

## DEVELOPMENT–POLLUTION BINOMIAL RELATIONSHIP. IT'S MANAGEMENT AND POSSIBLE EVOLUTIONS \*

Beatrice LEUSTEAN<sup>1</sup>, Nicoleta NICULESCU<sup>2</sup>

**Abstract.** *The paper here focuses on the relationships between the economic growth and the global warming. It is emphasized that the majority of the evidences supports this situation is the result of an entropic process, specific to the human activity. There are followed the global climate evolution scenarios and the very existence of human kind on this planet, altering some parameters according to the economic growth pressure on the carbon dioxide emissions. Solving the problems generated by the global warming cannot be easy because the pollution's management is influenced by the main millennium development goal: halving extreme poverty until 2015.*

**Keywords:** development, global warming, greenhouse gases, sustainability, poverty

### 1. Introduction

During the last decade, at least until the 2008 crisis, which leaves opened the future approach of economic growth, we assisted to major changes in what it concerns the global economical and financial environment. These removals could be described by the unprecedented growth of emerging economies which defines the BRIC concept, the commercial and financial global relationship's structure and the volume, growing on the communication technologies, information and the Internet. The downside risks which marked the considered period and which, at least partially apparently were implied in the actual global crises were those regarding to: the global warming, the global terror sign, the pressure of the financial derivatives and of the speculations with them on the global financial market and on the houses market, the energetic and the resources crises.

The paper here focuses on the relationships between the economic growth and the global warming. It is emphasized that, although multiple theories on the origins of the global warming phenomenon exists, the majority of the

<sup>1</sup> Asist., Economics Department, University "Politehnica" of Bucharest, Romania, (leusteanbeatrice@yahoo.com)

<sup>2</sup> Asist., Economics Department, University "Politehnica" of Bucharest, Romania, (nicojora@yahoo.com)

\* *The paper is carried out within the Sectorial Operational Program for Human Resources Development for 2007-2013, "Invest in people!" cofinanced by European Social Found*



EUROPEAN UNION



MINISTRY OF LABOR, FAMILY AND  
EQUAL OPPORTUNITIES AMPOSDRU



EUROPEAN SOCIAL FOUN  
POSDRU 2007-2013



STRUCTURAL  
INSTRUMENTS 2007 - 2013



VALAHIA UNIVERSITY OF  
TARGOVISTE

evidences supports that this situation is the result of an entropic process, specific to the human activity. There is a scientific theory which directly links the phenomenon with the carbon dioxide emissions in the atmosphere.

There are followed the global climate evolution scenarios and the very existence of human kind on this planet, altering some parameters according to the economic growth pressure on the carbon dioxide emissions.

Solving the problems generated by the global warming cannot be an easy way because the pollution's management is influenced by the main millennium development goal: halving extreme poverty until 2015. Economic growth cannot be simplistic treated anymore, not taking care of its environment impact.

The process management appears to be extremely difficult on the free market context. Given the fact that, through the USSR disintegration and through the capitalist transformation of China and India over 2 million people marched the market economy way and the fact that Brazil, Russia, India and China became a firm and specific management of the pollution since the beginning of the millennium real global growth engines.

## **2. The new millennium global economic growth**

The global context specific to the first decade of the XXI century is marked by the financial and economical recovery after 1997-1998 Asian crises, by the substantial oil and raw materials price growth (on the demand side this time), by the speculative bubble on the American house market, by the generalized and sustained economic growth until the middle of the period followed by deceleration and recession.

The developing countries situation is the following:

East Asia is firmly growing since the beginning of the century, giving the downside risk from the growing oil price and the avian influenza.

China and India, by far the more dynamic economies, and the South Asian emerging countries, with growth rates about 5% - having stronger economies and more immune to external shocks contagion – become economic growth engines.

China's strong economic development is based on exports and investments, while strong imports decline.

South Asia is also described by growing rates due to the agriculture and industrial output (especially in what it concerns the garment and textile industry of India, Pakistan, Sri Lanka and Bangladesh) and services. The main risk comes with the high oil price.

**Table 1.** Growth of world output, 1998-2008

Annual percentage growth											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007 <sup>a</sup>	2008 <sup>b</sup>
World output <sup>c</sup>	2,4	3,2	4,0	1,6	1,9	2,7	4,0	3,4	3,9	3,7	3,4
Of which:											
Developed economies	2,7	3,0	3,5	1,2	1,3	1,9	3,0	2,4	2,8	2,5	2,2
Economies in transition	-3,2	4,0	8,3	5,7	5,0	7,2	7,6	6,6	7,5	8,0	7,1
Developing economies	1,9	3,6	5,6	2,7	3,9	5,2	7,0	6,5	7,0	6,9	6,5
Of which:											
Least developed countries	4,6	5,3	4,8	6,6	6,3	6,6	7,9	8,4	8,1	6,7	6,9
Memorandum items:											
World output growth with PPP-based weights	2,8	3,8	3,3	2,6	3,0	4,0	5,2	4,8	5,4	5,3	4,9

**Source:** Department of Economic and Social Affairs of the United Nations Secretariat (UN/DESA).

**a** Partly estimated.

**b** Forecasts, based in part on Project LINK, an international collaborative research group for econometric modeling, coordinated jointly by the Development Policy and Analysis Division of the United Nations Secretariat and the University of Toronto.

