REPORT 10

SUSTAINABLE DEVELOPMENT AND FUTURE OF CONSTRUCTION IN ROMANIA

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NATIONAL REPORT

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1. INTRODUCTION

1.1 Romania. General data

The National Commission of Statistics [1] issues data on Romania. The following extracts describe the main features and characteristics of the country:

- Romania is situated in the south-eastern part of Central Europe and on the lower Danube, bordering the Black Sea.
- Its access to the sea enables the connections with the countries in the Black Sea basin, in the Mediterranean basin, and therefore with all the countries in the world. The Danube-Black Sea canal favours connections with the North of Europe.
- The main features of Romania's relief are its proportionality (31% mountains, 36% hills and plateaus, 33% plains and meadows), a concentric display in amphitheatre form of the major relief forms.
- With a total surface area of 238,391 km^2, Romania ranks the 11th in Europe. Its population amounting to 22.7 million is over 2.5 times lower than the population of France, Italy or the United Kingdom and about 2.5 times higher than the population of Portugal or Sweden.
- The average density is about 96 inhabitants/km^2, and the extremes recorded by the administrative units are 31.5 and 184.9 inhabitants/km^2, respectively.
- The running waters have a radial display, most of them having their sources in the Carpathians, being finally collected by the Danube, which flows along 1,075 km of the Romanian territory.
- In the mountain areas there are numerous glacial lakes and recently, anthropic lakes used for exploiting the hydropower potential of the rivers.
- Romania is located in a strongly seismic zone particularly in the southern, southeastern part. Other natural factors with a high-risk level are: floods, hail storms, drought, landslides, soil erosion and others.
- The subsoil, although rich in important natural resources, cannot however meet (with few exceptions), the needs of the national economy. Among these we may list: oil with old traditions in its extraction, natural gas, coal, especially coke coal, lignite and brown coal; iron and non-ferrous ore; gold, silver and bauxite deposits; large salt reserves and other non-metalliferous sources. A special category of resources is represented by the more than 2,000 mineral water springs, for consuming and medical treatment purposes.

1.2 Bench mark concepts

Although the thinking trend oriented towards sustainable development became distinct at the beginning of the 70's, the concept in itself is considered to belong to the 90's when it was adopted at world scale as a supreme objective for the development of the society. Romania openly received the message at the theoretical level, and adapted its

actions in the spirit of this concept but within the limits imposed by its specific conditions.

The reviewed literature used the following notions and definitions as points of reference:

"*Sustainable development is that type of development which meets the present needs, without endangering the capacity of the future generations to meet their own needs"*
(cf. Brundtland Report, 1987).

"Sustainable environment means to leave the world in a condition that will allow future inhabitants to enjoy the quality of life we have experienced"
(cf. Charles Kibert, USA, 1994).

"Sustainable development of constructions means the responsible design of a healthy built environment, based on a resources efficient use and ecological principles that can be responsibly created, managed, maintained and dismantled".
(cf. CIB-W82 Proceedings, Ascot, 1995).

Notes:

- The selected resources are: land, energy, water and building materials
- The established ecological principles are:
  (1) Minimize resource consumption (Conserve);

  (2) Maximize resource re-use (Re- use);

  (3) Use renewable or recyclable resources (Renew/Recycle);

  (4) Protect the natural environment (Protect);

  (5) Create a healthy non-toxic environment (Non-toxic);

  (6) Pursue excellent quality in creating the built environment (Quality).

"Built environment represents the type which includes all the lands occupied by the houses roads, mines, quarry and other facilities together with the additional surfaces of intended use for human activities. Are included also, some types of open spaces which are closely related to these activities such as waste storage, vacant land, city parks, gardens etc."
(cf. UN-HABITAT, Global Report on Human Settlements. Statistical annex, 1995)

"Urban sustainable development is a process leading to changing in the built environment which will favour the economic development while preserving resources and saving human, community and ecosystem integrity.»
(cf. Luc Bourdeau: Sustainable Development and Future of Construction French National Report.)

2. SUSTAINABLE DEVELOPMENT (SD) APPROACH. SOME PECULIARITIES

2.1 Classification related aspects

The classification used in Romanian for the concept of "sustainable development" was the word-by-word translation of the French "développement durable".

This interpretation does not accurately convey the meaning of the English expression [2]; "sustainable" which suggests the idea of "constant", permanent", "continuous", while in Romanian "sustainable" is translated by "durable" or "lasting". The concept of durable constructions might completely change the vision on the intended objectives, laying stress on their resistance in time and for this reason the expression "sustainable development of constructions " is preferred.

For accurately expressing into Romanian the essence of this concept, other attributes can be used such as: ""equitable", "balanced", "prudent", however, the variant "viable development" has been increasingly used, which appears to provide a comprehensive meaning similar to the English expression.

At present, specialists currently use both forms, "viable development" having a complementary role against the variant "durable development".

2.2 Meaning related aspects

The scientific community in Romania was highly receptive to the sustainable development principles, mainly due to the trend created by the works of some well-known specialists, such as N. Georgescu-Roegen. In one of his works published in 1971 [3] he maintained that "the basis of life is an enthropic process" and that "in Universe there is a continuous and irrevocable qualitative deterioration of free energy into processed energy" and "the entropy of a system generally increases faster in the presence of life rather than its absence".

