Some Aspects of Bio-Environmental Problems and Further Development of Science and Scientific Policy in European Countries.

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Abstract

There is a lot of concern about climate change, nature and quality of life of people. Human activities directly affect more than 70% of the global ice-free land surface. Land also plays an important role on climate. Sustainable land and forest management can prevent and reduce land degradation, maintain soil fertility and productivity and reverse the adverse impact of climate change and land degradation. The present state of our environment, problems and future for EC science and science policy are presented in this paper. The actual status with regard to agriculture, industry, food, environmental microbiology, production and consumption of greenhouse gasses and how microorganisms will be affected by climate change and how microorganisms affect climate changes and other human activities are shown. Quality of life and suitability of environmental policies are discussed. Analyzes, contribution and problems of environmental policy are demonstrated. Future purposes, priority areas and directions of the environmental EU policy are also presented. In addition, polices for implementation of bio-environmental strategy as complex purpose are discussed. Supporting of scientific personals involved in this policy, enough financing of environmental sciences and identifying priority areas were shown. Financial regulation for environmental policy and priority areas are being underlined. The following aspects are also handled: protection of intellectual property, science infrastructure, government and private science units, updated supply of science policy information, as well as cooperation and coordination between EC members. Building scientific centers to study the relationship among environmental science and policy and business are presented. Actions for implementation of the environmental strategy are recommended. More and more stronger standards for protection and maintenance of environmental quality are recommended. The EU countries have to initiate the introduction of new laws for protection of humanity and environment. The discussion of the above-mentioned problems strongly supports the paper: "scientist' warning to humanity: microorganisms and climate change". Some scientists predict environmental collapses at different periods. Bio, organic low impute and sustainable agricultural practices reduce the negative tendencies for natural processes, soil fertility, rate of contamination of soils, waters and air and climate changes. Poverty, soil contamination, ways of soil exploitation, low rate of waste management, rate of concern of nature by political leaders and governments have influenced the rate of climate changes. Better and stricter standards are needed for protection and maintenance of our environment. The EU countries can take an initiative for new laws to protect humanity and maintain our environment at the present level.

Key words: climate change, microorganisms, environment, scientific policy, soil, worming effect

Introduction

Environmental research and policy on the environment and natural resources that are fast depleting is due to overexploitation and to the anthropogenic activities. This will help people to find various ways and methods to maintain ecological balance, which our existence depends. Environmental research and policy plays a very important role in the conservation of the environment. In the past this problems were not enough clear and were underestimated. This was shown in our investigations (Kostov, O. (1973); Kostov, O. (1975); Kostov, O. (1976); Badjov, K. & Kostov, O. (1977); Kostov, O. (1977); Kostov, O. (1980). It was consider that nitrogen gasses were formed from agricultural fertilizers and have agronomical value but it was not predicted that investigated gasses such as NH_3, NO_2, N_2O and CO_2 will have such worming effect on the planet. In our experiments for reduction of N_2O to N_2 from 4 selected denitrifying strains only one, *Micrococus denistrificance,* was able to reduced fully N_2O to N_2 for 7 days. It was promising result in laboratory conditions but difficult for execution in field conditions. Soil scientists were discussing mainly for agricultural value of N lost but not for environmental value. The figures shown in Figure 1, 2, 3 clearly indicated that humanity have to decide to take worming effect of the planet as first aim. Worming capacity of the oceans went up by 0.5-0.7^{o}C but land temperature already have increased by 2^{o}C (Figure 3). Agriculture, Forestry, and other land use activities accounted for around 13% CO_2, 44% of methane (CH_4) , and 82% of nitrous oxide (N_2O). (IPCC, Approved draft, 2019). Bringing more attention towards various environmental issue such as pollution, flooding's, droughts, higher temperatures, fast depletion of natural resources, low efficiency of environmental technologies, climate changes and worming effect will support scientists to find ways and methods to solve already existing environmental issues (Ricardo Caviceholi, Viliam J. Ripple Kenneth N., Nicole S. Webster etc. (2019); Yunusa Hassan and Lazarus Abore Embaye (2018); Figures 1, 2 and 3).

SOME OF THE MAIN OJECTIVES OF EC SCIENCE POLYCY

I. Creating strong support medium for better Environmental policy

The last 50 years world economy was increased about by14 times causing massive increase in demand for energy and natural resources. The main purpose promises that for the next new 5 years period it will be approved so called "Green Agreement to 2050", which will change the following main activities of the European Government: 1. To convert basically priorities of EC for protection of Environment and reduction of climate changes and negative effect of them. 2. It will be done "green agreement" among EC members with only purpose to 2050 Europe to be environmentally neutral continent. It was concluded that purpose to reduce emission of CO_2 by 40% to 2030 is not high enough. The aim have to be much higher and emissions to be reduced by 50-55%. To support this purpose EC have to develop new lows called Climate lows. This activity needs new very high scale infestations but public financial support will not be enough. New Sustainable European Investing Plan has to be created and parts of the European Investing Bank have to be changed to Climate Bank. This will open about 1 trillion EUR ingestion's in the next 10 years. In addition, Europe have to strengthen

their small and middle enterprises. All these things will release ability of many companies from all countries to have access for collecting financial supports. Together with these actions, the Agreement for sustainable development of EC will be improved. Consumers can also do their bit as well: by flying less and eating less meat. Governmental decisions and industry have to be watch more carefully to keep correct way for environmental protection directions. Large multinational bank associations have to be strongly involved in the environmental protection policy. In addition, a fundamental change of our market economy is required. About 130 countries that participate in Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) already have endorsed IPBES report.

