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ORIGINAL PAPER

The forest and the life of the Earth

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Abstract.
In the paper are presented the main advantages offered by the forests to the nature and for us the people. In this sense it is reminded the forest intake of oxygen for the life on Earth, the absorption of large amounts of CO2 produced by industrial installations and machines, reducing the quantities of dust, powders, various other impurities, etc. in the air. It is remembered the contribution of the forest to increase the moisture in the soil and underground water reserves too, to reduce the soil erosion, the flooding, the floods and torrents formed on slopes. It is also outlined the role of the forests in maintaining the biodiversity inside it, the food intake that gives us the people, the resources available to natural medicine and last but not least, one of the major special treasure for us – the wood. Finally, it is shown the negative effect of deforestation in the world and in our country, the either natural or manmade fires produced in the forests, for the environment and foremost for us.

Key words: forest, biodiversity, deforestation, planting, climate changes

One of the greatest riches that God has given to us is the **forest**, as a source of raw materials, of species for naturopathic medicine, source of food for humans and animals. At the same time, forests give air large quantities of oxygen and the benefits do not stop there.

1. Years ago, the scientists have calculated that a hectare of tropical forest produces daily 11.1 tons of oxygen during the process of photosynthesis which it carries out in the atmosphere, as well as the forests of the temperate zones. You may recall that a hectare of plains (savanna, prairie), produces only 1.1-1.3 tons of oxygen per day, while a hectare of marine surface produces 0.5 tons of oxygen every day.

The world's population, consume in 20 years ago, approximately 900 billion tons of oxygen per day and the fauna and flora on Earth several hundred billion tons of oxygen every day. Experts say that the Amazon forest produces only 1/5 of the oxygen emitted into the atmosphere.

2. The specialists show that the plant world, particularly forests, absorb large amounts of carbon dioxide from the atmosphere, necessary for photosynthesis (produced by all plants).

Plants are the only living organisms on Earth, that starting from inorganic substances: water with mineral salts and carbon dioxide, under the action of light, given by the sun, realize synthesis of simple organic substances, such as monosaccharides. It is considered that only the equatorial rainforests absorb about 5 billion tones of CO_2 per year. But other forests on the Earth?

We remember these numbers because the world's population, through breathing, annual generates 50 billion tons of CO_2. Add to this number the quantities produced of the animal world but especially from industry and automobiles and understand what huge numbers arriving. So we have an essential contribution to the "greenhouse effect", which is spoken more often. It is estimated that a new tree planted in the tropics during growth consumes annually, in the atmosphere about 50 kg of CO_2, with much more than a tree planted in temperate zones, which take from the atmosphere only 13 kg CO_2 per year. This is why the plantings are required primarily in warm tropical and equatorial areas. It is considered that the benefit brought by the standing trees from forests is three times higher than the wood obtained by cutting them (Brown, 2011).

3. Another aspect of the forests "benefits" is it role in maintaining atmospheric humidity, precipitation regime in that region. Trees of the forest "stimulated" by solar energy, pumps water from the soil by their roots, sending it through the stem to the leaves, where take place the process of photosynthesis, "preparing food". The excess of water remaining is removed by the leaves into the atmosphere through the process of transpiration.

The remove water will turn into rain that is "godsend" for agricultural crops in the region. It is estimated that a forest "pumps" into the atmosphere millions of liters of water daily, which is transformed into the rain. If forested area will decrease - partly or wholly - and the amount of rainfall will reduce the agricultural production, will decrease in that area.

In the USA, 60 million people obtain drinking water from the basins areas placed under woodland, a nature made service, raised to 3.7 billion dollars a year (Brown, 2001).

The forests are those that stabilize the local climates as well, alleviating extreme fluctuations from day to night, especially in summer. The forest and it entire vegetation inside, stores and accumulate the needed nutrients of the entire forest ecosystem.

This is most obvious in the tropics, where tropical soils do not have a large capacity to store nutrients. Here's why the regions in these deforested areas, quickly turns into unproductive arid lands, being quickly abandoned.

