

Some aspects of organizing the maintenance of drainage systems in Czechoslovakia

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1 Introduction

This paper aims at discussing several aspects of drainage projects maintenance in Czechoslovakia including socio-economical factors that may be regarded as particularly important. As the situation may differ from those in many countries of the world, I would like to present first some general ideas about agriculture and farming systems in Czechoslovakia and about the role of drainage under Czechoslovak conditions.

Czechoslovakia covers an area of 128 000 km², of which 68 500 km² are nowadays agricultural land. Arable land covers 48 610 km². Of the entire working population 13% is employed within agriculture contributing 6.2% to the state yearly income. Characteristic for arable farming is the wide variety of geomorphological and soil physical conditions over the country. The lowest parts, flatlands with the best soils, are at about 200 m above sea level while the highest point of the country reaches more than 2 600 m. Agricultural land under cultivation (forests excepted) can be found locally at an altitude up to 1 400 m, intensively exploited arable land up to 1 000 m.

Almost all the common soil types can be found in the country and apart from some highly fertile soils in the lowlands one can hardly speak about any uniformity or even homogeneity from a physical point of view. The cropping pattern is rather extensive; wheat, sugar beet, maize and vegetables are the main crops grown on the low flatlands while potatoes, rye, oats and forage prevail elsewhere.

According to data of 1985 the total gross agricultural production amounted to US\$ 8.74 milliard, out of which US\$ 3.98 milliard came from arable farming. These figures look rather good for a relatively small country if one considers the variety of basic factors affecting the agricultural process. But beside the optimistic figures there are points more or less closely connected with already solved and still existing drainage problems and with the maintenance of drainage systems, that require to be analysed within the framework of general circumstances.

Before the second world war and shortly afterwards the organization of the agriculture in Czechoslovakia was based on private land holdings. Family farms were predominant and the farm size was usually between 3 and 15 ha. Parcelling of the agricultural land resulted from long-term physical and social conditions and although it was far from optimal according to present-day conception, it reflected more or less the geomorphological and hydrological picture of the country. After the second world war the entire organization of the agriculture in Czechoslovakia changed completely and followed the Soviet scheme of agriculture. During the period 1950-59 about 95% of the land holdings disappeared and two new forms of farming were introduced: cooperative farms and state farms. It is not the aim of this paper to discuss that procedure

with its control in top-bottom direction but two characteristic phenomena are essential for our topic.

By so-called ploughing away the balks, single fields were joined in such a manner that new fields of more than 15 ha in a single plot were no exception. The cropping pattern was changed and the area of such a cooperative or state farm is now almost 3 000 ha on an average. The whole action was planned and implemented without having a look at possible effects on the agrohydrological, soil physical, erosion control or ecological situation of the areas and of the whole region. On one hand the situation of that period didn't give much room to go deeply into these aspects and on the other hand, there was still a lack of knowledge and experience. Former drainage systems lost their function and the traditional way of maintenance by the local farmers was abolished. Partly because of that and much more because of the influence of negative factors that arose from the new situation, soon afterwards 60% of all the soils could be classified as soils having a low or very low potential with respect to fertility and to yield. The majority consisted of soils with newly arisen drainage problems, waterlogged grasslands and pastures, soils with extremely high deviations in physical and chemical properties, devastated land and finally soils liable to all kind of erosion. Although these effects and consequences were simply overlooked during the period when the new schemes were made, later on they became a problem of the first order. A reliable investigation estimated an area of 1 743 000 ha to be drained, about one quarter of all agricultural land. The problem, suddenly regarded as a really huge one, seemed perhaps too huge to be solved with a cool head. All attention and effort with official support were put on design and execution of new drainage projects, but the maintenance was again underestimated. Moreover, new organizations dealing with drainage didn't even incorporate any scheme of maintenance and no budget was established for this purpose. And what are the practical results? The area still to be drained is at present reduced by about 1 013 000 ha, and about 730 000 ha are still waiting for drainage. But in addition the need for reconstruction of drainage projects that are not properly functioning due to insufficient maintenance or no maintenance at all, presents at the moment a figure of 361 000 ha, thus 35% of the entire area that has been drained.

Over a very short period the basic conditions for farming were changed including such points as legislation, real estate evaluation and all the remaining socio-economical relations. The farmers, who had been cultivating their land throughout generations, were facing a new, strange situation without much chance to be seriously listened to. Then the cooperation itself, at least at the beginning, was more a simple word than the real cooperative spirit. The feeling of being insufficiently involved led further to indifference and even to irresponsibility, and resulted in neglecting maintenance of drainage structures, which depended at that time only upon their own activity.

