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The annual total artesian water diversion plan of 300billion Square meters in the arid desert area of northwest China

Abstract

The water shortage in the arid desert area of northwest China has seriously restricted the healthy, balanced and sustainable development of the national economy. In the arid desert area of northwest China, the total budget of the full artesian water diversion project of 300billion square meters per year is less than 3trillion yuan, and the construction period is less than 10years. Hope the central government, Ministry of Water Resources, ministry of agriculture, ministry of water and power. And other major national economy and people's livelihood related departments and many experts and scholars, people with lofty ideals to pay high attention in a timely manner.

Keywords: northwest china, arid desert area, 300billion cubic meters per year, all their, the diversion planning

Zhenqiang Huang
Fujian Institute of geological exploration, China Bureau of chemical geology and mines, China

Correspondence: Zhenqiang Huang, Fujian Institute of geological exploration, China Bureau of chemical geology and mines, Fuzhou, China, Email kexuetansuoze@sina.com

Introduction

There are vast land resources in the northwest of China, with sufficient light, but due to drought and water shortage, the ecological environment is poor, the land desertification is serious, and the resources are difficult to develop and use.[1,2] As long as there is enough water resources, the northwest region will be able to expand about one billion mu of arable land and large grasslands. We will develop modern agriculture and animal husbandry, increase the output of grain, beans, edible oil, feed protein and non-staple food, and absorb and resettle a large number of people. Basically solve the problems of cultivated land, pasture, food, edible oil, protein feed, non-staple food and population security in China and other major national and people's livelihood problems.

Since the founding of the people's Republic of China, the central government, many experts and scholars, people with lofty ideals, have put forward the South-to-North Water Diversion plan, the Yarlung Zangbo River river closure plan to penetrate the Tibetan Plateau and lead to Xinjiang, further discussion on the southwest water diversion project and the Northwest Water Diversion project, the "Hongqi River" project of the northwest water diversion plan, and the introduction of the Bohai Sea water through Inner Mongolia into the "East water and West Water" of Xinjiang Project ideas And so on. After decades of efforts, China has finally completed the east line and middle line of the south to North Water Transfer Project. The situation of water shortage in North China was partially alleviated. However, due to the urgent demand for large-scale water transfer in the arid desert area of Northwest China, in view of the current situation at home and abroad and unreasonable obstruction from India, there is still a lack of economic, effective and practical master plan.

Through the Internet, the author specially looked up the water systems of the Brahmaputra, Nujiang and Lancang rivers flowing out of Southwest China. The downstream flows through India, Bangladesh, Myanmar, Thailand And other countries are located in the tropical rain forest area with the most abundant rainfall in the world. In particular, the barrier of the Himalayas blocks the warm moisture flow in the Indian Ocean and the Pacific Ocean from moving northward and westward. The rainfall and snow melting in the southern part of the whole Himalayas have been increased. It also increases the frequency and harm degree of flood disaster. The closure of the Yarlung Zangbo, Nu and Lancang rivers in China is a feat for the benefit of other countries and the obligation to help them to prevent floods and disasters, so we should try to intercept as many rivers as possible. As for India, it is not necessary to pay any attention to any pretext or reason. Because the South Tibet Mountain Area in the middle reaches of the Yarlung Zangbo River belongs to the territory of China, they have neither the ability nor the courage to build large-scale hydropower stations in the occupied area. The lower reaches flow through Assam and Bangladesh in India and all flow into the Indian Ocean. The whole basin is a flat low-lying plain. Neither hydropower station can be built, but also flood occurs frequently. Obstructing the closure of our country can only expose the face of its rogue rogue. We only need to strengthen the safety guard of the dam area and the surrounding area at the turning of the Yarlung Zangbo River Grand Canyon in advance, especially the safety guard of the two saddles at the elevation of 3680-3700meters at the mout county and the border post and the South Ridge watershed of Milin county. To avoid further disruption events like the confrontation between China and India in 2017. When necessary, we should take decisive military action to recover southern Tibet. The dignity of a great power cannot be maintained only by economic assistance to those white eyed wolves and "villains", nor can it be allowed to be slaughtered again and again. The most effective way to build a powerful country is to use carrot and stick diplomacy.