II. Importance of Environment for life: Soil, Water and Air

The basic components of the Nature which support life in the planet are: soil, water and air. Unfortunately almost half of our ecosystems have been severely damaged by agriculture, fishing, mining, climatic changes such as droughts, flooding's and many forest fires, disasters, entertainment activities and pollution. Soil, water and air are important medium for growth of plants and animals supply, foods for people and health of the people; and (2) They are also responsible for turnover rate of the main life important elements in the Nature (N mineralization, N_2 fixation, turnover rate of N, phosphorus transformations, micronutrients, water maintenance and supply for plants, maintenance humidity in air and supply drinking water for human beings, provide charcoals for production of electricity, responsible for purification processes in soil and reduction of N_2O produced from mineral fertilizers to N_2, maintenance of microbial diversity, insects, small and big animals and finally maintain all biodiversity. Soil, water and air support also development of plants, giving food for human beings, consumed accumulated CO_2 in the atmosphere and maintain acceptable temperature for life of the people. Air supply oxygen to all living organisms and water is the main component of all bodies of living organisms in the planet.

Unfortunately, in industrial areas of cities the air is very often contaminated with dust, heavy metals and makes direct infections to people. Soils are contaminated with heavy metals and chemicals. Usually this happen nearby metallurgic plants. It is strongly recommended air to be clean by artificial or raining clear water; soils have to be bio remediated from heavy metals and chemicals. In case these areas have composting plants they needed inhalation and purification though bio filters. Asthmas, heavy breathings, lung infections allergic reactions are very often cases in this areas. Usually this happen nearby metallurgic combines and smoke is falling nearby areas. It is strongly recommended air to be cleaned by artificial reining's with clear water, soils have to be bio remediated from heavy metals and pesticides, and if they have composting plants they needed inhalation though bio filters for the whole air coming from composting plants. Also significant contamination can be observed around mining activities for gold, copper, zinc and other precious elements. Air, soil and water are contaminated and need bioremediation of soils, air and waters.

There are publications which showed that if we live like Nature we need 2.7 planets (www.footprintcalculator). Mankind already used resources of the planet for this year 2 months earlier as compare with 20 years ago (Ricardo Caviceholi, Viliam J. Ripple Kenneth N., Nicole S. Webster (2019). This showed that there iare slow regeneration ability of the ecosystems. On July 29, humanity will have used nature's resource budget for the entire year according to Global Footprint Network (an international sustainability

organization that has pioneered the Ecological Footprint). Earth overshoot day falling on July 29th means that humanity is current using nature 1.75 times faster than our planet ecosystems can regenerate (www.footprintcalculator). The costs of this global ecological overspending are becoming increasingly evident in the form of deforestation, soil erosion, biodiversity loss, or the buildup the CO_2 in the atmosphere. Significant opportunities of this problem can be found in 5 key areas: cities, energy, food, population, and planet. For instance, cutting CO_2 emission from fossil fuel burning by 50% would move the Date by 93 days. Therefore, as many people as possible are involved in CO_2 reduction, the higher regeneration rate will be increased globally. For now 2.5 million users per year of American are now available in eight languages and with Chinese and Portuguese most recently added (https://www.foodprintnetwork.org (2019); Global Footprint Network; "Advancing the Science of Sustainability"; https://www.footprintcalculator.org/, Oakland, CA, USA, July 23, 2019).

It is estimated that from 10% to 20% of the 450 billion tons of carbon emitted (Fig. 1) since the Industrial revolution may be attributed to soil carbon losses. Carbon that is released from the soil as CO_2 can traps heat and contribute to worming temperatures. Resent pooling in the USA shows 72% of American consider climate change an important issue, and 48% say that the science on climate change is more convincing than five years ago - mostly because they have seen evidence of more extreme weather. (Climate change, 2019).The results of this tendency is the restlessness, soil erosion, reduction of biological diversity and CO_2 in atmosphere. Some countries "burned" their limit faster like Kathar and Luxemburg (for 50 days from the beginning of the year) other like USA, Canada and Australia have option to 31 March. Cuba, Iraq and Ecuador are only countries, which can meet their limit to the end of the each year. It is important to note that together with exhausting of natural resources, the increase of poverty in population was observed. Scientists, practitioners, and stakeholders will be invited to document this topic and to present solution for pro-poor and gender sensitive strategies with objectives to improve human and environmental well-being at the same time.
From the Figure 1 it can be seen that the most CO_2, as worming equivalent, is at the part of CO_2 from fossil fuels - 62%; from methane (CH_4)- 16%; from nitrous oxide, (N_2O) - 6%; CO_2 chemicals - 3%; F-gas - 2% and from Eyaz. All gasses are important and can be reduced as much as possible by conditions and circumstances. Fossil fuels as biggest proportion can be tried to be replaced by substituting energy from them by using nature sources such as water, electricity from water, wind, atomic centrals for electricity, biogas plants which consume CO_2 to produce methane which is burn for electricity etc.

III. Environmental activities

1. Agriculture

Types of agricultures can be bio, organic, mixed bio-organic, using only mineral fertilizers, low impute, sustainable, high impute, exporting and etc. According to World Bank (World Bank data on agriculture) nearly 40% of the terrestrial environment is devoted to agriculture. This proportion is predicted to increase, leading to substantial changes in CO_2 and N_2O production and soil cycling of carbon, nitrogen and phosphorous among other nutrients. Furthermore these changes are associated with market loss of biodiversity including soil microorganisms. Methanogens produce methane in natural and artificial anaerobic