4. The forests - through their leaves - retain the numerous nuisances, dust from the atmosphere and numerous pathogens as well.

It is interesting to remember an experiment done in France, with a few tens of years ago, through the 1970s. It took a vacuum container of 1 m^3 and went in the Fontainebleau forest near Paris, where it opened for one hour and then closed. The same process with another container was done in the center of the well known shop Lafayette in Paris. Both containers were taken to the laboratory where the pathogen analysis was carried out, and was found that the container stored in Lafayette were 100 times more pathogens than those from the forest of Fontainebleau.

It may recall that, the specialists have calculated that a hectare of forest purifies in a year, 18 million m^3 of air and retain on the leaves of trees 80 t of dust and soot!

For those recorded before, rightfully, the forests in general and in particular tropical and equatorial forests are named, "green lung of the Earth".

5. The forests are those that maintain and improve the soil fertility and hydric, biogeochemical cycles in the area by adding organic substances from the fallen leaves, and protects against washing it by powerful rains, slowing down at the same time the water trickling.

Thus, the water will be absorbed better and taken into deep, reloaded the underground aquifers basins, reducing the formation of sandbars on hillsides that could inundate human settlements or agricultural crops. The USA is an example in terms of how to combat the soil erosion using vegetation and forest. Through the 1990s the U.S. Department of Agriculture, with the support of environmental organizations, have established The Conservation Reserve Program (CRP), in order to reduce the soil erosion and control the production of such agricultural species for Americans.

It was entered into 10-year contracts with the land owners, previously evaluated to keep these lands under the protection of a vegetable layer, in this period. The farmers were paying (the fineness being secured, for the most part, by the U.S. Government) to plant characteristic trees and grasses of the area concerned. The surface was small, about 14 million hectares. This has led to a reduction of annual soil erosion with 40%, increasing the degree of moisture from the soil (Brown, 2011).

Specialists in the field, warns: if it will continues the massive deforestation practice, this will lead to the emergence of devastating flood - as was noted in recent years in our country too.

The deforestation areas in the upper and middle hydrographic basins make the water that comes off the hillsides instead to find trees, fallen leaves and branches to retain it, it will find free land, involving different materials, transforming into an extremely dangerous flash floods, causing catastrophic

damage and flooding. Thus, in the summer of 1998, China has gone through a big natural disaster: 120 million of Chinese people from the banks of the Yangtze River were evacuated, leaving their homes and 3,500 of them died. It was all due to catastrophic flooding, which also caused damage of 30 billion dollars. There were large amounts of precipitation, but have not exceeded previous records. The cause was - by Chinese specialists – the excessive cutting of forests in the Yangtze River basin which had been lost until 1998, 85% of it forest surface. What remained, 15%, could not cope with the large quantities of fallen precipitation. As a result, the Chinese Government has forbidden the cutbacks and begins the afforestation of the area. Mistakes cost always.

In our country had held many such floods. For instance in 2005, the satellite images have shown that they have occurred, precisely in the places where massive deforestation took place. An example is Trotuş where, normally, the flow rate is 50 m^3/second but in the floods of 2005, Trotuş had 2,800 m^3/second (as Mădălin Mihailovici – General Director of National Administration "Romanian Waters" – mentioned). In the past 20 years, due to the numerous deforestation and floods, these disasters have caused 22 deaths, 13,000 evacuated people, numerous landslides and more agricultural lands, with their harvests destroyed (Fig. 1).