Thoughts and working methods of the planning of the total artesian water transfer of 300billion cubic meters per year in the arid desert area of Northwest China

The author's design and planning ideas can be summarized as follows:

i. Make full use of the upstream valleys and river beds in the river basins of the major rivers in Southwest China to build super large reservoirs. As long as the altitude of the watershed ridge around the impoundment basin of each major reservoir permits, the

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reservoir basin that can form trap can form a super large capacity reservoir for impoundment.

ii. We can also make full use of China's existing and internationally leading capacity to design and build large-scale reinforced concrete dams. At present, the design and manufacture of domestic large-scale shield machine has been successful for a long time, and the construction technology experience is also fully mature.

iii. We will make full use of the topographic effect of the branching and spreading of the gully, river bed and tributary when the river system is formed into a super large reservoir by the closure dam. Because of the elevation of the water level and the branch effect of the mountain ditch, river bed and tributary, the straight-line distance of the water flowing through the main stream system which is far away from each other is greatly shortened.

iv. Under this premise, by designing the directional drop of water storage elevation of each major reservoir, the large-diameter shield tunnel can be used to connect the directional flow of fresh water of each major reservoir.

In order to complete the above master plan, China map, China satellite map and topographic map are the necessary basic data and design basis. For details, please refer to the website: **HTTPS// map.51240.com**. Experts and scholars are invited to open the webpage and click the map, satellite and terrain icon in the upper right corner. Please pay attention to the topographic and geomorphic characteristics of the watershed of the major water systems and the upstream branch and tributary water systems. According to the contour data on the topographic map, and then read and review against this article.

The interval accuracy of contour lines in China's surrounding countries is up to 20meters, while that in China is only 100meters. The author can only use the method of visual estimation and interpolation. Fortunately, with the clear image data captured by modern satellite technology, you can sit in front of your computer at home, and through the Internet, you can have a panoramic view of the topography and geomorphology of mountains and rivers all over the world. In addition, it can switch instantly in the image of map, satellite and terrain, and zoom in and out at will. Before retiring, the author was a senior engineer in geology and mineral exploration. For the clear image data taken by modern satellite technology, from large area to operation point, the landform, mountains, rivers, vegetation distribution the experience ability of analysis and judgment with other characteristics has the innate advantage of decades of field work experience in this major. For the design of water diversion project in this paper, the requirements of accuracy in the planning and design stage are also sufficient.

In this paper, several shield tunneling projects are involved. The elevation is in the range of 3600-3650meters, under the adjacent ridge watershed of each drainage basin. The length of a single tunnel is 43, 6.5, 11.5, 63, 7 and 5(km) groups. It can completely avoid the geological structural fracture zone and fracture zone and other construction problems such as collapse and water pouring. Moreover, the slope ratio is designed as a straight-line tunnel which is close to the level of 3/10000. At present, the construction level of shield tunnel in our country is completely competent. The inner wall of the shield tunnel can be completely tight and smooth, and the flow friction resistance of the large-diameter shield tunnel can be almost ignored.

When the kinetic energy loss of the viscous friction resistance equals to the potential energy loss of the flow, the flow can maintain a uniform velocity. Therefore, when the slope ratio is 3/10000, the velocity V of water can be roughly determined by the following formula. Furthermore, the total discharge can be estimated from the tunnel diameter and number.

$$V=\sqrt{2GH}=\sqrt{(2\times9.8\times3)}=7.668(M/s)$$

Reservoir characteristics of each river system in planning and design[3]

Reservoir characteristics of the Yarlung Zangbo river system

First of all, the urban area of Lhasa is the birthplace of Tibetan Buddhism and a cultural heritage shared by all mankind, which should be preserved as much as possible. Secondly, the elevation of the two saddles in the South Ridge watershed of Milincounty is considered to be 3680-3700m. (on the satellite map, it is a mountain ditch. If the elevation of the bottom of the ditch is lower than 3650m, a dam trap must be built). According to the analysis of the topographic map, the elevation of the urban area of Lhasa is between 3650m and 3700m. Therefore, the highest water level of each reservoir designed in this paper is 3650m.