**c** Calculated as a weighted average of individual country growth rates of gross domestic product (GDP), where weights are based on GDP in 2000 prices and exchange rates.

In opposition, the Occidental Asia growth is maintaining robust in 2005, because of the high oil price. This is the consequence of maintaining a constant capacity of production close to the full capacity combined with the growing demand pressure of the new emerging countries, China and India [2].

As a result of Western Asia Growth benefits all Asian countries through the international commercial relationships, tourism and finances.

Versus Asia's economies, Latin America and Caribbean's remain at a 3.9% growth. Latin America's countries continue to benefit from raw material growing prices and from the exports increasing volume, but still remaining vulnerable to any external shock [2].

Economies in transition appear as a new player on world economic stage. These countries experiment a strong and sustained economic growth and they cannot be ignored any longer by every respectable investment fund.

The growing economic pattern of CIS is based, on one hand on the growing raw material prices growth especially oil, natural gases and metals and, on the other hand, on the increasing domestic demand based on the real wages and on the relaxed macroeconomic policies.

The downside risks against the economic expansion of the Russian Federation come with the growing production costs, with ruble appreciation and inadequate investment levels.

The real challenge for macroeconomic policies as far as it concerns region's economic growth is reducing institutional weaknesses and raw material dependence.

As for the South Eastern Europe, a strong growth is estimated based on the high level of direct foreign investments towards new businesses as well as recapitalizing former state owned enterprises, the modernization of the existing ones and infrastructure public projects. It is estimated a deceleration at the end of the decade which could affect private spending, as a result of macroeconomic policies towards overheating [2].

The African countries are in a catching-up process. The economic growth is over 5% (except Nigeria and South Africa) and the least developed countries experience a sustained and accelerated 6.6% growth.

An important factor in present growth is high raw material price, oil and nonoil, with the inevitable difficulty of long term sustainability, accompanied by the growing domestic demand in many states of the region. The economic growth has not a uniform trend. The developing and the least developed countries, as net oil and food importers, are highly affected by the growing commodities prices.

As well as for the countries which didn't adapt to the new context existing after the GATT Textile and Garment Agreement or the ones which suffered after armed political and civil conflicts [2].

The least developed countries and the most indebted ones still suffer from the external debt burden. The need for a global management for solving this difficult situation as well as for accomplishing one of the millennium development goals (halving the extreme poverty until 2015) becoming a most pressing one. The main conditions for the least developed economies growth sustainability are the stable political environment and the efficient macroeconomic policies.

Economic growth is essential but not enough for reducing developing countries poverty. For reducing the gaps between nations and lowering poverty a continuous growth about 3% a year it is required. On average the output per capita registered a 4% increasing during 2005, but with heterogeneous composing values. Almost half of developing countries (51 from 107) grew over 3% in 2005, 19 were close to the value, but the remaining 36 never registered the estimated growth from the Millennium Development Goals achievement [2].

In conclusion, during the studied period, there were recorded different growth rates both for developed and developing countries. The estimations for the following years are linked to the 2008 economic crises, to the energetic resources problem and, as a subject for this present paper of the relationship economic growth-environment management.

### **3. The Development Pressure on the Environment through the Greenhouse Gas Effect**

Giving the dramatic global climate change which questions the very existence of human kind on this planet, the development problem implies new challenges. The two aspects of the XXI century cannot and must not be treated as separate elements.

As resulting from the international reports [4], the climatic changes manifests through the increasing global temperature which already causes large scale glaciers melting, increasing ocean levels, extreme meteorological phenomenas and other negative effects. These were caused by massive greenhouse gases in the atmosphere – mainly CO<sub>2</sub> – resulted from the human economic activity. As a large scale phenomena, no matter the historic regions contribution to the massive greenhouse gasses in the terrestrial atmosphere, apparently all the countries would suffer from the global heating. The only way to reverse the global warming is an united action from both the developed and the developing countries towards limiting and reducing CO<sub>2</sub> emissions.

