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Review Of Indus Water Treaty Under Increasing Water Demand And Changing Climate

[1]Madiha Choudhry, [2]Waseem Yousaf, [3]Maryam Arshad

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Madiha Choudhry
PhD Scholar, Department of Irrigation and Drainage, University of Agriculture Faisalabad, Pakistan. Email: madihach3649@gmail.com
Waseem Yousaf
Institute of Chemical Engineering and Technology, University of the Punjab, Lahore, Pakistan. Email: waseemyousaf30@outlook.com
Maryam Arshad
Government College University of Faisalabad (GCUF), Faisalabad, Pakistan
Email: maryamarshad2000@outlook.com

ABSTRACT

Indus water treaty is a water distribution treaty between two countries (India and Pakistan). In this Treaty the distribution of water of six rivers and their tributaries is discussed. These rivers are Indus, Jhelum, Chenab, Ravi, Sutlej and Beas. The purpose for reviewing Indus xwater treaty is to analyze the impacts of climate change on river flow and how those impacts could be translated to translate to the sharing mechanism. The treaty was signed by India and Pakistan on 19th September 1960 to regulate the distribution of water between two countries for six rivers and their tributaries but it does not describe the utilization of groundwater and the change in available water due to climate change. This research work reviews the treaty to indicate the deficiencies and how they impact both countries. This research work will also analyze the projects of India on Trans boundary Rivers viz; Baglihar dam and Wullar barrage and many other hydraulic structures and Pakistan's objection on the construction of these structures. The research work will describe how these projects violate Indus water treaty and can create problems for Pakistan. This research will also analyze the effectiveness of water sharing mechanism in the present scenario. The research will also recommend, if there is a need to update Indus water treaty. It will also discuss the suggested changes which should be considered during the review of Indus water treaty.

INTRODUCTION

On April 1, 1948 India cut off water supplies to Pakistan from Ferozpur headwork. Pakistani political establishment wanted to get an independent access to waters of Indus Rivers flowing from India in order to ensure continuous supply of irrigation water. This perception of the allocated water flow between the two countries, led to the signing of 1960 "Indus Waters Treaty". In this Treaty the distribution of water of six rivers and their tributaries is discussed. These rivers are Indus, Jhelum, Chenab, Ravi, Sutlej and Beas. According to this Treaty water of Eastern Rivers (Sutlej, Beas, and Ravi) shall be available for the use of India, Pakistan will not interfere the water of eastern rivers. Whereas, Pakistan will use the water of western rivers. In the treaty it is clearly explained that India will not store or divert water of western rivers. Under Indus water treaty, Pakistan was able to build three multi-purpose dam, Dam Warsak, Mangla and Tarbela; a system of eight link canals and the remodeling of existing canals. Five barrages and a gated siphon were also constructed under this treaty.

There are a number of global water treaties to solve the problem of water distribution between countries. The 1996 Ganges Treaty (a thirty year far reaching bargain) accommodates the dissemination of water from Farakka for the two nations. Numerous settlements were marked amongst India and Nepal as the Sharda arrangement (1927), the Kosi bargain (1954, changed in 1966), and the Gandak arrangement (1959, corrected in 1964) the Tanakpur (1991), the mahakali arrangement of 1996. The Mahakali Treaty, signed in February 1996 between India and Nepal, relates to sharing water of a waterway (Miner *et al.*, 2009).

In 1947, after the separation of Indian subcontinent, long-term border related conflicts immediately started between India and Pakistan. Apart from the J & K dispute, another problem of water sharing surfaced between the two countries to share the Indus Waters (Kalair *et al.*, 2019).

The purpose of this research is to document the interests of India and concerns of Pakistan about Indus water treaty. This research work will explore Indian narrative for the construction of hydraulic structures and World Bank response to the Indian moves. The objective of this study is to investigate the core current conflicts in IWT regarding hydraulic structures and to study the required changes in the treaty with increasing water demand and changing climate.

Globally, the most used element is water. The main source of water which is available for agriculture in Pakistan is rain, Indus River- its tributaries, and groundwater. India is also an

agricultural country. India accounts for about 17% of world population but only 4% of clean water sources worldwide. Distribution of these water resources in many parts of the country is also inequitable. Almost 40% of the water demand for Indian cities is fulfilled by groundwater supply. As a result, groundwater levels in many cities have decreased by about 2 feet (Sarfraz, 2013).

