CLIMATE CHANGE AND AGRICULTURAL REFLECTIONS: NEW APPROACHES FOR ENVIRONMENTAL SUSTAINABILITY – A REVIEW–

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ABSTRACT

The relationship of human to the environment has existed since the time of the first human civilization. As the community developed, the negative impact of people on the other members of the ecosystem was greater. The values of some pollutant parameters reached a high level at an alarming rate. Air, soil, water pollution has become a global problem. Heavy metals as pollutants have been the focus of researchers, expressed more often than ever before in previous years. With a large number of toxic effects, heavy metals present the presence of plant species that are already living in contaminated environments. Monitoring of heavy metals is an important issue because toxicants and their accumulation have vital preservation for the ecosystem. Contaminated soils can be reduced and restore their function using physical, chemical and biological techniques. Physical and chemical methods are very expensive and often cause irreversible changes, thus destroying biological diversity. Sustainable intensification means producing more food from the same area of land while reducing the environmental impacts, under social and economic beneficial conditions.

Biological recovery of contaminated soil is an effective way to reduce health risks for both humans and the ecosystem. Numerous studies have led to the development of the first thought of plants to improve the environment and to use different pollutants in contaminated environments as promising technologies that promise environmental protection under the heading "Phytoremediation". This technology consists of reducing contaminant in contaminated soil, water or air concentrations. Plants have the ability to store, degrade, or remove pesticides, metals, pesticides, explosives and crude oils. In this review, practices and technologies for sustainable intensification are discussed. Especially the article discusses methods for the use and application of plants for the recovery of soil, especially polluted by heavy metals and other pollutants.

INTRODUCTION

Climate change is the catch-all term for the shift in worldwide weather phenomena associated with an increase in global average temperatures. The primary cause of climate change is the burning of fossil fuels, such as oil and coal, which emits greenhouse gases into the atmosphere primarily carbon dioxide. Other human activities, such as agriculture and deforestation, also contribute to the proliferation of greenhouse gases that cause climate change. Agricultural manifestations of climate change are:

●Due to the increase in length and intensity of the hot and dry ride, the forest the frequency, range and duration of fires may increase.

● Agricultural production potential may change (this change may be in the

form of an increase or decrease with species, with regional and seasonal differences).

● Climate belts will disappear hundreds of miles toward equatorial poles, as in the geological past of the Earth, there will be fauna and flora that can not adapt to this shift in the climate zones.

● Natural terrestrial ecosystems and agricultural production systems may suffer damage from pests and disease increases.

● Increased human pressures on sensitive mountain and valley-canyon ecosystems.

● Innovations will be added to the problems of water resources in arid and semi-arid areas, especially in cities; the need for water for agricultural and drinking purposes may increase further;

●An adverse change in climate change may the risk of drought on agriculture.

● In addition to the expansion of arid and semi-arid areas, increases in intensity will support desertification processes, salinization and erosion.

● Increases in the frequency of the statistical distribution towards high values and especially in the number of hot days (eg tropical days) can affect human health and biological productivity.

● With the contribution of the urban heat island effect, the night temperatures in the hot season will increase significantly, especially in big cities; this may lead to increased energy consumption for ventilation and cooling purposes.

●Infection from water stress and heat stress can increase health problems, especially in large cities.

● The effects on renewable energy sources, such as wind and sun, the number of wind blows and strength, and the duration and severity of sunbathing may vary.

● There may be some changes in marine currents, marine ecosystems and fisheries areas that may cause significant socioeconomic problems at the same time in terms of results.

● Depending on the sea level rise, the coasts, tourism and agriculture sectors, with low flood deltas and estuaries and coastal plains would be flooded rice type coast.

● Changes in CO2 capture and discharge capacities of forests and oceans can cause natural reservoirs to weaken.

● The area covered by seasonal snow and permanent snow-ice cover and the length of snow-covered landing may be reduced; sudden snowfalls and snowcrackers may increase.

ENVIRONMENTAL SUSTAINABILITY

Sustainable intensification means producing more food from the same area of land while reducing the environmental impacts, under social and economic beneficial conditions. Promoting environmental quality is about more than encouraging sustainable development or adaptive capacity. It is also about transforming use practices for environmental resources into sustainable management practices. In many countries and sectors, stakeholders who manage natural resources (such as individual farmers, small businesses or major international corporations) are susceptible, over time, to variations in resource availability and hazards; they are currently seeking to revise management practices to make their actions more sustainable (Yohe et al.2007). Three objectives of improved crop production under changing environmental conditions (e.g. climate change) are important: 1) Higher production by better exploring the (genetic) yield potential 2) Better input use by higher production efficiency 3) Increasing the site specific yield potential by improved land productivity. Relevant crop production system approaches for

sustainable intensification worldwide. A single strategy for up-scaling of advanced crop production systems (precision agriculture, conservation agriculture, agroforestry systems or integrated crop-livestock systems) will not work: The strategic approaches and principles must be tailored to countries, regions, farming systems or even local sites, reflecting specific technical, economic and social conditions. Climate change and growing water scarcity require policies and investments to improve access to clear environ, which is a major determinant of land productivity and yield stability. There are many opportunities to revamp existing schemes and expand small-scale schemes.

