing rights (IMF)
TTAPS Model: Turco, Toon, Ackerman, Pollack, Sagan Model on nuclear winter.
TARIC: *Tarife Intégré de la Communauté*
UN: United Nations
UNCED: United Nations Conference on Environment and Development
UNCES: United Nations Council for Environmental Security
UNCTAD: United Nations Conference for Trade and Development
UNDP: United Nations Development Program
UNEP: United Nations Environment Program

UNESCO: United Nations Educational, Scientific and Cultural
Organization

US: United States

USA: United States of America

WB: World Bank

WTO: World Trade Organization

WWF: World Wild Life Fund

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BIOGRAPHY of professor tamames

Ramón Tamames, Madrid 1933, studied at the *French Lycée*, the University of Madrid (Law and Economics), and was a pupil of Professors Meade and Sayers at the London School of Economics. He has written a few books on international and Spanish Economy, Ecology, and also on European contemporary history. He speaks fluently Spanish, French, German, and has a certain knowledge of Italian, Portuguese, Catalan, and Russian.

The main fields of academic activities of Prof. Tamames are related with Applied Economics, specially on Spanish questions (his book on this field, *Estructura Económica de España*, translated into French and English, is now in its 24th edition), Structure and International Economics, Ecology and Sustainable Development, and Politics and History. Areas on which he has published with a very large diffusion. He is also in acquaintance with many European topics, and very specifically Euro and the performing of the European Monetary Union.

As an international expert, Prof. Tamames has worked with the *Instituto para la Integración de América Latina* (Institute for the Integration of Latin America, INTAL, a Division of the Inter American Development Bank), in the preparation of several reports on the cases of the Dominican Republic, Brazil, and the small comparatively less develop countries of the Latin America Free Trade Area (LAFTA).

Also as an international economic expert, Prof. Tamames has been a consultant to the United Nations Development Program (UNDP), on the necessary arrangements for the improvement of the integration methods (LAFTA, Andean Community of Nations, Central American Common Market and CARICOM).

At present, Mr. Tamames is full professor of Economic Structure at the Autonomous University of Madrid, and also a Jean Monnet Chairholder of the European Union. In 1992 he became an international associated of the Club of Rome, being one of the member of the Club's Delegation to the *Earth Summit*, Rio-92.

In the political scenario, Prof. Tamames was an active participant in the Spanish democratic opposition to the previous authoritarian *Régime* of General Franco, and because of his activities he was imprisoned twice. He was elected a member of the Parliament in 1977 and he worked in the drafting of the present Spanish Constitution, of which he is the underwriter number 551.

Ramón Tamames has got a number of prizes, among them the 1996 Espasa Essay Award, the King James the Conqueror Economics Prize of 1997, and the Environment Recognition by the Regional Government of Castile and Leon. He is also an *ad honorem* Forest Engineer, by special Decree of King Juan Carlos I.

Prof. Tamames is married to Carmen Prieto-Castro, an specialist in International Relations, University of Madrid, and they have three children: Alice (1961), Laura (1962) and Moncho (1968).

Among the hobbies of Prof. Tamames, it can be mentioned he is very fund of various activities: *Literature*, mainly European and Spanish novelistic, having contributed himself to this field with the publication of two novels; *Classical Music*, with some specialisation in the 18th Century, being a member of the Association of Haendel House, London; *Nature*, having visited various mountainous scenarios (Pyrenees, Alps, Atlas, Himalayas, etc.), different rain forest areas (Amazon, Central Africa, South East Asia, etc.), deserts (Sahara, Syria, Central Australia, etc.), and the North Pole Regions (Greenland).

ACKNOWLEDGMENTS

I must mention as a very valuable contributor to this article, to my Secretary Begoña González Huerta, that worked very hard to help to finish these pages in time and in due order. My gratitude is extended to Sarah Dague, Professor of English at the Carlos III University of Madrid, who gave me her better support to ameliorate my English writing.