A DEFECTIVE PROJECT: ILISU DAM

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The Ilsu Dam will submerge not only Hasankeyf but also many other small villages and countless ancient monuments, will cause the displacement of 15.304 persons directly and 39.498 indirectly, and is furthermore predicted to cost a total of 1,200 billion USD: Ilisu Dam is an enterprise that must be discussed very seriously.

Activities for the Ilisu dam, which is a part of the GAP (South East Anatolia Project), had already started in 1951 with a research done in the area under an altitude of 550 m. In 1971, "Tigris River Pre-feasibility Report" was prepared by the EIEI (Electricity Affairs Etude Administration). Also a fieldwork research was conducted in 10 different areas that were seen as possible options for a suitable dam site. In 1975, the same institution prepared a Geology Engineering Report in which technical and economical feasibility of these 10 places was discussed. In the years 1980-82, an international consortium prepared a feasibility study and finalized the draft. The project was put into programme in 1998.

The only available public documents concerning the Ilısu Dam Project, which is extensively discussed both at home and abroad, are the Environmental Impact Assessment Report (EIAR) and its annexes (prepared in 2001 and published in 2005). Authored by the "Ilısu Environment Group", which consisted of 4 foreign-based institutions, the EIAR was prepared upon the request of the Export Credit Agencies of the countries where contractor firms were based and as a precondition for guaranteeing its approval. The Pre-feasibility Report, Geology Engineering Report, Feasibility Report and the documents relevant to the last Draft that was prepared earlier are inaccessible to the public.

In spite of the significant developments concerning research/investigation methods and techniques, of the vast amount of experience gained during the previously completed projects and of the utterly changed economic conditions, neither the engineering geology nor the feasibility evaluation reports were renewed, but were only reiterated. Thus, being the most expensive and one of the most destructive among all the GAP dam projects, the project planned to be implemented at the moment is based on evaluations done 50-65 years ago.

Furthermore, according to the information in the EIAR, the only accessible public document, this is indeed a defective project, which will have not only an unduly high economic cost but also really heavy environmental and social costs as well.

This is most evident from the study dated 1954, in which 10 different options were discussed for body of the dam. Following statement in the EIAR attracts immediate attention: "9 out of 10 of the dam places, topographically narrow places of the valley and one in a much wider place" From this statement, it can be said that, as the body of the dam is the major determinant of its cost, construction costs of the dam would be much less for the 9 other options compared to the Ilisu Dam, the only option topographically in a "much wider" place

in the valley. 5 of those other options are on the upstream of the Ilısu, on the side of source, and 4 of them are on the downstream.

In the geological structure of the vicinity there are three different stowages of rock. One of them, Midyat Formation is composed of a thick limestone formation. This limestone is affected by groundwater which is going along the cracks and is “carstified”, it has diffused and extensive melting spaces in it. Surface water easily leaks through that stone and can spread very fast. That’s why, in this part of the Tigris Valley, karstic spring water sources are getting empty. The researchers in 1954 and investigators in 1971, excluded 9 other options in the narrow places of the valley which would coast less, with the reason ‘if the body of the dam is built here, water may leak from the bottom and to be able to prevent it, it will coast high prices to make it leak proof’ and chose Ilisu. Ilisu is placed in an impermeable clay stone field where Germav formation comes up. Thus, it will indeed not be necessary to implement extensive activities for making the dam site impermeable.

But in a remarkable part of the dam site, on an area of almost 300 km^2, Midyat lime stones rise to the surface. Furthermore, these lime stones, on an east-west axis, stretch out the curls even beyond the basin. Moreover, these curls are crossed by the fault lines on the axes of E-W and WNW-ESE.

The EIA report contains no discussion whether these lime stones will leak water and let it go out of the catchment area or not. There are several springs which are flowing through Midyat lime stone to the Tigris Valley and their flow may reach 800 lt/sc. According the EIA, in many locations the groundwater is provided by the Tigris river. Besides, Gercüs formation which is placed under Midyat lime stones contains dissolvable “jips” and anti-hydrates. Even it is clear from the geology map, when the water impounding starts there is a big possibility that water will leak through Midyat Lime stone towards Sirnak out of the basin. In addition, the material fault lines, as a facilitating factor for karstic structure and underground water, may aggravate it. If it happens, to be able to catch the water in the reservoir, there must be some measures to be taken for making the lime stone impervious, in other words, it may be necessary to build huge underground dams. Then, the problems which were thought to be avoided at the cost of building a much bigger dam will appear again for the project, and this time in an even more serious way. Doubtless, the rising costs will only be in favor of the contractors, who will consequently undertake other new and huge projects.