According to the above design principle of the highest water level first, the closure dam of the YarlungZangbo River is initially selected in the grand turning Canyon of Linzhi City, which is about 113kilometers away from the East. The suitable dam site is selected between Gandeng Township and heating SA Township or nearby. The dam bottom elevation is 1000-1200m. The water storage elevation is 3650m. From the bottom of the dam to the water storage elevation, the height difference is about 2600meters, that is to say, the dam designed in this paper has a maximum height of 2600meters! Almost 8.7times the height of the dam which has been built or is under construction in our country!

On the surface, such a height is frightening, but with the existing dam design and construction capacity in China, further analysis is not too difficult. Because the dam site selected in this paper is the "V" type valley which is "deeply cut" by the torrent. The bottom of the valley is at most 100-300meters wide, and the two sides are built along the side of the steep ridge. So the height of the dam to the side becomes shorter. The dam designed in this paper is to maintain the storage elevation of the reservoir permanently. The elevation of the closure dam is only connected with the design building of several meters high and middle spillway auxiliary dam with gap. Flood discharge shall be carried out in time for the water volume exceeding the storage elevation. (the design scheme of other reservoirs and dams is the same as above).

For the reservoirs of Yarlung Zangbo River system, the annual average outbound runoff is up to 150billion cubic meters. As long as the diameter of the shield tunnel through the reservoir of Nujiang River system is large enough and the number of tunnels is large enough, (considering that 1/3 of the height above the circular section of the tunnel (diameter) can be used as the navigation channel for the water transport ships of each major reservoir system, the ships flowing down and upstream must be in accordance with the high speed The design and construction of highway tunnels are separated

from each other. As long as the total transportation capacity of the total dredging project is large enough, we can transfer the reservoirs of the Yarlung Zangbo River system with an annual average runoff of up to 150 billion cubic meters of fresh water into the reservoirs of the Nujiang River system.

Water transfer scheme and reservoir characteristics of Nujiang river system

Based on the topographic map, this paper makes a comprehensive comparative analysis of the reservoir topography and geomorphology characteristics of the Yarlung Zangbo River and Nujiang River system. We choose Bomi County, which is 140kilometers from the northeast of Linzhi city. From Bomi county to the West and then to the north, turn to the branch of bodzangbu, then turn to the branch of Yalong Zangbu for tracing, and then turn to the yadonumba curve with an elevation of 3650 meters in the mountain gully. Mark the location of the shield tunnel mouth, and set it as point a. Searching from point a to the direction of Nujiang River, we found that Dequ, the nearest tributary of Nujiang River, Baqu, the tributary of Dequ, and dongcuoqu, the tributary of Baqu. Further enlarged the topographic map, it was found that in the middle of maso and Bami village, the river bottom elevation met the condition of <3650m, and was set as point B. The straight-line distance between points A and B measured on the topographic map is about 43km. According to the agreement that the slope ratio is 0.03million, the reservoir storage elevation of Nujiang River system should be set as 3650-13=3637(m).

Swim down from Nujiang River to Bingzhongluo township (Bingzhongluo scenic spot), where the river level is less than 1600meters. Along the upstream of Bingzhongluo Township, about 20kilometers up the mountain canyon, is a suitable location for the construction of the closure dam. The height of the dam is about 2050meters.

The Nujiang River mainly originates from the Qinghai Tibet Plateau of China, with an outbound flow of about 70 billion square meters. According to the short section from the Nujiang River Closure dam to the downstream exit and the extremely narrow drainage area, the reservoir cut-off flow of the Nujiang River system can reach 60billion cubic meters.

