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Green Accounting in Romania - a Vision to European Integration

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GREEN ACCOUNTING IN ROMANIA-A VISION TO EUROPEAN INTEGRATION

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Introduction

There is a symbiotic relationship between the environment and the economical entities. As a feedback to this topic, the global community of policymakers made out of this problem a high priority. For the first time, the European Community developed the paradigm of an ecological policy with respect to a list of principles that generate an exhaustive insight on this matter. As a result, the environmental policy takes part in the structure of EU policies. Up to a point, considering the above mentioned circumstances, this kind of policy enables the development of a new modus vivendi between human beings and nature.

In the last years, Romania has kept the track of European Integration by refining its environmental policies to a certain extent. Needless to say, is that through this process of lining to the E.U. standards , Romania finalized its strategies that regarded the management of toxic-waste disposal, environmental lasses, land degradation, civil protection and nuclear safety.

Traditional accounting has lost its instrumental ability of entailing the informational dimensions that are requested in the process of comprehending the phenomenon discussed above. The paper debates solutions, points of view and a commune language for Green Accounting. The main purposes of our research are the following:

1. Sustainability. Adaptation and Evolution
2. The Ecological Footprint. Key Terms and Concepts
3. Green Accounting- a Transorganizational and Transpersonal Reasoning?

4. GAIA- an Organic Model of Sustainable Development

How do we Green Accounting? Is Green Accounting a part of Environmental Accounting? Which is the best way of ensuring the balance between business interests and environmental protection? Are environmental goals based on Total Quality Management? How should Environment be designed? Is GAIA an organic model of sustainable development?

This are some questions proposed to be discussed in this paper.

We would venture to suggest that the financial statements considered under the instruments of traditional accounting must be reconfigured in a larger context under the subtle influence of environmental attractors. A fortiori, we think that besides the principles exposed in traditional accounting, the set of principles that underpin the role of the environment in this context will develop a holistic vision on reality per se.

Keywords: Green Accounting, Environmental Accounting, Ecological Footprint, Sustainability, European Integration, Algebraic fractals, Eco-performance, Socio-genesis, Embryogenesis and GAIA.

Sustainability-Adaptation and Evolution.

In the last four decades, the human society has been trying to overcome the negative effects that have appeared in the context of the ecological crisis. The international community has increased its awareness towards this phenomenon of linkage between the social-economical development and the process of perishing that the environment endured. In spite of the warnings that the scholars gave, the acceptance of this phenomenon came as a late feedback from the international community. There is a gradual understanding of the factors that act as anthropic attractors on the systems of the natural environment. These factors develop negative effects. The consequences that have a global range are as follows: acid rains, global warming, and the thinning of the ozone layer. The second set of consequences acts local, in different parts of the world: chemical wastes, the excessive eutrophication of the aquatic ecosystem. There are three major impediments that disable the immediate understanding and acceptance of these problems: the economical interests, the dynamics and the high dimensional complexity of the environmental systems and the difficulty of correlating the various effects that cumulate.

We live in a system that relies itself on a finite number of resources and develops a wide range of structural properties. The theory of algebraic fractals, developed by F. Colceag, is a conceptual tool that gives us a boost in the understanding of complexity (Colceag, 2002). The consumption and generation of resources is a phenomenon that develops in a feedback cycle, a dynamic among four actors. Among these actors there is a special kind of relationship that regulates their ratio. These actors are:

1. The natural environment
2. The human being that derives from the natural environment
3. The technology that developed on the needs of human beings. These needs were of adaptation and evolution with a certain kind of instruments that were exterior and did not rely on the human genome.
4. The society, a product that appeared as a consequence of technology and socio-economical needs.

The four actors are displayed in the cognitive model Environment-Man-Technology-Society (EMTS) as system that generates relationships among them. Therefore, there is a relationship, $\text{Environment/Man/Technology/Society} \leq K$, in which K is the quantity of finite resources. This relationship underpins the refined equilibrium that exists between these entities. If three of these actors consume more resources in their self development than the fourth actor, thereby the latter will consume less resources and its inner structure will develop a process of self-degradation. The economical subsystem finds itself at the intersection (mathematical sense) of technology and society. Each system has a nonlinear behavior, characterized by an n -dimensional complexity.