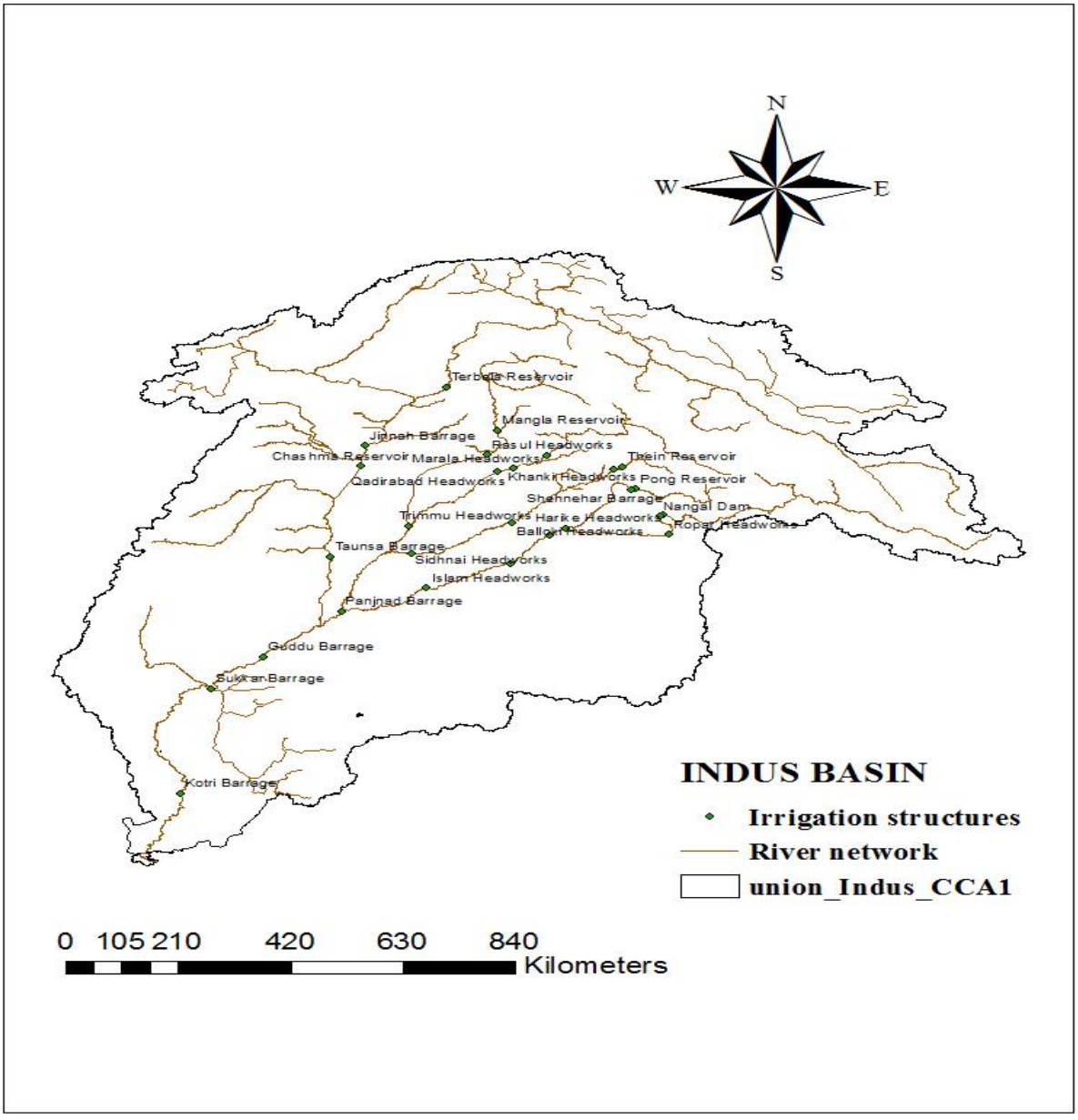

FIG. 1.GEOGRAPHICAL MAP OF THE INDUS RIVER BASIN

This research will investigate the core current conflicts in IWT regarding hydraulic structures.

Numerous controversies have emerged over the plan and development of various structures on the two sides of basin. India began to construct hydraulic dams on the Indus basin according to the agreement but Pakistan has objection on the design of these structures which include Baglihar dam, Wullar barrage and Kishanganga Project which were solved by the World Bank in the light of IWT. This research work will also discuss the concerns of India and the point of view of Pakistan about the design of these infrastructures. This research work will explain how India is infringementing Indus water treaty and World Bank's reaction on these projects (Alam, 2002).

Baglihar Dam project is situated at Chanderkot in Ramban southern dada district of Indian held Kashmir around 160 km north of Jammu. The capacity of reservoir is 15 billion cusecs. Indian government has chosen 8 sites where dams are to construct to create 5320 MW power. Wullar Barrage is situated on waterway Jhelum in Jammu and Kashmir (Wirsing and Jasparro, 2006).

This research work includes reviewing the entire treaty including its annexure and Outline water writes of Pakistan and India. It analyzes the limitations of Pakistan and India and Verify treaty under changing climate. This research work recommends version of treaty based on the analysis done in above steps.

The Indus basin is distributed between India and Pakistan which are predominately agricultural economics. Both countries use river water to irrigate the agricultural land. Water demand for irrigation is increasing day by day. Agriculture in Indian and Pakistani Punjab heavily depend on the water of these Head works. India control the regulated supply of headwork's which create administrative issues. In eastern parts of Pakistan which mainly depend on the water of these rivers, water shortage and environmental issues are increasing. Due to these problems disputes between both countries are increasing (Kliot *et al.*, 2001).

In the treaty it is clearly explained that India will not store or divert water of the western rivers. India shall not permit any interference with the water of western rivers but it can use water for Non consumptive use (e.g.,) runoff the river hydropower project. However, India is not allowed` to store or divert water of the western rivers. Under the IWT Article VIII, India and Pakistan establish a permanent Indus Water Commission (IWC), for smooth implementation of treaty (Ahmad, 2011).