The broadest meaning of the sustainable development concept is given by the definition included in the Brundtland Report which represents a reference definition. However, to be useful it should be adapted to the reality for each country, taking into account the different basic conditions such as resources, economic development, quality of life, pollution and the condition of the environment.

The situation in Romania against which “sustainable development of constructions” and/or “sustainable development” can be described is as follows:

- Resource levels are low and poorly managed. The additional resources and improved management (including environmental protection measures) result in significant expense but do not provide direct and immediate economic benefit. By using resources on environmental and sustainable issues measures in other fields are

not possible. In this respect, demands exceed by far the present possibilities of the Romanian economy.

- Restructuring of the Romanian economy is a welcome process, which corresponds to the current shifting trends at cultural level, i.e.. the prevalence of development processes against the growth ones.

Unfortunately, the efforts made by the entire Romanian society, (both the political class and particularly the population) cannot be found in the usual statistics, especially in the comparisons made at international level. The introduction of some data relating to the gap covered, to the speed of structural changes, to the weight of own efforts in achieving some major objectives, etc., would represent a measure for stimulating the degree of participation and for attenuating the feeling of being left apart.

Life quality is unsatisfactory in relation to the national and European standards determining a priority orientation towards achieving European living standards.

In fact, at European level it is already recognized that the developed countries may envisage "the maintenance or improvement of life quality together with the diminution of resource consumption" as objectives of sustainable development (SD) while the less developed countries will focus on "the improvement of life quality without an exaggerated increase of resources consumption" [4] or "the "increase of the average material consumption" [5].

After almost 50 years of a totalitarian regime, the Romanian society is now undergoing a difficult period characterized by structural changes in all areas (economic, political, legal, administrative, cultural, etc.). This process, desired by the entire community incurred high social costs, which have to be supported by the present generations, in spite of their previous frustrations.

Under these circumstances, the process of establishing the SD objectives is highly delicate, as it should not introduce restrictions above the tolerable limit of the population.

The adjustment of society to the SD principles requires serious cultural shifting. Some components, such as mentality are characterized by a considerable inertia. This cultural shifting in Romania requires a long time and the phenomenon is even more difficult if the individuals are particularly influenced by distorted or extreme ideologies.

Thus, it is difficult to identify what unanimously accepted means could lead to the moderation of the tendency towards "more", when in the highly developed countries this notion represented the idea of prosperity while in the ex-socialist countries it represented privilege and in-equality.

Also, the stimulation of activities such as recycling, re-utilization and recovery may face resistance in those environments where they used to be considered as a sign of poverty.

Finally, moderate consumption, so that resources "should also be available to the next generations" is not easily accepted by those whose minimally necessary needs can hardly be satisfied.

Communication is considered as a prerequisite for creating the conditions necessary to achieve SD. There are alarming signs in Romania that this capability is lacking and substantial barriers exist at all levels of functionality. Such signals are [6]:

- At decision making level: lack of correlation between the sectoral strategies and the assessment of their feasibility;
- With reference to the legal framework: lack of a consistent activity to ensure feedback by drawing attention to those situations incompatible with the old regulations or with the concrete implementation conditions.
- In relation to research: poor connections with the final user and difficulties in providing the primary data;
- With reference to professions: insufficient collaboration between specialists (engineers, architects, economists, sociologists, etc.)
- With reference to generations: a certain lack of trust in the capacity of the current adult generations to create something new after having been educated within an obsolete system, to which a certain arrogance of the "clean" generations is added

3. PREMISES FOR CONSTRUCTIONS SUSTAINABLE DEVELOPMENT (CSD) IN ROMANIA

In order to realistically assess the CSD chances in Romania, it is first necessary to analyze the existing situation of the entire society, pointing out both its strengths and its weaknesses, in accordance with some data issued by National Commission for Statistics [1], Romanian Government [7], and Ministry of Environment Protection [8].

3.1 Non-renewable resources

These resources were exploited and processed by means of technologies that heavily polluted some zones of the country. The fossil fuels (coal, crude oil) account for 50% of methane emissions, 97% of sulphur dioxide emissions, 88% of nitrogen emissions, 50% of carbon emissions. Mining as well as the metallurgic industry contribute to the pollution of the environment with heavy metals, deposited and suspended powders and other specific pollutants such as formaldehyde, sulphide hydrogen, carbon sulphur, chlorine, chlorides, etc. The loss of useful substances due to pollution reduces further the reserves which are already limited:

- 75 - 100 years for coal
- 20 - 30 years for crude oil
- 7 - 20 years for iron, manganese, gold, silver, polimetalliferous, non ferrous, bauxite ores
- 20 years for uranium, etc.

The resources of non-renewable materials are below the needs of the national economy, and therefore imports of such materials are common place.

3.2 Renewable resources

As far as the available **water** resources are concerned, Romania ranks the 16th in Europe. Water consumption has decreased during the last years in industry and agriculture as a result of the diminution of such activities but consumption in the home has increased.

The average consumption per capita as well as the specific consumption in industry and agriculture is higher than in other countries, especially due to the high losses in the supply and distribution networks, to the waste and inefficient technologies that are used.

For example, 40-50%, of water is lost or wasted in Bucharest, the irrigation systems use 40-50% of the quantity of water pumped into them, while many populated centres are facing a severe water shortage.

