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Kashmirs Hydro Dilemma: Water Resources Management Challenges

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Abstract: ***Water is a priceless and important resource that is necessary for every region's life and growth. The management of water resources in Kashmir, an area renowned for its breath taking natural beauty, poses a challenging array of issues. The management of Kashmir's water resources has been a subject of significant concern as a result of a number of environmental, social, and political issues. This review study investigates the complex issues surrounding the management of water resources in the area. It explores topics including the melting of glaciers, pollution, a lack of fresh water, climate change, and the effects of war on water infrastructure. It also looks at possible answers and policy suggestions to deal with these issues and guarantee sustainable water resource management in Kashmir.***
Keywords: Water resources, Sustainable, Kashmir

I. INTRODUCTION

Kashmir as a region is now dealing with serious water issues, such as water shortages, water pollution, and conflicts relating to water. The Indus River and its tributaries, which pass through the area, are the main sources of water for Kashmir. One of the longest rivers in Asia, the Indus River provides Kashmir's residents with a crucial source of water. Before draining into the Arabian Sea, the river travels through northern India, including the Kashmir area, from its source in Tibet. The Indus River and its tributaries' water is utilised for agriculture, hydroelectric power production, and maintaining the area's biodiversity.

However, despite being an area with abundant water resources, Kashmir continues to experience serious water issues that have an influence on its ecology, economic, and social well-being.

In Kashmir, one of the major water issues is water shortage, hence efforts are undertaken to encourage wise water usage and conservation. In order to solve the issue of water shortage, the government of Jammu and Kashmir has initiated a number of programmes, including the collection of rainfall, the building of check dams, and the development of effective irrigation systems. However, the issue's tenacity merely frustrates the coordinated efforts.

The Water (Prevention and Control of Pollution) Act, passed in 1974, which governs and manages water pollution in the area, is addressing water pollution, another serious issue in Kashmir. The legislation intends to set requirements for water quality and impose punishments on those who violate them. However, despite this Act, the region's water quality continues to decline dramatically. Several steps have been taken in Kashmir to address the considerable water challenges brought on by climate change, such as fostering climate adaptation, which includes the adoption of sustainable land use practises, afforestation, and the construction of climate-resilient water infrastructure.

Conflicts over water resources are a key water concern in Kashmir as well, and attempts are undertaken to encourage communication and collaboration to settle disputes. A number of rounds of negotiations between the governments of Pakistan and India have taken place to discuss regional water-sharing concerns. Additionally, to encourage collaboration and sustainable management of water resources, local communities are included in decision-making processes linked to water management.

II. HYDOLOGICAL NETWORK AND DATA

For Kashmir, there is a widespread lack of reliable hydrological data across any conceivable time span. This makes it hard to examine local hydrological processes over time in any meaningful way. Both the metrological observatories—one in Gulmarg and one in Srinagar—were inaugurated in 1891. Since then, not much has changed about the situation. However, as the Gulmarg observatory only operates during the four summer months of June to September for reasons best known to the IMD (Indian Metrological Department), regular metrological data are only available for Srinagar. There are several locations where rainfall is monitored, although the data are frequently inconsistent. Only four locations, including Budgam, Awantipore (Pulwama), Anantnag, and Handwara, have rainfall data going back at least eighty years, aside from Srinagar.

Only 56 years worth of data are available for Ganderbal, starting in 1924 and excluding the years 1933 and 1940. Snowfall is only sporadically recorded, despite the fact that it significantly contributes to the valley's moisture supply. Snow gauges are present at the five most recent observational locations. Data on river outflow also tell a somewhat similar trend. But poor measurement and data accessibility make a study of surface runoff difficult to conduct. The current analysis is based solely on the departmental files of the Central Water and Power Commission, which only provide average daily data for certain years and gauges.

It is also amazing how inconsistently the data is kept up to date by the federal Water and Power Commission. The information on the Kashmir valley's ground water supplies is completely lacking; it is not inconsistent. Since a thorough hydrological survey has not yet been conducted, the estimations of the presence of ground water and the recharge of aquifers are no more accurate than clever geneses.

