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Biodiversity and climate change

Report
Committee on the Environment, Agriculture and Local and Regional Affairs
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Summary

Biodiversity, the variation of all life forms, is under threat today from the destruction of entire habitats, the over-exploitation of soil and marine environments, air and water pollution and the spread of invasive species. Climate change is also contributing to the depletion of biodiversity.

Human activities play a major part in the depletion of biodiversity and disrupt the climate, leading in the long term to negative consequences in the social and economic sectors and as regards public health.

The Parliamentary Assembly therefore recommends that member states take steps to preserve ecosystems and introduce management, education and training methods to mitigate the negative impacts of climate change.

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A. Draft recommendation

1. Depletion of biological diversity is currently taking place much faster than natural extinction.

2. Human activities are the main cause of this depletion, both directly (soil and marine pollution and the introduction of invasive species, etc.) and indirectly (exponential increase in climate change brought on by various activities).

3. The smooth functioning of ecosystems is vital to the well-being of humankind, as they provide free services such as water resources, soil fertility, firewood and timber, food, medicines, fossil, solar, wind and geothermal energy and climate regulation.

4. The Parliamentary Assembly notes that global warming is a well established fact and an unprecedented challenge for biodiversity. Worldwide, it is also reflected in an increase in average air and sea temperatures, extensive snow and ice melt and rising average sea levels.

5. According to some experts, average temperatures on the Earth's surface could increase by 1.4°C to 5.8° C by the end of the 21st century, with greater increases on land and in the high latitudes than at sea or in the tropics. Sea levels could rise by between 0.09 and 0.88 m and even, according to certain experts, much more. Precipitation is also expected to increase in the high latitudes and equatorial regions and to fall in the subtropics, with an increase in high rainfall. It is predicted that 20% of coastal wetlands could disappear by 2080 because of rising sea levels.

6. The Assembly realises that modelling changes in biodiversity is difficult. However, it is obvious that climate change has serious repercussions for animal populations, the distribution of species and ecosystems. This also has an impact on the length of seasons, reproduction periods, animal and plant growth, animal migration, the geographical distribution of species and density of populations, the frequency of parasitic infestations and diseases, etc.

7. The Assembly also points out that changes in biological diversity in ecosystems and landscapes, which are caused by climate change and other phenomena (such as deforestation and forest fires) also, in turn, affect the climate by altering the absorption and emission of greenhouse gases in particular. In addition, changes in the structure of the biological communities in the upper layers of the oceans could alter their absorption of CO_2 or affect weather conditions and climate change. This is therefore a spiral-like process which could have disastrous results at global level.

8. It notes that there is very good evidence of the impact of climate change on species and habitats, making them all the more vulnerable. The Assembly underlines the fact that uncertainties concerning the precise effects of climate change on biodiversity should not be a reason for deferring concrete action to preserve ecosystems and that the principle of precaution must be applied.

9. The Assembly underlines the need for the full and immediate implementation of the objectives of the Convention on Biological Diversity (CBD) adopted at the Earth Summit in Rio de Janeiro in 1992.

10. It points out that in April 2002, at the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity, organised under the aegis of the United Nations Environment Programme (UNEP), the governments undertook "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth" (2010 Biodiversity Target).

11. The Assembly also draws attention to its Recommendation 1823 (2008) on global warming and ecological disasters, Resolution 1406 (2004) on global warming: beyond Kyoto, Recommendation 1883 (2009) and Resolution 1682 (2009) on challenges posed by climate change, Recommendation 1885 (2009) on drafting an additional protocol to the Convention on Human Rights, concerning the right to a healthy environment and Recommendation 1862 on environmentally induced migration and displacement: a 21st-century challenge.

12. The Assembly also draws attention to Recommendation 135 (2008) of the Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, ETS No. 104) on addressing the impacts of climate change on biodiversity, which calls on the contracting parties and observer states to address and communicate, as a matter of urgency, the impacts of climate change on biological diversity and its conservation,*inter alia*.

13. It points out that the environment ministers of the G8 and emerging countries, meeting in Syracuse (Italy) in April 2009, adopted the Syracuse Charter on Biodiversity, making biodiversity a major global cause on a par with the fight against global warming and underlining the close link between the two.