35% of the hydropower potential is used although it is common knowledge that hydroelectric energy is the least polluting and potentially the cheapest to exploit. The mineral water reserves are exploited only in 40% ratio.

The water resources are limited but they are exploited in a wasteful manner with high power consumption.

The land comprises 62% agricultural land, 28% forests, 3.7% water and 4.3% constructions, roads, railways.

In relation to 1989, a diminution of the agricultural land can be noticed, being characterized by a diminution of the arable land and of the orchards, and an increase of pastures and vineyards.

The non-productive land, which includes all the surfaces covered with constructions, has increased to a large extent.

The surface affected by drought represents over 45% of the agricultural land, while the surfaces affected by acidity represent approximately 15% and those affected by salt saturation represent approximately 3%.

The productivity of the agricultural surfaces is diminished by 20-30% due to factors such as: erosion, acidification, decrease of nutritive elements, salt saturation, but especially by chemical pollution with pesticides, heavy metals, fluorides, petroleum, etc.

The agricultural production has also diminished due to the conditions occurring after land privatization, i.e. fragmentation of lots (about 2 hectares/owner), reduction of

mechanized labour (only 10% of the works are mechanized), old age of the labour force (the age of most of the household owners is around 62).

Romania's flora includes over 3500 plant species, of which 1150 are grouped in the Danube Delta ecosystem. About 12% of the flora species are vulnerable or in peril of becoming extinguished. The fauna consists of over 33,800 species of which 23 of the vertebrates are in peril in becoming extinguished.

The forests mainly consist of broad-leaved trees (almost 70%) mostly covering the mountain areas (over 50%). Over 1/3 of the regions in Romania are poorly afforested.

The protected areas which include reservations, national parks or natural monuments cover a surface representing almost 5% of the national territory. Special importance is given to the Danube Delta reservation which represents over 50% of these protected areas in Romania.

3.3 Economy

Commencing from 1989, Romania's economy has been undergoing a structural reform which has influenced its entire evolution during the last 8 years.

Prior to 1989, the economy was characterized by: quasi-totality of state ownership; excessive centralization of the decision-making process; rigid planning according to ideological criteria; forced, excessive and energy intensive industrialization.

The governments democratically elected after 1990 adopted, as part of their reform programme, the pattern of gradual measures and slow changes. During this stage measures were mainly taken for abolishing the hyper-centralized economy, for opening the privatization process, social security, encouraging foreign investments.

After the November 1996 elections, Romania's Government, with assistance from international organizations (World Bank and IMF) adopted the "shock therapy" model, which results in a higher rhythm of change and a greater proportion of society affected by change. This has resulted in significant social costs. The main objective of this new stage is the restructuring of the large companies with majority state owned capital by their privatization or dissolution.

The main indicators at a macro level have evolved under the influence of the reform programme and of the limitation of the markets meant for export operations.

The phenomena associated with these processes, among which the energetic and raw materials crisis, diminution of investments, the discontinuities in agriculture further to application of the Land law, the financial blockages, the severe diminution of the export operations and the increase of import operations, etc., lead to the deterioration of the economic situation during the first transition years.

Thus, the industrial output decreased by 54% in 1992 against 1989, while the GDP had a negative trend until 1993, the year when a fragile macroeconomic stabilization occurred.

At the end of 1995 and the beginning of 1996, the following results were recorded:

- GDP increased in real terms by 6.9% against 1994, the construction industry having a significant contribution to it;
- The private sector contributed about 45% to GDP as compared to only 16% in 1990. The agricultural output was over 80% ensured by the private sector.
- The unemployment rate has decreased to 8.9% in 1995 and 6.3% in 1996.
- In 1995 the monthly average rate of inflation reached the lowest level since 1991 (2.1%) with an increasing tendency during 1996 (3.8%).
- The consumer price indices have constantly increased and in 1995 they represented 11.614 (11 thousand, six hundred and fourteen)against 1990 = 100.
    - ◊ Sale of food represents over 1/3 of the retail sales
    - ◊ Commercial services to the population have increased being with over 40% provided by the private sector
    - ◊ The gross fixed capital formation has had an ascending evolution and in 1995 it recorded an 11.7% increase against 1990. The increased weight of this index in GDP (21.8% in 1995 against 19.8% in 1990) was determined by the continuous intensification of the investment efforts, particularly by the mixed and private sector.
- The average nominal salary (May 1996) was about $ 125. Of the total number of employees, 58% had salary incomes below the average.

The results of the last year were below expectations:

- the annual inflation rate exceeded 130%;
- the unemployment rate constantly increased (7.7% in June 1997);
- the weight of the private sector in GDP decreased as a consequence of the dissolution of many SMEs;
- the deficit of the commercial balance increased due to the decrease in exports.

3.4 Construction sector

During the last eight years, the construction sector counted as one of the most dynamic and flexible areas of economic activity which is in line with the new requirements of the society, has faced some constraints caused by the process of structural reform.

The state of this sector is outlined by data published by the National Commission for Statistics, Ministry of Finance and Building Economics Problems Review, as follows :

- The share of GDP for the construction sector has increased consistently, although not spectacularly, until 1996 when it reached nearly 7%.
- Over 90% of the economic agents which operate in the construction sector are private capital firms and also more than 98% of them are small and medium size enterprises which cover over a half of the total turnover.

