

CONSIDERATIONS ON THE ASPECTS OF LIFE AND THE SOCIAL FRAMEWORK PRODUCED BY HYDRO-ENERGY ARRANGEMENTS

Cristina Ionici, *University “Constantin Brâncuși” , Tg-Jiu, Romania*

feliciaionici@gmail.com

Abstract: *The existence of a hydrotechnical construction changes the environment and the natural or artificial ecosystems. By carrying out a hydropower or thermal energy arrangement (by using water cooling) and related industrial installations, by developing tourism and leisure and in general by economic development of the area, a significant number of jobs are created, which can even exceed local possibilities. By flooding the lake or by occupying some lands located in the route of the diversions or navigable canals, an agricultural land is lost, maybe of good quality, which was the object of work and / or the property of some people.*

KEY WORDS: hydropower or thermal energy, water, thermal stratification, hydroelectric facilities.

1. Introduction

However, in general, due to hydroelectric facilities, more jobs are created than lost. The development of new industries leads to an increase in the number of jobs, so to attract the population in the area. Population growth and tourism development determine the development of trade. Depending on the position in relation to the hydroelectric arrangement, the lands can change their value. Thus a very good quality land, which is located at the bottom of the accumulation lake or the diversion channel (or navigable), will no longer have any value, while a weaker land in a drier area, which it is now irrigated, it will significantly raise its value.

2. Data analysis

Large accumulation lakes have an important impact on agriculture and animal husbandry, as they occupy large areas of cultivated land and pastures (sometimes the only ones in the area). Therefore, the decision to build the hydroelectric plant, in these cases, is not justified unless the advantages are significantly greater than the negative effects. For example: the flooded land is tens of times smaller than

the land protected from floods as a result of the construction of hydroelectric facilities.

Deforestation of forest areas can lead to the degradation of arable land or pastures. Also, the increase of the lake level leads to the increase of the groundwater level and implicitly to puddles on some low arable surfaces.

By storing a large amount of water in the accumulation lake, the premises for the construction of irrigation systems are created, which significantly raise the value of the land on large areas.

The realization of hydroelectric arrangements is usually an opportunity to improve and diversify the existing communication routes (roads, waterways, etc.). Even the dam itself is a bridge from one bank to the other, its canopy can be arranged with minimal expense as a crossing road, which can be a major advantage in the middle or lower course of a river or stream.

Waterways and diversions are also provided with bridges for crossing from one bank to another in areas of interest to wild and domestic people and animals.

Also, the more difficult to reach areas, where hydroelectric facilities are generally built, become easily accessible.

In order to maintain an effective road network in the area, it is good that most of the roads that are built during the development are designed with definitive utility. Obviously the development of the road infrastructure together with the tourist possibilities offered by the realization hydroelectric facilities (especially the accumulation lake, the dam or the navigable canal) determine the development of tourism.

However, in addition to a well-developed road network, tourist objectives, attractive landscapes and an appropriate hotel network are necessary for tourism. In this sense, an effective solution is to design the necessary accommodation spaces during the execution of the work with final utilities. In this way, a civilized accommodation is solved for the workers and technicians who build hydroelectric facilities, the temporary colony is no longer decommissioned and significant incomes can be obtained after the completion of the execution. Otherwise the aesthetics of the area where the site was organized with the temporary buildings not disused, with the accommodation chosen perhaps at random, with the injuries to the environment due to the gravel, will be extremely unpleasant and if corrective measures are not taken urgently necessary, the tourist influx will diminish considerably.

The beauty of the new view created by the dam, naturally framed in the existing setting, can of course attract tourists eager for a grand view or to practice water sports, swimming or fishing in the lake.

2.1 Protection against natural hazards, drinking water supply and social acceptance

The dam, through the huge possibility of storing the accumulation lake, protects the population downstream from floods, but at

the same time, also through the amount of water accumulated and directed through the irrigation systems, it also protects it from drought. On the other hand, large dams introduce a social risk related to the probability of their damage. [2]

Drinking water is also supplied by drawing water from the lake. Therefore, detailed studies on the physico-chemical characteristics of surface and groundwater in the area of hydroelectric development must be carried out and, if necessary, the negative effects that the construction of hydroelectric development causes on the quality of surface and groundwater (eutrophication, modification groundwater flow regime). At the same time, the water consumption index also expresses an index of people's quality of life, with the highest per capita water consumption being recorded in countries with a high standard.

The degree of social acceptance is generally directly proportional to the efforts made by the authorities to explain the advantages deriving from the construction of the hydroelectric arrangement. It was observed that in order to reach a smoother and faster social acceptance, it is necessary to exemplify on concrete cases the achievement of such objectives with the ascertained consequences.

During the execution of the works, the appearance of the workers who build hydroelectric facilities. exerts an impact on the life of the local population through the conflicts that appear mainly due to the relations with the local women and by bringing new customs and traditions. The impact is all the more serious as the accommodation spaces for workers are closer or even inside the localities.