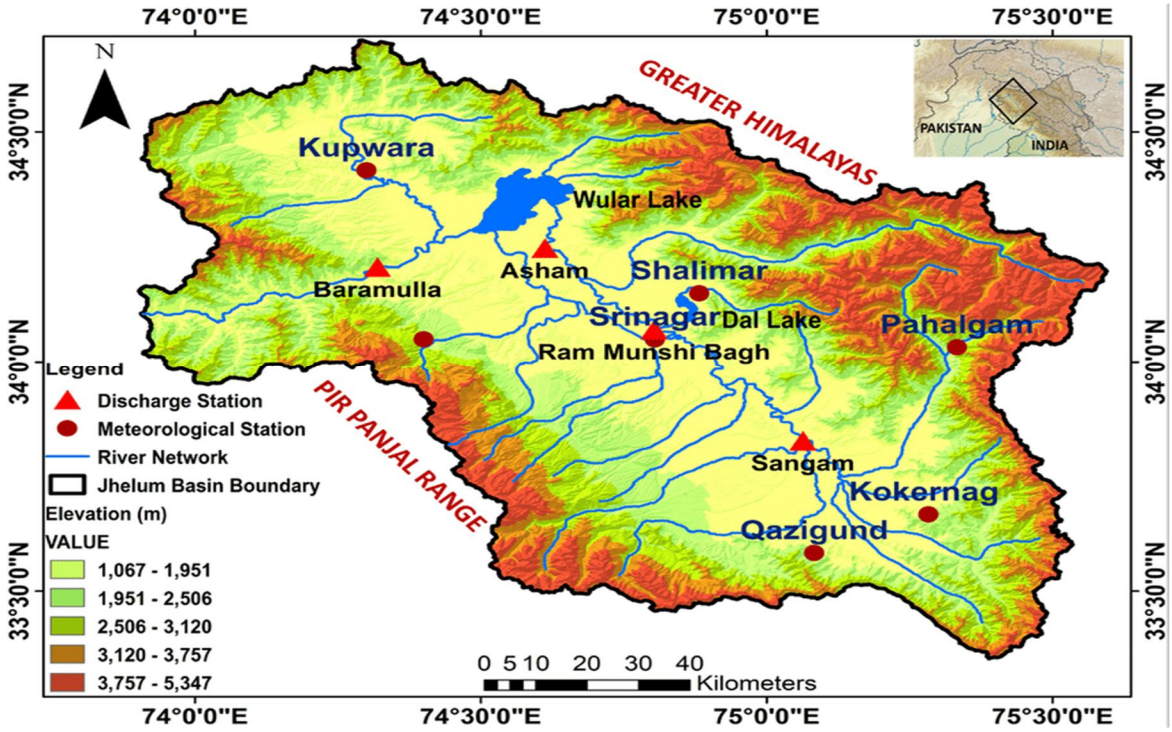


Fig1: Map of the Kashmir Valley displaying various elevation zones, the Jhelum River network, weather stations, and discharge stations.