- The labour force of the sector represents only 4.5% of the population, having an average gross income a little bit over the average income on the national level which is still very low in comparison with the other European countries.
- The value of the construction work has generally increased, now largely carried out (over 70% in 1996) , by the private sector.
- The dominant type of construction continues to be civil engineering projects(over 50%), followed by non-residential buildings. Road and hydrotechnical projects are the most common civil engineering works and office buildings, industrial buildings and commercial buildings are the most common in the non-residential buildings sector.
- The number of residential buildings completed between 1994 and 1996 decreased, although the high proportion in the rural areas has permanently increased, reaching about 66% in 1996. Also, 86% of the respective dwellings were secured by private funds.
- The most important share of the market (over 80%) is in new construction work & capital repairs, the share for maintenance & current repairs is well below current needs.
- The quantity of cement produced in 1996 year constituted only 2/5 of the production capacity of existing cement producers, however it covered the internal consumption needs and provided an important quota for the export.
- Between 1990 and 1997, construction prices have increased more than 650 times, the highest increases being as a result of increased railway transport fees, followed by the building materials costs and labour costs.
- As a proportion of estimates for construction work buildings materials constitute about 40% of the cost, labour amounts to about 25% and transport about 11%.

3.5 Human settlements, equipment and life quality

This data is taken from the National Commission of Statistics sources [9], [10].

The human settlements in Romania have the following structure:

- 262 cities of which 81 are municipalities
- 2 687 communes which include about 13,000 villages

Actually, the urban environment , which represents only 2% of the number of localities, represents less than 1.5% of the entire occupied land and includes almost 55% of the population.

The ratio between the housing stock existing in 1995 and the number of households was 1/1. Of these, over 90% were privately owned, the most widespread type being the 2-room apartments.

As far as the structure and degree of comfort are concerned, the existing building stock continues to have a relatively low level compared to most of the European countries.
Thus:

- dwellings formed by individual buildings account for 50% while dwellings situated in apartment buildings represent almost 2/5 of the total housing stock;
- the housing stock is characterized by a high degree of wear and tear with over 25% of the dwellings being situated in buildings with a life expectancy of less than 10 years;
- 45% of the dwellings are made of resistant materials (reinforced concrete, precast concrete, bricks) while a quarter are situated in individual buildings the walls of which are made from non-resistant materials;
- the average living floor area per capita increased to 11.8 sq.m. per capita, but the number of the families who live in inadequate conditions (two persons over the number of rooms) is still high (over a quarter);
- there is a large share of dwellings which are considered inadequate with: 450,000 being earthquake damaged dwellings; about 275 thousand are apartments with a low degree of comfort and facilities; another several hundreds of thousands of dwellings are considered "sick" affected by condensation and mould; and about 3 million apartments are in need of repair work mainly sanitary installations and the improvement of thermal insulation and finishing.

With reference to the supply of electrical power, almost all the dwellings in the urban zone and over 90% of the rural zones had such facilities;

The drinking water supply is not provided for about 1/10 of the dwellings and in the rural zone this network is extended over a small area

The sewerage system covers most of the urban localities and only 2.6% of the rural ones. However, less than half of the respective localities have water treatment plants.

Heating for dwellings in the urban environment is provided by district heating plants or thermal power stations which feed central heating systems. Individual heating with stoves (gas, wood, liquid fuel) is common for quite a large number of dwellings causing significant pollutant quantities.

Upgraded roads (with lasting coatings of ashlar stone, concrete, bitumen) from municipalities and cities, represent 58.5% of the total road length.

The average surface of green spaces is about 17 sq.m. per capita.

Urban passenger transport is mainly provided by buses which represent almost 60% of the public vehicle stock, while 23% is represented by trams and about 10% is represented by trolley busses. Generally, a decrease in the number of passengers using public road transportation has been recorded,

The state of health for the population is first of all reflected by the average life expectancy which is one of the lowest in Europe: 66.5 years for men and 73.1 years for women.

The national population increase has become negative due to the birth rate diminution. Although infant mortality has decreased, it is still high, while health care services are very low in number (one physician for 543 individuals).

The education system in 1995/1996 had as main features the followings :

- The school age population encompassed within the national education system (preschool, first degree, secondary and high education) accounted for 21% of the total population).
- The official statistics of the same period showed that an important part of the total school age population (over 1/3) was left beyond this education system.
- The higher education network, which is structured as public and private sector beginning with 1990, covered about 336 000 students, which means about 148 students per 10 000 inhabitants (out of which about 25% in higher private education sector).

The number of students specializing in the technical field is decreasing (1/3 against 2/3 in 1989), while the number of students specializing in economics and law as well as those in exact sciences is increasing (1/4 against 1/10).

The cultural real estate stock includes 1000 historical monuments, some of them being thousands of years old. Churches of various religions, cathedrals, fortresses, palaces, castles and statues all belong to this category with some of them under UNESCO protection (the monasteries in the north - eastern part of the country).

Regional disparities are common and, in compliance with the level of the Global Development Index [11], two under-developed zones of poverty were identified in the north-east and the south of the country.

As far as urban land is concerned, the following characteristics can be noted [12]:

- Several factors influence developments in Romania. Typically there are extensive conversions of agricultural land into urban use.
- The urban land markets represent a sector undergoing a very dynamic structuring process; the supply has rapidly grown especially due to the further application of the Land Law while the demand has exceeded the supply, especially for dwellings, services, trade, transport, etc.
- As a problem of the transition period, the market prices of the real estates are often below the value corresponding to the land development degree. In some areas, especially the central part of the major cities such as Bucharest, the land share in the total price (land + building) might represent over 50%. The use of prices under the real value, underestimate the community efforts to provide the major infrastructure works.