2 Today's state of organization and practice of drainage maintenance

2.1 Rules for maintenance

The abstract from the general methodology for the organization of drainage maintenance, that has recently been elaborated by the Ministry of Agriculture, says besides other rules:

- a. All institutions involved in drainage projects preparation, starting from feasibility study and continuing with design, financing, execution and operation, are obliged by law to conform their activity to new standards and regulations established by the ministry;
- b. In order to achieve long-term functioning of the drainage system, all institutions involved in carrying out drainage projects must be able to provide for:
 - Sophisticated design, covering all financial, technical and technological requirements for maintenance;
 - Regular inspection of the installed system;
 - Cleaning when necessary.

Further specifications are:

In order to achieve reliable inspection, monitoring and maintenance, it is a prerequisite to map out the situation how the drainage system was actually installed (so-called as-built data) and the record should mainly cover:

- Precise drawings of drains, manholes, collectors and outlet structures;
- Elevation and longitudinal sections;
- Some reference points of structures.

The task of inspection and checking distinguishes three levels:

- The delivery check looking for the quality of structures, free profiles of drainage pipes, straight lining and prescribed slope of pipes;
 - The routine inspection at least once a year and during the first year after installation as often as necessary, in order to find out the real quality and efficiency of the system and so to enable users to judge it within the allowed time;
 - The thorough checking of the drainage system when it appears to be necessary;
- c. In order to secure good conditions for the main outlets, a strict cooperation with organizations operating under the Ministry of Water Management is ordered (see further);
 - d. Special attention must be given to provide for sufficient maintenance equipment. If suitable machinery has to be imported from free market countries, it is the duty of the ministry to obtain the hard currency reservation;
 - e. A new system for the financing of maintenance has been introduced, based on sharing the expenses between the cooperative (or state) farms themselves and the state subsidy, in proportion to the yearly income-outcome balance of the farms.

2.2 The organizational structures

Three ministries are more or less involved in the preparation and maintenance of the drainage projects:

- Ministry of Agriculture and Food Production (MA);
- Ministry of Water and Forestry Management (MW);
- Ministry of Public Works (MP).

A simple scheme, showing the institutions directly involved, is presented in Figure 1.

The symbols in Figure 1 stand for:

- a1 Government Service for Land and Water Use
- a2 State Board for Management in Agriculture
- a3 Waterboards
- b1 Project designing institutions belonging to MA
- b2 Project designing institutions belonging to MW
- c1 Enterprises specialized in execution of drainage projects
- c2 Executive enterprises, operating mainly in public works, but in some cases also in drainage projects.

The Ministry of Agriculture (MA) is fully responsible as the main institution for drawing up the technical regulations that after justification must be followed by all the units subordinated to the ministry (a1, a2, b1, c1 and the farms themselves).

MA takes the responsibility for negotiation with other departments which are placed on the highest level of management. It has to approve and sign the drainage project

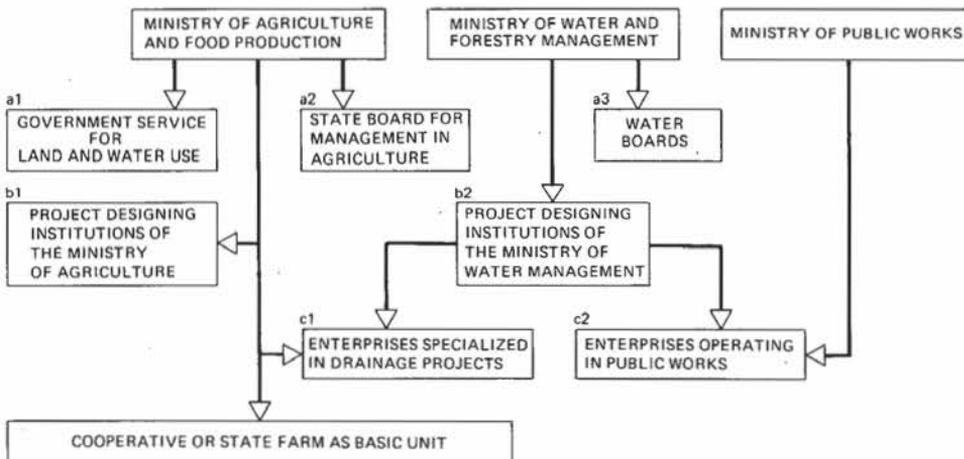


Figure 1 Scheme of directly involved institutions

budget with special attention for the budget part reserved for maintenance. Moreover, MA is the only institution that can permit the purchase of imported machinery for maintenance.