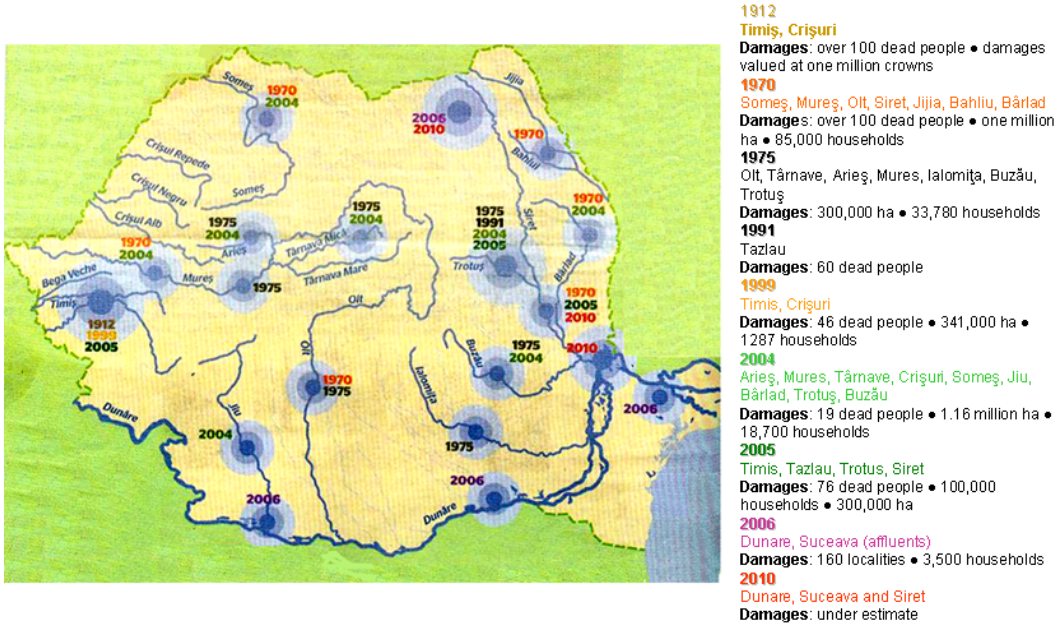

Fig. 1. Historical floods in Romania (Surce: „Hidrotehnica" Journal/ National Administration of "Romanian Waters" (NARW), 2006 (Adevărul, 12.07.2010).

6. The forests house and keep alive an extremely rich biodiversity. It is known that the world's forests contain more than half of the species of plants and animals known on Earth.

We can recall an example in this regard. In a 2010 a report of the "The World Wide Fund for Nature" (WWF) explained that, in the Amazon forest, scientists have discovered within ten years (1999-2009), 1,200 species of plants and animals remain unknown until then.

The forest is an important source of food for us, either through animals hunted within it, either through useful vegetal species it contains. For example, in New Guinea the population consumes over 250 species of trees from the local areas (Duma, 2006).

We must point out that more than a quarter of the drugs used in the world, take active substances from existing species in the rainforests. Asian indigenous populations had been used more than 6.500 plant species - mainly from the forests located in the South-East Asia (Duma, 2006; Mayers, 1984).

7. Perhaps the greatest wealth that provides the forest for human is the wood. In 1999 the world harvest of wood figure at about 3.28 billion cubic meters, 0.5 m^3 per person, reported to the number of inhabitants of the planet.

In 1999, 53% of this crop was used as combustible, especially in the third world countries, where the percentage reaches 80%. The rest of the harvest is used in the manufacture of paper (approx. 1/3) and one-forth to obtain the timber. If the recycling of paper and paperboard production would increase, it would reduce the massive demand for wood paste.

For the production of one ton of paper are required 3 tons of wood. From the countries that are at the top of a ranking of recycling the paper we find South Korea (91%), Japan and Germany (70-80%), the United State finding itself with only 59%, although the U.S. is the largest paper manufacturer in the world. If every country of the would will recycle the paper as do South Korea, the amount of wood needed for mass of paper and paperboard production would be reduced by 1/3 (Brown, 2011). No comment …

It would be good if our teachers and professors as well to say to the pupils and students, on different occasions, that every tone of paper saves 17 normal sized trees from cutting or that a tree produces in about 15 years about 700 paper bags.

The Food and Agriculture Organization of the United Nations (FAO) appreciates that in the future - till 2015 - will be an increase in the consumption of wood mass, in despite of the occurrence of plastic products.

The equatorial and tropical forests are those that contain the highest value of wood essences, used in the wood industry of luxury quality production of art works and in various furnishings (mahogany, teak, ebony, etc.). It has been calculated that these valuable species account for about 5% of the many

species of trees that grow in tropical forests (up to 1,000 species). For this 5%, unfortunately, more often the whole forest is cut. Why? Why is it necessary? The rest of the wood -often- is not used, is abandoned and rotting away.

