THE USE OF DRINKING WATER IN THE CONDITIONS OF MAINTAINING ECOLOGICAL BALANCE

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Abstract
Central Caucasus is an important transit place for the "Great Silk Road"; an important role in it is assigned to the Baku-Tbilisi-Supsa and Baku-Tbilisi-Ceyhan oil pipeline, Baku-Tbilisi-Erzurum gas pipeline and the Baku-Tbilisi-Kars railway line which is at finishing stage of its construction, and others. The countries of Central Caucasus can make a meaningful contribution to the construction of the "New Silk Road" with other untapped rich natural resources. Especially attractive for investors can be the Georgian underground artesian renewable, biologically clean drinking water reserves of international importance; an effective utilization of their small part can make a significant contribution to the resolving of high quality drinking water supply problem for millions of people in Europe and Asia.
After the collapse of the Soviet Union, independent post-Soviet Georgia has passed through the toughest period of reforms, conflicts and development. A significant part of its territory is still occupied, the economy is weak; the country is oriented to the European Union. In this light the country should use foreign experience and capabilities in the real sector (agriculture, mining industry ...). In post-Soviet Georgia according to the current legislation, foreign investors enjoy the same rights as domestic ones.
A large part of the world's population suffers from water shortages. In Georgia this resource is virtually untapped (only 0.01 is used). This resource will further rise in price on the world market of raw materials. Through the participation of foreign investors Georgia can make its contribution to the solving of the above-noted global problem in different directions: By the exploitation of freshwater resources Georgia should become a larger producer and exporter of drinking water until the problems of products transportation arise; the second part of underground water reserves should be provided to Europe and other countries through pipelines. Thus, there is proposed a model of bacteriological pure underground artesian water supply from Georgia to Europe in the conditions of maintaining ecological balance. This model takes into account the analysis of water pipeline alternatives, "Georgia-Europe" pipeline construction, as Europe's population is in need of high-quality drinking water, and Georgia is interested in its export.

Keywords: *Silk Road, Central Caucasus, oil pipelines, oil pipelines, natural gas pipeline, underground artesian drinking water.*

JEL Classification: *M20, M21, Q20, Q25*

I. INTRODUCTION

The Central Caucasus has always been a key place (starting from the II century, BC) connecting the Asia-Europe "Great Silk Road". In modern times, the revival of this road is very important for the development of goods turnover between Europe and Asia through the alternative route (oil and natural gas pipelines, railways and roads). In the "New Silk Road" a great role is taken by: the Baku-Tbilisi-Supsa and Baku-Tbilisi-Ceyhan oil pipelines; Baku-Tbilisi-Erzurum gas pipeline; the Baku-Tbilisi-Kars railway construction, which is in the final stage of completion (Silagadze, 2010); the tunnel under the Bosporus which has already been brought into service, and so forth.

The South Caucasus countries can make a significant contribution to the construction of the "New Silk Road" not only through their geopolitical and economic direction, but also through their natural resources (Silagadze, 2010). In addition, in the South Caucasus countries oil and gas resources of world importance are

concentrated in Azerbaijan (Tvalchrelidze and Silagadze, 2013). Georgia is rich in hydro, wind and solar resources; particularly it should be noted Georgia's underground artesian renewable, ecologically clean drinking water reserves of international importance; the efficient use of its small part can make a big contribution to the settlement of high quality drinking water supply problem for millions of people in European and Asian countries. A large part of billions of the world's population still suffers from an acute shortage of drinking water of acceptable quality. Some researchers, including professors A. Tvalchrelidze and A. Silagadze have paid particular attention to the studies of this problem (Silagadze and Zubiashvili, 2015; Tvalchrelidze and Silagadze, 2011; Tokmazishvili and Silagadze, 2013).

In the given work we tried to show the "drinking water" concept which is based on the richest renewable natural resources of Georgia – one of the key countries of the "Great Silk Road."

II. POST-SOVIET PERIOD

Georgia is one of the oldest countries in the world, which lost its Independence in 1921 (Atanelishvili, 2006) and turned out in the former Soviet Union. After the collapse of the Soviet Union, Georgia as an independent post-Soviet country has passed through the most difficult period of reforms, conflicts and general development. Often there was posed the question: Can Georgia be formed as an independent and democratic state with market economy (Atanelishvili and Silagadze, 2010; Basilia, Silagadze and Chikvaidze, 2001). Yes, it managed, but it was very painful: a significant part of its territory is still occupied, the economy is weak, the country is oriented to the European Union (Silagadze, 2014). In this light, unique capability in the real sector (agriculture, mining industry) is not exploited (Silagadze and Zubiashvili, 2015; Tvalchrelidze and Silagadze, 2011).

In the post-Soviet countries, the most foreign investments were attracted to the countries which are rich in fuel and energy resources (Turkmenistan, Russia, Azerbaijan, and Kazakhstan) (Tvalchrelidze and Silagadze, 2013). Unfortunately, foreign investors pay relatively little attention to the extraction of other resources. In Georgia there are extracted precious metals, stones, coal, peat, thermal springs, chemical and agro-chemical resources, oil and gas, but their explored reserves so far are not large.

III. DRINKING WATER BUSINESS

A large part of the world's population suffers from drinking water shortages, and in Georgia, this resource is virtually untapped (0,01% of the resource is exploited) (Tvalchrelidze and Silagadze, 2011.

According to the current legislation in Post-Soviet Georgia, foreign investors enjoy the same rights as domestic ones. It should be noted that fresh drinking water will be even more expensive in the world market in the coming years. Georgian underground fresh water is characterized by good chemical composition and bacteriological purity, but public water supply problem is unsolved even in the vicinity of artesian water basins which include strategic reserves (Silagadze, 2014). In Georgia, bottled water ("Borjomi spring," "Bakuriani," "Bakhmaro," "Natakhtari," "Geva") business is developing in the conditions of minimum load capacity, but their share in the international market is insignificant (Tvalchrelidze and Silagadze, 2011).