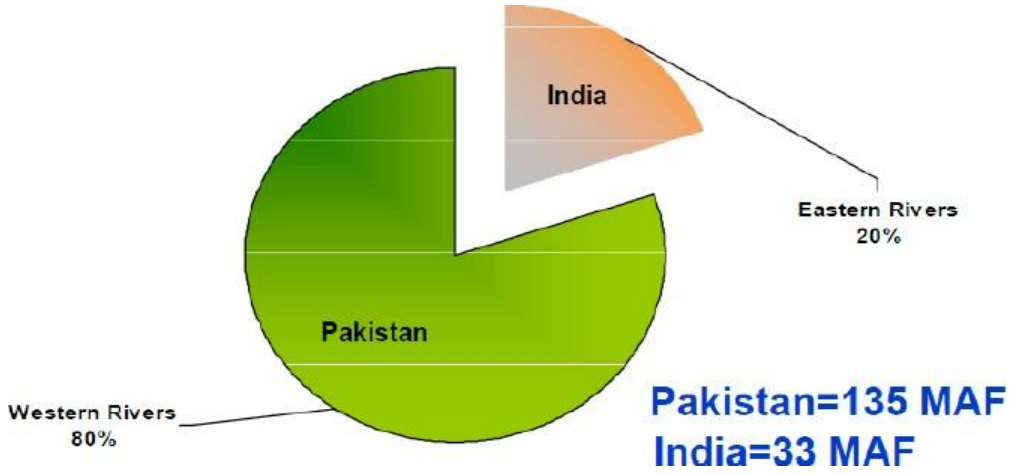

Fig.2.

SOURCE:

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This agreement not only establishes the Indus water rights among India and Pakistan but also opened the ways to organize Indus basin plain. However, Both Pakistan and India have built many canals and reservoirs because of continuous upstream intervention a series of conflicts have been raised just a few decades ago. Some examples of these conflicts are the projects of Wullar, Baglihar and Kishan Ganga dam. Recently, the Indian Prime Minister stated to end the agreement when he was delivering a speech to farmers in Punjab. According to some people Indian prime minister gave this statement because of public pressure, as public demands more water for their crops. The situation can directly affect the regional economy leading to the nuclear war between the two countries (Chaudhry, 2010).

INDUS RIVER BASIN AND REGIONAL ECONOMY

Pakistan and India are facing many problems including poverty, increasing population, less health facilities and poor standards of education. Agriculture is the source of the local economy and it depends on water. Currently, continuous and adequate supply of water for food production, human consumption, and industry is a major challenge. Available water for irrigation is inadequate due to shortages and competitiveness among different sectors. For poverty alleviation treatment of irrigation water is very important. Pakistan's 40 percent population works in agricultural sector most of which live in villages. Moreover, 22% of

Pakistan's domestic product (GPD) comes from agriculture. While in India, 1.2 billion people are linked with agriculture and 15-17 percent of GPD comes from agriculture (Mustafa and Wrathall, 2011).

Indus river basin is of vital importance not only to Pakistan and India but also to the world. Both these densely populated countries grow major crops namely rice, wheat and sugarcane and supply food in the world. In 2017 India and Pakistan were the fourth largest exporters of rice. India and Pakistan are ranked among the nine global sugar producers .In addition, both countries export wheat at large level. Therefore, any irregularities associated with the Indus water may result in a significant impact to the world.

However, under changing climate we need to examine the concerns of both signatories. The water resources of Indus River basin are greatly affected by climate change. This is a major threat for water availability in Indus basin. In Rain fed and arid areas of both countries, water shortage will be a major problem as the production of food, fiber, fuel, and other industrial inputs depends on the adequate supply of water.

EMERGING THREATS TO INDUS RIVER BASIN

Population is increasing day by day and agricultural land is reducing, hence required food security issues for increasing population. The shortage of water is also a big issue in Indus basin. Both industrial and agricultural sectors are affected by the water shortage. Major affect of Water shortage is on agriculture because 93% of Indus water is used by the agriculture.

Qureshi and Ali (2011) stated that only 70 million tons of food will be available in 2025, because available agricultural resources will decrease by 32 percent. Further, 30% of surface storage capacity is reduced due to siltation of dames and change in climate. The combined effect of features states that in 2050, the Indus River will be able to deliver water to only 26 million people (Hartmann *et al.*, 2013).

Recent studies have estimated that the available water in Indus river basin is very uncertain. Climate change is the major reason of uncertainty in available water resources in Indus basin. Some of the other concerns related to the Indus River Basin are: reducing food productivity, maximum use of groundwater, changing climate, increase in number of industries; and unexpected increase in urbanization. These are also major challenges in utilizing water resources and their management (Khan *et al.*, 2011).

CLIMATE CHANGE

To fulfill the needs for water both nuclear power countries are competing. Hence, the goal of

achieving the peace of the region seems to be extremely difficult because change in climate affects the Indus river basin. Change in climate in this region is a major threat to availability of fresh water. It hinders food production, increases atmospheric floods, and causes the loss of agricultural land. Major challenge in finding a comprehensive way to ensure Indus basin sustainability is its transboundry nature. Rainfall and snowmelt are major sources of water as 50-80% of the runoff in Indus basin come from these sources. Area of upper Indus basin is about 13000 km^2 and it includes about 5000 glaciers (Piao *et al.*, 2010).

By the end of 21st century temperature of world will increase about five percent due to change in climate and because of this change the precipitation rate will also change in Indus basin. According to the recent studies, the future trend of precipitation, temperature and other hydrological events will be more extreme (Estrela *et al.*, 2012).

Maximum rainfall occurs in Monsoon season, therefore, water supply of Indus basin because of its contribution of this season is maximum, however, due to climate change, and this season is becoming more severe and short. Due to extreme conditions of monsoon season floods and water shortage both are increasing. One fifth of Pakistan's entire area was affected by extreme floods due to which Pakistan sustained a loss of 10.056 billion dollars. Due to increasing intensity of monsoon season erosion rates are increasing which disturbs the natural environment. Clearly, climate change contributes to the threat related to water resources and food security (Lutz *et al.*, 2016).