Follow the Nujiang River Closure dam upstream for about 30km to Changxi village, turn to the south-east gully, then trace to the north-east direction to shequ River, then turn to the East into the basin of the small valley. The elevation here is 3637m, which is set as point A. at the southeast of point a, which is only about 6.5km away, it is a small tributary of Lancang River - nusongnuqu. The elevation here is less than 3637m, which is set as point B. According to the predetermined slope ratio, the reservoir storage elevation of Lancang River system should be set as 3637-2=3635(m).

Water transfer scheme and reservoir characteristics of Lancang river water system

From point B to Yunling Township on the edge of Lancang River, a tour of Yunlingtownship for about 10kilometers is a suitable place to build a closure dam. The dam bottom elevation is less than 2000m, and the design dam height is about 1650m. The designed impounding elevation of Lancang River Closure dam is 3635m.

The average discharge at the Lancang River estuary is 2180m³/s, which is converted to 68.7billion m³ per year. According to the location of the closure dam, the abundant annual rainfall in the downstream and the area of the catchment, only 10 billion cubic meters of the closure dam of Lancang River water system reservoir is set in this paper. (of course, experts and scholars who can specifically collect and consult the detailed data of relevant hydrological data near each closure dam are welcome to supplement and correct the data of the estimation of the intercepting flow of each major water system reservoir in this paper, the same below).

Tracing from the closure dam near Yunling township to the upper reaches of Lancang River is about 10km to Junda, turning into the Northeast tributary to Sanha River, and then tracing along the g214 national highway to the southeast gully to the elevation of 3635m, which is set as point A. It is only 11.5km from pointA to the northeast, which is a small valley of Jinsha River Basin.

Water transfer scheme and reservoir characteristics of Jinsha river water system

Similarly, the slope ratio of 11.5km long shield tunnel to be penetrated is about 3M. Therefore, the water storage elevation of Jinsha River water system reservoir is 3632m. From point B, you can go out of the valley to Yongzi, Yezhong, Dongshui and Dala, to the Jinsha River, and then you can trace about 15km downstream to Quzhi. It is a suitable location for the construction of the closure dam. The river surface elevation is less than 2100m, and the designed dam height is about 1550m.

The annual average flow of Jinsha River found on the Internet is 4750m³/s, which is converted into 1498billion m3 of annual runoff. According to the location of the closure dam, the abundant annual rainfall in the downstream and the area of the catchment of many tributaries, only 40 billion cubic meters of the closure dam of Jinsha River water system reservoir is set in this paper. From the closure dam to the upper reaches of the mainstream of Jinsha River to quyagong Township, Xulong Township and Diwutownship. Transfer to Baqu of Batang County, and then trace to modo Township, Zeri village, langduo village, Songduo Township, Bogexi Township and chaluo Township, to the elevation of 3632m at the ditch bottom. Set as point a. Search from point a to the direction of Yalong River. The nearest is Moqu, a tributary of Yalong River. Trace down the source of Moqu to the place where the river bottom elevation is less than 3632m, which is determined as point B. A. B the straight-line distance between the two points is about 63km. Therefore, the storage elevation of Yalong River water system reservoir is 3632-19=3613(m).

Water transfer scheme and reservoir characteristics of Yalong river water system

Trace along point B to the downstream of Yalong River to the turning point of right angle drama. From there to the section about 10km from Xiala Township, the river level elevation is about <2700m. It is a suitable section for building closure dam, and the designed dam height is about 900m. The water storage elevation is 3613m. Find the Yalong River at the entrance of the confluence of the Jinsha River from the Internet. The annual average flow is 1860m³/s for many years, and the annual runoff is converted to 60billion m³. According to the location of the closure dam, the abundant annual rainfall in the lower reaches and the area of the catchment of many tributaries, only the closure dam of Yalong River water system reservoir is set up in this paper.