8. Today, the forest covers an area of about. 2.5 billion hectares, about 31% of the total surface of the Earth.

At the beginning of the 20th century it was about 5 billion hectares (Brown, 2011) but the reduction of the forest areas is continuing. FAO recalls that in the period 1990-2000, have been lost almost 94 million hectares of forest, most of the losing belonging to the developing countries.

In contrast, the industrialized countries have earned 36 million hectares of forestry plantings, through what is a very good thing.

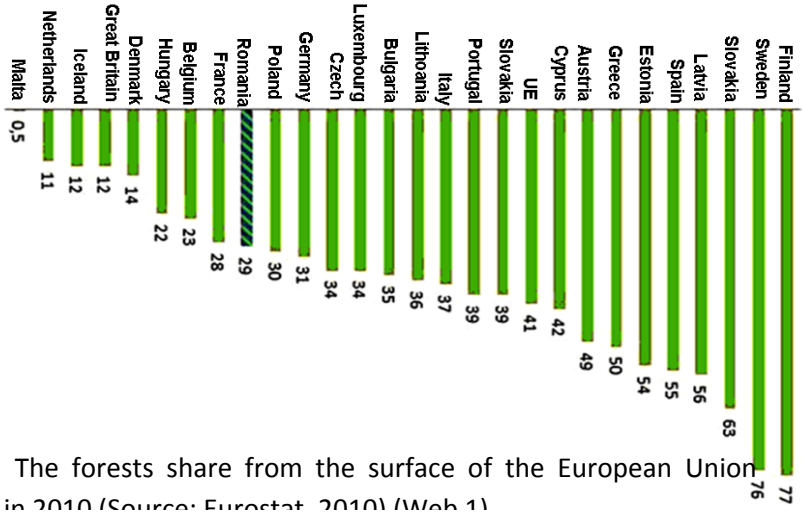

Fig. 2. The forests share from the surface of the European Union states in 2010 (Source: Eurostat, 2010) (Web 1)

From the total area covered by forest, the largest are the tropical and equatorial forests, with 53.4% of the total area.

Unfortunately, 100,000 km^2 (according to some authors over 50-000 km^2) of these forests are cut annually (as Greece's surface), with extremely negative effects for the so rich biodiversity of forests (Gnesotto and Grevi, 2007; Mâşu, 2011). Then follow the boreal forests, with about 25.4% and the temperate zone forests, with about 21.2%.

The country with the most extensive forests is Finland, occupying 77% of the country's surface. Very close second position, Sweden, where the wooded surface dominates the 76% of the total surface of the country. The following countries with rich forests are: Slovenia (63%), Latvia (56%), Estonia (54%), etc. Basically, the Baltic States occupy places three, four and six (Fig. 2). At the opposite pole, the countries with the fewest forests are Malta (under 0.5%), Netherlands (11%) and Ireland (12%) (Fig. 2). The situation in Malta is explicable by the fact that the country is extremely small. The European

average is 41% - as we said before - almost half of the European Union is covered with forests.

In 2012, the European Union has created a European regulation on combating illegal logging of trees and to try to limit this deforestation.

Worldwide deforestation is continuing and most of this work takes place in developing countries, affecting annually about 1.5-2% of the area covered by forest. There are countries where the forest almost disappeared: Nigeria, Cote d'Ivoire and Madagascar is approaching.

By an FAO statistics, from 1981-1990, the cuttings represented, on average, about 1.7 million ha/year, but in developing countries, the surface is much higher (Negulescu et al., 1995).

Most losses of tropical and equatorial forest is recorded in Latin America, about 7.4 million ha/year, then Pacific-Asia – about 3.9 million ha/year, followed by Central Africa (Congo, in particular), etc. (Brown, 2011).

The International Tropical Timber Organization (ITTO) announced, not for a long time (several years), that tropical forests have fallen today. 50%, compared with 1975 (when the estimates were made) and unfortunately their surface continues to decline.