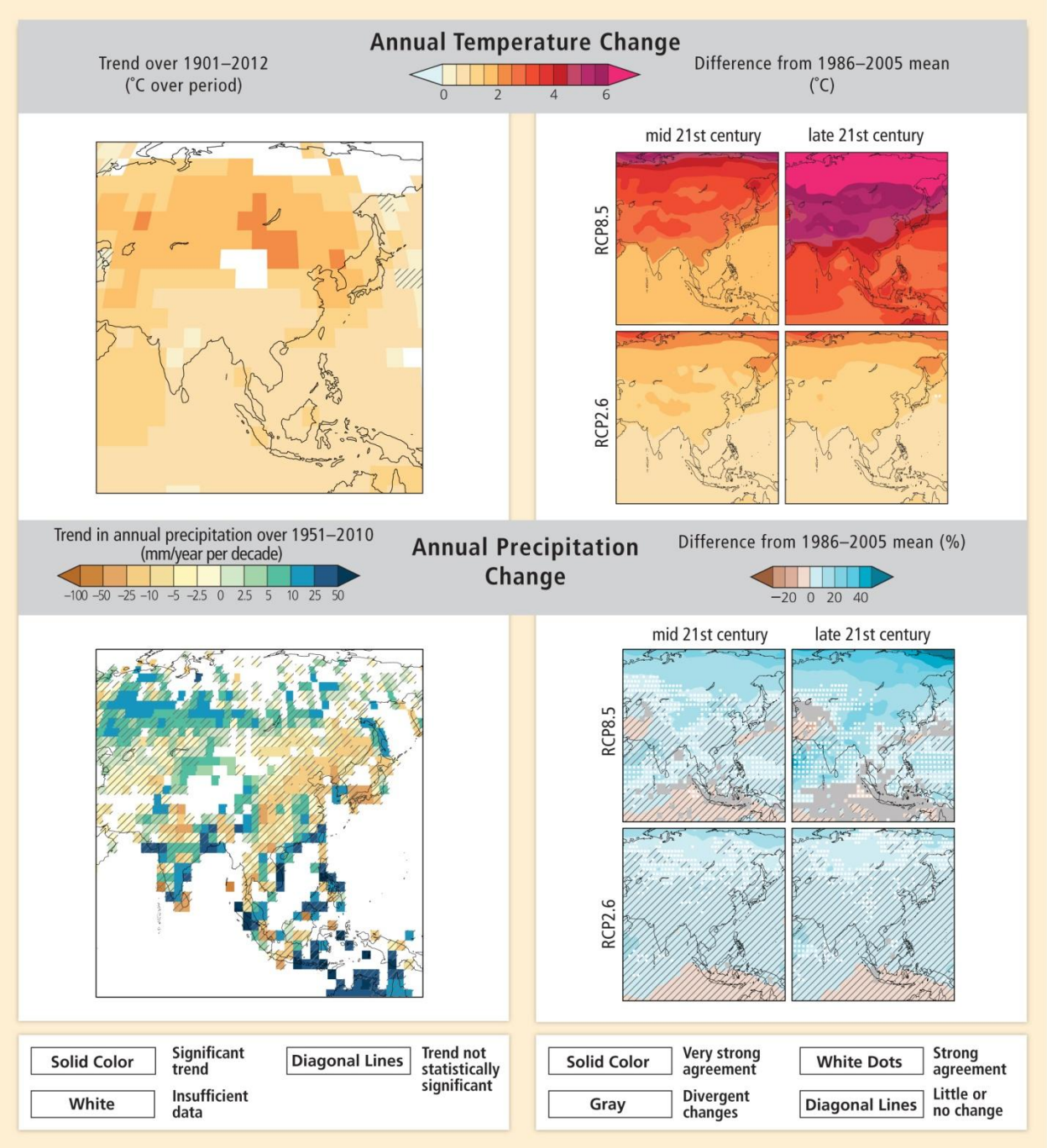

FIG.3. SOURCE IPCC MODEL

In figure top left map demonstrates the average annual changes in temperature during 1901 to 2012. Whereas, the top right map indicates the difference in temperature from 1986 to 2005. At 10 percent, level where trends are significant- indicated with solid color and diagonal lines give non significant trends. In figure, the bottom left map shows the change in annual precipitaion from 1951 to 2010 and bottom right map explains the difference in mean annual

precipitaion from 1986 to 2005. Top and bottom maps on right side shows CMIP5 multi-model average annual change in temperature and annual average change in precipitation for the duration of 2046 to 2065 and 2081 to 2100 under RCP2.6 and 8.5 compared to 1986–2005. Areas with strong agreement are indicated by solid colors (Cook *et al.*, 2010).

