



# GLOBAL, ECOLOGICAL POTENTIAL OF THE PLANET

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Uncontrolled, unpredictable population growth is changing the reality of the planet; natural ecosystems are being displaced by megalopolises, transport, agricultural, energy, other industrial facilities; oil extraction and refining are causing especially great harm to the environment. All of them lead to colossal pollution of the environment, loss of biological diversity, reduction of agricultural plantations, deterioration of living conditions of the population of the whole planet. Environmental pollution has an extremely negative impact on the health of its inhabitants. Every year, more than 1.8 million people die, as a result of non-infectious lung diseases; 9 out of 10 inhabitants of the planet breathe polluted air; more than 70% of deaths from stroke, widespread lung cancer and respiratory diseases are caused by high levels of air pollution. It seems, that in the XXI century, the most important international problem concerns the field of ecology – namely, keeping the acceptable environmental balance in conditions of extremely increased and still increasing worldwide population and highly developed industry.

Already at the beginning of the XXI century, humanity faced unprecedented environmental problems: in addition to the unpredictably growing population of the planet, global climate change, the melting of large masses of ice, a huge increase in the volume of industry and transport, the formation of a large number of megalopolises, worldwide spreading of unknown earlier infectious illness, and many others. On the basis of intensive agriculture, soils are becoming increasingly depleted in terms of their content of organic carbon and nitrogen and degraded as a result of the action of great amount of techno-genic stable compounds. In this amazingly fast-changing world, achieving a sustainable ecological balance and providing food resources to the world's population has never been such a difficult and important task.

More than 800 millions of tons of chemicals are produced annually in the world. In different ways, huge amounts of these hazardous substances or toxic intermediate products of their incomplete transformations are accumulated in the biosphere, significantly affecting ecological balance. Nevertheless, members of the plant kingdom (microorganisms and plants) could assimilate environmental contaminants, and remove toxic compounds from the environment, providing long-term protection against their environmental dispersal in ever increasing doses. Lately, many ecological technologies have been elaborated, targeted to minimize the flow of toxic compounds to the biosphere or to control their level or state. Despite the definite positive effect from the realization of these technologies, the intensive flow of toxic compounds to the biosphere is still increasing.

Taking into account all the above mentioned, the group of scientists under the leadership of the author, proposed a biological concept, developing over 30 years, as a permanent acting ecological biotechnology, designed to restore eroded soil, monitor and improve ecological imbalance by degrading toxic (foreign) compounds, intensifying the metabolic processes of the soil, by using the detoxification potential of rhizosphere microorganisms and the root system of plants. In fact, the proposed concept represents a significant intensification of the natural biological process based on the synergistic action of microorganisms and plants to jointly degrade in natural conditions anthropogenic stable contaminants. A significant increase in the

efficiency of the technology is achieved through the selection of both plants and microorganisms that actively assimilate contaminants in the soil. According to the authors' calculations, the effectiveness of joint detoxification potential of microorganisms and plants occurring in nature, as a result of their joint co-existence, does not exceed 5-7% of their maximum capacity. This potential can be increased to at least up to 40-50% by introduction in soil selectively chosen active consortia of microorganisms and plants acting by root systems, thereby only strengthening the immune system of the soil, and using them in the form of environmentally friendly technology under unlimited global conditions.