Brazil had suffered the most, having destroyed most of the equatorial forest from the Atlantic coast through the 1980s. Now the giant Amazonian forest (of the river basin) is attacked by the same "poachers". It covers an area as well as Europe surface (excluding Russia) and which, until 1970, was almost intact. Since then in about 35-40 years, it has cut about 20% of its surface. That is why -in 1999 – the Brazilian Government realized the need to intervene, prohibiting cuts officially. But, illegally, the thieves are seeing their plunge (who may control a so huge surface!). Norway has pledged an assistance of one billion dollars aid to stop the deforestation, especially in the Amazon basin.

Meg Symington, director of the WWF said: "If you will not do anything, many species of animals and plants will be history".

Do not forget that the Amazon region is very large, amounting to 6.7 billion km^2 and is estimated to contain 10% of terrestrial and aquatic organisms known, some not exist in other parts of the Earth. In fact, experts believe that forests are home to 80% of the variety of species and ecosystems that constitute life on Earth, providing livelihoods for 1.6 billion people (about a quarter of the global population). The assessment was made by IUCN, on the occasion of the "International Year of Forests' - 2011. Deforestation - especially those from the tropical and equatorial - is continuing a phenomenon that is hardly dimmed.

The specialists say the world is lost each year 100,000 km^2 of these forests, as we mentioned - about 30,000 ha, daily, the largest "share" gives Brazil

(approx. 48% of all recalled). The experts also estimated that 40% of the carbon dioxide that accumulates in addition to the atmosphere, increasing the greenhouse effect, comes by decreasing the forests areas, of the "green lung" of the Earth by the deforestation in recent decades (Mâşu, 2011).

Recently, in 2013, the specialists have been working on a project called Global Forest Change and have made a map with images of Earth as seen from outer space, they are highlighted areas where there have been massive forest cuttings but also the areas where trees have been planted.

Surprisingly, at this time, the country with the most deforestation is Malaysia, followed by Paraguay and Indonesia (Fig. 3).

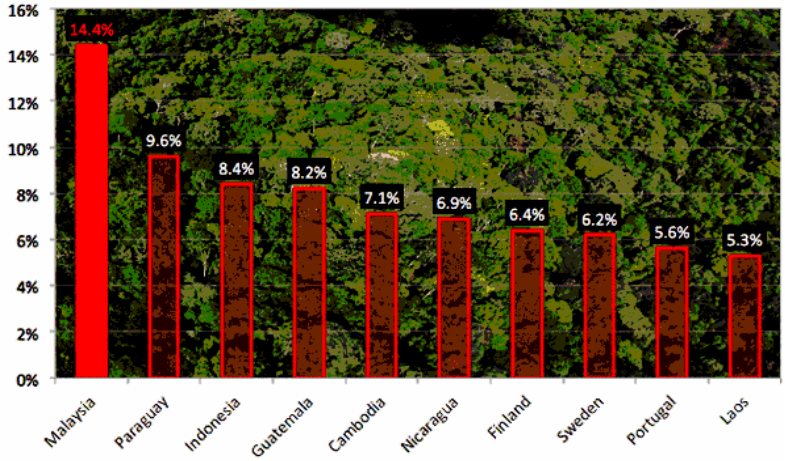

Fig. 3. The countries with the largest forest loss in the world (Web 2).

The same specialists say that between 2000 and 2013 have been cut worldwide 2.5 million km^2 of forest, while plantings of trees accounted for only 0.8 million km^2, which is a real danger to the health of our planet and our peoples.

According to data provided in 2010 by a UN project, entitled "The Economics of Ecosystems and Biodiversity" (EEB), which quantify the financial value of the services brought us by nature, it is found that only annual the forestry damage stands at 2,000-5,000 billion dollars, high above the cost of the banking crisis (Brown, 2011).

Haiti is another negative example. In the old days was covered with tropical forests. Today only 2% of it southern part has forest, the rest was cut off. As a result in this small country (as unloved by God, with earthquakes and pestilence), more and more numerous hurricanes in the Caribbean Sea, make ravages (Fig. 4).