Along with the foreign investors, Georgia can make a substantial contribution to the above noted global problem solution in different directions (Silagadze and Zubiashvili, 2015; Tvalchrelidze and Silagadze, 2011):

1) Through the exploitation of fresh water resource Georgia should become a big producer and exporter of drinking water in the international market to the extent that transportation will not create insurmountable problems (;

2) A part of underground water reserves should be supplied to different countries through pipelines, but it must not break the conditions of ecological balance.

Due to the gradual decline of drinking water supplies, the different regions of the world including Europe are facing acute problem which will become more acute in the coming years. A vast majority of the European population (especially in southern European countries), is supplied with ground water of poor quality. The problem is more aggravated by unprotected environmental conditions, which is directly linked to the population health. (Tvalchrelidze and Silagadze, 2011).

To eliminate deficit in drinking water Europe will need 120 million m^3 of fresh water per year. This problem can be solved by the part (1/20) of bacteriological clean fresh water reserves (2.3 billion m^3 per year) existing in Georgia; so the ecological balance will not be endangered. (In the conditions of maintaining balance, this product can meet the demand of many other countries). It should be noted that 92% of the fresh water reserves in Georgia are available for exploitation. (Tvalchrelidze and Silagadze, 2011).

It is clear that Georgia can resolve the problem of drinking water shortages for Europe and some other

countries, but how?

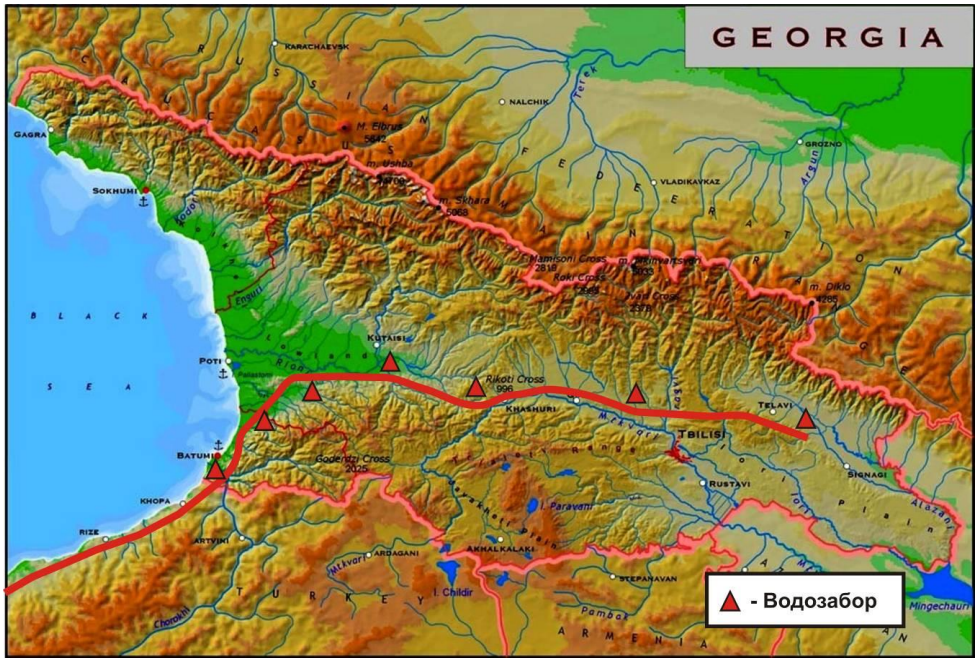
In the case of the first direction (Tvalchrelidze and Silagadze, 2011) realization we think that logistical problems will arise there: the Bosporus Strait will not be able to pass through a great volume of cargo (bottled water); the freight turnover will increase and become even more expensive; the problem can't be solved by the new railway line construction.

The problem of drinking water supply can be solved by the development of the second direction: the construction of the pipeline from Georgia to Europe. (Fig.1). (Silagadze and Zubiashvili, 2011; Tvalchrelidze and Silagadze, 2011).

Figure 1. Possible alternative routs of the water pipelines

For the purpose of water export by pipeline, first of all, drinking water-collecting constructions should be built in the territory of Georgia. (Fig.2). (Silagadze and Zubiashvili, 2015; Tvalchrelidze and Silagadze, 2011).

Figure 2. Water-gathering constructions in Georgia



The construction of water pipelines in the territories of Russia, Ukraine and Moldova is unrealistic, dangerous and impossible because of the situation existing there (Abkhazia, Transdniestria, Donbas problems). In fact, the only way to Europe remains via Turkey. This route is shorter than first possible one. (Figure 3). In this case to achieve interstate agreements are easier. Through private investments (approx. 12 billion US dollars) the realization of such a highly profitable project presumably is possible in four years, which will allow for getting a multibillion dollar profit. (Silagadze and Zubiashvili, 2015; Tvalchrelidze and Silagadze, 2011)

Figure 3. Possible version of water-distribution intra-European system

IV. CONCLUSION

The rapid development of the post-Soviet countries in the long term is impossible only at the expense of fuel and energy resources, without use of innovations and great potentialities of other resources. This refers also to Georgia, which in addition to that, so far doesn't use effectively and fully the potentialities of the real sector, and virtually doesn't use underground artesian water reserves. The realization of the concept, given in this work, of the supply of packaged drinking water and through water pipelines from Georgia to various countries, including Europe, will give a great chance to Europe and other countries to meet the demand of their population with cheap, high-quality underground artesian drinking water, in the conditions when ecological balance is maintained in the country.

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