III. WATER AND SANITATION

By signing a worldwide agreement, several key signatories made the promise to guarantee universal access to water and sanitation by the year 2030. The most fundamental requirement for human health and wellbeing is access to adequate water, sanitation, and hygiene, which should come as no surprise. Even Nevertheless, there are still billions of people worldwide who lack access to clean drinking water. In addition, as the population grows, so does the need for water, which is rising daily. A serious worldwide water issue has been sparked by urbanisation, coupled with rising water demand for agriculture, industry, and the energy sector. It's a significant difficulty. Water stress is a serious concern that is made worse by ineffective water management, excessive groundwater exploitation, and pollution of fresh water sources. This problem does not just affect locations with poor access to fresh water; it also affects areas with abundant water supplies because of the Himalayan Glaciers. These areas run the risk of being excessively investigated, used, and urbanised. Therefore, it should come as no surprise that many developing countries are struggling with issues related to deteriorated water ecosystems, water shortages, which is mostly brought on by climate change, and inadequate investment in water and sanitation. In Kashmir, where we have abundant fresh water resources like high altitude glaciers, this is a problem as well. 2.2 billion people, or one in four people worldwide, lack access to clean drinking water. There are 4.2 billion people without access to decent sanitation, and 3 billion do not even have basic amenities like safe handwashing. Urbanisation, excessive water source exploration, poor governance, and corruption in government agencies worldwide are the causes. Additionally, riverbed mining in the already heavily used Doodh Ganga, Shali Ganga, Sukhnag, Romshi, and Rambiara riverbeds in Budgam and Pulwama may impede easy water flow, which would therefore have an impact on irrigation and the availability of clean drinking water.

A. *Sustainable Water Management*

The current rates of advancement need to be accelerated and enhanced in order to provide greater access to drinking water, sanitation, and hygiene by 2030. 8.30 lakh persons might be spared from death if these goals are met. Relevantly, a significant number of individuals pass away from illnesses brought on by the consumption of unsafe and filthy water and poor sanitation.

Government agencies, non-governmental organisations, and people must collaborate to implement sustainable water management strategies, particularly in emerging and poor countries, in order to promote change.We must make significant expenditures to guarantee the availability of clean drinking water and improved sanitary services. In truth, India has made significant strides in these areas since initiating the Swachh Bharat Mission in 2019 to combat open defecation, during which time millions of restrooms were built throughout all the states. Jal Jeevan Mission (JJM), which aims to provide pure drinking water, has also been established. 'Functional Household Tap Connections' (FHTC) are intended to be made available to all rural households in the nation by 2024 thanks to the JJM, which was introduced by Prime Minister Modi on August 15, 2019. The goal of the Jal Jeevan Mission is to launch the Jan Andolan for Water. Our government's agencies have failed to establish clean water as a reality in Kashmir.

B. *Ground Water Resources*

The priceless subsurface resource of ground water, which is needed for drinking, agriculture, and industry, must be depended upon in the lack of adequate surface water supply. We are faced with its depletion and pollution due to mounds of solid waste, industrial effluents, and indiscriminate use of fertilisers and pesticides as a result of excessive groundwater withdrawal and poor water management. The Achan region of the Srinagar district serves as a prime example, where the ground water has been deemed unsafe for human consumption due to mountains of solid waste dumps. Due to our irresponsible logging practises in the catchment regions, we have severely disrupted the natural recharge, which has decreased the absorption capacity and consequently the ground water recharge. The natural water bodies and the ponds constructed by our wise ancestors have almost vanished. The wet lands which act as flood basins, bird sanctuaries and water bodies are being converted into housing colonies. The case in point is Rakhi Aarath. Narkara and Batamalu nambals. The water bodies provide us a friendly environment besides acting as flood absorption basins. The maximum use of ground water is in agriculture where there is no scope of recycling. The agriculture scientists have to address this issue and devise such crops which not only have reduced gestation period but also reduced water requirement.

Presently the farmer is interested in paddy and sugar cane for better returns. These crops need six times more water than wheat, maize and millets. The farmer if assured of equal returns in alternative crops, he will be too happy to adopt the same. The Government has to play a role here by including food grains from such crops in the public distribution system. In the case of drinking and industrial use, recycling and recharging has to be made mandatory. Rain water harvesting from all types of large buildings and its utilization especially for replenishing the ground water has to be implemented. Water has to be treated as an economic source and effort made for more income per drop of water. Equally crucial is raising public understanding of the value of water and how neglecting it would jeopardise life. Print and electronic media, social scientists, clergy, educators, and panchayats can all fill this function. Stakeholders must voluntarily participate in an integrated water conservation strategy in order to enhance the water security system and boost agricultural output. The newly empowered Panchayats may be extremely helpful in managing and protecting water resources.