Fig. 4. Satellite image representing the border between Haiti (left) and the Dominican Republic (right). While in Haiti have been massive deforestation, Dominican Republic has adopted tough laws concerning deforestation (photo: NASA/Goddard Space Flight Center Scientific Visualisation Studio via Treehugger, 2010) (Web 3)

In 2004, over 1,500 people died because of the tropical storms and 1,000 were missing. The fertile soil has been destroyed, washed away by the flows of water and wind. A country that was a tropical paradise has become the poorest in the world, millions of people emigrating.

In 1964, in Viet Nam, Laos and Kampuchea – because of the war - were destroyed about 1.086.000 ha of forest as a result of American bombing: with napalm, defoliant, herbicides or other chemicals that cause the leaves fall. In Viet Nam, for example, were destroyed about 45% of forests and along with it, their characteristic fauna, all with dramatic effects on the population.

All the extremely negative effects on forest are the natural fires or man-made. The growing drought in recent years has led to a drying of the wet tropical forests, which favored the expansion of the fires, either from natural causes (lightning, lava from volcanic eruptions, etc.) or people who have set fire to the forest to increase their agricultural area, or burned the forest area to buy the land at a low price, either the arsonists had fun.

Such fires have been in previous years in Indonesia, Australia S-E, on the Pacific coast of the USA, in France, Spain, Italy, England, Greece, etc. around the Mediterranean countries but also in Russian and even Asia not far from Moscow, as has occurred in the summer of 2010, when the world has walked with the gauze nose mask the whole days. In 1983, on the island of Kalimantan, in only three months, they burned more than 35 million hectares of equatorial forest (Duma, 2006; Roberts, 2002).

9. Romania had in the 1800s an area of 8.5 million hectares of forest, i.e. 36% of the territory. In the year 1989, the entire national fund forest (6,517 million ha) is owned by the State. The forestry of the country decreased progressively since 1991 due to several negative aspects (Fig. 5).

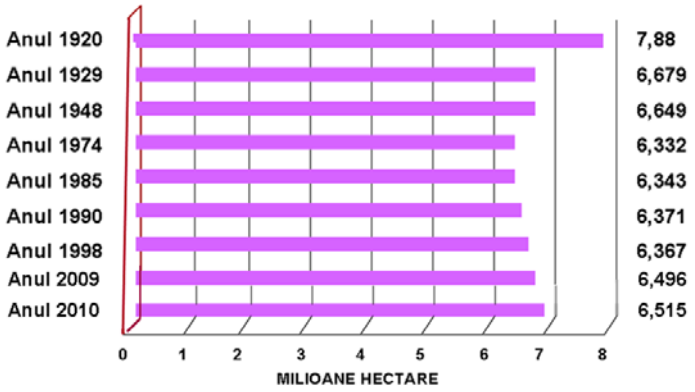

Fig. 5. The evolution of forest area in Romania (modified) (Source: National Afforestation Program until 31.05.2009) (Web 4).

The inconsistent application of legislation for restoring ownership of Land Fund and the illegal cuts of the forests trees owned by the State but also those belonging to individual and legal persons are the main cause of our forestry fund. In this regard, according to the National Institute of Statistics (NIS), only in 2010, the area of deforestation in Romania increased by 7.4% compared to 2009. We should mention that the massive deforestation has aimed mainly the desire for enrichment of individuals or groups of interest, considering the high price, in Euros, of forest hectares. We can give the example of 2013, a hectare of forest was sold between 1,000-3,000 €, and in exceptional cases even 5000 €, depending on their location and composition.

An alarm signal comes from Eurostat (the European Institute of Statistics of the European Commission) according to which, the Romania area of the forest fund in 2010 have a share of only 29% (27% according to other authors) of the country area, under the European average, which is 41%. This places our country close to the tail ranking – 19th place – of the top of the woodland surface in the EU states.

In Constantza County, the area of the forest fund was in 2013, 38.112 ha of which forest was about 32.691 ha. Due to the reforestation actions in recent years (starting 2009) the area has grown by about 1.386 ha in 2012. To better protect this forest a part of it was established in natural protected areas by the law (about 2.300 ha).