Trace upstream from Yalong river closure dam, along the tributary of Qingda River to Murong Township, seka Township, Bamei town and kezisi. Trace to the place with the elevation of 3613m at the ditch bottom, which is designated as point a. It is determined as point B when the elevation of the tributary of Dadu River system from provincial highway S303 to the valley of Yala snow mountain scenic spot is less than 3613m. A. B the straight-line distance between the two points is only 7km.

Water transfer scheme and reservoir characteristics of Dadu river system

Therefore, according to the slope ratio of 7km shield tunnel, 3613-2=3611(m). The design water storage elevation of Dadu River Closure dam is 3611m. The closure dam should be located between suopo Township and gezong Township downstream of Danba county. The river level elevation is less than 1900m, and the designed dam height is about 1750m.

Tracing upstream along the mainstream of Dadu River from Daba to Badi Township, Anning Township, Jinchuan county and Baiwan Township, turning into jiaomudu River, a tributary of DaduRiver, tracing upstream to jiaomudu Township, caodeng Township, Nipu Township and maerqu, then continuing to trace to Rong'an Township, anmudao Township, Zhong'an village and Chali Township, then tracing southward to chalma Township, tracing along Longre road to valley elevation of 3611meters Point a. The nearest place in the East is Baihe River. Trace along Longre road to the place with elevation less than 3611 in zhimiqu and valley, which is designated as point B. A. B the straight line distance between the two points is only 5km! It is designed that the exit elevation of the 5km long shield tunnel is 3609meters.

According to the statistics of observation data from the hydrological station in Fulu Town, the lower reaches of Dadu River, the average annual flow is 1510m^3/s, and the annual runoff is 47.3billion m^3. According to the location of the closure dam, the abundant annual rainfall in the downstream, the area of the long reach and the tributary catchment, only about 20billion cubic meters of the closure dam of Dadu River system reservoir is set in this paper.

The total power generation capacity after 300billion cubic meters of water finally flows into Liujiaxia hydropower station of the yellow river

In this way, about 1500+600+100+400+200+200=3000(billion square meters) of pure natural fresh water and natural rainwater mainly melted by the snow mountains of Qingchuan and Tibet Plateau, which are collected from the YarlungZangbo River, Nujiang River, Lancang River, Jinsha River, Yalong River and Dadu River system, all of which are from the upstream of Dadu River system, the foot Mudu River and the maerqu River, and then flow into the langmiqu and Baihe River through Jiangyu township. After Anqu Township, Hongyuancounty and wachi Township, it finally flows into the Yellow River. The elevation of Tangketownship at the confluence is only a little lower than 3500meters.

When the Yellow River flows from Maqu County through the mountain pass between Kesheng Township, Duosong Township and Ruanlashima Township, the elevation is less than 3400meters. When it passes through the town of Raja and qushi'an Town, the elevation is

less than 2800meters. When it reaches the old Yangqu of the harvest platform, the elevation is less than 2700meters. Excluding the original flow of the Yellow River water here, only 300billion cubic meters of water collected and 3400-2800=600(m) elevation difference are added. Assuming the total power generation efficiency of the hydropower station is 50%, only the water volume of 300billion cubic meters and the elevation difference of 600meters in this section will provide the power generation capacity of 27.94million kilowatts of pollution-free and renewable energy!

Then, the elevation of the 300billion cubic meters of water flowing into Longyangxia hydropower station is 2600meters. After Lijiaxia Hydropower Station and Liujiaxia hydropower station, the export elevation is reduced to 1700meters. The height difference of 900meters can provide another 41.9million kilowatts of power generation capacity. The total of the two is 69.84million kilowatts!