Dicle Valley, close to Hasankeyf. In the left part there is stretched out continuancly a fault line, and with similar it is stretched out of the eastern side of the reservoir basin

During the last 50 years, significant improvements took place in remote sensing technology and important tools were supplied for investigating such karstic systems in a better way. Isotope technique was developed and facilities were created for researching water sources both in and out of the river basin. Beyond all of them, the developments in the technique and methods of geophysics provided great opportunities for researching these karstic systems from the surface. Despite all these recent developments, Ilisu dam project is still based on, and will be constructed with, the data collected with the technology of 50 years ago, and this is a grave and unacceptable defect.

Price of building such a big dam body cannot be disregarded as well. Due to the specific choice of Ilisu as the site, the dam will be 1810 m length, 135 m height and 610 m in the bottom and 15 m wide on the top. So it will be necessary to build a body of 43, 8 million cubic meters volume.

After the emergence of a great public awareness and sensitivity about the historic settlement Hasankeyf, one of the places that Ilisu Dam was going to submerge, the renewed EIAR also partially discussed (and dismissed) other possible options. First, an option that would save Hasankeyf by bringing down the dam altitude code from 515 m to 495 and thus making the dam smaller was discussed. It was argued that under these conditions the capacity of the power plant would decrease from 1200 MW to 600 MW. But in such a case, energy production does not fall into half, but gets down from 3,6 TWh to 2,3 TWh. This means, with this option, it is possible to increase the productivity from 37 % to 48 %, and thus to work with a lower capacity but get more energy. Furthermore, it is also not mentioned in the EIAR that both building expenses and cost of the energy unit will rapidly decrease in this option, as the body volume will get less, more than one fourth of the original. This option is cursorily passed over and not discussed well in the EIAR.

Because it is discussed very often, option of building a smaller dam is touched upon slightly in the renewed EIAR. If a lower Ilisu dam, Hasankeyf dam, Botan dam and Garzan dam are built, the lake surface of these dams will occupy only 64 % of big Ilisu dam, the body

cost and natural expenses will reduce by 20 %, and the energy production will decrease by only 13 %. In particular, if the Garzan dam option is given up, lake surface will be reduced by half, the bodies of the dams will decrease by 64 % of the Ilisu dam, and 82 % of the energy foreseen by the original project will still be produced. According to the EIAR, this option is not viable since it wouldn't be possible to use some of the extra water that comes due to seasonal changes. Even the evaluations in the EIAR which were done in order to defend the Ilisu, shows that the Ilisu project is defective in terms of economy too.

Due to the chosen place and the river basin, the length of the dam lake will be 136 km and its sphere will be 300 km^2 at the normal water level and 313 km^2 at the maximum. The length of the lake will be 136 km, and its width will be between 500-2000 m. This means, an extremely long and narrow lake will affect an extensive geography incomparable to any other dam options.

It is foreseen that the dam will cost € 1, 8 billion, € 1, 1 billion of it will be used for the construction of the dam and the power plant, and the rest of it will be used for resettlement, expropriation and infrastructure investments. It is very interesting that, the dam project, tendered for € 1, 8 billion before, is now contracted for only € 1, 2 billion. It is clear that the works which will be done by the public institutions are omitted from the total cost.

The dam will provide employment for only 420 persons upon its completion, yet it will cause displacement of thousands of people. Because of the dam 53 villages, 14 hamlets and the town of Hasankeyf will be resettled, 1112 km long energy line, 120 km long village roads, 148 km long state road and 5,575 m long railway will have to be renewed. The cost of the resettlement is more than the cost of dam and power plant.

Ilisu Dam is the most expensive one among all the dams of the GAP. The power plant with the minimum surplus factor will be established here, and so that, its investment value, which is calculated per a unit of power, will be the highest one as well. Thus, project's economics feasibility in the case of building a smaller dam that would not flood should be openly discussed in public. Apparently, such a change will both save Hasankeyf and improve the feasibility of the project.