A good thing according to the report SILV 1 National Forest, area increased in 2010 to 20,445 hectares (0.3%) compared to 2009, reaching 6.515 million ha.

However, the pace of deforestation in Romania is alarming. Thus, since 1990 and until 2013, the specialists estimated that in our country have been cut almost 400,000 ha of forest that brought those who cut them a profit of € 5 billion. Only in the period from 2000 to 2011, the forestry area of Romania has been reduced with 280.108 ha, i.e. at a rate of approximately 28,000 hectares per year. In 2012 was cut 3 ha per hour!!! (Fig. 6). A calculation done a few years ago by the Academy of Agricultural and Forestry Sciences of Romania shows that our country is in need of reforestation of a surface of over 700,000 ha of land.

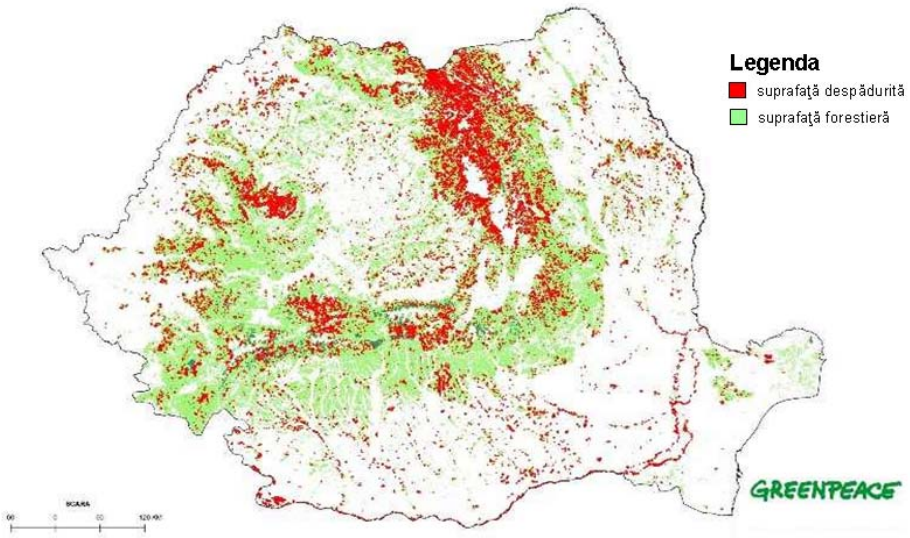

Fig. 6. Romania map deforested areas (2000-2011) (modified) (Source: Greenpeace) (Web 5).

A very little known aspect is that of the *virgin forests*. Professor Jean Pardé, a great specialist in forestry, quoted in the study of the Forest Research and Management Institute (ICAS) in 2007, wrote: "They actually belong not only to the national heritage, but also European and even the world". These appreciations are due to the creatures living inside them. In the Romanian virgin forests there are the main groups of higher animals that make up the country's fauna and numerous plant species.

In the Carpathian and the Danube eco-region the virgin forests sums 322.000 ha. Of these 250,000 hectares, are in Romania, the country with the most extensive area of the region. In the 19th century, virgin forests accounted

for approximately 30% of the total area of forests in Romania. At the end of the 20th century there were only 6%. Today remained less than 3% (according to the WWF-Romania) (Fig. 7, a, b). The virgin forests in our country are very dispersed, however, as some of the islands, which are difficult to be protected so that, by 2012, only 18% were included in the protected areas. The remaining 82% had no form of protection, being in danger of being destroyed (the case of the Apuseni Mountains and the Cibin or Maramures zones).

Charles, Prince of Wales of Great Britain, which has purchased several properties in Transylvania, joined the campaign launched by the World Wide Fund for Nature (WWF) Romania "Save the virgin forests", making a strong appeal for the protection of those from Romania, "We have the duty to save the last unspoiled areas of Europe, how we can still do it. Also, we should not underestimate the economic value of these wild lands". From September 2012, through OM MMP no. 3397/2012, the virgin forests in Romania has a full protection status, applies to more than 13,000 species living in these truly unique places.