environments (sediments, water saturated soils such as paddy soils), waste waters, biogas facilities etc. and denitrifying bacteria produce N_2O in all soils, waste alters and sediments produced CO_2. For reduction of this negative influence the following measures can be taken: improving structure of agriculture, cities, forests reserved, areas regrading significant reduction of global warming, climate changes and balance of used ecosystems. Extended research and analyses on better soils distribution for usage can be: a). high fertility soils with sustainable yields; b). medium fertility soils with sustainable yields; c). low fertility soils. Important are means and ways to use; extended of regeneration agriculture; improve their fertility by: pH corrections, microbial diversity, crops suitability and crops rotations, reduction of NO_3-N doses to decrease N_2O formation at the same level of yield.(Kostov, 1973, 1975, 1976, 1977, 1980). Significantly to be increased areas of N_2-fixing crops with wide usage of microbial fertilizers for higher symbiotically N_2-fixation (Kostov and Lynch, 1997). In this way legume grasses can play an important role for supporting animal breeding thus supplying animals with cheaper food to fight poverty. In addition, to increase oil producing crops (vineyards, rape (seeds), olive oil plants etc.) to increase value added thus to contribute to the circular economy. It has to be improved the study of effect of present practices of agriculture on environmental contamination regarding soil, air, water and waste management. It has to be improved research policy to reduce plant diseases and encourage all types of biological agriculture (legumes areas, legume forage crops, organic agriculture, manure and compost formation and application, biochar production and making new combined bio organic fertilizers such as "compost + biochar + *Trihoderma harzianum (bio control agent)* ". Rice feeds half of the global population and rice paddies contribute 20% of agricultural CH_4 emissions despite covering only 10% of arable land. Anthropogenic climate change is predicted to double CH_4 emissions from rice production by the end of the century. It has to be done new calculations which have to include consumption of CO_2 in all biogas plants during process of methane formation in the world by using formula: 1 molecule of CO_2 produce 1 molecule CH_4 at -120 mV oxy- reduction potential. It must have immediate reactions for all new Environmental technologies suggested in the world. (European Commission, Brussels,(2016), COM (2016) 157 final).

2. Nature risks, microorganisms and climate change

Human activity and their effect on the climate change and environment cause unprecedented animal and plant extinction, cause loss of biodiversity and endanger animal and plant life on Earth (Ricardo Cavicchioli etc., 2019). In the Anthropocene, in which we now live, climate change is influencing most life in the Earth. Microorganisms support the existence of all higher trophic forms. Climate changes also affects microorganisms (Kostov, O., J. Lynch & L. Elliott, (2002). Climate influence the structure and diversity of microbial communities directly (seasonally and by temperature and moisture content) or indirectly by plants composition, plant litter and root exudates. Soil microbial biodiversity influences plant diversity and its importance of ecosystem function, including carbon cycling. Elevated CO_2 concentrations enhance competition for nitrogen between plants and microorganisms. Thus, climate changes resulted in overall alterations to global nitrogen and carbon cycle that reduce terrestrial carbon sequestration. Although microorganisms are crucial in regulating climate change, they are really the focus of climatic change studies and they are not enough considered in policy development. Their immense diversity and varied responses to

environmental changes make determining their role in the ecosystem challenging. It is time to illustrate the links between microorganisms, macroscopic organisms and climate change, and put humanity on notice that the microscopic majority can no longer be the unseen elephant in the space: emit affect climate change and climate change affect microorganisms: ocean warming and acidification, acidification of soil, eutrophication, overuse (fishing, tourism, shifts microalgae, disappearance of coral). Autotrophic respiration by plants (60 Pg. C per year) and heterotrophic respiration by microorganisms (60 Pg. C per year) release CO_2 back into atmosphere. Worming is expected to accelerate carbon release into the atmosphere. Forest cover 30% of the land surface, contain 45% of terrestrial carbon, make up 50% of terrestrial primary production and sequester up to 25% of anthropogenic CO_2. Graceland cover 29% of terrestrial surface. Non-forest, arid and semiarid regions (47%) are important for the carbon budget and respond differently to anthropogenic climate change then forest regions. Lake Make up 4% from the non-glaciated land area and shallow lakes emit substantial amount of CH_4. Peat covers 3% of the land surface and as global carbon sink contain 30% of soil carbon. The fire in Russia showed another role of peat. It can be burned and maintain fire in North Russia areas now. Climate worming changed 1.5-2^{O}C organic matter into biomass, microbial respiration and greenhouse gas emissions.

Higher CO_2 levels increase primary productivity which resulted in higher carbon emission due to the microbial degradation. Plants release 50% of fixed carbon into soil which is available for microbial growth but they also release CO_2 in atmosphere. Soil microorganisms also produce N_2O which is much more dangerous for global worming (Ricardo Caviceholi, Viliam J. Ripple Kenneth N., Nicole S. Webster, 2019). Climate changes affect microbial diversity directly and indirectly. Soil microbial diversity influence plant diversity and is important for ecosystem function, including carbon cycle. Climate changes directly and indirectly influences microbial communities and their functions through several factors such as temperature, precipitation, soil properties, and plant root exudates. Tundra microbial communities change in the soil layer within 1.5 years of worming, the functional potential of microbial communities changed markedly, with an increasing amount of genes involved in aerobic and anaerobic carbon decomposition and nutrient cycle. Rapid worming in Antarctic Peninsula is also a problem. Climate changes are likely to increase the frequency, intensity and duration of cyanobacterial blooms in many eutrophic lakes, reservoirs and estuaries.

Climate changes affect microorganisms. Microorganisms also can affect climate changes. In our experiments (1973-1976) not all denitrifying bacteria were able to reduce N_2O to N_2 (Badjov K. and Kostov O. 1977). From 4 selected strains only one (*Micrococcus denitrificans*) was able to reduce fully N_2O to N_2 for 7 days thus positively influenced climate changes. Increasing the temperature and droughts strongly affect ability of plants to grow (Vasileva and Kostov, 1998). Climate change affect different soil bacteria and soil fungi. The fungal population is more resistant to dry conditions. The reduced soil microbial activity reduces the overall functional potential of communities, and thereby limiting their capacity to support plant growth. Climate change affect the occurrence and spread of diseases in marine and terrestrial biota. For example there is a strong link between increasing of sea surface temperature and coral diseases. Anthropogenic climate change stresses native life, thereby enabling pathogens to increasingly cause diseases. Human activities, such as population

growth and transport, combined with climate change increase antibiotic resistance of pathogens and the spread of waterborne and vector borne pathogens. Therefore increasing of diseases of humans, other animals and plants. Population growths, which amplify climate change, is also an important factor in contributing to the development of resistance.