Under the control of MA are about 35 000 km of watercourses, so called 'agricultural watercourses' with a catchment area less than 50 km². It means that these courses have to be maintained within the range of agriculture without participation of the Ministry of Water and Forestry Management.

The institutions supposed to fulfil the main part of the management and control of maintenance (a1, a2 and a3) take care of the investment policy and, in a later stage, of passing the subsidy for maintenance to the farms. They must submit the feasibility studies and project schemes to MA in order to get final approval before the design is made. Recently obtaining the approval has become a real problem because of a strict attitude of MA towards projects with regard to maintenance. These organizations have to keep in close contact with both the design making institutes and the future users (farms) for finding the best solution to meet the regulations and at the same time the real facilities. This way to secure maintenance must be carried on without excuses. The Government Service for Land and Water Use (a1) makes the contracts with the farms and the designing institutes and then they list together the as-built data during the execution. Later on this team ensures the delivery check and the inspection over the first year.

The maintenance is done by the farms. The farms according to the rules have to provide for both machinery and labour. The machinery is often developed in the farm's workshops or just adapted from commonly produced agricultural machinery. The amount of money to be spent on maintenance is proportional to their yearly income. In fact, the budget approved by MA as subsidy for maintenance is a flexible one. MA, of course, has a very good record of the economical situation of each farm as it establishes compulsory plans for all the farms.

The Ministry of Water and Forestry Management (MW) is responsible for the maintenance of main courses according to the classification, which means courses with a catchment area larger than 50 km² as a rule. The inner structure of MW with regard to maintenance is completely different. Highly specialized waterboards (a3) were established already 30 years ago. They have their own staff, own budget and machinery. Generally these waterboards provide for very good maintenance of the main watercourses. About 25% of the drainage projects are designed by the institutes belonging to MW. Unfortunately the new regulations of MA are not approved within MW, so the situation becomes more complicated including the financial aspects. Some of these projects do not provide for maintenance at all but, for many different reasons, are still being executed, e.g. via enterprises belonging to the Ministry of Public Works (c2).

From the whole system it is clear, that there are no specialized institutes for the maintenance of drainage systems. The reason is, among others, that farms must have quite large workshops, where the cost of equipment is not much affected by buying or adapting special machinery for maintenance and also the labour possibilities on these farms are not much reduced in this sense.

It may be too early to evaluate this new system of drainage projects maintenance, but some remarks can already be made:

- The weakest point of the system seems to be the coordination between different ministries and their subordinate parts;
- Concerning the maintenance, it does not seem to be a sound solution to divide the watercourses into 'agricultural' and 'non-agricultural' courses;
- In spite of planning and MA's responsibility for the budgets, there is still a critical lack of machinery for maintenance;
- The system of financing based on the fact that under all circumstances maintenance will not be neglected due to financial reasons, seems to be very positive;
- Although the system solves the involvement in drainage maintenance at all levels, a comprehensive scheme for evaluation of the quality of maintenance is still lacking.

3 Conclusions

The subject of organizing drainage maintenance is so wide and complex that one must enter fields that at first sight, have nothing to do with drainage in order to understand really the problem. But often there is no other way to solve it. The Czechoslovak conditions can serve as a good example.

If one wants to rely on farmers cooperation, and this may apply not only to drainage maintenance, it is necessary to define in the entire organizational structure the room for the farmers themselves, for their activity, for using their experience, for giving them the chance to be really involved. This can hardly be secured by a top-bottom down organization.

How serious the drainage problem seems to be, it is wise never to stop thinking and acting in favour of maintenance, in spite of the fact that the official attitude towards maintenance may not be positive at the moment. If one waits too long before the system of maintenance is officially set up, the development of the surrounding circumstances might have gone too far ahead. Then the introduction of an optimal system is almost impossible and one gets too many institutions involved.

The only solution for the maintenance of drainage projects is not always to establish specialized institutions or enterprises. In the Czechoslovak situation of cooperative farming such a solution would even mix up the whole lot.

At last, the subject of drainage system maintenance has been seriously picked up in Czechoslovakia and the future will show whether the chosen scheme will work. But the way can be long and thorny before you tackle such a 'simple' problem, as this contribution has tried to show.

References

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