Fig. 7. The last intact forest landscape (PFI) in the temperate zone of Europe – Retezat-Godeanu-Ţarcu (a) and the Bigăr waterfall belonging to the Cheile Nerei-Beuşniţa National Park. It was included among the most beautiful waterfalls in the world (World Geography, 2013). It is unique because of the way water flows (b) (both from Caraş-Severin County) (Web 6, 7).

In comparison, the developed countries such as Austria, Switzerland, Italy, France or Spain have no virgin forest although they have forested areas, much better maintained than ours. In Europe there are virgin forests only in Bulgaria, Slovakia (but smaller areas than those in Romania), Finland, Sweden and Norway.

In the world, the expansion of planting trees is constantly underway. In 2010, eleven African countries have decided to carry out a project of major significance for the Sahara desert, titled "African Green Great Wall" (Green Wall Sahara Initiative). They aim to plant a tree-line of forest along the continent, from Senegal to the Indian Ocean, with a width of 15 km (Fig. 8). This new forest has a length of about. 4,300 miles and the cost is estimated to be about 119 million U.S. dollars. The money was credited by the Global Environment Facility (GEF) (Brown, 2011) and will combat the phenomenon of soil erosion, will slow down the wind speed and will stop the advancing of the sand.

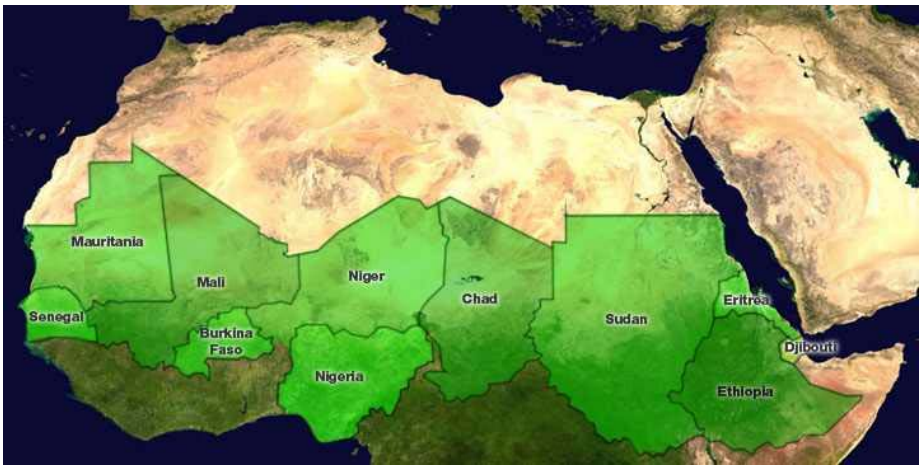

Fig. 8. The African Great Green Wall which includes 11 African countries (Web 8).

China has a great program of reforestation. After the distress produced by the cutting of forests on the shores of the Blue River (Yangtze River) and to prevent further flooding, it have decided to plant a tree belt in the Northwest of Beijing area, up to the border with Mongolia. This will protect the land against the expansion of the Gobi dessert over 4,400 miles and the costs are estimated at about 8 billion U.S. dollars.

Another positive example is that of Costa Rica. In this country a great deal of rainforest (wet and dry) were cut as wood mass. Costa Rican Government understood the danger for this country and people (increased awful the number of tropical storms, flooding, etc.). Thus, in 15 years they have managed to restore the forest on an area of 60,000 hectares - of the total 110,000 hectares - which was proposed by the draft surface rehabilitation. The new forest has been entirely protected by tough laws that prohibit grazing or hunting.

As shown, the planting trees are a solution to repair what we have broken. In 2010, was already done about 300 million ha of forest plantations, more than a third parte of the cereals cultivated surface area. The forehead is South Korea, followed by China, India, USA, Canada and Russia and Viet Nam (Brown, 2011). For the whole world, South Korea is an example of reforestation. Starting in the 1960s, through a great national effort, began the planting of a large surfaces, bared by an irrational exploitation.

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