The central elements that are used in Colceag's model for characterizing the relationship between the global system and the dynamics of actors are as follows:

1. *The degree of the inner complexity* of each subsystem.
2. *The relations of competition or cooperation* among subsystems shaped by the inner complexity of models with different components placed on the future and past markers of the time arrow.
3. *The finitude of inner resources* gives only a few degrees of freedom, restricting to a certain extent the process of generation and consumption in the global context.

4. *The processes of informational exchange* between actors. The information is filtered, enriched and altered when it passes through the inner structure of each actor and through the transport channel that mediates the relationships between actors. The information has a cyclic pathway, being in a permanent process of modifying the inner structure of the target systems.
5. *The communication protocols* between systems, that is, the common functionalities of the informational sender and receiver and the metalevel of the message. The protocols are a direct product of the relation that develops between the actors and the degree of complexity that characterizes the ecotone.

This sort of model can be the starting point of a gradual increase of the Human understanding referential and consequently, of those of Society and Technology thus creating a common bridge with the referential of Nature. The informational models that actors exchange between them will be assimilated entirely and correctly, a process that will lead to a higher degree of synergy between the natural components and the anthropic ones as parts of the ecosphere. Therefore, the result of this kind of dynamic will be the decrease of entropy in the global system.

The Ecological Footprint. Key Terms and Concepts

As the demand for instruments that could quantify sustainability increased, Rees and Wackernagel developed in the 90' the Ecological Footprint indicator. This was a counter argument to the optimistically techno-scientific supporters that sustained the infinitum spectrum of development possibilities that both technologies and trading can give. It was thought by them that the social economical metabolism, particularly the population growth, the ratio of resource exploitation or the structural integrity and functionality of the environmental capital are unimportant and irrelevant in the development of the human species. The ecological footprint finds itself at the intersection of the Social economic and Environmental system. It quantifies certain interactions among the anthropic metastructure, its biophysics layout and the assessment of the anthropical action over the environmental systems.

The ecological systems are dynamic, opened, dissipative, exchanging matter and energy with other systems and have the property of regulating the inner degree of entropy. Thus, for

these systems to have equilibrium in their inner energy, they need a continuum flux of matter and energy that have low entropy.

Taking into account that the Social-Economic subsystem is a part of the ecosphere, we therefore gather that every effort of maintaining or increasing the economical and material status will produce an increase of disorder in the context of the ecosphere. The sine qua non condition of sustainability states that every consumption of materials and every production of wastes must not be bigger than the capacity of the ecosphere of good production and assimilation of wastes.

Incorporating the contributions made by Nicolae Georgescu-Roegen and Herman Dally (they applied the laws of physics in the paradigm of social economic metabolism), the authors of the ecological footprint concept underline the necessity of integrating the functionality of social economic systems from the perspective of total dependence of the economical systems to the biophysical infrastructure in the process of conceptual characterization (Rees, 2001).

An *ecological footprint* is the amount of land and water area a human population would need to provide the resources required to sustainably support itself and to absorb its wastes, given prevailing technology.

The key concept that is at the base of the theory of ecological footprint is the *sustaining capacity*. In the view of classical ecology this concept represented the maximum number of population members that can be sustained for an undefined time by an ecological system without altering its structure and functionality. By bringing this concept into the human context, there appears a need of redefining it. Two human populations, similar in number, can create different effects on the environment because there are some criteria that configure the specific of a population: life standard, the technological development and the resources, the customs and traditions. The concept of sustaining capacity can be defined in the human paradigm (W. R. Catton, 1980) as the maximum degree of anthropic pressure that can be supported by an ecological system, thus the ecosystem being able to provide under a undefined time the resources needed by the economical metastructure without the permanent degradation of its functions or structure. The ecological footprint is an indicator of quantity, without underpinning the qualitative aspects, neither in calculus nor in the process of result dissemination. It must be mentioned that the measuring unit that has been chosen, the hectare or global hectare, is a hypothetical one, and it is easy to be confused by persons that are rookie in this domain.

In the last years a variety of computing methodologies developed in order to calculate the ecological footprint. We are presenting two schools of thought: the first one, developed by

the promoters of the ecological footprint, is represented by the *compound approach*, and the latter by the *component approach* (Lewan, Simmons 2001). The compound approach uses international standardized data from the similar sources. The use of official data implies the delegation of responsibilities. The component approach was developed by Best Foot Forward, a consultancy enterprise, which realized the study of London's ecological footprint (2002).

Green Accounting-a Transorganizational and Transpersonal Reasoning?

