

## *Abstract*

the habilitation thesis “**Sustainable management of soil resources in the South – Eastern Romania**” developed by prof. univ. dr. Mihalache Mircea

*Key words: soil resources, limiting factors, soil improvement, sustainable management*

In the Habilitation Thesis on “**Sustainable management of soil resources in the South – Eastern Romania**” I presented the most important scientific and professional achievements in thematic directions. The scientific and professional achievements and the career development plan are shortly presented by highlighting the most relevant academic and scientific research conducted after the doctoral thesis completion.

The research has started from the premise that sustainable management of soil resources have the major objective of optimizing productivity and at the same time preserving the natural resources base. It is very important in the agricultural production systems to maintain a balance between inputs and outputs, between investments and benefits, in terms of quality assurance environment and promoting, overall, a sustainable economy.

Agricultural soil within an ecosystem has the most important determining supply services (to produce biomass), regulating services and cultural services. The increasing levels of soil productivity and, at the same time, maintaining a healthy environment, are two compatible concepts, despite the perception promoted until recently, who claimed to be in "conflict".

Soil evolution forecast, both internationally and in our country, highlights the negative trends in the state of agricultural soils, agriculture, being a factor that generates degradation, and at the same time is the victim of degradation caused by other socio-economic activities as well as itself. The intensifying pressure on soil resources led lately to increased agricultural areas where there is one or more limiting factors for agricultural production with major implications on the physical, chemical and biological properties of the soil.

The main objective of sustainable agricultural management must seek to minimize or eliminate adverse effects of agricultural intensification. Looking at edaphically resource, sustainable use proposes to reduce until elimination the negative impacts of degradation processes, increase resilience to soil quality and restore its status.

I watched through my research to identify the limiting factors of soil, the causes for their occurrence and the major conservation and increase soil fertility measures in South-Eastern Romania.

Following the developed projects I conducted interdisciplinary research on the use of various wastes from metallurgy to relieve acidity of chromic luvisoil, its influence on soil properties and crop plants. The research was conducted for the first time in Romania by using slag LF from the metallurgical steelmaking on the fields with high acidity; this allowed establishing the optimal dosage application and its influence on soil properties and on the main crops.

Another research direction followed the influence of various technological systems applied by farmers and their impact on soil properties.

The research has shown that under the influence of different tillage systems the physical and chemical properties can be modified with negative impact on agricultural production. Applying technological tillage systems must be linked to attributes and properties of soils in order to preserve its resources.

By applying the agricultural technology systems we need to impose those technological links for enhancing and preserving the organic matter. Another important component of the conducted research in projects aimed to identify the pollution sources and the workload of the soil with various heavy metals resulting from industrial activity. The results have established the main pollutants, distribution area and their influence on the physical, biological and chemical properties with negative implications on agricultural ecosystems.

In the second part of the Habilitation Thesis is presented the evolution and development of the professional, scientific and academic career plan in which are highlighted the scientific directions in which the future young PhD will be engaged. The scientific research plan will focus on new research directions in the field of Soil Science and through my participation in multi-disciplinary teams in national and international projects. The research topics will include: management of agricultural soils, monitoring of soil resources, influence crop technologies on physico-chemical properties of soils, soil pollution with heavy metals, phytoremediation of soils polluted with heavy metals, recycling of organic waste through agricultural land in terms of environment protection, conserve water in the soil, improving soil using different acid wastes from industry, alternative crops with potential for adaptation to

different ecological conditions and their complex capitalization of biotechnology, ecological restoration of polluted soil.

The results of the research will contribute to the implementation of new technologies with practical applicability for the economic environment and will be published in journals indexed in ISI and BDI.