Dam will be able to produce 1200 MW electricity, however it will use only 34 % of the established capacity. Because in our country the thermal and natural gas power plants which produce electricity as dependent on sources in abroad are operated continuously, with full capacity, in order to supply the needed power; however, the hydroelectricity plants are operated with a limited capacity only in order to supply the high need of energy that peaks in the morning and evening hours. The usage/exploitation rate of Atatürk dam is 48 % and Karakaya dam is 52 %. But Ilisu will not be as productive as others due to the specific location choice. Thus Ilisu dam will be the project with the highest amount of the investment cost per a unit of energy. Furthermore, these are only the foreseen figures. Due to unexpected costs, like having to implement new project steps in order to provide the necessary impermeability in the case of water leaks gaps out of the catchment, the cost of the project may increase further and its economic feasibility may become even worse.

Visibly, **this project is defective in terms of economy**.

The project also claims to improve agricultural irrigation, however 20% of "First and Second Degree Agriculture Areas" will be flooded by the Ilisu and the Cizre dams that will be built on the downstream. Thus, almost 6,000 ha agricultural area will be destroyed with this project. The production loss that will be brought about by its completion is also a defect of this project.

Lake area, which will be 300 km^2 during the normal levels of the water at 525 m, will decrease down to 100 km^2 when the water level drops down to 485 m level, that is the minimum level for operation. Thus, the areas that will be submerged will change between 100- 313 km^2. It is mentioned even in the EAIR that this situation will create remarkable environmental affects. Under these conditions, ditch water pools and humid areas are suitable places for production and diffusion of the bacteria that cause infectious disease through water. As a matter of fact, the findings of Assist. Prof. Dr. Ali Ceylan from the Medicine Faculty of Dicle University shows that these kinds of event have already taken place in the region of other due to other existing GAP projects. At an average, 80 % percent of all the diseases that are spread by contagions in water in Turkey occurs in the GAP region. EIAR contains no preventive measures in terms of these diseases. The project is **quite defective** in this field.

Also it is foreseen that in a couple of years after the dam is built, with the eutrophication of the reservoir, the quality of the water in the lake will be significantly degraded. Again according of the EIAR, this is the hardest problem to cope with. None of the measures EIAR suggests are foreseen as a part of the project implementation activities. The only suggestions the EIAR could come up with are the use of chemicals and compost in the agricultural areas on the upper side of the dam, treatment of waste products in the settlements on upper side of the dam and keeping more water (!) in the reservoir. It is clear that the quality of the water both in the reservoir and downstream of Cizre will be degraded. The project is **openly defective** in this field.

Ilısu Dam reservoir will flood 6,000 hectares of land that is classified as 1. and 2. Degree Agricultural Field. After the establishment of the Cizre Dam reservoir, the land that will be flooded will be much bigger than the land that will be provided with irrigation by the dam. Also, because the material that the Tigris carries to the lowlands--which is useful for productivity of the soil--, will be kept in the dam in the long and middle terms, the soil will also get less fertile within time (the quality will get down). The fields that will be irrigated with the water coming from these two dams will be at the risk of salination. In the Harran plain, during the last 13 years, 8 % of the agricultural areas has been extremely salinated, while 1/3 has been salinated at medium and strong levels. In the beginning, in the Harran and Akçakale plains, the agricultural productivity increased 2,5 times and the value increased twice fold, however, then this increase got slower and finally stopped. This is because after the construction of the dams, the agricultural areas can not get enough of the material necessary for productivity as much as they used to, and they start getting salinated after a while. This will be also the fate of the plains on the downstream of the Ilisu-Cizre dams. Within this respect, **the whole project of the GAP must be evaluated again.**

The geologic unit that Hasankeyf is located on is composed of a trick/cellular rock. It can be excavated very easily and the excavated surface gets taffy; it does not get decomposed easily by atmospheric conditions. The monumental structures in Hasankeyf are also made of the stones of that rock and have the same characteristics. But, when this rock is submerged, and especially when the water level goes up and down, the carbonate pieces and cement which constitute this rock will get easily dissolved and all the historic monuments as well as the natural cliffs will be crumbled in time. So, once it is submerged, it is impossible to save Hasankeyf. After the life of the dam expires, only gaiter mass and mud will have remained under water. It is mentioned in the EIAR that erosion and land slip will also occur on the coast due to the changing levels of water. But, again, no remarkable preventive measure is suggested in the EIAR. That's another **defect of the project**.

Briefly, **this project is defective in the terms of geological sciences**. It is vital to make new investigations and to address and discuss the social, cultural and scientific issues within a participative, publicly open framework before it is too late. If the project is implemented the way it is foreseen at the moment, it is unavoidable that the amount of water foreseen to be kept will be less than expected, project will cost more than foreseen, and that the project will have negative affects on human and environmental health in the end.