The cyclic development includes the appearance from time to time of a series of crises. By surpassing them, there appears a qualitative change in the cycle's development by bringing that system to a higher level of complexity. Each crisis determines the human species to observe and learn things that will lead their future steps. It is obvious that not always man has realized the reiterative character of these crises and the risk of repeating the same effects.

An example of a crisis that is the result of the narrowness of thought is the ecological crisis. If this crisis is not solved we will be responsible for what we let as inheritance to the following generations.

The environmental crisis is not a local problem, in a particular country, but it is a global one, having as a high priority target the environmental protection. The conclusions that have been drawn from the Conference of Stockholm (1972) and the Conference of Rio (1992) for the Environmental Protection underpinned the necessity of a global scale program for the protection of the environment, as a common goal.

The "21 Agenda", the official document adopted at Rio de Janeiro, presents a new way of life that might be lived by all countries and states. This new *modus vivendi* between man and nature is based on an ethical approach from the human species. The Rio Conference has enlighten the awareness of people of how refined is the equilibrium between man and nature. The sustainable development, a world based only on ecological concepts, is the essence of the future, unanimously accepted.

The main lines are found in the Ecological File of Earth. They are as follows:

1. The effects of the industrial activity (water, air and land pollution)
2. The perturbing and irreversible effect that man has on the equilibrium of the biosphere
3. The destruction of resources
4. Problems in handling the environment
5. The life of people that live in the third world countries

The main relationship that appears in the game of environmental protection is between economy and ecology. Without giving a considerable consideration to this matter the possibility of a sustainable development will not be available. The Johannesburg Conference on sustainable development underpins the inefficacy of the unsustainable economic models of consumption and production. In addition, the process of globalization brought new dimensions that reveal new problems in the context of sustainable development because the revenues and costs of globalization are unequally distributed.

There is a global engagement toward the problem of environment protection. In the European Union, the requirements of environmental protection are indispensable policies. As a first policy of Environmental Protection, the Unique European Document states that the inner activity of a country must not deteriorate or affect the environment of the neighbor country. The states of the European Union must act as a whole and develop a certain kind of coherent dynamic at a global scale with respect to the environmental protection.

Regarding Romania, the only choice for its development in the European Union is the incorporation of an environmental protection policy. As a fact, the discussions for Romania's integration in the European Union the policy of environmental protection were forecast in Chapter 22- Environmental Protection; this document was approved by the Romanian Government on 18.10.2001.

Through The Treaty of Romania's Adherence to the European Union there was planned the implementation of a communitarian acquis in the field of environmental protection until the date of adherence with some exceptions for which there was requested a transition period.

For the EU adherence, Romania finalized its strategies that regarded the following items: waste management, chemical substances and genetically modified organisms, environmental protection, civil protection, nuclear safety. In addition, there is a starting point in the development of the harmonization of the legislation that regarded the environment. In Romania's governmental programs, in Chapter 18- Environmental Protection Policies are exposed the following requirements needed by a sustainable development:

1. The incorporation of the environmental policy into the development and application of district and regional policies
2. The assessment of the actual status of the environmental factors and the consolidation of strategies that allow a sustainable development of the environment and resources

3. The empowerment of the institutional capacity in the environmental field
4. The enlargement of the national network of protected areas
5. The creation of partnership between similar institution from different countries
6. The development of strategies that keep citizens safe from natural calamities.
7. The consolidation of the relationship with non-governmental organizations in the process of development and appliance of the environmental policies.

The first consequence was the establishment of the Environmental Guard in 2001 that has the responsibility of monitoring the environment, the prevention and the banning of the contraventions.

The Environmental Protection Law, modified and completed in 2002, states the way on how the assessment of the environment must be made, the regime of chemical substances and dangerous chemical compounds; the toxic wastes; the pesticides ; nuclear activity; etc

The 195 Urgency Ordinance from 22.12.2005 that regards the environmental protection assures the fulfillment of Romania's engagements in the process of European integration as a base for the incorporation of the legislative field of environmental protection. Furthermore, there is a presentation of the specific terms that are world wide used in this field:

1. The principle of integrating the environmental policy into other regional policies
2. The principle of precaution in the process of taking decisions
3. The principle of the preventive action
4. The principle of retaining the pollutants into their source
5. The principle "of the paying polluter"
6. The principle of conserving the biodiversity and the ecosystems specific to a place
7. The sustainable use of natural resources
8. The process of filling people with information and letting them participate in the process of taking decisions, as well as allowing justice to solve environmental problems
9. The development of the international cooperation for environmental protection

From this selective legislation results Romania's concern for environmental protection through the prevention, limitation and elimination of some effects that have a negative impact on the environment. To prevent, restrict or eliminate the unwanted effects on the environment

there must be a special financial effort from all participants: government, all kinds of entities and people.

