PRESENT STAGE AND PROSPECTS REGARDING THE EXPLOITATIONOF THE SOILS WITH EXCESS MOISTURE IN ROMANIA

PREZENT ŞI PERSPECTIVE PRIVIND VALORIFICAREA TERENURILOR CU EXCES DE UMIDITATE ÎN ROMÂNIA

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Abstract *Romanian climate conditions and the ratio between the rain falls and the water consumption (≈1) lead to the necessity of an effective management of the undergroud water using irrigation and draining works.*
These respects were on the basis of the land reclamation programs application, in a modern concept based on the principle of integrated set-up and solving the hydro-reclamation problems of the developed complexes,using different type of works on the same land.
The design and resesarch in this field, in the new political and economic situation in Romania, should
be organized on new structural basis, having in view: the exploitation of the soils with excess moisture in the frame of sustainable development,the sustainable use of the antropic eco-systems in t
he areas with excess moisture and the setting up/development of the protected areas.

Rezumat *Condiţiile climatice temperate în care este amplasată România şi raportul dintre precipitaţii şi consumul de apă (≈1) determină necesitatea unui management eficient al apei în sol, prin lucrări de irigaţii şi drenaj.*
Aceste consideraţii au stat la baza aplicării unor programe ample de amenajare, într-o concepţie modernă bazată pe principiul amenajării integrate şi rezolvarea problemelor hidroameliorative în complexele amenajate, prin aplicarea mai multor categorii de lucrări pe cuprinsul aceluiaşi teritoriu.
În noua situaţie politico-economică a României, proiectarea şi cercetarea în domeniul acesta trebuie organizată pe baze structurale noi, care să urmărească valorificarea terenurilor cu exces de apă în contextul dezvoltării rurale durabile, utilizarea durabilă a ecosistemelor antropice din zonele cu exces de apă şi crearea de zone protejate.

Key words: *excess moisture, underground water management, drainages.*
Cuvinte cheie: *exces de umiditate, managementul apei în sol, drenaje.*

INTRODUCTION

The average geographical latitude at which Romania is placed (45 parallel) determines a climate at which the ratio between the rain falls and the water consumption varies around number 1, fact that leads to the necessity of an effective management of the underground water using irrigation and draining works.

To this climatic fundamental of the hydro-reclamation work necessity, the ecological necessity of such works is added, by which the hydro-saline balance of the soil is provided as an essential condition for the recovery of the soil natural fertility.

These considerations have been on the basis of the large land reclamation programs application, so that, from the Romanian total landed stock of around 24.000.000 ha (31st of December 1995) over 9 million hectares are fitted out with land reclamation works.

As a remark, the application of such underground water management works has been done in a modern conception, based on the principle of integrated set-up and solved the hydro-

reclamation problems of the developed complexes, using different type of works on the same land.

MATERIALS AND METHOD

A. Dewatering and draining existent works

The generation of excess water in Romania on around 5.530.000 hectares, in the tears with average pluvial-metric regime imposed the application of a land reclamation intensive program so that, in 1990, the un-watering and draining works totalized 3.165.000 hectares, of which 185.000 hectares were equipped with underground draining works.

From geographical point of view, the distribution of these areas is presented as follows:

- about 34% (1.090.000 hectares) in the West Plain;
- about 34% (1.080.000 hectares) in Romanian Plain, of which about 78% (820.000 hectares) in irrigated lands;
- 8% (225.000 hectares) in river alluvial plains and in wolds in Transilvania;
- 6% (172.000 hectares) in river alluvial plains and in wolds in Moldavia;
- 4% in alluvial plains, wolds and high plains placed in Muntenia and Oltenia.

The horizontal underground draining with tubes is distributed in the country as follows:

- 46% in irrigated lands;
- 41% as distinctive settlements, especially in Suceava County;
- 13% in soil erosion control settlements and soil creep consolidation, of which 9.000 hectares in Salaj County.

The weight of the excess water causes on Romanian territory is the following:

- 31% rain falls,
- 26% floods, underground water and rains,
- 15% rains and underground water,
- 8% rains and underground water on salted and alkaline soils,
- 16% underground water and
- 4% costal springs.

The issue of the wetlands exploitation, as base for the existence of some specific eco-systems, gets a special importance.