As a result microorganisms make a major contribution to carbon sequestration, particularly marine phytoplankton, which fix as much as CO_2 as terrestrial plants. Microorganisms also contribute substantially to greenhouse gas emissions via heterotrophic respiration (CO_2), methanogens (CH_4) and denitrification (N_2O) (Badjov K. and Kostov O., 1977). Human activity that directly affects microorganisms includes greenhouse gas emissions, (particularly CO_2, CH_4 and N_2O), pollution (particularly eutrophication, agriculture (particularly land use), and population growth which positively feedback on climatic change, pollution, agricultural practice and the spread of diseases (Vasileva, V. & Kostov, O., 2002). Human activity also can accelerate climate change. By contrast, microorganism also offed important opportunities for remedying human cause problems through improved agricultural practice and outcomes, production of biofuels, production of biofertilizers for legumes and remediation of pollution. Addressing specific issues involving microorganisms will require targeting laboratories. These labs activities should be followed by field tests. We must improve our quantity understanding of the global marine and soil microbial functions related to the environmental suitabilities.

In this consensus, statement that it is illustrated the link between microorganisms, macroscopic organisms and climate change, and put humanity on notice that the microscopic majority cannot longer be the unseen, and put humanity in environmental risk. We have to appreciate the importance of microbial processes and it will be fundamentally our understanding of the Earth's biosphere and response to climate change (Ricardo Caviicchioli, William J. Ripples etc., 2019).

Heavy metals contamination of soils is very serious factor for soil fertility, soil respiration and soil microorganisms number, functions and ratios. In addition, contamination of soils with heavy metals significant reduce functional diversity and biodiversity of soil microorganisms. More information for Cu toxicity to soils and soil microorganisms are reported by Kostov O., O. Van Cleemput, 1997; Kostov O., O. Van Cleemput, 1998; Kostov, O., O. Van Cleemput, 2001; Kaloyanova N., Petkova N., Kostov O., 2009; Kostov O., O. Van Cleemput, 2012a; Kostov O., T. Ngan, 2002b); Kostov O., 1997, Kostov, O., Lynch, J. M. (1998). Generally bacteria and symbiotic N_2-fixing bacteria were more sensitive to copper contamination as compare to fungal and actinomicetes populations. Affected microorganisms showed higher specific respiration rate (C-CO_2/biomass C). They release more CO_2 in air for their surviving in toxic conditions. Bioremediation of toxic amount of Cu can be successful by application to soil of correct amount of well-matured compost rich in normal microorganisms and their ratios of bacteria/actinomicetes/fungi and this have to be combined with correct amount of lime for correction of pH to neutral value of 7.0. Duration of contamination also have negative importance. Microorganisms which are is stress conditions from Cu toxicity need more energy for surviving but possibility of soil to support surviving is less and therefore the rate of stress is increasing corresponding to the time under heavy metal stress (Ross, S., J. Kaye (1994). One way to recover soil fertility and it functions is application of well-matured compost enriched with useful soil microorganisms with high

metabolic rate and ability to survive in stress conditions. These composts are inoculated and contained microorganisms such as selected strains of *Trihoderma harzianum* with association with very good N_2-fixers. Strains from genera *Azospirillum*, *Azotobacter* spp are better N_2 fixers but they have low ability to survive in contaminated conditions (Kostov, O. & Lynch, J. M. (1998). Duration of copper contamination also have ecological importance. It was established in Bulgarian soils that Cu contamination is stronger when duration of Cu contamination lasted more then 6 months and the rate of contamination is more then 5% (Kostov, O., 1997), (European Commission, Brussels,(2016), COM (2016) 157 final). Climate change, including increases in frequency and intensity of extremes, has adversely impacted food security and terrestrial ecosystems as well as contributed to desertification and land degradation in many regions (IPCC, 2019). Climate change create additional stresses on land, exacerbating existing risks livelihoods, biodiversity, human and ecosystem health, infrastructure, and food systems. Increasing impacts on land are projected under all future GHG emission scenarios. Some regions will face higher risks, while some regions will face risks previously not anticipated (IPCC, 2019). The level of risk posed by climate change depend both on the level of warming and on soil moisture content, how population, consumption, production, technological development, and land management practice are used. Approaches with higher demand for food, feed, water, higher resource consumption and production, and lower technological developments and improvements in agriculture yields will resulted in higher risks from water deficiency in dryland, land degradation and food insecurity (IPCC, 2019).

IV. Environment policy: measures, assessment, recommendations

Policies related to the food system, reduce food and waste lost, people and environment will better accept support more sustainable land use management, enhanced food security and low emissions. Such polices can contribute to climate change adaptation and mitigation, reduce land degradation, desertification, poverty and improved people's health (IPCC, 2019). Policies related with more manners that are flexible, can maximize benefits and minimize risks for land management decisions from farm level to national scale (IPCC, 2019). This type of policy have to support increasing of biogas plants using waste waters from towns and villages to delivery energy (methane) and consume CO_2; In addition, it will be strongly useful creating new technologies for less waste discharged by recognizing problems, science prognoses for maintenance of high yields and protection of ecosystem (soil - water - air). It is needed better scientifically assessment of existing environmental situation. Peoples need new methods and equipment's for measuring environmental indicators and protection. It is obviously that financial support have to be increase for Nature protection every year and 4 years ahead; Organizing new specializes scientific laboratories and industries are also needed; It have to be improved interaction by policy makers, scientists and politicians among EU countries for better future of EU countries. This will be very important to do planning of science policy to meet higher requirements of EU farmers and population. The Science Policy should initiate legislative processes in EU members to support decrease of global warming and decrease contamination of soil, air, waters and reduction amount of wastes. In addition it has to be increased effectiveness of communication between Science Policy Office Bureau/ EU members/ and EU media and environment business man. Science policy have to be better orientated to increase publications activity by writing blogs, journal articles,

