

## **CONTRIBUTIONS OF PLANNING ENGINEER AND RESEARCHERS FROM THE FOREST RESEARCH AND MANAGEMENT INSTITUTE TO THE WATERSHED MANAGEMENT ACTIVITY DURING 1950-1992**

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### **ABSTRACT**

This paper present details related to the research and study of many aspects on the torrential phenomenon and degraded lands. The planner engineers solved the problems related to torrential correction and degraded lands asked by the beneficiaries.

They had to establish the most suitable functional and economic solutions to solve all sorts of the projects developed in the time. The beneficiaries from the water management, railway administration and national roads, local administration and forestry domaine appreciated them.

**Keywords:** torrential watershed management, afforestation

Few years ago, planning engineers from the watershed management activity of the institute, with the support of the technical staff from all the forests districts under guidance of central administration, achieved one of the important works of this sector called: "Management of the torrential watershed in Romania: inventory of works executed between 1950-1992, their conduct and effects, proposals for continuation".

This period was established because the 1950 means, on one hand, the revival of the activity after the second world war and, on the other hand, represents the beginning of the torrential watershed management process at national level, and 1992 represents the moment when the Forestry Department proposed and endorsed the inclusion in its program and financing of torrent inventory.

The inventory developed in every forests district from the entire region with these problems. The register of the data was made on the questionnaire (for 17 information) for each torrential hydrographic basin or amelioration perimeter.

**As a synthetic report of the activity:**

- There were achieved works for watershed management and ecological reconstruction on degraded lands in 3166 basins and perimeters with a surface of 983745 ha, which means 4.14% of the entire country area;
- works on torrential water network over 1800 km, around 10% of the network length. In this area there are still over 2150 km who need to be rehabilitated
- in this period there were executed:
  - tree plantation on 220000 ha of degraded lands, of which 158,600 ha of forests included in forest management, and 61,400 ha there of plantations with a specific system
  - channels made simple concrete, masonry and mortar, chipboard enforced or not or poured on slopes, soil with traverses, also other longitudinal works which together totalized 1.898 pieces, respectively 155.157 m in length;
  - transversals works (traverses, rapids and barrage) of concrete that was reinforced or not, stone brickwork with mortar, prefabricated elements, soil etc, their number is 13.496 pieces;
  - there were executed simple terraces on more than 52.070 km, over 2.611 km sustained terraces, over 1.085 km as well as wattle-work, rapids of dry brick stonework or dry brick stone on gabions etc 192 km.

All these works were aimed at protecting many social-economics objectives in the country, many of them have a national importance, strategic for the economy (watershed management or water supply, railways and national roads, industrial objectives) also with locale importance (localities, districts roads, communes, forestry roads, agricultural lands etc.).

After a calculation, the annual economic effect of works is around 600 billion lei and over 400,000 m<sup>3</sup>/year of wood that can be produced in plantation stands. Very important is the effect on the environment through the reinstallation of the forest vegetation on the degraded lands.

The inventory of torrent correction activity and land improvement performed over the period 1950-1992, establishes the progress of actions in Romania and what works are still needed in these basins.

A team of planners-engineers, coordinated by a head of project had participated in the collection of data and in the development of documentations. A very large number of specialists from administration, education, production, research, project management, construction had participated in torrential watershed management.

Some of them have died and we wish to pay our respect and express our full gratitude for what they have done. The conclusions of the researches and studies sup-

ported and still support the progress in this sector.

We will give the names of these representatives:

- Dr. Stelian Munteanu, full member of the Romanian Academy - professor awarded by the Academy;
- Dr. Constatin Chirita., professor, member founder of the institute;
- Dr. Ion Z. Lupe, professor, member founder of the institute;
- Dr. Atanasie Haralamb, professor;
- Dr. Constantin Arghiriade, professor, member founder of the institute;
- Dr. Eugen Costin, former director of the institute, FAO adviser;
- Dr. Constantin Traci, head of laboratory in the Institute, awarded by the Romanian Academy;
- Alexandru Apostol, member founder of the watershed management collective;
- Traian Mecota, member founder of the watershed management collective;
- Dr. Nicolae Lazar, lecturer, awarded by the Romanian Academy, director and head of project - ICAS Brasov.

The Watershed Management Department had a rising period during 1949-1990. It started from a research nucleus continuously developing in the headquarters and territorial branches, from a project department, in Bucharest and then expanded with well-organized teams in Brasov, Pitesti and Focsani, with its own construction enterprise and it was later separated in construction regional units.

Today we can benefit from the achievements of research and planning from the glorious period of the forest sector. We hope that this anniversary of seventy years activity of the institute will renew the tradition. We cannot say that in this moment there is nothing to be achieved in this activity. There are over 2, 500 km of torrential water network that are active and that each year lead to catastrophic floods and lot of suffering in the local communities.

These days are made for celebration, for reviewing the results and conclusions. And today we will try to present some of the research and management planning achievements of the institute, together with the higher education that made possible the correction of over the 1,800 km torrential water network and the afforestation of about 220,000 ha degraded lands.