IV. UTILIZATION OF WATER RESOURCES

Although limited, water is important to Kashmir's economy. Its primary use is in agriculture, and a typical Kashmiri sees prosperity in its abundant supply. Gradient irrigation, navigation, and primitive fishing—uses that date back to the Neolithic era—remain the main uses today. Hydroelectricity production is insignificant and infinitesimal when measured against potential.

A. *Irrigation*

Surface water resources in the valley are mostly used for gravity irrigation using outdated technology. However, there are limitations on making the most use of the water potential in terms of politics and the environment. One of the rivers covered by the Indus Waters Treaty, which governs how the Indus Rivers are used by Pakistan and India, is the Jhelum. This treaty states that India may only use these rivers' waters to a limited extent whereas Pakistan is entitled to a major claim on the Indus, Jhelum, and Chenab rivers and their tributaries. India is further hindered in its use of these waters, particularly in the case of the Indus, by the challenging topography and communication issues.

The Kuhls7, which draw from water courses at convenient points, make up the Kashmiri system of irrigation. In terms of area covered and channel length, the Khuls much outpace the government canals. The area irrigated by Khuls was up to sixteen times larger at the start of the first five-year plan than by government canals.8 Government Canals Are Not Comparable To The Kuhls,

Despite Them Constantly Extending Their Command Area Since 1950. The Feudal Lords, who Were Concerned With The Construction And Maintenance Of These Channels, Led To The Development Of The Kashmiri Kuls Irrigation System.

The Kuls fell into disrepair when the Zamindari System was abolished and turned out to be a threat to the nearby agricultural land because of the spill-over from these channels, which frequently caused flooding. The government just recently became aware of this issue, and a comprehensive plan has been developed to expedite their restoration and renovation.9 The Scheme Was Initially Intended To Cover Only 2,046 Kuls, But It Envisaged An Eventually Takeover Of All The Remaining Kuls With A Command Area Of 1,012 Hectares. However, the government has shown little interest in expanding irrigation to the valley's drier regions, particularly the chronically dry Karewas. Additionally, it won't be possible to irrigate these uplands until more advanced technology is used to lift water tens of metres above the river valley floors.

B. Domestic Uses of Water

Drinking water is one of the most popular uses for it. Water is abundant throughout the valley, but it is only distributed systematically in large urban areas. Anantnag appears to be the Valley's district that is best-served. Public access to tap water is provided via a number of reservoirs built at various locations around the district. Water supply schemes exist in the towns of Pampore, Shopian, Awantipura, and Sedov Tsotopora. Only Four of the Nine Urban Centres in the Baramulla District have Regular Water Supply: Baramulla, Sopore, Bandipora, and Gulmarg (Tangmarg). Only the large villages of Wanigam and Bunagam in Baramulla Tehsil, Nadihal, Tiyar, Seer, and Ajar Aithmulla in Sopore, and Sogam in Handwara Tehsil have a water supply system, as far as rural areas are concerned.

C. Navigation

Waterways Serve As Navigational Channels As Well. The Dal and Wular Lakes, the Jhelum River, and the majority of its tributaries in the floodplain are navigable. Hardly can their importance as transportation arteries be overstated.

D. Generation of Hydroelectricity

The Valley has a sizable potential for the production of hydropower, but no significant attempts to use it significantly for either industrial or domestic use have been made to far. Fewer yet are the villages and urban areas that have access to electricity. The Valley has two hydroelectricity stations with installed generating capacities of 15,000 and 6,000 Kws each at Ganderbal and Moharra. Aside from significant tourist resorts and a few villages, they cater to the needs of all urban centres. Fewer than two percent of the villages in Anantnag, one percent in Baramulla, and eight percent in Srinagar have electricity currently. Work is also being done on the Chenani, Upper Sind, and Lower Jhelum projects. Chenani was the first of the three to be prepared for commission in 1972. An interregional grid will be connected to a 220 kV transmission line that will carry the supply to Srinager and enhance the supply to Ganderbal. Additionally, a 33kv line is proposed to link Pattan to Tanmarg, Sopore to Bandipora, and Anantnag to Shopian.11 One may anticipate that as the economy diversifies and new plans for resource conservation and utilisation gain more attention, water will be put to an increasing number of different uses in the near future. Therefore, it is important to pay more attention. Therefore, Priorities Must Be Set Up Front, And A Comprehensive Plan Must Be Outlined For The Best Use Of The Valley's Water Resources.