14. The Assembly therefore invites the governments of Council of Europe member and observer states to take account of the opportunities offered by the International Year of Biodiversity in 2010 to:

14.1. improve the interface between science and politics, particularly with regard to biodiversity, whose importance still seems to be underestimated by some policy makers and by a large proportion of the public;

14.2. devise appropriate policies and take concrete measures to promote the conservation of biological diversity and reduce the impact of climate change on biodiversity;

14.3. develop evaluation systems to improve our knowledge of how biological diversity interacts with ecosystem structure and functioning and deepen our understanding of how biodiversity reacts to climate change factors and other exogenous pressures;

14.4. encourage synergy and interaction between national, regional and local environmental projects and policies on climate change and the objectives of international treaties such as the Convention on Biological Diversity (CDB);

14.5. promote a more efficient transfer of best practices in preventing biodiversity loss, which is very important in ensuring that a co-ordinated response can be devised and implemented at European level;

14.6. develop education, information and participation programmes targeting the public and policy-makers concerning the value of biodiversity and the importance of the conduct of individuals, businesses and the authorities in preserving it and mitigating the impact of climate change;

14.7. step up the fight against illegal trading in fauna and flora;

14.8. fully respect the status of protected areas, extend them as far as possible and establish environmental corridors to link them, while focusing in particular on cross-border areas which are more vulnerable because of the considerations of territorial sovereignty that affect them;

14.9. ensure that the networks of protected areas and the environmental corridors between them improve possibilities for flora and fauna to adapt to climate change by means of migration;

14.10. not allow large infrastructure projects that would cut through, and thus destroy, the above-mentioned environmental corridors;

14.11. protect all old-growth forests, functioning wetlands and permanent grasslands/pasture lands as carbon stores and sinks and important habitats;

14.12. adapt forestry techniques in the forests used for economic purposes so as to reduce impacts on climate and biodiversity;

14.13. facilitate transition to sustainable agriculture which would produce quality products, maintain high nature value habitats and landscapes, and have low climate impact;

14.14. support the renewable energy developments that have a real effect on reduction of green-house gas emissions and no negative impacts on biodiversity, and in no way support “green-wash” projects;

14.15. co-ordinate the responses to climate change and biodiversity loss by different sectors to achieve synergy and avoid conflicting actions and duplication of efforts;

14.16. implement Recommendation 135 (2008) of the Standing Committee of the Bern Convention on addressing the impacts of climate change on biodiversity, which sets out detailed guidelines for concrete action at all levels;

14.17. identify, on the basis of the experience acquired in the context of the activities conducted with a view to achieving the “2010 Biodiversity Target”, a common strategy for a common framework of activities “post-2010”.

B. Explanatory memorandum by Mrs John-Calame, rapporteur

1. Introduction

1. Biological diversity, or biodiversity, is the variation of all life forms. There are three types of biodiversity: genetic diversity within species, diversity between species and diversity of ecosystems. Exchanges and interaction between these different entities give them their ability to adapt, which is why life has been able to sustain itself for billions of years. As living beings, we are part of that biodiversity.

2. The healthiness of ecosystems hinges on biodiversity and the benefits for humans are numerous, through fundamental functions including food production, recycling of water and air, supply of raw materials, energy resources, ingredients for remedies, protection against natural disasters, the contribution made to our culture and leisure activities and the economic value linked in particular to biotechnologies.

3. Despite, or perhaps because of, these many benefits, biodiversity is under threat today from the destruction of entire habitats, the over-exploitation of soil, marine environments and certain species (excessive hunting/fishing), the fragmentation of environments, air and water pollution or the spread of invasive species.

4. The climate change under way (heat waves, tropical cyclones, floods, drought) is also a threat to biodiversity. Global warming is an established fact. There is clear, worldwide evidence of it in the increase in average air and sea temperatures, extensive snow and ice melt and rising average sea levels. It constitutes an unprecedented challenge to biodiversity because it is combined with other anthropogenic hazards.

5. Human activities are therefore the main activities responsible for the depletion of biodiversity and are also causing an exponential increase in climate change.

6. Our impact on the Earth has been considerable; no other living being has transformed its habitat as much as we have. But those changes are happening far too quickly for species to adapt and without that adaptation they become extinct.