newspaper articles, using LinkedIn and Facebook Portals and giving more presentations with higher standards in ordinary media. It will be better to increase the trust of EC members to the Central EC management science policy; The Science Policy has to support development of new approaches and methods to assess and give legislative support of EC environment policy on the field of climatic changes, biodiversity, soils fertility and water resources; It has to be encourage making scientifically proposals on the field of environmental problems. The Science Policy need to formulate more clearly science policy and strategy of EC countries; It have to increase efficiency of European Science policy by promoting activities and influence decision-making in the relevant fields; The Science Policy have to make attempts to improve better collaboration, coordination, information, with EC members and potential partners on the field of priority areas of soil, water, air and wastes; It has to publish the present EC positions regularly including in many media and all in line of management and communication units; It has to support financing of research on selection of partners of bacteria/N_2 fixing plants relationship such as soybean, Lucerne, peas, groundnut etc. thus to achieve 30% reduction of N_2O released into atmosphere from NO_3 containing mineral fertilizers applied. Depending on specific country it has to be supported specified research on N_2O releasing from soils by microbiological and biotechnological point of view. Complex assessment is needed to assess environment related to productive value of ecosystems and it have to be evaluated taking into account all parameters such as metric, energetic, social, human health and compare at beginning of the same nature parameters. Waste management is important for climate change and has to be done the following activities: 1. Using town wastes, regenerate disturbed lands and create new soils, significant increase production of green biomass for CO_2 consumption, O_2 production and aerobic advance composting of all wastes. 2. Management of plastic wastes (they are chemically and physically neutral): to carry out experiments for composting and followed by introduction to soils for physical properties improvements. It has to start mass growing green plants in towns, roads, mountains etc. for consumptions of CO_2 in EC and in the world. The Consensus Statement warning to humanity underline perspective of microbiology to regulate climate changes. It will raise awareness of the microbial word and will make a call to action to microbiologists to become increasingly engaged in and for microbial researches to become increasingly integrated into the framework for addressing climate change and accomplishing the United Nation Sustainable Development Goals (Ricardo Cavvicchioli and etc. ORCID, 2019); Zero waste discharged bio technologies have to be supported, financially encouraged and internationally awarded for better stimulations and protection of environment. (European Commission, Brussels,(2016), COM (2016) 157 final). These type of polices include individual and institutional level, accelerate knowledge transfer, enhance technology transfer, enable financial mechanisms, implement early warning systems, undertake risk management and address gaps in implementation and upscaling (IPCC, 2019). These type of policies will address climate change adaptation, mitigation, desertification, protect land degradation and food security, and can bring social and ecological economic and will contribute to poverty eradication. Delaying climate mitigation and responses across sectors would lead to increasingly negative impact on land and reduce prospects of sustainable development (IPCC, 2019). The effectiveness of decision-making and governance can be enhanced by the involvement of local stakeholders: particularly those most vulnerable to climate change including indigenous people and local

communities, women, and the poor and marginalized in the selection, evaluation, and implementation and monitoring of policy instruments for land-based climatic change adaptation and mitigation. Integration across sectors and scales increase the chance of maximizing co-benefits and minimize tradeoffs (IPCC, 2019).

V. Building measures for applications and protection means:

Start building of small scale units for production of bio fertilizers, microbialy produced enzymes, inoculated composts and purification of waters and air.

A. Maintaining of policy for adapting to EC conditions production of all available bio fertilizers and enzymes having in mind definite country, soil types and crops conditions and sustainable production and protection of environment. It is needed financial support to all existing microbial culture collections of EU members;

B. It has to be started using virgin lands, re-cultivation of destroyed soils from mining and road building industry in towns and, bioremediation of heavy metals contaminated soils; It is necessary to increase using in all cities green wastes for biogas production and composting. More advanced methods have to be used for increasing efficiency of purification of town waters using microbiologically produced enzymes cellulase,s and lipase,s. etc. (European Commission, Brussels, (2016), COM (2016) 157 final)

VI. Administrative and other policies applications for discussion

To support research policy for production of healthy food we need bio organic policy including for bio pesticides, not using genetically modified organisms and using only useful microorganisms. More efficient work and control of EC Environment Ministers, Environment Agencies and Commissions to support and increase number and production ability of environment protection units in all EC countries. To find suitable support to those farmers, which do not required high profit from yields production but express high care for environment protection. More support needed for bio farmers to increase number of these farmers and for better protection environment areas. The higher level needed for adapting policy for extra incomes of EC countries which have to be directed to bio farmers. All extra income have to be directed from Council of Ministers in each country to avoid corruption and directed to the Ministry of Agriculture. To increase number of visits as much as possible to all scientific and environment exhibitions in the world. It is needed to expressed and showed better science policy and care, for protection of soils from disasters such as seasonal dryings, droughts, flooding's, increasing areas of drop way of irrigation, air contamination from metallurgic enterprises, applying regeneration methods in very low yielding soils, introduce environment (ecological) stamp to as many as possible farmers in EC, to introduce new higher yielding cultivars and in the same time to use less mineral fertilizers (higher efficient photosynthesis), to make history record of environment protection, more usage of organic and bio fertilizers production units etc. It is useful to discussed possibility of creating New European Union Methodological Panel (not all, last accepted methodologies were not able to produce incomes to farmers) for assessment of different environmental practices and to be financial supported: biogas production plants (consumption of CO_2 and methane formation for production of electricity), development of new forestry's areas, new agricultural practices with lower level of application of mineral fertilizers, practicing new N_2-fixing crops, development small scale production of bio fertilizers units for N_2-fixing crops, bio fertlizers