V. CONCLUSION

Kashmir’s water problem is a complex issue that requires a multi-faceted approach to address. Some of the possible solutions to Kashmir’s water problem include –

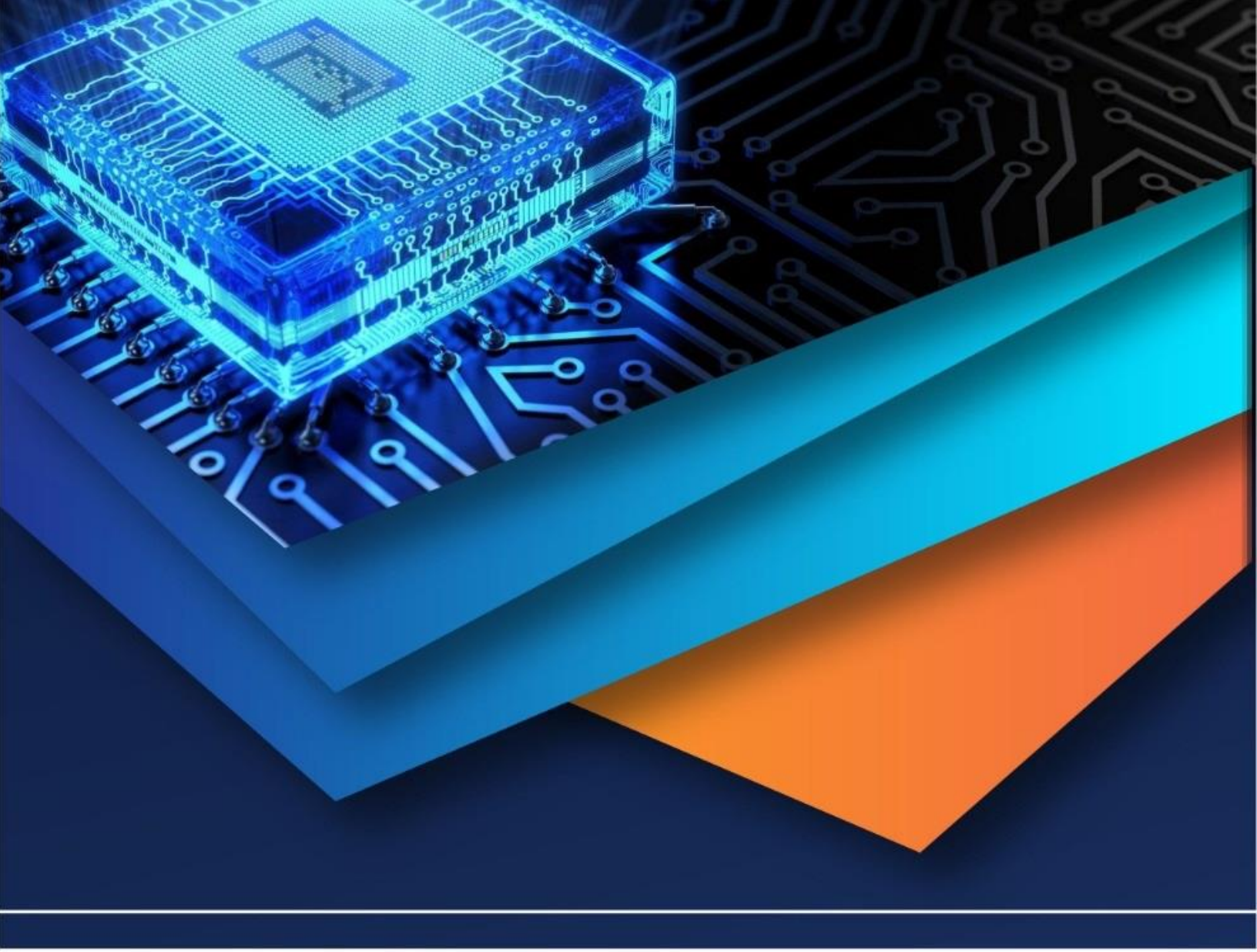
1) *Sustainable Water Management*: The sustainable management of water resources is essential to address the water problems in Kashmir. This includes promoting water conservation, reducing water waste, and improving water infrastructure to reduce water losses.
2) *Regulation of Industrial and Agricultural Practices*: The regulation of industrial and agricultural practices is necessary to reduce water pollution in Kashmir’s water bodies. The government of Jammu and Kashmir can implement and enforce laws and regulations to control industrial effluents and agricultural runoff.
3) *Rainwater Harvesting:* The implementation of rainwater harvesting techniques can help to address the water scarcity issues in Kashmir. The government of Jammu and Kashmir can promote and incentivize the implementation of rainwater harvesting systems in households and public buildings.