Green Accounting conducts accounting through a transorganizational and transpersonal development. Whereas Green Accounting is focused upon multi-constituency accountability, specifically tracing and identifying the accumulating green costs and green revenues of products both to internal managerial accounting to externalized social and ecological accountability. Taking into account that the EMTS is partial additive, in which some elements are cumulating their effects while the others are not, therefore we must avoid the trap of double recognition. In the case of using the methodology of compound computation, there is a possible danger in the appearance of effects that sum up but are not cumulative and in which the maximum effect must be considered as the highest priority. If one is using the component computation than two types of potential error sources are identified: on one hand the multiple recognition of the effects that are induced by a product or services in different stages of a cycle and on the other hand the recognition of the same sources used in the process of obtaining goods and services (City Limits- A resource flow and ecological footprint analysis of Greater London, 2002). To avoid these errors there are some corrections of the ecological footprint through the exclusion of the effects induced by matter, energy in order to obtain other resources.

Now, there is no conceptual framework that is able to provide information to managers from the *green zone*. The green accounting extends its accounting practices and incorporates new computing procedures of costs in order to control the effects of pollution and of some alternatives of waste recycling. Which are the costs of recovering the equilibrium of nature?

Some concepts to Green Accounting by United States Environmental Protection Agency (EPA), United Kingdom Association of Chartered Certified Accountants (ACCA), The Chartered Institute of Management Accountants (CIMA), and United Nations Environment Programme (UNEP):

- Identifying and measuring the costs of environmental materials and activities and using this information for environmental management decisions. The purpose is to recognize and seek to mitigate the negative environmental effects of activities and systems (EPA, 1995).
- Green accounting should first focus on "true and relevant" costs (EPA, 1995).
- Environmental Accounting is how to define and identify "environmental" costs (EPA, 1995).
- Green accounting is a management tool used for a variety of purposes, such as improving environmental performance, controlling costs, investing in "cleaner" technologies, developing "greener"

processes and products, and informing decisions related to product mix, product retention, and product pricing (EPA, 1995).

- Environmental Accounting is management accounting practices that enable to incorporation of environmental cost and benefit information into business decisions (EPA, 1995).
- Environmental Accounting - the identification, prioritization, quantification or qualification, and incorporation of environmental costs into business decisions (EPA, 1997). Three types: Can be national income account (e.g. Gross Domestic Product and done by Generally Accepted Accounting Principles GAAP rules), financial accounting (e.g. reports used by lenders and investors), or managerial accounting (for management decisions). Here we look at managerial accounting tools for business decisions. Environmental or “Green” accounting affects the company’s bottom line (internal costs) and it encompasses costs to society (societal costs).
- Identification, analysis, management and reduction of environmental costs in a way that benefits both the business and the environment (CIMA).
- Green Management Accounting uses data about environmental costs and performance for business decisions. It collects cost, production, inventory, and “waste” cost and performance data in the accounting system to use to plan, evaluate, and control.
- TQEM - Total Quality Environmental Management (TQEM) is a concept that enables companies to apply Total Quality Management practices to corporate environmental strategies. Companies that have already implemented TQM programs will find it relatively easy to expand the scope of TQM initiatives to satisfy the requirements of TQEM. Similar to TQM, TQEM supports continuous improvement of corporate environmental performance.
- Green Life Cycle - The life cycle of a product, process, system or facility begins with (up-front) acquisition to make it green to the (back-end) decommissioning which can include toxic removal and remediation. Life cycle is a more systematic and complete assessment of a firm’s long term costs.
- Green accounting addresses the shortcoming of traditional national accounting, known as the System of National Accounts (SNA). Green accounting is based on the concept that a proper assessment of a country’s income and wealth needs to account for the contributions of activities made by all sectors of the economy and their impact on resource depletion and degradation. Traditional SNA ignores the value of resources (on and in the ground) as well as the value of environmental degradation. Therefore, it gives a false impression of income and wealth and often leads policy-makers to ignore or destroy the environment to further economic development. Incorporating the real value of natural resources as well as their depletion and degradation allows for better allocation of priorities, thereby helping to address the causes of current major environmental problems including the over-exploitation of natural resources such as forests (UNEP, 1997).