based on *Trihoderma harzianum* for other crops and etc. Development of new systems for financial support for European Country Members working on bio and organic environmental agriculture have to be done. All EC projects abstracts of all awarded environmental projects have to be registered at ResearchGate and Academia.edu in order to be increase research interest by number of reads, recommendation's and citations. Public opinion factor to be developed which will additionally includes, opinion of scientific and non scientific readers, not peer reviewed newspapers, journals, magazines etc. Environmental value have to includes not only opinion of professionals and high level researches but opinion of ordinary people for creation of new environmental public factor. At composting of green, harvested, agricultural, town and other wastes to make new requirement to reduce danger from infection of population, to increase sanitation temperatures at composting from 55^{o}C for 3 days to 60^{o}C for 3 days. This will introduce, as a must, usage of microbial accelerators such as biocontrol agent *Trihoderma harzianum* (in addition *Trihoderma harzianum* have killing effect to the highest number of pathogens) which next to killing effect will prolong thermophilic stage thus sanitation period. In addition enough big volume will be needed before composting. All wastes have to be kept into improved quality depots with high sanitation requirements (town wastes can carry infections from hospitals and other private medical offices, protection from fires etc.). To all environmental projects, analyses for economic, effectiveness, ecological efficiency, protection of environment and social acceptability must be done at the end of the projects. (European Commission, Brussels, (2016), COM (2016) 157 final)

VII. Practical measures for useful implementation of EC Environmental Policy

The figures shown in Figure 1, 2 and 3 strongly support urgent measures have to be taken for protection, maintaining and improving environmental presence of the planet: Policies to support reduction by 15-20% of mineral fertilizers to all agricultural and forest plants; Policy to support reduction by 30% of N mineral fertilizers for leguminous plants; Policy to support production bio fertilizers for all leguminous plants; Policy for production manures, composts and strong extension bio and organic agriculture; Policy to support production of *Trihoderma harzianum* strains, bio fertilizer by stimulating root and top biomass and suppressing a large number of plant diseases; Policy to support changing ratio root/top plant biomass for better consumption of mineral fertilizers by roots and to maintain sustainable yields and reduce stress factors such as droughts, flooding's, early or late snowing's which reduced N_2-fixing activities etc.; Policy to support better waste management to all agricultural residues by mulching, composting, organic fertilizers production such as manures, sludge's, vine wastes, biochars (husks from sunflowers, rice, residues after extraction of oil from vine seeds, woods chips, barks, town bushes waste and all other wastes. Enzyme production and application has to be used for increasing efficiency of composting of wastes; Policy to support better management for higher food quality production and delivery at the markets as fresh as possible; Better policy to support "public factor" such as publication in newspaper, small magazines, popular publications, radio broadcastings, TV ecological movies, posters in conferences, symposiums, meetings for nature protection, advertisings etc.; Creating conditions for better regeneration of town soils already destroyed from city industrial activities and production of green biomass for better quality of air, consumption of CO_2 and composting; Large scale Reforestation of flat and mountain areas with trees, bushes and grasses with higher leave surface. Plastic management: a). experiments to be DE gradated by

enzymes produced by microorganisms, b) to be use high temperature and new formed balls and other forms thus using them as basis (lowest and top layers) for new roads, and producing new surface layer on the roads. Advantage for this activity will come because plastics are chemically neutral but very difficult to be DE gradated by microorganisms. Sea microorganisms suffered from salt content and that needed to start selection of salt tolerant microorganism which can be developed in artificial conditions and then it will be possible to attacked big accumulations of plastics in sea. Policy to support start of better water management by building small scale biogas plants using waste waters, waste town foods, green biomass in order to produce electricity and consume produced CO_2 from air. Subsidies and creating green towns and areas and substitutions of classical cars and vehicles using petrol with electrical cars and all other transportations. Building new parking places with effective air purification systems and wastewaters. Financial support for peoples to buy electrical cars, busses and vehicles. For example in San Francisco, USA 47% from total emissions in town are from cars and vehicles and 71% are from private transportation. Organizing more available information about environmental pictures in small villages, cities, big towns and industrial centers. Building more resting places at roads and towns to meet very hot day's temperatures like last days in Europe and too cold days and nights due to climate changes. (European Commission, Brussels, (2016), COM (2016) 157 final). More legal and financial measure have to be taken by EC against these countries which do not want to stop deforestation and financial support to be given to countries which support measures against worming effect of the planet.