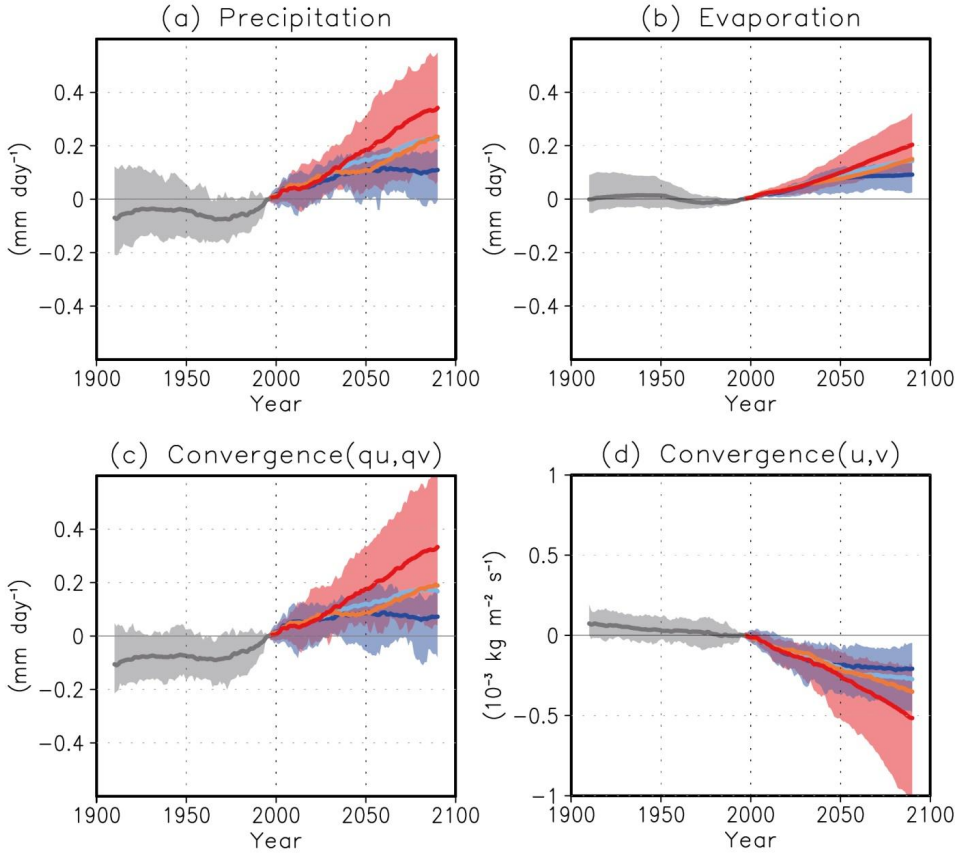

FIG.4. IPCC MODEL 2013

CMIP5 models explain a decreasing trend of wind convergence during the 20th and 21st centuries in Fig(d). Figure (c) illustrates that the moisture flux convergence demonstrates an icreasing trend in 21st century as compared to 1980s. In Fig (b) surface evaporation shows a similar trend related to warmer sea surface temperatures. Due to raising evaporation and moisture flux convergence the precipitation in monsoon season increases globally (See, Fig a)

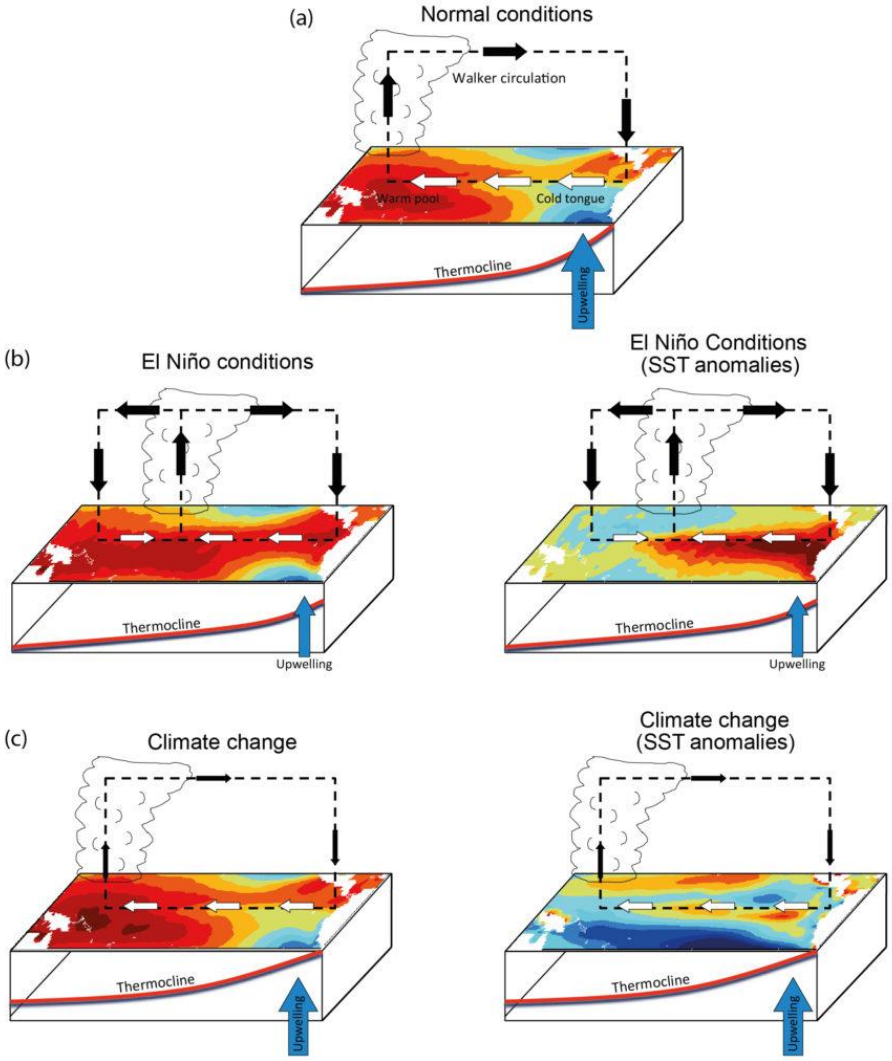

FIG.5. SOURCE: IPCC MODEL 2013

Figure (a) shows mean atmospheric conditions in a tropical pacific, representing sea surface temperature, walker circulation and surface wind stress, the average point of convection and the average flow and thermocline position. Figure (b) shows normal conditions throughout the event. Figure (c) shows the possible average conditions under atmospheric change derived from theoretical data, observations and general circulation models.