7. Ecosystems are our habitat. If we compare them to a house, living species are the bricks in its walls. Each one has its role to play even if, in isolation, it appears to be of little importance. In its own quiet way, this construction is what guarantees our quality of life. Every species that dies out is a hole in the wall. With successive extinctions, the ecosystem becomes more fragile, the house deteriorates and the balance is threatened. The entire structure will ultimately collapse and we will find ourselves without protection or resources.

8. In the history of the Earth, the emergence and extinction of species has hinged until now on natural causes. Occasionally, there have been particular events leading to mass extinctions, as with the dinosaurs 65 million years ago. That was the fifth great extinction and the last one to date. The pace of the trends observed at present is far swifter. Will we be the cause of the sixth mass extinction on our planet?

2. Interplay between biodiversity, climate change and human activities

9. Climate has changed throughout the Earth's history, and biological evolution – the emergence of new species and extinction of others – has also been continuous for over four billion years. These processes started long before humans emerged as the result of this very evolution and they are still at work today.

10. During the latter part of the 20th century, substantial quantities of carbon were released as a result of industrial activity and the deforestation that had been going on for several centuries in both the mid and the high latitudes and, in particular, in tropical regions. Most of the warming observed in the last fifty years is probably the result of increased concentrations of greenhouse gases (GHGs).

11. Nowadays, however, the impact of human activities on climate change and biodiversity is such that they are threatening the balance of natural environments and, by extension, the survival of mankind, since we are dependent on biodiversity and on the climatic conditions in which we have evolved.

12. To appreciate the unprecedented speed of current climate change, one has to bear in mind that at the end of the last ice age, under entirely natural conditions, world temperatures rose by a few degrees over several thousands of years. Over the last millennium only a few tenths of a degree separated the warmest periods (during the Medieval Warm Period) and the coldest (during the Little Ice Age). It is not so much the absolute temperature figures as the unprecedented rate of increase that will determine how ecosystems respond.

13. The impact of human activity on climate and biodiversity are manifold and the following aspects should probably be distinguished.

14. Some human activities have a direct two-fold impact on climate and biodiversity. For example, cutting down old forests causes both climate change due to the release of carbon dioxide from burning or decaying of woody biomass and species extinction due to habitat loss. As another example, the drainage of wetlands leads to carbon dioxide from peat burning or decay and the loss of rare habitats that are home to an abundance of specialist species. Opening up oil and gas fields in untouched wild areas would also impact both climate and biodiversity.

15. The intensification of livestock breeding and agriculture is a related and fairly complex issue. The increased use of mineral fertilisers is resulting in nitrogen oxide emissions and the production of manure from big livestock farms is leading to an increase in methane emissions. These two gases contribute to the greenhouse effect. Biodiversity loss is occurring at the same time because of the conversion of species-rich semi-natural grassland into arable land, the loss of field margins and hedgerows and the replacement of traditional breeds with modern uniform genetic stock (in some cases genetically modified).

16. One example of the potentially disastrous consequences of a loss of genetic biodiversity in crops is the current spread of the western corn rootworm. The larvae of this beetle eat maize roots, devastating crops, which can no longer stand upright. Previously, a plant attacked in this way secreted a substance through its leaves and roots which attracted the pest's natural predators (a small parasitic wasp). But at present, the most widely grown variety of maize in the United States and Europe has lost the gene needed to produce this alarm signal and, with it, the ability to defend itself. After very heavy crop losses, research efforts are now under way to find and reinsert this missing gene into the varieties of maize grown.

17. At the same time, climate change (induced by humans) is also impacting on biodiversity. An example that has recently had a lot of publicity is the thinning and shrinking of polar ice that is threatening the survival of polar bears. Less discussed but also well known are the dangers to all the other components of Arctic biodiversity. Climate change is also having important effects on mountain biodiversity.

18. As a result of climate change, species will feel the need to adapt, particularly by migrating towards more favourable areas. However, habitat fragmentation limits these population movements and reduces species' abilities to adapt. Moreover, biodiversity loss makes ecosystems less resilient to climate change, as they are less resistant to disease or invasive plants.

19. Because the problems are interrelated, the solutions should also be considered in a co-ordinated manner.

20. For example, measures leading to less intensive and more sustainable agriculture would contribute to both climate change mitigation and biodiversity conservation. Conservation of old woodlands would also have an impact on both.