2.2 Expropriations, rural exodus and health

Especially in the case of dams whose accumulation lakes can occupy

large areas, thus causing massive expropriations, there are significant population movements. This situation must be avoided as much as possible, by studying several different variants from the point of view of the lake surface and by preferring a variant that may be less successful from an energy - economic point of view, but for which the expropriated surface is minimal.

However, if expropriations occur, an attempt should be made to fix the displaced population in a region close to accumulation, around which, in any case as a result of the development of the economy and tourism, an additional workforce is needed.

Regarding the health of the population in the riparian zone, it can be affected, in some cases, by the excessive multiplication of mosquitoes or by the appearance in the lake water of pathogenic bacteria such as salmonella and shigella (water being in principle an ideal means of transmission of pathogenic bacteria).

Typhoid fever and enteroinfections can be transmitted through water. Also, if pollutants are discharged into the lake or by any other means, some of them (mercury) can accumulate in fish, which can then lead to poisoning.

Factors that influence the energy production of hydropower plants and, implicitly, the flow of revenues and expenditures. During the operation of hydropower plants, a number of technical issues can have a major impact on the flow of revenue and expenditure. These are:

- reduction of energy production compared to the average established in the design stage, due to the poor quality of hydrological data or their overestimation;
- failure to meet the guaranteed parameters for the equipment (power, efficiency, long-term operating behavior, high costs related to maintenance, repair of damage, etc.),

due to the poor quality of the design, assembly and assembly;

- decrease in energy production due to a dry period (low rainfall). If the operator of the micro-hydropower plant is not able to supply the amount of energy contracted by consumers, it could be penalized. Another possibility for the micro-hydropower plant operator is to buy expensive electricity from other sources (eg coal-fired power plants) and resell it at a lower price to the customer in order to fulfill its contract tasks. Of course, this option will cause significant financial losses;
- the rupture of the dam is a major accident with important consequences such as the closure of the micro-hydropower plant for a long time.

Statistically, the combination of a flood upstream of the dam and damage to the spillway are the most common causes of accidents. Secondary causes are foundation errors or water infiltration

If the dam is a backfill cone, it could even lead to dam damage. Another cause that could lead to the destruction of the dam is earthquakes

- clogging occurs due to the sedimentation effect of solid suspensions, which leads to increased deposits on the bottom of the accumulation lake. The result is a reduction in the amount of water that can be stored and, therefore, a reduction in the amount of energy that can be produced.

Environmental issues caused by energy production, maintenance and repair activities. There are costs associated with the requirements to reduce, limit and even remove the impact of these environmental consequent.

Sensitivity analyzes must be performed in an economic study to analyze how technical and economic indicators vary, especially profitability, when each of the components of financial flows varies.

For example, in the case of hydropower facilities there are many

elements that have a lower degree. or greater uncertainty:

natural conditions (geological, topo, hydrological), the size of the investment, the duration of the work.

- the amount of energy produced during the recovery of the invested funds depending on the real character of the respective period, production costs and capitalization prices and their evolution in analysis periods and especially in the period of return of possible loans, evolution of restrictions imposed by environmental conditions, the amount of water possible to be removed from the energy circuit to ensure various consumers, etc.

The functional impact of hydropower facilities is the impact on the environment, which results as a result of the performance of their designed functions or as an implicit and inevitable result of the performance of the functions. [2] The designed functions of the hydrotechnical arrangements are very diverse:

- electricity production;
- providing water supply sources for any type of use;
- regularization of riverbeds;
- flood protection, shore protection;
- water transport, improving water quality, facilitating transport.

The fields of the environment on which the functional impact is exerted can be the most diverse: economic, social, ecological, geophysical.

In this way, it is often found that, on the whole, a well-designed, built and exploited hydropower facility can be beneficial for the environment in general and for the natural environment in particular.

3.CONCLUSIONS

The hydropower arrangements with accumulation lakes have implicit important effects on the downstream hydrological regime, regardless of their uses and their mode of exploitation, by regularizing the water stocks. Among the most important effects are: attenuation of flood waves, increase of the minimum insured flows and modification of the flow regime downstream of the restitution of the used flows.

In order to establish the “risk” of the respective project, the “sensitivity” calculations must examine how the variation of each element influences the economy of the respective project as well as the situation in which several independent factors can change simultaneously.

For example, in the case of hydropower facilities, it is possible to extend the execution time due to some unforeseen geological accidents initially, and after the completion of the execution to follow a deficient hydrological period.

BIBLIOGRAPHY

[1] V. Nisteanu , Water resources management and environmental impact, Bren Publishing House, 1999

[2] A. M.Tătar, Research on CO pollution in urban areas, REV.CHIM.(Bucharest), 69, No. 5/2018, pag. 1075-1078, Journal ISSN: 0034-7752, Impact factor 1.412

[3]. [http://www. Hydropower.ro](http://www.Hydropower.ro)

[4].<http://www.hydrop.pub.ro>