3.6 Global environmental quality

In Romania, the environmental quality is affected by the negative impact of some economic activities, the improper exploitation of some natural resources, an urban

infrastructure which does not correspond to the development of human settlements, as well as cross-border pollution. This situation is described by the statistics provided by the National Commission of Statistics [1].

Air quality estimated as the quantity of pollutants emitted in the atmosphere in relation to the number of inhabitants, is in many cases quantitatively lower than the average of the EU countries (sulphur oxide, nitrogen oxides, carbon monoxide, carbon dioxide).
Within the pollutants emissions, the greatest share is held by: sulphur oxides from thermal-power plants (70%); nitrogen oxides from thermal-power plants and road transport (60-65%); carbon monoxide from combustion processes in industry (80%), carbon dioxide from thermal power plants and industrial installations; methane from zootechnical farms, extraction and distribution of fossil fuels (75-80%).

Water quality, although having improved since 1990, continues to be affected. It is considered that about 10% of the length of watercourses have deteriorated in quality.
Underground water supplies are also facing problems, such as the relatively high nitrogen and pesticides level in some rural zones.

The **soil quality** has been adversely affected by natural and anthropic processes and phenomena. In 1995, the surface affected in this way amounted to 11 million ha of agricultural land consisting of about 7 million ha arable land and about 4 million ha forestry.

The **forest quality** has been affected by biological causes. More dramatically however, forests have been adversely affected by inadequate administrative policies which have allowed higher levels of exploitation than the forests can naturally support and also by the pollution caused by industrial activities.
The advanced defoliating percentage, especially in the case of broad-leaved trees reached 40-45% in some more affected zones, the oak being the most affected.
Globally, the forests are undergoing an accelerated deterioration process, but forests in European countries cause greatest concern.

Waste has become a major concern in the policies adopted after 1989.
The present situation is characterized as follows:

- The largest share is industrial waste representing 97% of the 305 million tons (approx. 1995 figures);
- The percentage recovered of metallic wastes, glass, wood, paper, textiles, plastics ranged between 82 and 99%. Oil wastes represent the lowest recovery percentage.
- Domestic wastes are produced in a quantity of about 0.69 kg/capita/day.
- Inadequate storage of both industrial and domestic wastes represent the main problem in relation to wastes administration.

The environment protection expenses have significantly increased during the last years, exceeding 1% of the GDP since 1995.

4. MAIN CONSEQUENCES OF THE PRESENT STATE OF THE ART ON THE DEVELOPMENT DIRECTIONS

Under the current circumstances, sustainable development for the Romanian society actually means development that should ensure the assimilation of all the present moral values, the improvement of life, quality for all the social groups and the responsible utilization of natural resources.

Consequently, each sector shall subject its development directions to the above mentioned global objectives, as results from some Romanian Government documents [13].
For example:

- For **primary energy resources**:
  - Re-engineering, upgrading and development of the hydrocarbons exploitation systems;
  - Compensation of the crude oil and gas shortage by the improvement of the recovery technologies and by the development of new exploitable resources particularly offshore (Black Sea);
  - Rehabilitation and upgrading of the national transport networks that should ensure the avoidance of losses, safety in exploitation and reduction of environmental pollution.
- For **transport**:
  - Repair and rehabilitation of the existing infrastructure network (roads, motor ways, ports, airports, etc.)
  - Modernization of the transport networks in compliance with the European standards related to safety, fluency, and comfort;
  - Development of the river, land, air transport networks together with environmental protection measures.
- For **communications**:
  - Modernization and extension of the urban and long-distance communication network;
  - Modernization and extension of the radio and TV network;
  - Modernization of mail service.
- With reference to **land**:
  - Stopping the decline in the productive capacity of agricultural land by reactivating the existing equipment (mainly irrigation);
  - Stimulation of land development by the involvement of land owners;
  - Restraining the utilization of land for purposes other than agriculture requiring justification for social and economic purposes;

- With reference to **water resources**:
  - Diminishing the gap between the available resources and demands;
  - Satisfying the drinking water demand of the population, and the needs for irrigation and industry;

- ◊ Prevention and control of flooding by building embankments and aligning water courses. Also ensuring the use of monitoring equipment;
- ◊ Water pollution prevention and control;

- In relation to **housing**:
  - ◊ Improving the quality of existing dwellings by rehabilitation, particularly, strengthening works, thermal insulation, and finishing works;
  - ◊ Improvement of living conditions by increasing the useful area per capita;
  - ◊ Increasing the number of social housing stock;
  - ◊ Increasing the access level of the disadvantaged categories (youth, unemployed).
- With reference to **education**:
  - ◊ Improvement of the existing base at all education levels;
  - ◊ Providing the necessary space for the development of the school programme according to nationally approved standards (26 students for a classroom in primary school and 30 students for a classroom in secondary school);
  - ◊ Restructuring of the technical and vocational education systems.
- In relation to **health**:
  - ◊ Removal of obsolete and worn out equipment and adequate equipping of the health care network;
  - ◊ Improvement of the cost/efficiency ratio specific to health care services;
  - ◊ Development of emergency health care services;
  - ◊ Development of health care services in the rural areas.
- For **culture**:
  - ◊ Development of the works for the restoration and conservation of the existing cultural heritage;
  - ◊ Repair and modernization of existing cultural units;
  - ◊ Development of existing networks in both urban and rural environments;
- For **industry**:
  - ◊ Continuation of the restructuring process so that this sector may provide the necessary conditions for economic recovery and for the improvement in quality of life;
  - ◊ Supporting those fields which have the real capacity for contributing to the fulfilment of the mentioned objectives, such as: the industries that can ensure comparative benefits and the development of export operations, i.e. food industry, wood processing, textiles, glassware, ceramics, and building materials; the industries that can provide the infrastructure programmes.