3. Influence of humankind on biodiversity and climate change

21. Human activities strongly influence ecosystems and biodiversity and disrupt climate. The areas of activity where the consequences are most marked are land use, urban and road infrastructure, raw materials procurement, agriculture, forestry and water management. Each of these topics is discussed in detail below.

22. Misuse of land can result in problems with surface water retention. There are higher risks of erosion and landslips during disaster events.

23. The extension of towns and villages and building construction are eating up fields, woodland, wetlands or wasteland (destroying burrows, habitats and nests) and endangering biodiversity as a result. Urban architecture leaves little room for wildlife; concrete and glass prevent plants from growing and establishing ecosystems.

24. Urbanisation gives rise to other problems such as the air pollution caused both by increasing numbers of cars and by non-renewable energy use, waste production and disposal, the building of roads and car parks rendering the ground impermeable and destroying all plant life, the destruction of green corridors that enabled species to move around freely (loss of green belt land, etc.) and the destruction of orchards, fertile farming land, wetlands and streams (which are key habitats for dozens of plant and animal species).

25. Furthermore, the new fashion of decorating gardens with “exotic” plants does nothing to foster local biodiversity, rather the opposite in fact, because most are invasive species and compete with local flora, threatening the stability of the ecosystem.

26. Transport infrastructures comprise a great variety of different modes, contexts and flows, including public transport, rail networks, “soft” transport options and river transport. They have a strong environmental impact during both construction (through occupation of space, building sites) and use (pollution, noise).

27. They also have major social and economic effects such as making areas less isolated and stimulating exchanges. Choices concerning forms of transport (public or private, rail, river or road), or energy sources (electricity, petroleum-based products, hydrogen or agrofuels) also have a significant environmental impact.

28. Mining and oil extraction can also have significant environmental effects. To minimise these, it is advisable to anticipate problems when choosing equipment (focusing on questions such as fuelling systems, flow management and waste management).

29. Poorly managed farming and forestry activities can also cause serious environmental problems. Nearly 39% of the world’s surface is given over to crops and grazing and another 30% is occupied by forests (according to Food and Agriculture Organization of the United Nations (FAO) statistics).

30. Agriculture produces substantial GHG emissions. Farming activities and changes in land use account for about one third of total carbon dioxide emissions and are the largest source of methane (produced by livestock rearing and flooded rice fields) and nitrous oxide (deriving mainly from the use of mineral nitrogen fertiliser).

31. Agriculture accounts for some 70% of the world’s water consumption and up to 95% in many developing countries, and this affects the availability of water for other human uses.

32. Water quality could be improved by changes in farming practices, such as more effectively managing needs, reducing salinisation, combating soil erosion or avoiding harmful subsurface run-off due to pesticides and livestock waste. All these measures, associated with waste-water recycling, could lead to an increase in the water available through replenishment of ground water and improve the quality of water resources.

4. Problem of CO2 in relation to the carbon cycle

33. The bulk of global warming observed over the last fifty years is probably due to increased concentrations of greenhouse gases, the main ones being water vapour, carbon dioxide, methane, nitrous oxide and ozone.

34. Carbon dioxide is a natural greenhouse gas and, in itself, not toxic. Increased concentrations of it in the atmosphere linked to human activities is nevertheless one of the causes of global warming. In the latter part of the 20th century considerable quantities of carbon were released as a result of industrial activity and deforestation, in tropical regions in particular.

35. Control of CO_2 concentrations is coupled to the natural carbon cycle. However, the short-circuiting of that cycle caused by the burning of fossil fuels bears much of the blame for today's problems.

36. The dynamics of terrestrial ecosystems vary, depending on the interaction of a number of biogeochemical cycles which humans can disrupt, particularly the carbon cycle, the nutrient cycles and the water cycle.

37. Because they store carbon in the living biomass, decomposing organic material and the soil, terrestrial ecosystems play an important role in the global carbon cycle. Atmospheric CO_2 is fixed by photosynthesis in plant biomass, while respiration, decomposition and combustion transform organic carbon into CO_2. These processes sustain the natural circulation of carbon between ecosystems and the atmosphere. Human activity, particularly in the areas of land use, reassignment of land, forestry and industrial use, alters carbon stocks and exchanges between pools.