AGING TREATY

With technical and financial support from India, Afghanistan also plans to control the water resources of the Kabul River(van der Werf and Smulders, 2007). At upstream of river Chenab and river Jhelum same projects are planned. On western rivers the construction of dams and barrages will seriously affect Pakistan because rabbi crops of Pakistan depend on these waters.

If India builds dams on these rivers and store water, it will affect Pakistan's agriculture and create a tension between India and Pakistan (Zawahri and Michel, 2018).

Additionally, without considering the transboundry aquifers under current weather conditions, this agreement focuses mainly on the surface water resources. It is expected that the frequency of the extreme events will increase in the near future, and flood management plans need immediate attention.

HYDROPOWERPROJECTS OF INDIA ON TRANSBOUNDRY RIVERS

In Jammu and Kashmir India is constructing large number of dames and barrages on heads of Jhelum ,Chenab and Indus rivers which were given to Pakistan according to Indus water treaty. These hydraulic structures affect water availability in Pakistan. Due to which Pakistan wants to review Indus water treaty. Both countries blame each other for creating water related issues. Muhammad Nasrullah Mirza (Professor of Defense and Strategic studies in Quid e Azam university) stated that India is using water storage and diversion as a political tool to control Pakistan's water recourses because unrestricted flow of water is critical for Pakistan (Saklani *et al.*, 2020).

India can build dams and consume water because India is on upper riparian. To restrict the supply to Pakistan, India can use the projects of Baglihar dam and other hydraulic structures on Tran boundary Rivers. According to Indus water treaty India is allowed to construct only a small runoff water plant but capacity of Baglihar dam is 15 billion cusecs and Wullar Barrage also have a potential to disrupt the triple canal project of Pakistan (Hill, 2013).

BAGLIHAR DAM

In 1999, India started to construct a dam on head of river Chenab called as Baglihar dam. This project was designed to generate 450 megawatt electricity but under Indus water treaty India can store water only in a small amount .Pakistan states that this dam is a clear violation of treaty because the gated spillways were used in the construction of this dam which complement its storage capacity is larger than the allowed capacity (Salman, 2008).

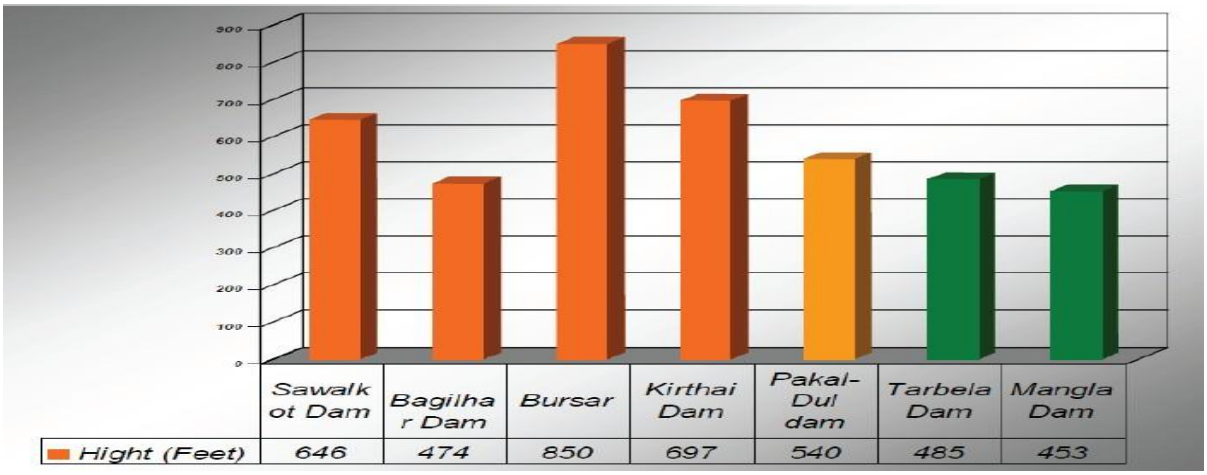

FIG.6 SOURCE:

HTTP://WWW.LEAD.ORG.PK/JW/READING_MATERIAL_JOURNALIST_WORKSHOP.HTML

According to a report Baglihar dam can create many issues for Pakistan. Point of view of Pakistani hydrologists is that if India violates Indus water treaty and this treaty fails to sort out issues then problems of water shortage will increase and Pakistan will suffer the conditions of food shortage and economic problems. Half of Pakistan's irrigation system depends on Indus River and its tributaries. Half of Pakistan's electricity is also generated with the supplies of Indus River. According to Pakistan India can use Baglihar dam against Pakistan by unregulated release of water and causing floods (Biswas, 2011).

WULLAR BARRAGE

India started to construct Wullar barrage in 1984. This barrage is situated in Indian held Kashmir on Jhelum River. India named this barrage as Tabul navigation project but Pakistan called it as Wullar barrage. India started to construct this barrage at the head of Wullar Lake which is situated in Sopore town in Jammu Kashmir. This lake is India's largest lake of fresh water. The provisions of Indus water treaty stated that India will not construct any storage structure on main branch of Jhelum River. According to treaty India can store 0.75 million acre feet water from the main branch of Jhelum River, but Wullar barrage which is constructed on head of main branch of Jhelum can store 0.30 million acre feet of water. According to Indian view this barrage would navigate river in summer and it will not control flow of water towards Pakistan. However, Pakistan views it as a course under which India can use this barrage against Pakistan by controlling river flow. This barrage also has the capacity to disturb triple canal project of Pakistan on Jhelum River. Pakistan cannot ignore this project because 97

percent water of Pakistan is running through Indian held Kashmir (HIll, 2012).