Green Accounting is a component of Environmental Accounting, a quantifier of the entropy of a given system. It assesses the equilibrium of a system and the events that are unquantifiable. The assessments predict the catastrophic behavior of a system.

GAIA-an Organic Model of Sustainable Development

The scientific research has as a starting point the empirical observation of the natural identity preservation that arises in the development stages of different cultures and cultural groups, (C. Caraiani, M. Dumitrana, C. Dascalu and F. Colceag, 2006). Which is the human ideal that can be universally promoted and recognized as educated people?

There is no culture in the actual world that is perfectly well balanced. Each culture creates tensions of different kinds that end in revolts, revolutions, wars, or other kinds of conflicts. A brief analyses of these movements evidenciates various causes (economical causes, human rights etc.), and this consequences are due to the social models that are behind different political cultures. These social models create inequities and tensions, favoring some groups of people in the detriment of other groups of people.

The first image of GAIA confuses various cultures with organs of the global organism. Even if the model looks accurate enough, it is not. This model created unique crops, or centralized economical model used by the communist countries. As a result, unbalanced economies in the third world based on cultivation of a unique plant, or the ex- communist countries based on only one kind of economical product, created revolts, revolutions, and wars. Even if from the structural perspective these economical models look complete, they don't cover the number of dimensions required by humans to get a balanced structure. For example, a culture in which only money is appreciated will create de-balance in achieving social position due to personal skills, and professional merits. Such a country will become a political Mafia that will not respect human rights, creating the emigration needs for each person that wants to be appreciated conforming to his or her merits. The lack of specialists will determine soon a decrease of the economic level, poverty and revolts.

The good and accurate model of GAIA needs to consider an entire feedback cycle of dimensions (to be, to do, to have, to become, to protect, and to adjust) that finally will give the possibility to integrate all cultures in a unique organism. The perspective for analyzing this model will not be based on the relationship between cultures and organs, but between organisms, biologic and global, and their identical functions. The contemporary world is already partially structured like this. We have a blood system created by the global economy, in which money replaces feeder cells. We have a global defense system created by INTERPOL, and NATO, and we have even a peripheric nervous system created by the Internet. There are many other international organisms that create connections across various cultures, and intersect each other in different ways for different cultures and create cultures-

organs as a need of adaptation to these various functions. This model is still very simplistic, but it is a very important step towards the ideal of the global culture GAIA.

These articles have as purpose giving the technical tools for determining all these functions that need to be transferred from the biological organism to the social organism, the relationships between organs and functions, the number of dimensions required for a well balanced cultural organism. Because of this purpose, these articles will contain medical terms, and medical analyses, that will be useful in understanding the circulation of information in a living organism. These articles will transfer these organic models to cultural issues on various directions, targeting the actual structures and other potential structures required in the future by GAIA.

Different stages of development of the global culture GAIA as an unique cultural organism will be partially considered as similar with the development of an complex organism from a cell to a simple collection of nondifferentiated cells that form a colony, to a culture of differentiated cells that form a simple organism with organs; than to the stage of more complex organism able to regenerate from an organic segment; to the stage of complex organism able to regenerate some organs; and finally to the stage of a complex organism that is so complex that every part is irreplaceable. From the sociologic perspective the last stage will be the one of the global peaceful world, in which humanity and environment will form a symbiotic global organism.

For each stage, the functions of the organism are different in the level of complexity. The social analyses that are isomorphic with the biological evolution will evidenciate functions- programs, organs-institutions, and biological relationships-social relationships. The hypothesis is that a living organism is structured to respond to the same specific needs as a complex social organism. It is also hypothesized that a living organism's functions form a complete set of functions able to assure survival and evolution.

Another hypothesis used in this model is the existence of complex relationships among various compounds of an organism, relationships that suppose the existence of informational feedback cycles. These feedback cycles will behave using the same pattern generated by the two halves of the feedback: the self-stimulating half and the self-inhibitory half. The general pattern of these behaviors will be represented as a graph theory, and is supported by a homological algebraic theory; algebraic fractals and fractal varieties, that basically develop structures with different stages of complexity, but that respects at any level the same basic rules.