38. Net carbon absorption by terrestrial ecosystems is caused by several factors, such as agricultural practices, the natural regeneration in the mid and high latitudes, the indirect effects of human activities (such as fertilisation by atmospheric CO_2 and depositing of nutrients) and natural and anthropogenic climate change. It is currently impossible to establish the relative significance of each of these processes, which vary from one region to another.

39. One strategy for reducing atmospheric CO_2 concentrations is to promote sequestration of atmospheric carbon by plants and in soil. Increased root biomass and organic material enhances the retention of water and nutrients in soil and hence the productivity of land. Changes in agricultural management practices can accelerate or slow down rates of carbon fixation over a relatively short period.

40. Similarly, increasing the volume of above-ground biomass (trees and bushes) enhances atmospheric carbon fixation. Sequestration rates vary according to species, soil type, local climate, topography and management methods. Forest plantations and forestry-pasture systems are examples of the type of reassignment of land which fosters atmospheric carbon fixation.

41. It must also be borne in mind that carbon can be captured in biomass then stored in wood products for decades. Neither should it be forgotten that energy production from biomass, that is to say from wood by-products and tree or other crops planted especially for this purpose, may result in a major reduction in net GHG emissions by replacing fossil fuels.

42. Even so, the use of wood biomass as a substitute for fossil fuels raises complex issues. As long as the amount of energy gained is greater than that used for cutting and extraction, this would help to reduce climate change. However, far more sophisticated safeguards are needed to avoid the negative effects of increased wood extraction on biodiversity. Even more complex is the issue of biofuels derived from agriculture ("agrofuels"). In this field, initial enthusiasm has given way to a strong scepticism. Clearly, a balanced view is needed. It is indeed true that much of the intensive agrofuel production has been at the expense of biodiversity and in some cases it has also been a poor choice from the climate point of view. However, it is possible to produce agrofuels in a sustainable way that is both good for climate change mitigation and compatible with biodiversity aims.

43. Global warming tends to inhibit the sequestration of atmospheric carbon dioxide by terrestrial and marine ecosystems, thus increasing the volume of man-made emissions remaining in the atmosphere. The outcome is like a never-ending spiral.

44. Swift action is required. We must stop fuelling global warming, which has now become inevitable. We should, for example, be making massive reductions in our GHG emissions and taking immediate protection measures.

45. Warming inhibits atmospheric CO_2 fixation on land and at sea, thereby increasing the share of anthropogenic emissions that remains in the atmosphere. This positive feedback from the carbon cycle accelerates the increase in volumes of atmospheric CO_2 and results in greater climate change for any given emissions scenario.

46. The major driving forces behind future GHG emission trends will continue to be population growth, economic and social development and the pace and direction of technological progress.

47. GHG emissions must decline for concentrations of these gases in the atmosphere to level out.

48. The mitigating measures taken over the next two to three decades will determine to a great extent whether it is possible to stabilise concentrations. However, we will only be able to control carbon dioxide emissions if we use less fossil fuel.

5. Energy resources

49. The need to reduce GHG emissions has forced us into a headlong rush to find new energy sources to replace fossil fuels, and we are now using alternative energy sources without really assessing what their medium and long-term effects might be.

50. The growing demand for renewable energies increases competition for natural resources.

51. There is currently quite a controversy about the use of agricultural biofuels. Ultimately, however, these are no more than diversions, which may initially have derived from good intentions but actually distract from the real problem. They do not really reduce our consumption; they simply give it a "green" label, whereas in fact the use of such fuels is not at all environmentally-friendly.

52. Forestation and planting for bioenergy purposes may be a means of restoring poor soil, curbing run-off, capturing carbon in the soil and boosting rural economies, but they can also compete with food production, increase drought and threaten biodiversity if poorly implemented.

53. Not only is the reduction in GHGs only a relative one but the fact that the biomass products involved, such as maize or sugar cane, are not to be eaten means that fertilisers and pesticides are used without any second thought, and monoculture is the norm.

54. Exceptions to this are, of course, waste-based bioenergy, which seems the best way of disposing of waste. Otherwise, second-generation biofuels are also showing promise.

55. However, there are other totally clean energies – such as solar power – which can help to reduce GHG emissions without having any other harmful effects on the environment. It would be enough simply to install solar panels on roofs to be able to heat water even in cloudy weather.