The areas of pools, bogs, permanent or temporarily, natural or artificial water peat bogs, where the water stands or flows, is sweet or salted, including the sea water areas which ebbing depth doesn't exceeded 6 m are considered wetlands.

In Romania, a surface of 1.107.080 hectares has been identified as wetlands, of which 269.080 hectares are interior wetlands.

The conception regarding the relation between man and wetlands has developed radically. If, not long time ago, wetlands were considered with no economic value and they have to be fitted out for fisheries, agriculture and forestry, today the approach of this matter must be done having in view the concept of the natural bio-diversity conservation as a chance for the lasting of the natural biologic patrimony in order to promote the sustainable development of the human society. Wetlands represent refuges/shelters for numerous species of plants which find, only in such places, optimal conditions for living and growing. The classical example is that of peat bogs (oligotrophic bogs) in the mountain regions. There, adapted plants to the cold and moist climate can be found (with limited spreading area) etc.

Such sites are centres of preservation and spreading of these species, in case of climatic changes.

Wetlands are places for reproduction, feed and wintering for numerous species of aquatic and semi-aquatic animals. In certain areas, ten thousands birds are surveyed (especially wild ducks, geese, shore-birds which gathered in big bevies). Some mammals (otter, mink) live only in places less fit out by man, while other species of wild animals survive only in places remained in their natural state.

The vegetal resources of the wetlands are exploited in different methods, depending on plants type. Thus, the wood is a raw material for construction industry, furniture industry or cellulose industry. The reed is another source on which enterprises base their production of cellulose, manufacture handicrafts or build houses in a traditional style (with roof, exterior walls covered with reed).

The herbal vegetation in wetlands is rich also in the dry season that is why the grazing lasts the whole year.

The pollen of the honey plants is the raw material for beekeeping.

B. Technological engineering studies and researches for surface and underground draining

The validity of the causes which generate the excess water, the complexity of the natural conditions in which it is produced and the great number of the manifestation forms required the organization of some technological engineering study and research activities. Under the technical and scientific management of the Research Institute for Land Reclamation and further, the Research and Technological Engineering Institute for Irrigation and Draining, a national network of pilot plains has been settled in the all representative areas for excess water generation: Livada and Turt in Somes Low Plain, Berini and Sudrias in Timis High Plain, Bacles-Mehedinti, Smeeni and Batogu on salted lands; Simnic, Olanesti, Albota; Baneasa-Giurgiu, Saligny, Braila Big Island, Ostrovu Tataru and Periprova.

In Transilvania pilot plains were settled at Fagaras, Sercaia, Halchiu, Miecurea Ciuc, Huedin and Berini and in Suceava Plateau at Suceava, Calafindesti and Radauti. Since 1975 pilot plains have been settled also on irrigated lands, where are sand and loess soils: at Dabuleni, Tunari –Northern Bucharest area, Dor Marunt, Lacu Sarat, Corbu Nou.

To all these we may add the researches performed by the universities in the areas with problems resulted from the exploitation of the lands with hydro-reclamation works.

The technological engineering studies and researches for the exploitation of the lands with excess water were materialized in valuable scientific papers by which the following issues were achieved: the continuing training of the specialists, optimal design technical solutions and characteristic technologies for land exploitation. Among them we mention:

- special technologies for low permeable soil reclamation, in Satu-Mare County;
- technologies for clay soils and clay-erratic soils in the High Plain of Banat and in Orastie Wold, for vertic-clay in Balacitei Plain, Cotmeana Platform and Boianu Plain;
- technologies for the exploitation of the clay soils, muddy soils, partially salted in Crisana Plain and Banat Plain and also of the clay soils with/without skeleton in the piedmont of the Fagaras Wold;
- the exploitation of the salted and alkali soils in Banat Plain, Carasu Valey, in Calmatui hydro-graphic basin, in Braila Plain, in the Low Siret Alluvial Plain;
- technologies for the agricultural exploitation improvement of the humico-gleic soils in Barsa County and Targu Secuiesc;
- complex technical solutions for the exploitation of the wet lands in the Northern area of Bucharest, Burnaz and East Romanian Plain;

- technologies for a better exploitation of the alluvial soils in Danube Alluvial Plain and Prut Alluvial Plain.

