

Water Balancing and Power Generation Using Topographical Advantages (Hidden Potentials between the Transboundary Aquifers)

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ABSTRACT

Great potentials are hidden across the Transboundary aquifer regions between the neighbouring countries. But these potentials are interlocked by boundary disputes. If any how we could open these interlocks of such disputes, tremendous potentials will be available at the disposal of mankind on the earth. In an ancient time boundaries are formed because of natural obstacles like high hill ranges, water barrier rivers & the coastal limits. The boundaries formed because of high hill ranges & the rivers flowing through it. There is a sudden & drastic changes in topography, like silt gradient of lands & tremendous changes in hydrodynamic current, which has high potential to satisfy man's need like water for drinking, water for irrigation, mainly for the generation of hydroelectric power, which will become the prime & eco friendly source of electricity. Thus the down flow stream sprinkled the lower altitude region at the same time produced power will illuminated the higher altitude region. Beneficiaries will be neighbouring all.

Every continent has a similar type of topographical landscape. To the extreme one end, high ranges of mountains are there, and next region is followed by silt gradient till nearby river basin, which is followed by low hill ranges & plateau then the slope of plains till the sea level. Thus surface area of continent spread at different altitudes. Nature distributes the potable (2.8%) water in the form of precipitation. Water at particular height acquires certain fix quantity of potential energy because of its altitude position ($PE = mgh$). This potential can be use for the transportation of water from high hill ranges to the low hill ranges, crossing the lowest point of the river basins in between. Thus hill-to-hill transportation of water is possible throughout the continent through the conduit. Same water with the same quantity can be reused for the series of electrical power generation projects across the continents. This is just like a surface water current through conduit to balance the water scarcity zone & water rich zones.

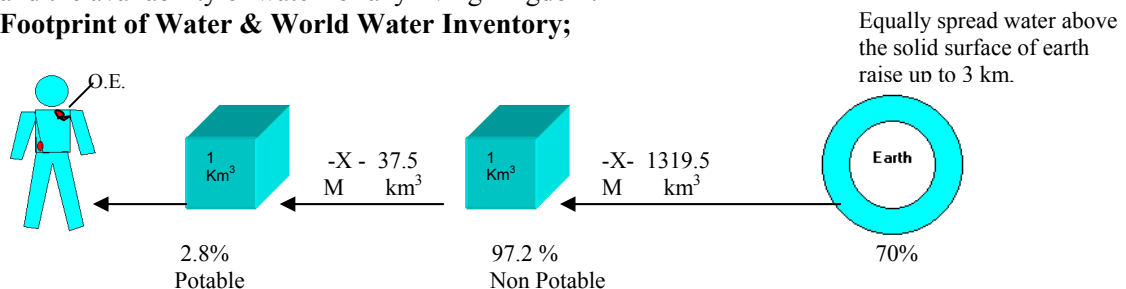
One of the region in **Himalayan Transboundary aquifer location** is challengeable for giving the new directions for the use of transboundary aquifers.

Keywords.: Aquifer, potential, Interlock, dispute, water transport, Advantages & Reduction of global warming,

1. INTRODUCTION

Water is one of the essentials of natural sources. We utilize it more than 95% throughout life with respect to other essentials (O.E). But water inventory shows only 2.8% water is potable with respect the total water present on the planet. These figures reveal the contrast between necessity and the availability of water for any living kingdom.

Footprint of Water & World Water Inventory;



1

So it is very important to know, how we get potable water and at what cost the nature is

sacrificing for us, to provide the water at our doorstep. Just like the Atmosphere, Air ,climate, weather, Birds and Sea animals do not follow the rules of boundaries .In the same way precipitation and water-cycle have their own way across the continents. But as soon as precipitation touches the earth's surface it is distributed among the countries and the countries are divided by boundaries. Most probably boundaries are formed because of geophysical barriers and the obstacles like high hill ranges ,rivers ,coastal lines of the continent. Continents have nearly similar topography and water sheds structures. Water shed also does not follow the boundary rules but the barriers and obstacles between the thoughts of mankind produce artificial barriers which do not allow the use of this water of transboundary region ,which has very great potential to meet the drinking, irrigation and hydroelectric needs of the neighboring countries. Most of the transboundary aquifer regions are comparatively very small. But considering the height and altitude of water storage in the form of snow,& the silt gradient and the availability of water in all seasons. Such water possesses tremendous hidden potential energy($P.E.=mass \times g \times height$).If anyhow we could transform this energy into electrical energy, and use it for water transportation across the continent crossing the river basin in between, by using the conduit, then no doubt transboundary aquifer will play a role of fulfillment of all above mentioned needs of mankind.