56. Real efforts have to be made to raise awareness among manufacturers and the public about the need to reduce energy consumption and use cleaner energies in order to cut GHG emissions.

57. This would enable us to meet the targets of the Kyoto Protocol to the United Nations Framework Convention on Climate Change without needing to sacrifice quality of life, change our lifestyles or adopt new technologies. Unfortunately, people show little inclination to buy more economical devices or install solar panels on the roofs of their houses. Even in developing countries, people find it hard to save energy.

58. Energy efficiency and the use of renewable energies also lend themselves to interaction with sustainable development. In less advanced countries, energy substitution can curb mortality and morbidity by reducing air pollution, the uncontrolled use of firewood and hence deforestation.

6. Survival of ecosystems and adaptation of species

59. To appreciate the unprecedented speed of current climate change, one has to bear in mind that at the end of the last ice age, under entirely natural conditions, world temperatures rose by a few degrees over several thousands of years. Over the last millennium only a few tenths of a degree separated the warmest periods (during the Medieval Warm Period) and the coldest (during the Little Ice Age). It is not so much the absolute temperature figures as the unprecedented rate of increase that will determine how ecosystems respond.

60. Account also needs to be taken of the growing frequency of natural disasters, including storms, high rainfall, flooding, extreme rises in sea levels, prolonged drought and fire, which may have a major impact on the health of ecosystems and jeopardise food production, giving rise to famine, which in turn could trigger conflicts.

61. Ecosystems are crucial to the survival of the human race. They supply food and drinking water, preserve our constantly changing natural heritage, protect the soil, fix nitrogen and carbon, recycle nutrients, control floods and filter pollutants.

62. Climate changes have an influence on ecosystems, which varies from region to region depending on other factors such as land use, fragmentation of habitats, substance input and invasive species. We must prepare ourselves for significant changes in the species make-up of ecosystems and the disappearance of a considerable number of species if the climate continues to change. Should we also fear a mass depletion of biodiversity, or will climate change offer species threatened by human activity a chance to increase their numbers?

63. The rate of spread of species also plays an essential role when it comes to the effect of rapid climate change. Studies show that some species will not be able to reach sites with potential for colonisation in time and they will therefore die out.

64. Diversity loss can be local or global depending on whether it affects a key species. Local losses can have fatal consequences for an ecosystem, while global losses will have irreversible consequences. One well-known example is the decline in the number of bees and the increasing rarity of various species of wild bee. These insect pollinators are indispensable for the reproduction of plants, including the ones we grow. If bees disappear, the production of food resources runs the risk of being severely compromised.

65. Drawing on extensive data covering a wide range of species, experts have concluded that the recent warming is strongly affecting terrestrial ecosystems with the result that events in spring such as bud break, bird migration and egg laying are occurring increasingly earlier and certain animal and plant species' geographical ranges are shifting towards higher altitudes or the poles.

66. It is thought that communities which will move towards the poles or to higher altitudes will only partly resemble today's communities. It could be that new ecosystems will emerge, and this would result in radical changes in species make-up and have as yet unfathomable consequences.

67. The changes observed in marine and freshwater biological systems are linked both to the rise in water temperatures and to related changes in ice cover, salinity, oxygen levels, circulation rates, pollution and overfishing. These changes are reflected in the following ways: shifting geographical ranges and variations in the concentration of algae, plankton and fish in the high-latitude oceans; an increase in concentrations of algae and zooplankton in lakes in the high latitudes and in mountain areas; changes in fish species' geographical ranges and early migration of fish via water courses.

68. The effects of climate change on coral reefs are becoming more and more obvious. It is difficult, however, to distinguish the adverse effects of climate change from those deriving from other sources (such as overfishing and pollution).

69. Rising sea levels and human expansion are contributing to the shrinkage of coastal wetlands and mangroves and thereby exacerbating the damage caused in many regions by coastal flooding.

70. Unfortunately, studies have shown that the tropics, where many vital areas are located, will be severely affected. A large number of ecosystems there are over-exploited or being converted to farmland or plantations. The tropical forests may also be damaged by insufficient rainfall. The situation is worrying when looked at from the evolutionary viewpoint as the tropics are both the cradle and the most visible illustration of biodiversity.