Technological engineering studies and researches were the substantiated the applied technical solutions applied at the land reclamation designs of those areas and using the extrapolation, they consisted the base materials for the technical solutions generalization, in homogenous natural conditions, materialized in issuing standards, norms, technical regulations and recommendations for design and operation activity:

- instructions for the introduction of the close draining;
- instructions for the hydraulic and constructive elements settlement of the draining tubes and filters;
- instructions for the elaboration of the necessary researches and studies for the design of the un-watering and draining works;
- technical regulations for the draining of the irrigated lands;
- instructions for the maintenance of the draining works;
- hydro-reclamation works monograph in Danube Alluvial Plain.

RESULTS AND DISCUSSION

Prospects regarding the exploitation of the soils with excess moisture in Romania

The economic and social transition that Romania is passing through starting from 1990 put a strong mark on the research activities development, too. Besides these transformations which influenced the Romanian society, at global level, the restructuring of the land property took place, under the effect of the **Law no. 18 in 1991**. By this law, lands belonging to research centres were given back to the former owners and the draining works, which had a compact shape, were broke up by the new property limits, un-correlated with the hydro-reclamation schemes.

The politics in the field of research and design organization adapted to the Communitarian Aquis and to the market economy requests determines a different structural approach of the technical problems, even if their physical expression doesn't suffer important changes. The structural changes in the design and scientific research activity organization consist in:

- approaching from a new point of view of the research and environment engineering themes for the superior exploitation of the soils with excess moisture and of the salted and acid soils, as compound elements of the rural sustainable development of the respective areas;
- domains of priority settlement in order to achieve national high level studies;
- elaboration of an integrated research program in the national agriculture politics;
- elaboration of research and environment engineering subjects with complex inter-disciplinary character and practical application;
- national level programs running and their completion by the drawing up of the methodologies and technologies for the capitalization of the rural areas in our country;
- enclosing the specific objectives in the frame of the research national programs and the preparation of the research project proposals with a view to their financing

A. Fundamental approaches

- new concepts regarding land reclamation with draining works in private property conditions of the agricultural lands;
- evaluation of the present values for the calculation assurances of the hydrologic parameters , with a view to their application in design activity;

- updating of the methodologies for the technical characteristics settlement of the underground draining works;
- studies regarding the generation of the water excess and the water circulation in the saturated soils;
- technological engineering comparative studies regarding the effects of the secondary draining works in the excess moisture control of the agricultural lands;
- audit of the existent draining works, based on the geographical zoning.

B. Applicative approaches:

- rehabilitation of the draining works in territory organization conditions corresponding to the land private property;
- extent of the vertical suction drainage for the discharge of the excess water from the local reclamation works;
- more intensive use of the special draining techniques: bio-drainage, modular drainage etc;
- studies regarding the hydro-technical diagram of the local drainage works;
- extent and recovery of the local drainages for the land reclamation with miscellaneous use;
- improvement of the surface and underground draining works impact on the hydro-geological regime;
- performance of the statistic studies regarding the effect of the draining works on the profit obtained by agricultural exploitation of the lands;
- studies regarding the forecast of the underground water level in the underground drainages;
- prevention of the water infiltration from the storage basins and from the impounded streams;
- carrying out of the draining works in order to exploit the sloping lands;
- carrying out of the draining works in order to consolidate and exploit the landslide;
- studying of the characteristic features regarding the land draining in the land reclamation where modern irrigation technologies were applied.

CONCLUSION AND RECOMMENDATIONS

The temperate climate conditions where Romania is placed impose the carrying out of the complex and miscellaneous land reclamation works. In the frame of these works, the works regarding the control of the water excess have a determinant character. From this reason, the agricultural territory has been equipped with surface and underground draining works with modern and flexible conceptions, adapted to the mixed property on land.

In the new political and economic situation in Romania, the design and research in this field must be organized on new structural basis having in view:

- insertion of the research objectives in the frame of the programs regarding the rural sustainable development of the respective areas;
- insertion of the researches regarding the exploitations of the lands with water excess in the national research programs subjects;
- elaboration of the complex design themes for the sustainable use of the antropic eco-systems in the areas with excess water and setting up of the protected areas;
- elaboration of the research programs under the special scientific organisms management at national level, programs consisting in specific objectives for different categories of limitation factors for the exploitation of the land with water excess.

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