2. POTENTIAL CONTENT OF WATER BECAUSE OF ITS HEIGHT & ALTITUDE ;

As man understands only the language of money the calculations and figures given below will prove interesting for any economist.The water cycle completes after consuming millions of Kilo joules of energy of nature. For example the following figures reveal how many Kj energy is consumed during water cycle of one cubic kilometer quantity, from evaporation of sea water to precipitation on 8000 Meter altitude at 3000 Km distance away from the ocean .

Table No. 1

Vaporization	Precipitation	Transportation	Lifting
8.71x10 ⁷ Kw 25000 billion US D	8.71x10 ⁷ Kw 25000 billion USD	2.6 x 10 ⁷ Kw 5000 Billion USD	2.6 x 10 ⁷ Kw 5000 billion USD

Thus it is not difficult to understand that,How much quantity of energy is utilized by nature to complete a water cycle of one Km³ quantity. These figures are only for 1 Km³ .We can calculate for 37.5 M Km³ (2.8 %)of water which is in potable form out of 1357 M Km³ of water on the planet. Most of the Transboundary aquifer regions are enriched with the snow covered areas which are at very high altitudes.This snow melts in summer at the same time other parts of continents face drastic scarcity of water. These storages of water in the form of ice at the highest altitudes of the continent are a bounty for mankind.So we can say that these Transboundary regions are tremendous sources of energy and water for every need. But the tragic thing is that all such points are interlocked in boundary dispute.If any how we could open the these locks ,the earth will become the green earth in the truest sense.

3. TOPOGRAPHY OF CONTINENTS ,TRANS BOUNDARY AQUIFER REGION AND IT'S ADVANTAGES;

Every continent has similar landscapes & watershed structures. At one extreme end there are the high mountain ranges followed by silt gradient basins then by low hilly ranges ,next plateaus ,river basins and slopes till the ocean (as shown in fig no.1).Trans boundary regions lie somewhere between two ranges, banks of rivers ,coastal regions. Here I wish to discuss the trans boundary aquifer region especially in hilly regions & its potential energy content to perform the tremendous work for the sake of mankind & to reduce global warming rate. In the above table we see how much quantity of energy is utilized till precipitation,only for 1Km³ water. According

to law of thermodynamics we can regain the energy. Such sources are most probably in trans-boundary Aquifer regions.

4. BEST ILLUSTRATION OF TRANSBOUNDARY COOPERATION IN CHINA & INDIA

This can be best explained with help of one of the region like the Indian sub continent & China. Brahmaputra (known as Tsanpo). Transboundary Aquifer region Tsanpo-Brahmaputra has a perennial source & it is abundant even in summer because of the melting of ice. We all know because of global warming process, the melting of ice is continuously increasing. Then why not take advantage of the global warming phenomenon to produce green energy, which may help in reducing the global warming rate? As we have observed in the above table 1 Km³ water possesses a potential energy convertible into 17.41X 10⁷ Kilowatt electrical energy. Brahmaputra has 586 Km³ water per year in all its forms on the Himalayan Ranges near Gayala & Peri hills in China. It is at 8,000 meter altitude above the sea level. This much quantity of water possesses tremendous potential energy according to formula P.E. = mgh (where m- Mass of water, g-Gravity constant 9.8, h=8000 metre Altitude) This potential energy can be utilized for work done (Wmax) in two ways. The Beneficiaries will be both the neighboring countries i.e. India & China. It is as below-