In essence, almost all of the development directions formulated so far relate to works belonging to the construction industry field (rehabilitation, renovations, modernization, strengthening, new constructions, etc.)

Theoretically, this would mean that this sector could significantly develop both in volume and in speed of delivery.

However, in reality, the estimates of investment necessary to bring this about exceed the capacity of the construction sector as well as other internal funding possibilities.

Thus, according to some estimates, the necessary investments for priority interventions until 2004 represents 11 times the 1996 budget.

5. ACTIONS FOCUSING ON SUSTAINABLE DEVELOPMENT IN ROMANIA

A sustainable development strategy as such does not exist either at the level of the entire society or at any sectoral level. However, its' principles and objectives are explicitly and to a larger extent, implicitly, conveyed in some of the already developed strategies (over 30), in the structure and content of the legislative system and in the medium and long-term research programmes.

5.1 Strategies and programmes

The National Strategy for Romania's joining the European Union envisages among other things:

- Elaboration of some national development strategies converging with the European policy for environment and life quality protection and improvement. Romania's participation in the co-operation focused on solving the ecological problems at regional or trans-European level.
- Modernization of the Romanian education and professional training system; harmonization of the education methods and study programmes applied in Romania with those of the EU member countries;
- Promotion, fostering relations and intensification of co-operation in the field of culture, audio-visual, information and communications for asserting the Romanian cultural patrimony at European level and for involving Romania in the cultural pan-European dialogue.

Within the Restructuring and Reform Strategy of the Ministry of Public Works, Regional Planning and Urban Development (1994/1995) as well as in the Sector Strategy for Romania's accession to the European Union (1995/1996) the following major objectives are stated for 2004:

- Providing the conditions for the fulfilment of the envisaged investments programme together with the creation of the general framework to favour quality and effectiveness in a competitive system;
- Improving the life conditions in localities by promoting a housing policy, as well as a policy for the development of infrastructure and urban services, and the protection of the built environment.

The Plan for the National Territory Development (PATN) which formulates development plans at regional level but with a global concept and broad vision states that the priority fields are:

- major transport infrastructure
- rational management of water and soil resources

- safeguarding of the natural and built environment
- development of localities in relation to their economic-social and cultural historical importance
- development of special zones (with a specific economic, cultural and touristic potential; disadvantaged zones from a geographical, social and economic viewpoint; zones with the potential connection to the EU space)

During 1991-1995 the studies that were used for substantiating the necessary legislation in the respective fields were drawn up.

The Environment Protection Strategy developed by the Ministry of Water, Forestry and Environment Protection (MAPPM) provides the major means and ways for meeting the proposed objectives, among which:

- Legislation relating to wastes, noxious and harmful substances, industrial hazards, pollutants emission, etc.
- Improvement of environmental factors affected by acid rain;
- Re-utilization of wastes discharged through gases and water in a 10-15% ratio by the year 2000.
- Reconditioning of land used for solid wastes storage;
- Storage of domestic solid wastes under controlled conditions;
- Increase of the forestry stock by about 200,000 ha by the year 2000;
- Conservation of the historical monuments at least in a 30% ratio by the year 2000; etc.

Numerous actions included in the Environment Protection Strategy are happening or in development. Some programmes are using their own funds whilst others use international financial assistance (World Bank, EU, EBRD, USAID, G-24 and others).

The National Agency for Environment Protection has been in operation for several years, having subsidiaries in almost all of the counties in Romania. These agencies provide the National Statistics Commission with the necessary data for characterising environmental factors in Romania.

Also, there are about 70 non-governmental, non-profit organizations operating in Romania, which represent a real ecological movement.

5.2 The legal system

During the last years, significant efforts have been made for adapting the legislative system to the principles of democracy, to the demands of the market economy and to the European norms related to life style and environment protection exigencies.

Among the most important laws in force are the following: Constitution of Romania (1991); Land Law (1991); Law for authorizing the constructions erection (1991); Law on local taxes (1994); Law for the prevention of unfair competition (1991); Law on foreign investments (1995); Law on commercial companies privatization (1991); Law

on securities and stock exchanges (1994); Law on expropriation for public utility reason (1994); Law on quality in construction (1995); Environment Protection Law (1995); Housing Law (1996); Law on cadaster and real estate publicity (1996); Law on general regulations for urban development (1996); Law on public finance (1991); Law on banking activities (1991); Law on free zones (1992), etc.

In the process of development are: Law on regional planning and urban development; Law on real estate; Law on historical monuments and sites; Law on Forestry and others.