One of them “Phytoremediation” consists in mitigating pollutant concentrations in contaminated soils, water or air with plants able to contain, degrade or eliminate metals, pesticides, solvents, explosives, crude oil and its derivatives, and various other contaminants, from the media that contain them. Phytoremediation as the term express the use of green plants for solving the problem of polluting the environment. Phytoremediation indicates a great number of technologies that are based on the capacity of plants to accumulate large amount of metals that are naturally present in plant tissues, without causing symptoms of toxicity. Although many data and results are already available in the literature, it is still a developing technology. It can be successfully combined with other biotechnologies, particularly when they are in the terms of contaminated sites with a complex problematic. This is a relatively new

process of cleaning of all three environmental media. Its practice began in the early '80s and has been tested on a number of world-wide sites to date.

Phytoremediation word’s etymology comes from the Greek and Latin language (phyto: plant remedies: restoring). Phytoremediation is an environmental friendly technology, which uses plants for decomposition, metabolism, or detoxification of various contaminants the environment (air, water, soil). Organisms involved in phytoremediation, besides plants, are microorganisms and fungi. There are various process in phytoremediation as phytoextraction, rhizofiltration, phytostabilization, rhizodegradation, phytodegradation.

In determining which of phytoremediation techniques will be applied, we must take into account all environmental factors. For example, it is necessary to evaluate whether and how much applied methods of remediation will affect inter-specific relationships, especially if it will affect other crops. Considering that plants that were grown for phytoremediation should be subjected to the conditions of contaminated soil or water, other crops are unlikely to survive in such (for them toxic conditions), and will likely reach of for the competition problems.

HYPER-ACCUMULATING MECHANISMS

The mechanism of genetic control of processes of hyper-accumulating heavy metals in plant tissue is still not well understood, though scientific genetic studies have shown that the tolerance of plants to heavy metals are responsible for some major genes in their genetic maps (Lasat 2002) . Negative characteristics from the aspect of biotechnology in some plants are that most of plants that are hyper-accumulative are small and slow-growing species. Therefore, it is necessary to focus on genetic engineering in order to artificially correct these features. Brown et al. (1995a, cited in Lasat 2002) suggested transfer of

genes are responsible for the phenotype of hyper-accumulating from species that are low and slowly growing in those that have high biomass production but low ability of hyper-accumulating heavy metals. The combination of high accumulation of metals and high biomass production gives the best results in the removal of metals.

Some plants hyper-accumulative absorb large amounts of metal, unlike other plants. Natural hyper-accumulative of metals are plants that can accumulate and that can tolerate high concentrations of metals in outcrops without noticeable symptoms of intolerance. Hyper-accumulators have an increased amount of metals in outcrops: 1% zinc and manganese, 0.1% nickel, cobalt, chromium, copper, lead and aluminum, 0.01% cadmium and selenium, up to 0.001% live in total dry matter of biomass outcrops. It is known that plants have natural potential to remove heavy metals from the soil, such as Cu, Co, Fe, Mo, Mn, Ni, Zn, which are in small amounts necessary for plant growth and development, but also the of Cd and Pb, which certain types of plants also accumulate (although these elements have no known physiological activity in plant organism).

It is necessary at this point to emphasize that heavy metals have different mobility within the trees, so lead, chromium, and copper usually remain immobilized in the roots, while cadmium, nickel, and zinc more easily move to the aerial parts of the plant. It is believed that poplar and willow represent a great potential when it comes to the use of trees in phytoremediation (Capuana 2011) because of its fast growth, high of biomass and high tolerance to heavy metals.

CONCLUSION

There are many projects and studies on the ways and potentials of improving the environmental situation around the world. Conventional methods should be abandoned and adopted balanced choices with the terms of habitat types, i.e. the maximum use of habitat potential, both economic and environmental potentials a basic principle. Phytoremediation represents a technology of great significance, which makes the test of plant species with the capability of phytoaccumulation extremely important. It is a multidisciplinary technology, confronted with a series of problems that are awaiting resolution, and the performance of each of these methods can not be achieved without the cooperation of scientists and experts in various fields, because the issue is very disciplined and complex. Attempts to control pollution and environmental degradation are as old as the problem, but the answer is often insufficient and comes with a delay. In any case, we must pay attention to the use of nature and its resources, and we must protect it. In the future, it predicts that different pressures on the environment will develop, which is a hard, almost impossible job that has been developing for centuries. Of course, it is clear that many problems await us. The main problem with coping with pollution is that there is no technology that can prevent deterioration. For this reason, we must try to find a balance between the demands of the society and the opportunities and resources of nature, which can withstand all oppression.

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