The scientific community as well as the civile society and political organisms are awe red and conscientious about the economic activity has on the environment because of the green gases emissions. Given the generalized and global capitalist economic system, a proper management for counteracting this problem is a great challenge. A good global governance, impartial, uninfluenced by the various lobbies the national states face and pointed to long term sustainability, could be a proper solution to the economic growth – global warming dilemma.

The last 50 years we assisted to an escaladation on mondial awareness regarding pollution problem, through the Clubs of Rome, the emerging and growing role of various non governmental organisms and organizations (Greenpeace, discution forums), various intergovernmental protocols towards pollution reduction (Kyoto Protocol).

The present situation regarding the global level of greenhouse emissions has 17% increasing values between 1990 and 2003, away from the Kyoto Protocol resolutions. North America's countries and Western Europe had the major contribution to the increasing greenhouse concentrations into the atmosphere

(55% of the total greenhouse emissions), followed by the new emerging Asian economies (37%). (Table 2)

**Table 2.** Emissions, Population, GDP and Energy Supply on Geographical Areas, 1990-2003

Regions	CO2 emissions (billion metric tons)		Population (millions)		CO2 emissions per capita (metric tons)		GDP (constant prices, \$ 2000)		Energy consumption for 1000\$ GDP (PPP) (kg oil equivalent)	
	1990	2003	1990	2003	1990	2003	1990	2003	1990	2003
World	22,2	26,0	5295	6359	4,2	4,1	23671	33305	261	213
Africa	0,6	0,9	637	881	1,0	1,1	425	645	299	299
Asia and the Pacific	6,4	9,7	3054	3674	2,1	2,6	6119	9154	271	207
China	...	...	1155	1304	...	...	551	1732	485	220
India	...	...	860	1099	...	...	268	544	253	191
Europe	8,2	6,8	800	824	10,3	8,3	7814	9904	256	203
Eastern Europe	3,3	...	231	223	14,3	...	496	376	557	513
Central Europe	1,4	1,2	188	199	7,7	6,0	523	685	290	211
Western Europe	3,5	3,6	381	403	9,1	9,0	6795	8842	173	154
Latin America and the Caribbeans	1,1	1,3	444	544	2,4	2,4	1458	2066	169	165
North America	5,5	6,4	284	325	19,3	19,8	7591	11097	277	228
Western Asia	0,4	0,8	75	110	6,0	7,2	264	440	...	...

Source: Geodata, UNEP<sup>1</sup>

The global warm impact was, at least until the beginning of the millennium, in a reversed proportion with the emitters role. According to this, the developed countries, which massively contributed, the last 200 years, to the gases emissions into the atmosphere, will be the least affected by global warm effects, because of using various technologies and favorable geographical positioning.

The removals comes with the increasing developing countries role in the greenhouse gases emissions which makes them also responsible for the negative effects.

<sup>1</sup> available on: <http://geodata.grid.unep.ch>

Although the developed countries have the moral responsibility in what it concerns the atmosphere gases emissions reduction because of their important role in greenhouse effect, developing countries (although with the minimum historic responsibility but the most dramatic affected) have the main interest in reversing the phenomena, because various reasons. First, their geographical positioning, as islands or on coastal regions, puts them at inundation risk (according to the scenario with a 3°C temperature increase implies a 7 m rising in sea and oceans levels) which could cause real human and material losses or even the total submersion of small island states, all these together with an already underdeveloped existence. In the second place, developing states base mainly on the agriculture or on nature related activities, desertification, glacier water streams draughting represents the main downside risks for these economies development. In the third place, the management and adaptation capacity to a situation of this particular kind is extremely low for the least developed or developing countries.

The global climate change problem requires a combined effort both from developed and from developing countries, in three simultaneous directions: population – a decreasing population growth rate means a proportional emissions reduction; incomes – decreasing per capita income means a direct emissions reduction; energy production – investing in energy-efficient production methods, based on alternative fuels, and on capturing CO<sub>2</sub>, the emissions volume will be highly reduced, maintaining a constant capacity of production.

The global management present dilemma is combining sustainability with no.1 Millennium Development Goal: halving extreme poverty by 2015. The main way of realizing this goal is economic growth. India and China are the best examples, the former bringing a huge proportion of its population above the extreme poverty line.

The Kyoto protocol, in 1997, specified developed countries 5.2% gas emissions reduction between 1998 and 2008. There were no limitations in what regards the developing countries giving their considered neglectable role in this matter and the pressing need of poverty reduction. The Clean Development Mechanisms promoted through this Protocol were targeted towards the collaboration between the developed and developing countries for environment protection. To fulfill their obligations, industrialized countries had to implement in the developing ones efficient solutions for reaching Millennium Development Goals.