These feedback cycles that characterize the informational connection between two informational components will also characterize an internal dialog between two organic components of the same biological or social organism, and an external dialog between two partners of dialog. As a potential of this theory is the prediction of human global society considering comparative analyses of the evolution of a living organism.

The main idea of this theory is: **socio-genesis repeats embryogenesis**, and the isomorphic behavior of socio-genesis and embryogenesis creates a connection among functions-programs, and organs institutions. The main advantage of this theory is the possibility of prediction for the future of the global world GAIA, the diagnosis of various stages of development of GAIA, and the creation for potentials of strategies able to correct various social diseases, as tumors leading to uncontrolled development of young cultures in the detriment of other or of the global organism, self-immune diseases leading to diseases. Isomorphic informational needs and patterns for the two or three phenomena can prove this isomorphism: socio-genesis, organo-genesis, and phylogenesis. This article will start with the analyses of the actual stage of cultural and social development, by comparison with various stages of organic development of an organism.

Instead of exoderm, mesoderm, and endoderm, we will consider the three main social philosophies: Buddhism, Old Testament derived philosophies, and Animism. Buddhism and other Asian philosophies as Hinduism, Brahmanism, created a cultural root that can be connected with the functions of the nervous system and derived tissues. Old Testament religions as Christianity, Muslim, or Jewish religions are connected with the osteo-muscular system. Animist religions like various forms of Shamanism create similar functions with the internal organs of an organism, considering also the internal environment of an organism similar with the natural and social environment of GAIA. During embryogenesis, these three main tissues differentiate, conquer each other's territory, creating in the end a unique living organism. During socio-genesis of GAIA similar interference took place among the main three cultural philosophies. They interfere, conquer each other's territory, fight against each other even if have common roots until find the cultural balance that is isomorphic with the organic balance.

A living organism is monitored by the mother's organism, or by the proteic complex containing all packages of information required by development. GAIA's development needs also to be monitored by packages of programs, and these programs can be determined by comparing GAIA's development with the embryogenesis of a living organism. This article focuses on the technical instruments able to assess these developments. The final assessment

must be done by the authorized responsible organizations that create the globalization policies.

The actual stage of development of GAIA is a primitive one that requires and uses a small number of functions, but there is the possibility of an accelerated development in the future. The environmental problems, the increasing number of people and exhaustion of resources will significantly contribute at this acceleration. GAIA is built from metamers (cultures) interconnected to each other in sequences, but from a short time connected by a peripheric nervous system (the Internet).

GAIA has the tendency to develop a unique economical organization, unique defense system (NATO, Interpol) and unique systems of values for various areas of trust (equivalent with neurotransmitters). The system of diplomatic protocols, and international laws reglement intercultural behavior are part of these unique value systems. It is also the tendency in GAIA's development to avoid destruction of any culture, a tendency reglemented by human rights. It is also the tendency of inclusion of environment in GAIA's metabolism through environmental protection movements. GAIA is at the phase of passing between the stage in which different components that are destroyed can be reformed, and the stage of final stability in which more elaborated organic systems like brain are formed.

From GAIA's perspective a brain will be a complex organ that will take care of GAIA's metabolism (business community). Another stage of this brain development will be given by the global problems assessment, the system of education on the Internet that respects cultures, individual giftedness, economical needs, and promote environmental protection is required. At the actual moment the system of communication and feeding given by market, act more or less randomly without closing every feedback. This shows us that GAIA is developed in an un-even way. The previous attempts of developing a fixed ruling system for market, failed, and led to simplicity in policies by creating poverty. Both versions: random behavior and centralized economy proved to be wrong.

How will the future world look considering these aspects? How will people develop their personality? Will continue to survive noble principles like freedom or everything will become an organism of obedient human insects? The answer at these questions can be obtained considering GAIA's evolution up to the actual moment. The set of rules that gives the possibility for the global world to survive on the planet is not completely deterministic. It makes a frame of feedback cycles oriented at various directions and dimensions in a hyper-cubic model. This frame of the hyper-cube will give the possibility of existence of various cellular automata that will regulate the behavior of individuals and society, considering

various inputs. This means that some people will simply obey rules, some other will assess these rules, and other people will adjust these rules. Other people will make their own rules that will become an engine for new adaptation of GAIA at a different stage of development, or will have a perfectly free behavior. In conclusion, GAIA's development will not suffocate individual development, but by contrary will give the possibility to develop personality in a more varied way.

Where are we now?