7. The effect on human beings of biodiversity loss and climate change

71. We note the appearance of other effects of local climate change on natural habitats and the human environment, although many of them are somewhat masked by changes in non-climatic factors such as the excess mortality rates caused by the European heat wave, developments affecting the vectors of infectious disease in some European regions and the earlier appearance of and upsurge in the seasonal production of allergenic pollen in the northern hemisphere’s mid and high latitudes.

72. The dramatic weather events of summer 2003 and last winter were more serious and took place on an unprecedented scale. If there is an increase in natural disasters such as excess precipitation, floods, heat waves and drought, there will be serious consequences for all living organisms and the quality of human life will be undermined.

73. It is also to be feared that climate change will adversely affect social and economic progress in developing countries.

74. According to the experts, it is difficult to dissociate ecological challenges from social ones. To guarantee humankind a decent future, society and the economy have to be redesigned along sustainable lines as quickly as possible.

75. Among the most vulnerable industries, human settlements and societies are those located on coastal or fluvial floodplains, those whose economies are closely tied up with resources that are strongly influenced by the climate and those in areas affected by extreme weather conditions, particularly in cases of rapid urbanisation.

76. Disadvantaged groups can be particularly vulnerable, especially when they are concentrated in danger zones.

77. Climate change will affect the state of health of millions of people for reasons including greater malnutrition, an increase in deaths, diseases and accidents due to extreme weather events, heightened consequences of diarrhoeal illnesses, more cardiorespiratory ailments as a result of high concentrations of tropospheric ozone in urban areas due to climate change and changes in the geographical ranges of certain infectious diseases and allergies.

78. Climate change will have some positive effects in temperate zones, in particular a decrease in deaths linked to exposure to the cold, and some mixed consequences, including changes in the dissemination and potential for transmission of malaria in Africa. On the whole, however, it is expected that the positive health effects of warming will be offset by negative ones, particularly in developing countries.

79. Factors with a direct influence on people’s health such as education, medical care, public prevention measures, development of facilities and economic growth will be decisive.

80. Climate change also stimulates the destructive spiral that links social and ecological systems. Here again, it is economically weak countries and poor population groups which will be most affected. Climate change will continue to increase the pressure of exploitation piled on ecosystems. These countries will suffer even more than others from the impact of the process of environmental and social deterioration. It will affect landless farmers, who depend on the exploitation of natural resources, small African farmers, inhabitants of shanty towns built in dried-up river beds, fishing communities, nomads and hunters living in the peripheral areas of sand and ice deserts. None of these people will be able to do much to resist the new key players and new constraints. Insidious changes will undermine their lifestyles and make them extremely vulnerable to natural disasters.

81. There is a need therefore to set up institutions capable of supervising the management of natural resources and determining levels for local, regional, national and world action, including individual survival strategies, budget strategies, family and community strategies and higher-level strategies (of a social, political, economic or institutional nature).

8. Conclusions

82. Sustainable development is a tool for slowing biodiversity loss, lessening the vulnerability of ecosystems and driving down GHG emissions, in order to minimise our impact on climate change.

83. The rate and scale of future anthropogenic climate change and their impact on biodiversity and human life will be determined by national governments' choices when defining social and economic development models.

84. Specific measures need to be taken to safeguard biodiversity and the climate in parallel, as these two causes offer considerable potential for synergies. Measures to preserve and promote biological diversity may also help to protect the climate, for example.

85. So-called "climate corridors" may help threatened species to leave protected areas where living conditions are unsatisfactory and migrate to more hospitable areas. Ecosystems will have to adjust, but it should be considered to what extent adjustment without biodiversity loss will be possible in view of the current intensity of land use and the static nature of protected areas.

86. Co-ordinated action at all levels is required for the conservation and creation of ecosystems, so that these systems can continue to provide their ecological services in future. Only by managing and preserving resources and keeping ecosystems intact can we expect to combat poverty successfully.

87. Species-rich ecosystems can be an insurance against extreme natural events. Climate change can provide an opportunity to alert the public to biodiversity-related problems, thanks to the considerable interest that these issues arouse.

88. Measures to restrict deforestation and natural habitat loss can help to safeguard biodiversity and preserve soil and water resources while being implemented in a socially and economically viable manner.