The greenhouse gases emission evolution, very different from the protocol agreement, imposed a G-8 reunion at Heiligendam, Germany, in 2007 [8]. Developing countries reached to a certain agreement in what it concerns the fact that the efficient energy production and consumption is the cheapest way to

combat global warming. It is also emphasized the developing countries role in sustainable development as intensive energy producers and consumers [9].

The main problem for developing countries is adapt their economies to climate changes. The global warm combat must be put together with economic development, avoiding adverse effects on the later one, calculating the priorities in what it concerns extreme poverty and sustaining economic development. The recent example of Kenya which developed a water force using technology for energy production is illustrative in this matter.

A couple of funds for the promotion of climate change adapting measures in developing countries were created: Global Environment Facility (GEF), which offers 50 million dollars a year for adapting the infrastructure; The Special Climate Change Fund, financing the technological transfer and economic diversification, with 50 million dollars a year mainly from ODA sources (Other Development Aid); The Least Developed Countries Fund which finances the preparing and the implementation of the National Adaptation Programmes of Action (NAPA) in LDCs, with 115 million dollars a year; Funded from the Emissions Reduction Certificates of the developed countries and other contributions, it is the Adaptation Fund under the Kyoto Protocol, towards implementation and adaptation program [6].

According to the developing countries anticipated losses, these funds are more than insufficient.

In this case, a new way of solving the problem it is required, eventually on a Post Kyoto Protocol shape.

It is emphasized developing countries altered role, from passive actors into active participants, in what the greenhouse effect matters. Giving the fact that the emerging countries gas emissions are increasing over the global average values, it is likely for them to continue growth in a less pollutive manner. A number of developing states (India, Indonesia, Kenya, Brazil, China, African, Asian, Latin American and Caribbean countries) established a set of rules for rapid climate change adaptation and for reducing gas emissions [7].



## Conclusions

- The major challenge for developing countries our days is to reach the highest economic growth trends while minimum gas emissions into the Earth's atmosphere.
- It is also emphasized the importance of changing today's consumption habits according to the minimal principle. In the end, economic activity is satisfying needs with rare resources. The clean and stabile environment becomes, our days, an important economic factor.
- The present days debates focus on the way to implement these desiderates towards sustainable development. The solutions are either combated either difficult to apply because of divergent interests, of the lack of knowledge on the gravity of the situation, of short time economic options, of the lack of resources for implementing clean technologies, of the subsistence economy for a great part of this planet (deforestation for agricol reasons).
- Developed countries fight actively through rigid environmental policies, through various ways for emission control: reglementation (the pollution tax, green tickets) and certification (FSC) and through education and public opinion sensibilisation towards modifying the way of life.
- Developing countries are fighting simultaneously against two evils: poverty and pollution. It is their choice how they manage this situation: prosperity versus clean environment.
- A global governance is still needed, either it is a representative or a direct democracy, either it is an overstate organism.

## REFERENCES

- [1] United Nations Department of Economic and Social Affairs, *Report on the Project LINK Meeting*, 30 Oct 30th – Nov the 1st 2006, United Nations, Nations Palace, Genève, Switzerland, available on [http://www.un.org/esa/policy/link/presentations06/postlinkreport\\_fall2006.pdf](http://www.un.org/esa/policy/link/presentations06/postlinkreport_fall2006.pdf);
- [2] United Nations (DESA, UNCTAD, ECA, ECE,ECLAC,ESCAP,ESCWA) ,*World Economic Situation and Prospects 2006*, New York 2006, available on <http://www.un.org/esa/policy/wesp/wesp2006files/wesp2006.pdf>;
- [3] Felix Salmon, Can Gross World Product Shrink, 4th November 2008, available on <http://www.portfolio.com/views/blogs/market-movers/2008/11/04/can-gross-world-product-shrink>;
- [4] United Nations Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis*. Working Group I Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, available on: <http://ipcc-wgl.ucar.edu/wgl-report.html>;
- [5] Milankovic, M. (1920), *Theorie Mathematique des Phenomenes Thermiques produits par la Radiation Solaire*, Gauthier-Villars Paris;
- [6] Nicholas Stern, *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge University Press, available on: [http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm);
- [7] Rosina M. Bierbaum et al, *Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable*, United Nations Foundation-Sigma Xi Scientific Expert Group on Climate Change, 2007, available on: [http://www.unfoundation.org/files/pdf/2007/SEG\\_Report.pdf](http://www.unfoundation.org/files/pdf/2007/SEG_Report.pdf);
- [8] [http://www.mpn.nl/ipcc/pages\\_media/AR4-chapters.html](http://www.mpn.nl/ipcc/pages_media/AR4-chapters.html);
- [9] G-8, *Chair s Summary*, available on: <http://www.g7.utoronto.ca>.