5.3 Research-development programs

The restructuring process during the last few years has had a severe and sometimes dramatic effect on this sector (diminution of funds and of R&D staff, poor equipping, difficulties in accessing documentation, etc.). In spite of these effects, the medium and long-term research programmes reflect an orientation towards the major demands of society. Thus, the main topics refer to:

5.3.1 Construction

- Establishing and adjusting policies related to restructuring and economic re-launching
- Improvement of the legislative framework and of the technical regulations
- Harmonization of regulations to European exigencies
- Improving construction quality
- Improving the construction process and construction technologies
- Efficient use of resources
- Improving the companies' operating conditions in the market economy system

5.3.2 Regional planning and urban development

- Development of specific strategies and substantiation of recommended policies
- Improvement of assistance tools for urban management at the level of local administration
- Organization of the urban land markets and rational utilization of the land
- Solutions for the rehabilitation of the rural space and the diminution of regional disparities
- Studies related to the means and methods for improving life conditions in the urban and rural localities
- Knowledge transfer

5.3.3 Energy

- Clean technologies for energy generation
- Environmental protection by the prevention and control of polluting emissions

- Increased effectiveness throughout the energy supply chain
- Renewable energy sources
- Modern management systems
- Promotion of technologies for predictive and preventative maintenance of equipment and power units

5.3.4 Environment

- Environmental quality and climatic changes
- Analysis of the synthetic and industrial products life cycle
- Environmental protection, rehabilitation and re-construction technologies
- Waste treatment and recovery
- Human dimension of environmental changes
- Environmental pollution impact on the cultural heritage
- Environmental economics

Commencing from 1996, research has been carried out within URBANPROIECT focusing on the consequences of sustainable development on construction, a project that is supported by the Ministry of Research and Technology. The main results envisaged are:

- the identification of the specific features of sustainable development;
- identification of some indicators (method) for the assessment of the SD degree or of its reverse – unsustainability of the built environment;
- some recommendations on the strategy for the sector regarding sustainable development;

At present, the Method for the Assessment of the Sustainability Alteration Degree (MEGAD) is being validated, while the recommendations and possible scenarios are re-programmed for the end of 1998.

6. OPINIONS ON PERSPECTIVES OF THE CONSTRUCTION SUSTAINABLE DEVELOPMENT IN ROMANIA

6.1 Some findings of an inquiry

At the beginning of 1996 URBANPROIECT organized an inquiry by launching over 600 questionnaires addressed to the following categories: children, students, employees, (in research, design, education, manufacturing, local and central administration).

The response rate was of about 70%, the main characteristics of the respondents being:

- average age around 36 years;

- over half of the respondents were high school and university students; within the specialists group, the greatest share was held by administrative staff (49%), followed by executive staff (25%), research-design (17%) and higher education;
- as professions, engineers held the greatest share, followed by architects and university staff;

The main purposes of the inquiries were:
- assessment of the way in which the concept of constructions sustainable development was perceived
- opinions of specialists (active or in the process of training) with reference to the future of constructions;
- identification of the main obstacles in the application of the SD principles.

The most significant results of this inquiry can be summarized as follows:

6.1.1 Sustainable development denomination and definition

The term "sustainable" is considered to be suggestive and acceptable by most of the subjects. Other suggestions, in the order of the votes cast were: balanced, continuous, controlled, moderate, viable. It is interesting that the attribute "viable" ranks the last, although it is the alternative with the most frequent utilization in the Romanian literature after "durable".

The definition of Constructions Sustainable Development introduced by the CIB-W82 Commission is considered as being suitably accurate and satisfactory by most of the respondents, although a significant number of the high school students consider it to be difficult and unclear.

Of the suggestions and proposals that were advanced we can mention:
- Definitions:
    - "The idea of a healthy built environment, based on the effective use of resources and in compliance with ecological principles, in order to achieve, exploit and maintain at a minimum total cost and to responsibly restructure the built environment on the basis of the same exigencies."
    - "An environment built in such a way as to harmoniously integrate in the natural environment within its acceptance limits".
- Ideas to be included:
    - humanization of the built space
    - the continuous, long-term meeting of essential human needs
    - flexible (adaptable) built environment
    - controlled development during and after utilization
    - utilization and re-adaptation of the built environment to the new needs
    - efficient, careful and intelligent use of resources
    - the morality component
    - influence of culture on built environment.

6.1.2 The future of construction in Romania

- With reference to the **types of construction** the following predictions prevailed:
  - in the future - buildings will be built with greater density and longer life span;
  - as types of activities - although there will be an increase in renovation and rehabilitation activities it is expected that new construction will prevail;
  - as to construction categories - although infrastructure works will prevail there will be a more rapid development of dwellings, commercial buildings and institutional buildings for services supply
- With reference to **design and construction process**
  - the demands for improved quality, increased environmental protection and improved response time (duration of designing process) will have a major influence;
  - a greater use of life cycle analysis will be required with solutions needing to be substantiated;
  - most of the responses indicated that the following issues should be addressed as a matter of urgency in the construction process: lower exploitation costs, harmonization with the environment, alternative lighting/heating solutions, wastes management, utilization of local materials and technologies, low consumption of non-renewable natural resources.
- With reference to **building materials**:
  - it is estimated that structures will continue to comprise of masonry and monolithic concrete, which means an increase in the consumption of bricks, light-weight concrete and concrete;
  - higher levels of utilization for cement, marble, asbestos, steel, aluminium, bitumen and wood are forecast.
- With reference to **skills and regulations**:
  - the role of urban planners, sociologists, IT specialists, architects, geographers and ecologists are expected to increase and expand over the next 10 years;
  - the following changes in the education system are predicted: curricula structure, trainers' training, post-graduate courses.
  - the following categories of regulations (standards) are considered to be urgent in the future: environment protection, building materials quality, urban ecology, built and natural environment rehabilitation.
- With reference to **human settlements**:
  - most of the responses were pessimistic, with the increase of population density and increase in pollution considered possible;
  - as far as life quality was concerned, divergent opinions were expressed, a significant part predicting a deterioration and an enhancement of discrepancies, while others expected the settlements to be cleaner and "greener".