The transportation network of passenger and cargo ships formed by connecting reservoirs with major water systems

i. The reservoir is composed of YarlungZangbo River water system, with water storage elevation of 3650m, and the shipping water surface can reach Lhasa directly. At the same time, it also includes the surrounding counties, towns and villages with an elevation of 3650m.

ii. It is connected with the reservoir of Nujiang River system through shield tunnel project, with water storage elevation of 3637m (if the draft of passenger ship and cargo ship is less than 5m) Upstream, it can be transported to less than 10kilometers away from the county seat of Bianba.

iii. The reservoir is composed of Lancang River water system, with water storage elevation of 3635m. You can go upstream by shipping through Changdu, and you can directly reach less than 20kilometers from Nangqiancounty.

iv. The reservoir is composed of Jinsha River water system, with water storage elevation of 3632m. Upstream, you can go through Baiyu County, dege county and Yushu Tibetan Autonomous Prefecture.

v. The water system of Yalong River is a reservoir with a water storage elevation of 3613m. Upstream, it can go through Xinlong County, ganmu County, Kagang Township and wentuo township. Upstream to the tributary of Xianshui River, you can directly reach Daofu County, Luhuo County, sitongda Township and Duoduo township.

vi. The reservoir is composed of Dadu River system, with water storage elevation of 3611m. From the closure dam upstream, it can be transported through Danba County, Jinchuan County, Aba Tibetan and Qiang Autonomous Prefecture, ABA County, Hongyuan County,Ruoergai County, Diebu County, etc.

In a word, through the closure dam and through tunnel of the six major water systems, the horizontal Lake transportation network composed of the six dendritic water systems and the dendritic reservoir with water storage elevation of 3611-3650 meters is like a mirror. It has truly realized the reality that mountains and valleys become flat lakes and natural moats become smooth roads. Moreover, the cost is far less than railway and road transportation, and the economic and social benefits are far greater than railway and road transportation.

Promoting effect of six reservoirs on agriculture, forestry, animal husbandry and sideline fishery in plain and hilly area with elevation of 3600-4500m

Combining the topographic map with the satellite map, when the water storage elevation of the six major reservoirs is permanently stable at 3611-3650meters, with the priority to solve the energy and traffic problems, the surrounding areas of the six major reservoirs and the vast area from aba to Gannan are above the water storage line of 3611meters, 4500meters of glaciers, snow lines and plain and hilly areas below the permafrost line will become productive areas for agriculture, forestry, animal husbandry and freshwater aquaculture. For the vast plain and low-lying area from aba to Gannan, the satellite image shows a green, low-lying water and grass land. As long as we dredge the river course, take the value of the curve, and do well in the water conservancy project, the plain and low-lying water grassland in this vast area will soon become a productive farmland. Further, it can be developed into a low, medium and high-end fine processing enterprise group and industrial chain of agricultural, forestry, animal husbandry and sideline fishery products.

Conclusions and supplementary notes

i. The national economic and social benefits of introducing 300billion cubic meters of fresh water into Northwest China every year

In conclusion, it can be concluded that the water shortage in the arid desert area of Northwest China has seriously restricted the healthy, balanced and sustainable development of the national economy; the total budget cost of the project is less than 3trillion yuan (RMB) and the total construction period is less than 10years. Therefore, if it can be completed as soon as possible, it will undoubtedly benefit thousands of people at present The great cause of autumn; the Northwest China will expand about one billion mu of arable land and vast grasslands, develop modern agriculture and animal husbandry, increase the output of grain, beans, edible oil, feed protein and non-staple food in China, absorb and settle a large number of people; basically solve the problem of arable land, pasture, food, edible oil, protein feed, non-staple food and population security in China And other major national and people's livelihood problems.