This question is very important for the process of understanding GAIA's evolution. We have already several major social philosophies and directions. We started the process of cultural interference for any geographical place, country, and local culture; we started to create global functions, and global institutions. Transferring in embryogenesis we are after the stage of development of spina chordata, but before the development of a brain. We still can replace a damaged social organ, but soon this will be impossible. At this level of development by exciting a tissue we can obtain an additional organ, and by removing a metamer, it will reappear. Specialization of tissues is not yet complete, each cell preserving the capacity for readjusting to a different role, migrating, and reconstructing a new organ. By picking spina chordata we obtain later a new head, arm, or other organ or metamer. This is the danger for our stage, to develop monstrous hybrids unable to survive later. These hybrids can be economical, cultural, defense, or other hybrids that can form by exciting different cultural tissues. In embryogenesis this stage corresponds with the formation of the first specialized tissues that are not yet organs with a much delimited functional role. From the social evolution perspective our stage of GAIA's development corresponds with a similar tendency.

We didn't sacrifice yet several metamers to form very specialized organs like brain. Highly specialized people who will be later the components of the global brain are still avoided and frequently rejected by their people, are not selected as leaders, and frequently are regarded with hostility as potentially dangerous people who have the potential for changing the system. This stage is not yet definitive, and has the tendency for a very fast transformation and evolution due to the crises.

Our main difference from the embryonic development is constituted by our lack of supervise. Embryo is supervised by the mother's organism who corrects any defective development. If the embryo is in an egg, the proteic albuminic blanket containing biochemical programs will supervise this development. Gaia is apparently isolated and not supervised. Its development can be random and self-destructive. A potential control can be done by a referential created by comparing sociogenesis with embryogenesis, and by introducing

various programs corresponding with functions by specialized institutions. Organs corresponding with global institutions will develop as a result of introducing new function that will solve various crises creating new potentials.

If human species was aggressed by the environment in its previous stages of development, they became aggressors of the environment later, and at this stage humans must make peace with the environment, including it as a metabolic compound of its development in the global culture Gaia. This relationship with the environment can be considered to be similar with the supervising relationship with placenta, or with the albuminic blanket of birds' egg. By destroying this placenta GAIA will die. In the backside of this placenta can be or not a supervising mother's organism. From the social development perspective this means that we don't know yet if we need controlling institutions for the global development of GAIA, or this development will not need any control, being inscribed in the environmental blanket's program. This is something to study, and direct interventions will be made only in case of dangerous deviations from a normal development. Our tendency for different kinds of rights, freedom etc. can be interpreted as a reminiscence of some previous stages of development in which specialization was not required, and as a future development that will be more complex than an embryonic development.

The mathematical frame able to describe this development is given by cellular automata build on fractal varieties formed by feedback cycles. This theory gives various stages of development in which each stage respects the main characteristics of the previous stage, but develops new characteristics for the next stage. Considering this aspect, sociogenesis will be much more complex than embryogenesis but will respect in the main directions the same principles and algorithms of development. From the social modeling perspective this fact will correspond with an extreme adaptability to conditions variation, in varied conditions that will determine a change. A frame of hyper-cubic cellular automata formed by feedback cycles of a fractal's variety level able to describe social complexity, will generate a very dynamic behavior that will simulate the social behavior. By completing with feedback cycles on any direction, will appear holes in the net that will circulate in the hyper-cubic matrix, forming a complex computational system very sensitive to external information.

Considering the practical perspective of GAIA's development in parallel with embryogenetic development we can make the following parallel. During embryogenesis there is a stage in which is formed the neural tube as the first differentiated tissue. This neural tube will precede the peripheral nervous system, and will assure the possibility of communication and coordination of information. The next stage will differentiate another function; the

circulatory function that permits to feed the different parts of the embryo. Into the third stage we can notice the development of a digestive tube including later the liver. These tissues will assure a new function, specific assimilating components for different tissues. The following stage will differentiate a communication system with the placenta. The fifth stage will differentiate an excretory function that will lead in time to an excretory system. The sixth stage will generate sexual organs. A parallel with GAIA's development as a cultural global organism will prove the same pattern. After the collection of cultures will enter in globalization process something similar with the neural tube (the Internet) will appear, assuring communication and information coordination. The second stage, the circulatory system that will create the feeding, defending, and oxygenation possibilities will be in parallel with the development of a unique economy, in which everybody will find a job in any culture, and in which an unique currency policy to be consider in rewarding the work. GAIA does not yet adopt this system. We can see signs for this direction, in globalization' policies and we can certainly see the negative reactions of the poor world regarding the unfair distribution of welfare. It can be considered that GAIA is now challenging a new functional stage of development. The third stage, meaning the digestive tube and the liver that can synthesize specific feeding component for various tissues, regards the relationship with the environment. The program of Rio for durable development targets this function, but considering this parallel, a perfect coordination for this function will be possible only after the second system will be completely implemented. It is required a perfect coordination of the natural resources and of the environment to rich this goal. The actual devastating liberal philosophy is not able to protect the environment.