KISHANGANGA HYDROELECTRIC PROJECT

In 1994 Kishanganga project was started in Jammu Kashmir. Two main tributaries of river Jhelum are in India. Northern tributary is the river Neelum which flows in the hills of Himalayas at a higher altitude and southern tributary is the Jhelum which flows at a lower altitude. These tributes join when enter in Pakistan. Due to this different pattern a barrage over Neelum can be constructed, to set a power station and produce electricity in a significant amount. In Pakistan downstream side and in India upstream side are the obvious sites for the construction of this barrage. These potentials were considered in Indus water treaty so it was already mentioned that India could not construct any dam or barrage if it will affect Pakistan. In December 2013, the Court ruled that India could divert water for power generation while ensuring a minimum flow of 9 cumecs (m^3/s) downstream to Pakistan. Now India is constructing Kishanganga project of 330 MW and Pakistan is constructing Neelum Jhelum project of 1000 MW(Giacomini *et al.*, 2013).

DISCUSSION

NEEDS FOR MODIFICATIONS

Water resources are present in the form of groundwater and surface water resources. It is difficult to deal with the water resources as compared to static and land resources because, water is always in motion and it cannot be controlled easily and this becomes more complicated when water resources are shared by a number of political entities (Kliot *et al.*, 2001).

Shared water management of Transboundry Rivers has taken a political form in south Asia because clean water is essential for the development of the health economy. The lack of cooperation in the integration of water resources has a serious impact on the environment and the Indus Valley community (Warner and Zeitoun, 2008).

The IWT could be fruitfully modified and renegotiated to bring it more in line with contemporary international watercourse law. The treaty could include emerging concerns with water quality, environmental sustainability, climate change, and principles of equitable sharing (Nasim *et al.*, 2010).

Whenever India chooses to build a dam or reservoir, on a controversial site this issue goes to the neutral arbitrator, which decides on the issue in the lights of agreed points in IWT. Pakistan does not find any immediate relief because in Indus water treaty a long procedure is characterized, Pakistan has only option to convey complain to India or World Bank and this

procedure requires much time and money. Meanwhile, there is no immediate mechanism to stop the construction on the upstream(Hashmi *et al.*, 2020).

In the review of Indus water treaty, pollution control is another major problem that needs consideration. Polluted water is entering into Pakistan which is harmful for human's .In Indus water treaty, no provision is given about pollution control. In review of Indus water treaty the problem of pollution control can be discussed (Zawahri, 2009).

INDIAS POINT OF VIEW AND PAKISTANS INTEREST FOR MODIFICATIONS

India denied the fact that it is constructing dames for water storage and diverting water. According to India it cannot divert water in the presence of Indus water treaty commission. Of any built structures India said that they take into account all the provisions of treaty and their structures are according to these provisions. If both India and Pakistan try to resolve the issue and make the relations better then both can use their water resources in a better way and can get more benefits from the same amount of water (Sarfraz, 2013).

Indus water treaty does not consider the increasing water demands. When India and Pakistan sign this treaty water was available in excess amount but now its availability is not sufficient to fulfill all water needs due to increasing population. Change in climate is another major reason of water shortage; both India and Pakistan are facing problems of water scarcity. For the management of Indus basin it is necessary that we consider the whole basin as a single unit and we should consider all economic, environmental and social interests as mutual interests.

WAY FORWARD

Khalid Mohtadullah, former Member Water, Water and Power Development Authority (WAPDA) and Senior Advisor, International Centre for Integrated Mountain Development (ICIMOD) of Pakistan said that "We destroy our environment in various ways on an unprecedented scale". Shortage of water is the main reason of degradation of agricultural field. On the other hand side 60% of world's poorest people are engaged with agriculture.

If country have a good water policy in the region, the ambition of having wide ranged policy of agriculture can be attained. There is an uncertainty in the current water distribution that needs to be directed to complete, transparent and permanent document. This document does not recognize its use in other neighboring countries (such as China and Afghanistan). This agreement based on water rights of both India and Pakistan.

Incredible population growth is another major reason in revision of Indus water treaty. Most

populated area of the world is south Asia. It is accommodating 237 million people in Indus basin. It is expected that in 2050 population will grow to 383 million and in by 2025 the population will rise to 319 million. Regional approach is only required to control in human growth rate. The regions should promote the increase in low water productivity.

The most potent threat to resources of water in Indus basin is change in climate. At high temperatures ice is melting and this is the major risk to the water resources. Indus basin flow can be reduced to 50% in future due to this increasing temperature. Population of India and Pakistan is increasing rapidly due to which the situation is becoming more challenging.

We need to solve a series of disputes and make combine efforts to fulfill future water needs and to save water resources to Indus basin. It is necessary that Government and non-governmental organizations make efforts to combine all stakeholders at a common platform to enhance understanding of each other's concerns, eliminate any doubts, and ultimately, to create a sustainable solution of the Indus River basin. Better cooperation between governments is essential to achieve a high level of efficient water management.

Continuous threats of floods and socio-economic pressures in the development of these areas require action by the both countries. Long-term co-operative solutions can result in reduction of conflicts in both countries. Considering the extent of the problem,

LIMITATIONS IN IWT

Indus water treaty was signed for the distribution of Transboundry Rivers between India and Pakistan. Both countries should treat the Indus basin as a shared river, if India and Pakistan take basin as a single unit they can work in a more efficient way for the security of water resources and their management. However, In Indus water treaty joint management of Indus basin is not discussed (Kokab and Nawaz, 2013).