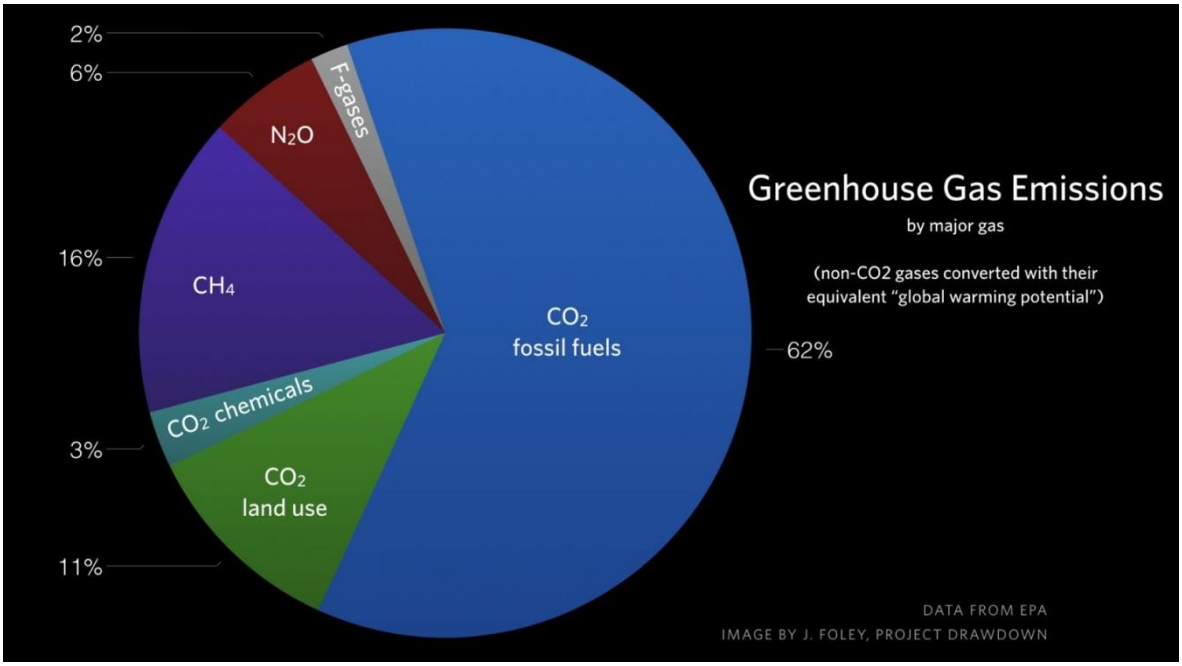

Figure.1. Distribution of Greenhouse gas emission. *(Data from EPA, Image by J. Foley, Project Drawdown https://www.drawdown.org/)*

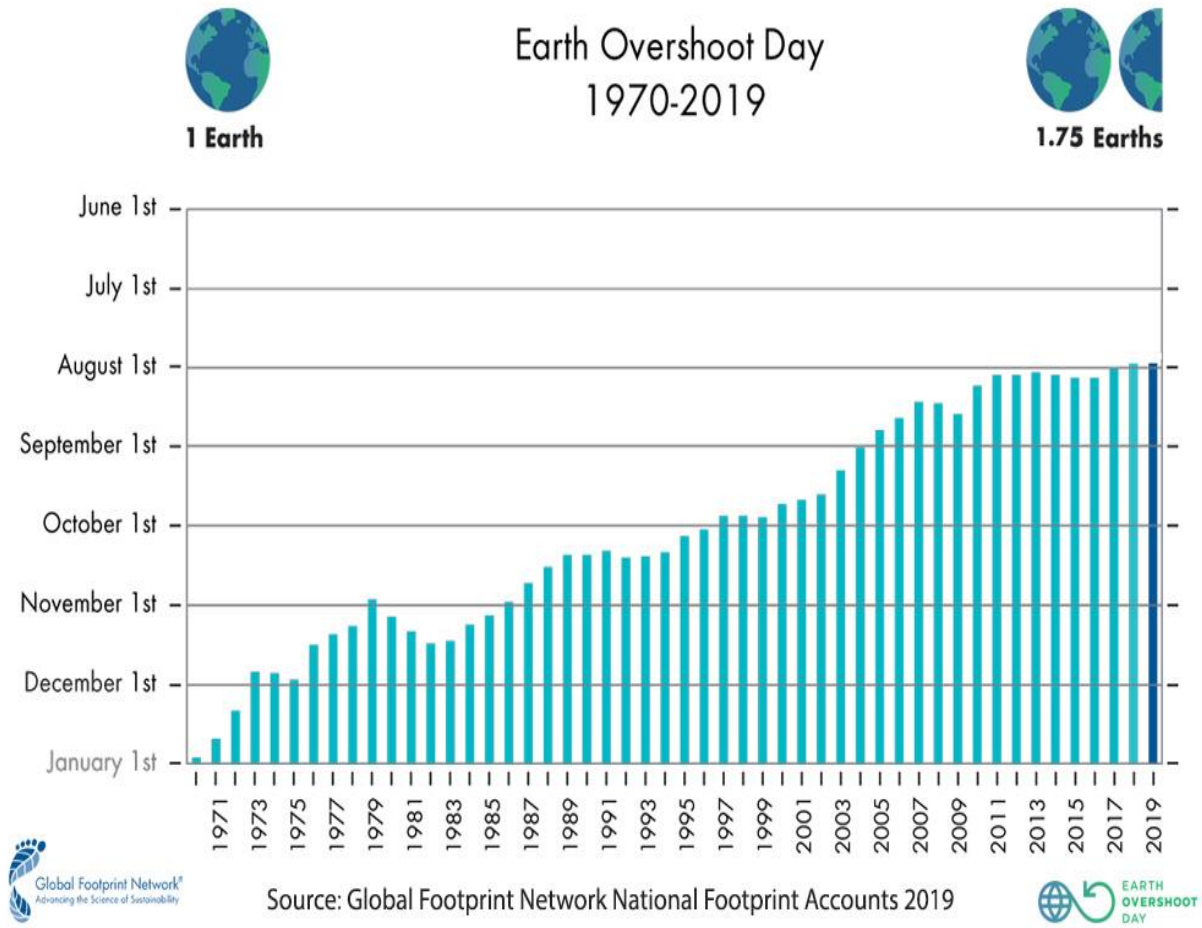

Figure 2. *Footprints accounts by years; Global Footprint Network. National Footprint Accounts 2019. (https://www.overshootday.org/)*

SHOW CASES NEEDS FASTER MEASURES AGAINST DISASTERS BY NEW LOWS AND OBLIGATIONS

It is important to note that recent disasters will stimulated EC authorities to take faster protection measures:

Russia, Siberia, Novosibirsk (8/4/2019): 3 million ha forest area are burned (or 30,000.00 km^2). Totally 12 millions ha are destroyed. At the moment (17.08.2019) according to Russian authorities under fire are about 1.2 millions square kilometers. 2. Nobody can tell just now how many animals, plants, microorganisms have been burned? North behind Arctic circle: burned 784 931 ha in zone of forest ice (Arctic, Yakutia, Tundra. In addition somewhere peat has been burned: Siberian Times Reported; At the moment according to Russian authorities are under fire only 1.2 millions square kilometers in Siberia and Far East. Greenlandic worming effect (8/4/2019): melted over 11 billions ice for 24 hours. Worming temperature: -22^{o}C.; The last (8/2/2019) hot days in Europe melted 800 million tones ice in Switzerland which will meet needs of Switzerland for 1.5 years of water, reported World Meteorological Station (also: www.varhove.com); In Bulgaria several forests places and depots have been under fires (14.08.2019) and new appeared. In addition Bulgaria at the moment is number 1 for contamination of air with SO_2. In the Brazilian states Amazonas (17.08.2019) had 1699 fires in July and in Mato Groso 8799 fires. Totally are deforestrated

4,699.0 square kilometers in 2019 as compare with 2810 fires in 2018 which is increase of 39% as compare with 2018. The previous year are deforestrated only 2,810.0 square kilometers. This is the reason why Germany declare that they will stop financial support to Brazil for protection of environment. These fires will be real assessed in the near future but now CO_2 noted weak decrease for this year because of photosynthesis and phytoplankton in the North semi globe.