4) *Groundwater Management*: Overexploitation of groundwater resources is a significant problem in Kashmir. The government of Jammu and Kashmir can implement groundwater management plans to regulate the use of groundwater resources and reduce overexploitation.
5) *Climate Adaptation Measures:* Climate change impacts, such as melting glaciers and changing precipitation patterns, are exacerbating the water problems in Kashmir. The implementation of climate adaptation measures, such as the development of climate-resilient water infrastructure, can help to address the impacts of climate change on water resources.
6) *Conflict Resolution:* Water-related conflicts are a significant problem in Kashmir, and their resolution is essential to promote the sustainable management of water resources. The governments of India and Pakistan can engage in dialogue and cooperation to resolve water-sharing issues, while local communities can be involved in decision-making processes related to water management to promote cooperation and sustainable management of water resources.

In short, the solution to Kashmir's water problem requires a collaborative effort from governments, communities, and other stakeholders to ensure sustainable management of water resources and protection of the region's water bodies. The implementation of sustainable water management practices, regulation of industrial and agricultural practices, promotion of rainwater harvesting, groundwater management, implementation of climate adaptation measures, and conflict resolution are essential to address Kashmir's water problem.

REFERENCES

[1] G]. Golam Rasul and A.K.M. Jahir Uddin Chaudhary, Equality and Social Justice in Water Resource Management, 14600IIED.pdf, 2010.
[2] Sulan Chen and Katharina Davis,Climate –adaptive Community water management For Food Security,99-613-1-PB.pdf, 2014.
[3] Frans J.G.PADT and Juan Carlos Sanchej, creating new spaces for sustainable water management, 4_NRJ53-2_Padt-Sanchez.pdf.
[4] Vasantha Chase, Integerated Water Resource Management, small-Island-developing-state.pdf, 2012.
[5] Department of Economic and Social Affair, Global Initiative in rationalising Water information (GIRWI) project,status of implementation of CSD-13 policy action on water,UN_DESA_CSD13_Monitoring_report_on_Water_andSanitati on.pdf, 2014.
[6] Energy and Water- The Vital link for a sustainable future,SIWI(stokholm International Water Institute),2014-www-report-web-2.pdf,2014.
[7] OECD,financing water Resources Management, 44542043.pdf, 2010-2011.
[8] UN habitat, Expanded-water-monitoring initative.pdf , 2014.
[9] The World We Want, The final post 2015 water thermatic consulation, report.pdf, 2015.
[10] Irrigation Commission Report.
[11] Kuhls Are Irrigation Channels In Which River Water Is Diverted By Erecting Weirs Or "Projecting Snags." (Lawrence, The Valley Of Kashmir, Op, Cit, P, 323).



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