6.1.3 Predictable obstacles in the implementation of sustainable development

The majority of the responses indicated that the principles of CSD had a good chance of being implemented providing they were adapted to reflect the priorities of the Romanian society.

For example:
- to build in a healthy and qualitative manner
- to avoid waste
- to ecologically rehabilitate the built and natural environment
- to use the existing stock in full awareness

The responses indicated the following possible obstacles in approaching CSD:
- poor performance of the economy
- impoverishment of the population
- state of the built environment
- absence of specific regulations
- poor political will
- state of natural environment
- lack of communication
- mentality inertia
- remote benefits

6.2 Comments on possible scenarios

Four types of scenarios formulated by the Dutch specialists [15] were used as reference:

1) Strong Together
2) Strong Alone
3) Considered Sustainment
4) Weak Sustainment

The compatibility of the four alternatives is dependent on several criteria considered as relevant, namely:
- the will and possibility to act;
- the state of capital categories envisaged (environment capital, manufactured capital, human capital and social capital) and the relations between them.

The will of the Romanian society, from the bottom to the top, to converge with the standards practised in the developed countries is indisputable. From this viewpoint, the principles of the Strong Together scenario could be adopted due to the interest in the protection of some specific ecosystems such as the Danube Delta and the Black Sea coast. Some other situations, such as the pollution of the upstream Danube would also justify the promotion of this scenario.
The restrictions imposed by such a policy relate to the effort required to bring it about

and, which currently, far exceeds the available economic resources to which also severe social problems may be added (unemployment, segregation, low purchase power). Due to these reasons the Strong Alone scenario does not seem to be adequate either.

The Considered Sustainment scenario is closer to our specific conditions as there are real concerns for environmentally related technological solutions, i.e. the diminution of pressures upon the environment. This direction also results from the international commitments undertaken by Romania.
On the other hand, the state continues to play its role of assuring minimum health care and education conditions.
The incompatibility is caused by the priority to restructure the Romanian economy and the entire Romanian society. This causes a rapid alternation of capital within the intervention priorities.

The Weak Sustainment scenario seems to be satisfactory from several viewpoints (stress laid on the increase of productivity, the increase of incomes, less ambitious objectives, the not very severe state of environment). However, some incompatibilities emerge when the market, which is now in the process of consolidation in our country, gains a basic position. Also, the prevalence of material values over the spiritual ones may be disputed.

7. CONCLUSIONS AND RECOMMENDATIONS

The Romanian society is open to assimilate the SD concept both in practice and in theory.

During the last years, remarkable efforts have been made for a fundamental restructuring at political, economic, social, legal, administrative, etc. level, which in itself is a movement in the spirit of sustainable development. The macro-economic indicators, which are now being used in international comparisons, fail to take into consideration these efforts, which are a disadvantage and even an injustice for the transition countries.

The existing strategies represent a valuable starting point for converging with the SD exigencies, but they still contain some unrealistic predictions and are not correlated. Moreover, the formulated strategies are not usually followed by the necessary actions, i.e. development of programmes, budgets, and responsibilities.

This observation wishes to support the idea of formulating a sustainable development strategy at national and sector level, which should start from an evaluation of the priorities and the existing exploitation of the SD principles.

Improved quality of life has become an absolute priority objective. Improvements in the quality of life presupposes a number of investments, which in the end represent high consumption of resources, greater pressures upon the environment, an increase in the risk of pollution, etc. For this reason, such measures cannot be conceived or implemented unless complementary actions are provided in order to reduce or mitigate the predicted negative impact.

The present state of the Romanian economy does not favour the establishment of very ambitious objectives in relation to CSD, in spite of the construction sector being among the most dynamic ones and with relatively good prospects.

The mentality burden represents a high inertia factor which may delay the society's evolution towards SD; the action of this factor may be corrected by training and knowledge transfer both among the specialists in the country and partnerships abroad. These factors require special attention because their effects do not emerge in the short term.

Communication is also a prerequisite for the new concept to succeed. If the common language is accepted as an essential means for its implementation, then there are arguments in favour of a multilingual glossary of SDC.

Also, a collection of worldwide practised methods for the assessment of construction sustainability will be beneficial.

* * *

The following were selected as examples of SDC concept implementation in Romania:

1) Rehabilitation of dwellings in a low quality apartment block

2) New technologies for the water treatment plant

3) Introducing public transport by trolley bus

4) Protection, conservation, and development of the historic heritage area

5) Delimitation of the protected areas for monuments of outstanding national heritage value

These examples are presented in a separate volume. Examples n°1 and 4 are presented in Appendix 1.

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9. APPENDIX 1: BEST PRACTICE