Central government, Ministry of water resources, Ministry of agriculture, Ministry of water and electricity People's livelihood related departments, many experts, scholars and people with lofty ideals, etc. in major countries, have given extremely high evaluation to the early South-to-North Water Diversion Project, and even the "hongqihe" project plan of 60billion cubic meters of water diversion every year, which has been heated in recent years. How to evaluate the economy, practicability and feasibility of the whole planning system for the planning draft of the project of 300billion square meters five times of the "Hongqi River" every year? Experts, scholars and people with lofty ideals are welcome to actively participate in the discussion and supplement, so as to make it more perfect, more practical, scientific and feasible. The author only wants to make contribution in the present age and benefit in the future Figure 1.
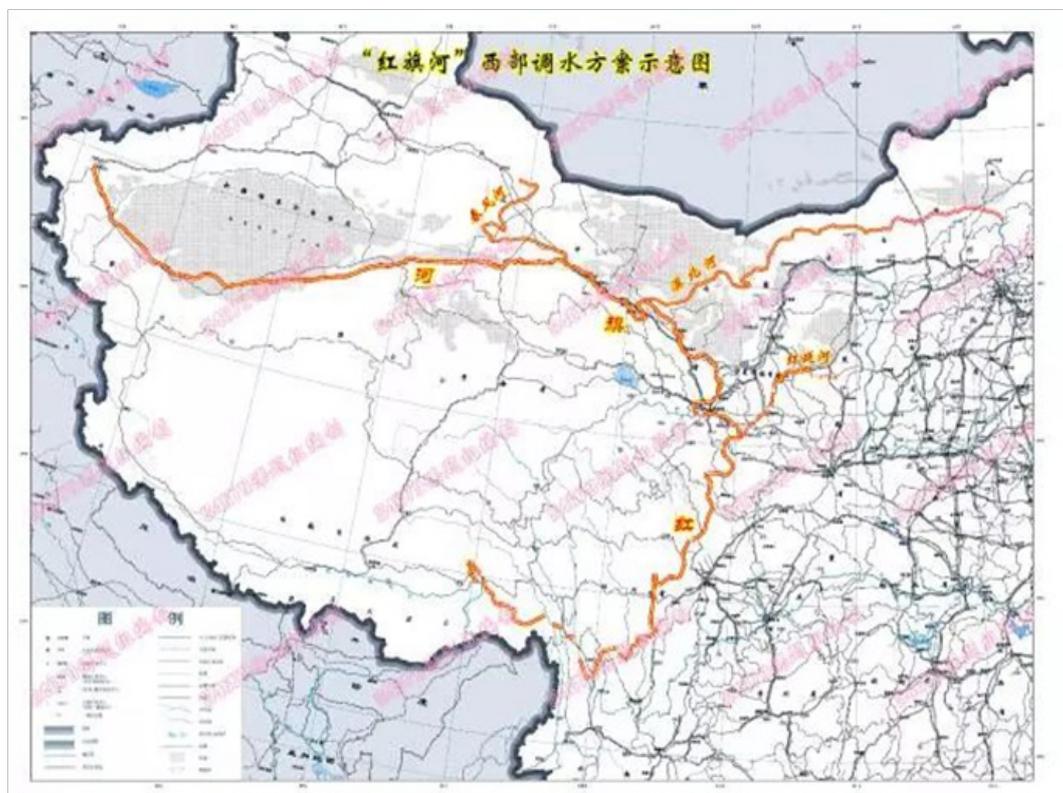

Figure 1 schematic diagram of the second half of the total artesian water transfer plan of 300billion cubic meters per year in the arid desert area of Northwest China.[1]

ii.   Supplementary notes

Whether the water diversion plan of 300billion cubic meters of artesian flow per year can be successfully implemented in the arid desert area of Northwest China. The key lies in whether six Super Large closure dams with design building heights of 2600, 2050, 1650, 1550, 900 and 1750(m) can be successfully built with existing building materials and construction technology. It can not only run safely for hundreds of years, but also cannot break the dam under the influence of non extreme natural disasters and man-made disasters. Such harsh preconditions will bring unprecedented severe challenges to China and the world dam design and construction industry. For details, please refer to the author's follow-up paper, design and demonstration of special innovative research on super large long-life and dam break resistant closure dam.

In this paper, the planning of 300billion cubic meters of total artesian water transfer in Northwest China is discussed only for the planning and design of the water transfer to Liujiaxia hydropower station. For the second half of the water delivery plan after flowing out of Liujiaxia hydropower station, the design line of "Hongqi River" can be used, but the scale of water delivery must be expanded by 5times. See for details.

Acknowledgments

Conflicts of interest

The authors declare that there are no conflicts of interest.

Funding

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