The communication of the embryo with placenta will mean for GAIA, a very cooperating behavior between the human species and with all the others components of the environment. This function will presume new technologies that will not hurt the environment any more, and is at this moment just some kind of science fiction. This stage will presume also the complete fulfillment of the previous stage in which resources and environment will be considered in a cooperating way with human civilization. The fifth stage, the excretion function, will mean something that we can not define yet. We don't know yet what kinds of GAIA's metabolic products need to be eliminated, and which of them are considered acceptable and desirable. We can see some primordiums of this function in various cultures that select and promote some kinds of behaviors, or people, rejecting other, but there is no evaluation yet regarding the reasons of this behavior. The last stage considered in this study is related to a faster human evolution, by selecting the best human exemplars. Probably in the

final this stage will create a different kind of human being, more evolved, with less primitive behavior and with a larger cosmic perspective. The embryogenesis develops latter an entire set of functions, more complex than the previous stage, that transferring to GAIA's development will probably create the adult cultural organism. The actual stage when the three embryonic leaves are formed, and the digestive tube is targeted, when the neural tube is not yet a nervous system and doesn't assure an efficient control of the information is one of the most dangerous for GAIA's development. At this stage the environment replacing placenta has the possibility to reject monstrous development. We can see now that global warming, mondial dry, and other phenomena caused by the industrial pollution are reactions of the environment against this monstrous development. GAIA can die, and human species too at this stage, very easy. In order to live, GAIA has to go to the next stage, in time to avoid a great imbalance. These political problems that usually are negotiated by different states have a random behavior right now, because depend on the wish of some small groups of people who have money control. It depends on us if humanity and GAIA will survive and develop or not.

This parallel between embryogenesis and socio-genesis might look to be artificial for a not attentive eye, but it is not. It is perfectly natural, and well adjusted to reality. Both these structures will consider similar conditions for development, a finite space: the egg or mother' organism and the earth. They consider finite regenerable resources, and finite not-regenerable resources in both cases. Mother's organism brings food periodically, so does the environment that periodically feeds the increasing population. Both consider a stress factor that is similar, both the embryo, and humanity parasitizing mother's organism or environment. Both consider the same tendency to escape mother's control by corrupting it, and mother's tendency to control this development. This parallel can continue in every detail in order to give an empirical list of similarities. The scientific perspective created by the fractal variety perspective shows the same thing. Even if these two structures, GAIA and embryo are not identical, and GAIA is more complex, it will respect every behavior of the embryo, developing a new set of specific behaviors that are not studied in this article. Two different stages of a fractal variety have this behavior, and cellular automata developed on these varieties respect the frame of specific feedback cycles.

It is certainly difficult to approach humanity as an organism and most people will contest this approach, but if we don't do it now, it is possible to be no future for GAIA, and implicitly for humanity. We can consider the depth of the actual crisis that hardly finds any solution, but we have a perfect example of solutions for similar crises at the development of an embryo. Like many times before these solutions developed by the nature can be only

followed and transposed in a different situation. We can do this if we renounce to our arrogance, to our limited perspectives, and to pure simplistic points of view. This will be the only guaranty of peace.

Future Approaches

Future research developments that regard the application and theory of green accounting:

- The assessment of costs and risks that regard the natural environment in green accounting
- The way of computing provisions that are tied to the natural environment and can be noted with green marks in the box of the balance sheet
- The budgeting and supervision of green costs through the application of a budgeting procedure tied to the investments and consumption that regard the natural environment
- Financial reports that present information about the environmental policy and performance
- The Eco balance sheet allows the assessment of the impact that a product has throughout its life cycle on the environment

Taking into account that the presented accounting systems do not take into consideration the above mentioned aspects, we therefore conclude that it is not surprising that managers do not know the entire potential of green production technologies for the maximization of *Eco-performance*.

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