The document also ignores water-related activities in China and Afghanistan. Additionally, extraction of groundwater for irrigation purpose is completely ignored in this agreement, the use of groundwater in irrigation increased. Exponentially Uncertainty and insecurity of the river water in the basin are the main reason for this increased use. Moreover, the poor condition of irrigation structures is also a reason for increased extraction of groundwater. Therefore, while updating Indus water treaty extraction of groundwater should be considered (Miner *et al.*, 2009).

The second major drawback is that the demand of water for future is missing in the agreement. Major portion of Kashmir which is a disputed territory is under Indian control. Population of

Kashmir is increasing rapidly it was 3.5 million at the time of treaty. Large amount of energy and water is required to fulfill their needs. Amount of water allocated to Pakistan was 135 MAF according to Indus water treaty. Population of Pakistan is also increasing rapidly and it is three times more as compared to the population at the time of treaty. Due to increased population per capita availability of water is decreasing. Now Pakistan is facing problems of water shortage and it is expected that this shortage will increase in future (Alam, 2002).

LACK OF TRUST AND COOPERATION

To manage river systems internationally, institutional capacities are necessary for building more cooperation. Both parties can maintain stability of regions by cooperating with each other over water sharing and by promoting harmony. Due to effective cooperation we can improve the ecosystem, river management and get other benefits also.

The implementations of Indus water treaty are strictly monitored by a commission. Both India and Pakistan are determined to use limited water recourses in better way by building storage reservoirs and hydropower projects According to Indus water treaty both countries will share their information about projects on transboundry rivers before start of the project. But Pakistan objections that India does not compels with this act (Akhter, 2015).

The solution of Water issues between countries is very difficult and its major reason is Kashmir issue and behavior of people from both sides of border. Now case of Indus Basin River becomes political due to which accountability and transparency does not exist is this issue. Indian authorities do not give any information about projects on Transboundry Rivers before time. Join development of Indus river system is becoming tougher due to all these conditions (Qureshi *et al.*, 2008).

REVISION OF TREATY

From previous discussion, it is concluded that Indus water treaty limits the water rights of Pakistan. Indus water treaty does not consider the increasing water demands under changing climate. When India and Pakistan sign this treaty, water was available in excess amount but now its availability is not sufficient to fulfill all water needs due to increasing population. Change in climate is another major reason of water shortage. According to experts, due to the transboundry nature of the Indus basin, without some necessary changes Indus water treaty is not helpful for the development of Indus basin. For the management of Indus basin it is necessary that we consider the whole basin as a single unit while simultaneously considering all economic, environmental and social interests as mutual interests. The interest of India and

Pakistan is divided due to the partition of Indus basin and it adversely affects the ecosystem and environment of region. India is constructing dams, barrages, and hydroelectric power plants on Transboundry Rivers which adversely affects s agricultural sector of Pakistan.

Both countries should establish a joint framework for better and sustainable utilization of shared water resources of Indus basin. This framework allow independent decision making. There should be no political influence in resource management and decision making. The participation and collaborative effort of technical staff from riparian countries in analyzing the situation and making decisions will increase the working efficiency of the joint river basin management to efficiently manage shared water resources, cooperation at the political, institutional, and technical levels is critical. Effective cooperation between states on shared resources promotes not only the resource management but also regional stability by lowering political instability.

Establishment of joint river basin management framework will be helpful in promoting cooperation by improving the level of transparency and accountability.

CONCLUSION AND RECOMENDATIONS

After the study of available literature related to the issues of Indus water treaty it is concluded that there are certain managerial issues which are the main reason of major conflicts between the two countries. It is observed that India is not ready to cooperate with Pakistan and Pakistan is not ready to compromise with the dominant behavior of India, This condition will not help to solve the dispute. Another major problem is the intera-national disputes in Pakistan. There are water issues among provinces of Pakistan which increase the pressure on central government. Government should take measures to solve water issues of Pakistan on both national and international level.

Keeping in view the different dynamics of the water problem, India and Pakistan should seek international support, perhaps with the World Bank again taking the lead to negotiate a sound water sharing and usage mechanism through an IWT II. India and Pakistan should make a joint organization with representatives from both countries, whose responsibilities would include determining the basins short and long term supply capacity as well as its integrated development, infrastructure development, and coordination of various technical agencies activities. The transition from large scale, capital, technology intensive and environmentally deteriorating water resource management to management intensive and ecologically balanced development based on indigenous technology is highly required in

current circumstances. If India and Pakistan agree on something, mediation in the case of water conflicts has worked in the past between the two countries, and it would answer another major difficulty financing the projects (Wasi, 2009).

Certain new approaches and procedures can be included in the reviewed Indus water treaty to increase the trust. For Example, real time telemetry system can be installed at various locations to monitor water quality and quantity, in order to reduce data sharing mistrust. The Indus Waters Treaty need to be updated to reflect changes that have occurred since its inception as well as future climate change projections in order to promote more effective water use with in each country In the face of diminishing Himalayan glaciers, India's increased energy need and Pakistan's increased water demand would put the treaty to the test, possibly promoting its amendment (Kokab and Nawaz, 2013).

No doubt the treaty has provided benefits to both Pakistan and India. India received extra water from Eastern Rivers, whereas Pakistan received water from the western rivers without interruption. However, Controversial Indian projects have also highlighted the need for a revised Indus basin treaty to consider the concerns of downstream riparian.

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