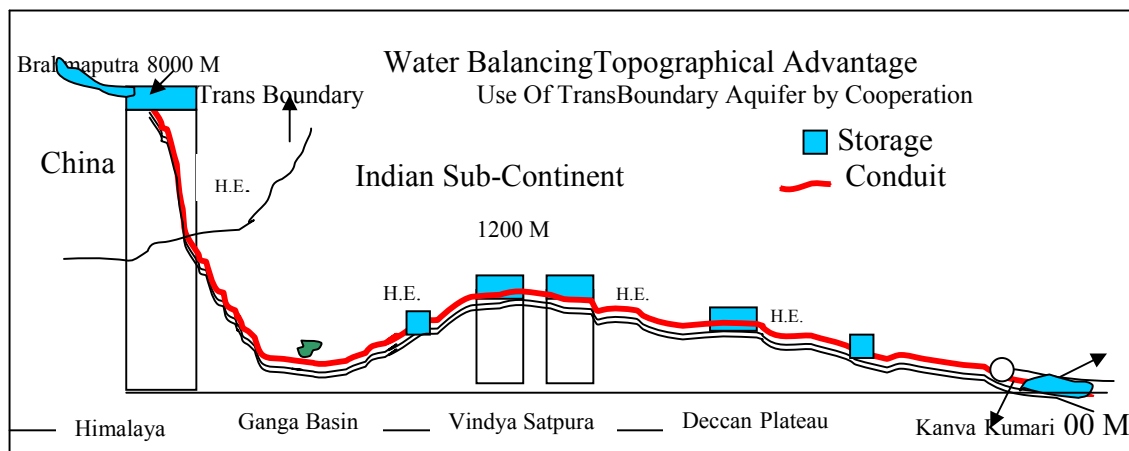


Fig.No. 1

Above TransBoundary Aquifer can perform Two Major Functions;

- 1) Part of this potential energy can be converted into electrical energy by setting numerous hydro electric projects in the region .This is possible because of the silt gradient which is nearly free falling water. It can produce millions of megawatt electrical energy which can be utilized by China as well as India & other neighboring countries.
- 2) Secondly near about 586 Km³ water is available at Gayala & Peri at 8000 meter height above sea level. This much quantity of water possesses huge potential energy which is acquired because of its altitude against gravity. If we could construct a sort of Sump there (not a big Dam) & if this sump could be joined by conduit to the storages present on the top of Vindhya & Satpuda (1200 meter) at a distance near about 1800 Km away from Gayala and Peri in China .Head difference between the two ends will allow the water to flow from Gayala & peri

region to the Vindhya ,Satpura Ranges (1200 metre above sea level) by crossing the Ganga Basin (300 M) only by gravity . Once the water comes up to the top of Vindhya & Satpura ranges, we can distribute it throughout the peninsular region of India with different storages & dams upto kannyakumari. Again we can install a series of hydroelectric projects using same flow of water As shown above in fig.No.1

5. ADVANTAGES OF STRENGTHNING COOPERATION BETWEEN CHINA AND INDIA

1) China will get electricity 2) India will get crystal clear & pure water for drinking & for irrigation 3) India can install a series of hydroelectric projects across the peninsular region . 4) Global warming melts the extra ice every year; we can use it to produce green energy.5)These projects will help to reduce the global warming rate by lessening the need for thermal & nuclear power generation which adds direct heat & pollution to the atmosphere 6) These will be a pioneer example of the use of potential content of transboundary aquifer which can be replicate for other such regions on the planet.

CONCLUSION

WWF,ISARM & conf.2010 should take the initiative to open the such boundary interlocks of dispute in order to use hidden potentials of transboundary aquifer regions for the benefit of green planet.

REFERENCES

- Vidhale P.N.(1991 Brahmaputra Yojna IWRS journal of Indian Water Resources Society issn0970-6984 11/2.
- S.Subramanya, 'Engineering Hydrology' Tata McGraw-hill Publishing Company Ltd.
- Harish Kapadiya, 'The Himalayan Journal Vol. 61 2005 Oxford University Press.
- Allen,Charles, A Mountain in Tibet' The missing Link:the exploration of the Tsanpo Gorge, Andre Dutsch, London.
- Ward,Michael, ' Exploration of the Tsanpo River & its Mountains' The Alpine Journal London 2000.
- Walker,Derek,The pandits'The Tsanpo Brahmaputra Controversy:LalaNemsing and Kinthup University Press ofKentaky,Kentaky1990.