89. Changes in lifestyle and behaviour can help to mitigate the effects of climate change in all spheres, and management methods, changes in consumption habits, education and training methods, the behaviour of building residents, the management of transport demand and management tools in the industrial sector are some of the factors that can have a positive influence in this area.

90. To sum up, by adopting a sustainable social and economic development policy which limits GHG emissions it is possible to reduce vulnerability to climate change and guarantee the future of the human race.

91. The effects of climate change can be curbed, and policies encouraging energy efficiency and promoting renewable energy forms often have economic benefits, increase energy security and result in local reductions of pollutant emissions.

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Draft recommendation adopted unanimously by the committee on 23 November 2009

Members of the Committee: Mr Alan **Meale** (Chairman), Mrs Maria Manuela de Melo (First Vice-Chairperson), Mr Juha **Korkeaoja** (Second Vice-Chairman), Mr Cezar Florin Preda (Third Vice-Chairman), Mr Remigijus **Ačas**, Mr Ruhi **Açikgöz**, Mr Artsruni Aghajanyan, Mr Miloš Aligrudić, Mr Alejandro Alonso Núñez (alternate: Mr Gabino **Puche Rodríguez-Acosta**), Mr Gerolf Annemans, Mr Miguel Arias Cañete (alternate: Mr Gonzalo **Robles Orozco**), Mr Alexander Babakov, Mr Tor Bremer, Mr Vladimiro Crisafulli, Mr Taulant Dedja, Mr Hubert **Deittert**, Mr Karl Donabauer, Mr Miljenko Dorić, Mr Gianpaolo Dozzo, Mr Tomasz Dudziński (alternate: Mr Stanisław **Huskowski**), Mr József Ékes, Mr Savo Erić, Mr Bill **Etherington**, Mr Nigel **Evans**, Mr Joseph Falzon, Mr Relu Fenechiu, Mr Peter Götz, Mr Rafael Huseynov, Mr Jean **Huss**, Mr Fazail Ibrahimli, Mr Stanislav **Ivanov**, Mr Igor Ivanovski, Mr Birkir Jon Jonsson, Mr Stanisław Kalemba (alternate: Mr Michał **Wojtczak**), Mr Guiorgui Kandelaki, Mr Haluk **Koç**, Mr Bojan Kostres, Mr Pavol Kubovic, Mr Paul Lempens, Mr François Loncle (alternate: Mr Jean-Claude **Frécon**), Mr Aleksei Lotman, Mrs Kerstin Lundgren, Mr Theo Maissen (alternate: Mrs Francine **John-Calame**), Mrs Christine **Marin**, Mr Yevhen **Marmazov**, Mr Bernard Marquet, Mr José **Mendes Bota**, Mr Peter Mitterrer, Mr Pier Marino Mularoni, Mr Adrian Năstase, Mr Aleksandar **Nenkov**, Mr Pasquale **Nessa**, Mr Tomislav Nikolić, Mrs Carina Ohlsson, Mr Joe **O'Reilly**, Mr Evangelos Papachristos, Mr Dimitrios Papadimoulis, Mr Germinal Peiro, Mr Ivan **Popescu**, Ms Teresa **Rodriguez Barahona**, Ms Jadwiga Rotnicka (alternate: Mr Dariusz **Lipiński**), Mr René **Rouquet**, Mrs Anta Rugāte, Mr Giacento Russo, Mr Dzavid Šabovic, Mr Fidias Sarikas, Mr Leander Schädler, Mr Herman Scheer, Mr Mykola Shershun, Mr Hans Kristian Skibby (alternate: Mr Per **Dalgaard**), Mr Ladislav Skopal, Mr Rainder **Steenblock**, Mr Valerij **Sudarenkov**, Mr Laszlo Szakacs, Mr Vyacheslav Timchenko, Mr Dragan Todorovic, Mr Nikolay Tulaev, Mr Tomas **Ulehla**, Mr Mustafa **Ünal**, Mr Dirk Van der Maelen, Mr Peter Verlič, Mr Rudolf Vis (alternate: Mr John **Prescott**), Mr Harm Evert Waalkens, Mr Hansjörg Walter

NB: the names of those members present at the meeting are printed in **bold**

Secretariat to the committee: Mrs Agnès Nollinger, Mr Bogdan Torcătoriu and Mrs Dana Karanjac