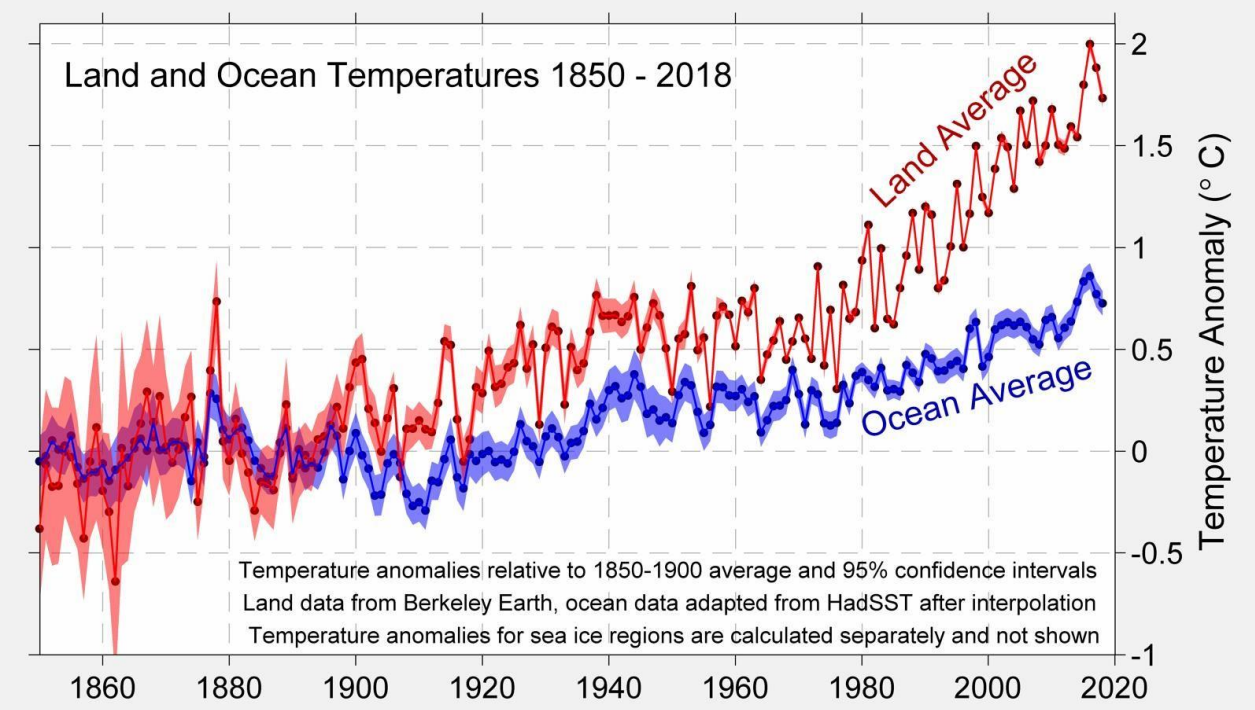

Figure 3. *Land and ocean temperatures dynamics by years (http://berkeleyearth.org/global-temperatures-2017/)*

This tendency will continue to the middle autumn. In Greenland from 31 July to 31 August this year (2019) over 58 billion tones ice have been melted This is with 40 billion tones more as compare to the middle values. This 58 billion tones do not include the amount of the ice which have be removed from icebergs and melting of ice from the wormer water. Bulgaria is at first place in the world for production of SO_2.(22.08.2019)

VIII. Reduction of climate changes already started with the following activities:

Recognizing importance of world environmental policy for development of new plants with big leave surface and density as strongest and fastest way to reduce concentration of CO_2 having in mind recent developments:

1. Switzerland Research Group make calculations and suggested:

One trillion trees can consume 830 billion CO_2 from atmosphere equal to CO_2 produced from population for 25 years; Free areas are equal to territory of USA which is 9 million m^2 free space suitable for accommodation of 1 billion (1,000,000,000.00) trees. Other decision will be difficult for implementation because this is the cheapest. There are examples:

A. To maintain the forest in Amazonia will support 1/5 from O_2 in the planet;

B. In Philippines there is a new low "Hose Bill 8728". According to the low graduated students from schools, colleges, universities when graduated must have planted 10 plants.

This mean 175 million plants. Their forest reduced CO_2 by 20% from towns, mining areas and in forests;

C. Ethiopia decided daily reduce CO_2 200 million t/day and to plant 4 million per day plants for stability of climate and nature;

D. India is making 66 million plants planted per 12 hours;

E. This July of 2019 is the warmest month in our history;

F. For the last 120-140 years temperatures of waters increased by 0.5-07^oC and for the surface of 2^oC;

G. In Bulgaria form 15 million acidic soils 4 million (26.6%) need improving of pH. Also many new plantations were started this year; many local forest places and depots are in the fire (17.08.2019) and government took strong measures to stop fires.

Unfortunately the most suitable countries for new plantations are not EU members. They are: Russia, USA, Canada, Australia, Brazil and China**.** There is space for 1-1.5 million trees in the planet.

***Positive balance is also needed between destroyed trees and new plantations*.**

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