In this field, researches and studies were performed to establish the role of torrents in small basins. There were studied the relation between rainfalls, the characteristics of the basin and different other uses, on one hand, and, on the other hand the terms of the equation on water balance; there were established the relations between the characteristics of the basin, surface run-off and erosion processes correlated with the species and stand characteristics. The results were used to dimension the watershed management works.

Researches were performed in forest and torrent hydrology: Constantin Arghiriade, Petre Abagiu, Emil Untaru, Cristinel Cristescu, Gheorghe Moja, Iosif Ciortuz, Alexandru Apostol, Nicolae Gologan, Ioan Clinciu, Nicolae Lazar et all.

The studies and the technical solutions aimed at enriching the watershed management construction types that will fulfill the requirements for stability and resistance, for reduction of work amount and costs, for improvement of implementation technology, by increasing the work productivity and mechanization of the works.

Thirty-five types and variants of construction solutions were conceived and applied in planning and implementation. The authors are professors the higher education institutions, researchers, planner engineers and constructors: Stelian Munteanu, Ioan Clinciu, Radu Gaspar, Alexandru Apostol, Nicolae Gologan, Iulian Voiculescu, Constantin Avram, Vlad Pârâu, Vasile Oprea, Fotin Necula, Valeria Gologan, Boris Alexa, Emanuel Alexandrescu, Nicolae Morar, Irina Novacovski, Nicolae Sihota, Paul Mesina, Viorel Popovici, Aurel Ungur, Eugen Cârçu, Constantin Marineata, Constantin Arghiriade, Cristinel Cristescu, Adrian Ionescu, Alexandru Comanescu, Anatolie Costin, Tanase Anghel, Costica Popa, Andrei Adorjani; Traian Mecota; Costantin Iliescu; Gheorghe Codoi; Gheorghe Rosianu; Gheorghe Niculescu; Ion Miulescu; Dinca Teju; Vasilica Marineata; Igor Tabacaru; Marian Popovici; Stefan Botgros; D. Kraft;

I. Illyes; Vasile Matasaru; Cezar Ungurean; Sandica Driu; Corina Gantz; Costica Anastasiu etc.

The research activity on the afforestation of degraded lands was very rich and it was started after the establishment of the institute and it continues today. Many experts in research, planning and production were involved in this very complex activity. We can mention: Constantin Chirita; Ion Lupe; Constantin Traci; Eugen Costin; Emil Untaru; Nicolae Bogdan; Constantin Rosu; Marin Diaconu; Ilie Musat; Grigore Caloian; Gheorghe Ceuca; Traian Ivanschii; Iosif Ciortuz; Anatolie Costin; Constantin Anghiriade; Atanasie Haralamb; V. Frangu; Nicolae Geambasu; Costica Constandache; Gheorghe Rosianu; M. Greavu; Anatolie Marian; Vasile Oprea; Marian Popovici; Costica Anastasiu; Corina Gantz; Gheorghe Caragheorghe; Mihaela Manescu; Melanica Urecheatu; Rodica Ungureanu, as well as other specialists from the forest units who participated on this action. We can mention the important regions of the country where the results of researches, planning and production were implemented:

- Vrancea;
- Constanta and Tulcea;
- Portile de Fier and the Danube Gorge;
- Chineja Watershed;
- Mobile sands from the south of the Oltenia and the south of Moldavia;
- Danube Delta etc.

The results of the researches were implemented in practice through the "Technical guidelines" endorsed by the ministry. These guidelines were applied in the actions developed for the improvement of degraded lands and torrents correction, especially for the afforestation of degraded lands.

- During this period, the researchers and planner engineers together with other specialists, provided the data for elaboration the documents that contributed to the development of the torrential watershed management:

- Guidelines on degraded land improvement and torrent correction, developed in 1948 (Al Apostol, S.A. Munteanu). They were included in the Forest Technical Guidelines from 1949;
- Legal documents have been developed with the participation of:
  - in 1955: C. Arghiriade; Gh. Agapie; Al. Apostol; A. Costin; R. Gaspar; Tr. Mecota; Gh. Mosandrei; M. Petcut (manuscript);
  - in 1956: R. Gaspar; V. Matasaru; Al. Apostol (manuscript).
- Guidelines on the planning of torrential watershed management and land improvement works published in 1959 (R. Gaspar; V. Matasaru; Al. Apostol).
- Standards on the planning of torrential watershed management and land improvement works published in 1967 (R. Gaspar; Al. Apostol; C. Traci; P. Mesina; F. Necula; - Coordinator R. Gaspar).
- Solutions for the planning torrential watershed management works - Standards for planning activity 1990 (specialists from the project, research and high education - manuscript).
- Standards for watershed management work planning (Coordinator N. Lazar; B. Alexa; Ioan Cliniciu; Radu Gaspar; Nicolae Lazar; Vasile Oprea - manuscript 1995).

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We have presented shortly the activity of researchers and planner engineers of the institute, appreciating that the results of their works, the dedication and perseverance that made possible the achievement of documentations necessary for consolidation of 1 856 km torrential water network in 3 166 watersheds and the afforestation of 220 000 ha degraded lands, all during the period 1950 - 1992.

He hope that the next anniversary on 2013 year we will have more results.

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