Necessity of Inserting Climate Change Clause in the Transboundary Water Agreements of South Asia

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Abstract: The transboundary water agreements are created worldwide in negotiation among different States to avoid any conflict relating to shared water resources and South Asia is not an exception. South Asia isa region having conflict over shared water resources due to water scarcity for an over growing population. One of the major challenges associated with the management of transboundary water resources is to develop suitable mechanisms for managing shared water resources while adapting the impact of climate change as climate change has a major impact on water scarcity. The amount of water may increase or decrease due to climate change in any shared water resources of South Asia creating impact on water allocation system; the consequence of which is conflict over shared water in South Asia. Therefore, the impact of climate change should be taken into consideration for water resource planning, management and decision making in the transboundary water agreements of South Asia which is absent until now. This study unveils the legal as well as institutional arrangements to allocate shared water in transboundary water agreements of South Asia. It suggests some flexible mechanisms or climate change clause to be included in the transboundary water agreements of South Asia and the necessity behind doing so to adapt the impact of climate change.

Keywords: Climate change, flexible mechanisms, institutional mechanisms, South Asia, shared water resources, and transboundary water agreements.

1. Introduction

South Asian region bears a long history of hydro-politics.[1] Most of the rivers in this region are transboundary in nature originating either from the Himalayas or the Tibetan Plateau and then flowing to the soil of the member States of South Asia from upper riparian States (i.e., India) to lower riparian States (i.e., Pakistan, Banglades) [2] The member States of South Asia have been entered into transboundary water agreements (hereinafter TWAs) for allocation of water

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1 James Kraska, 'Sharing Water, Preventing War—Hydro diplomacy in South Asia' (2009) 20 Diplomacy & Statecraft <http://dx.doi.org/10.1080/09592290903293852> accessed 22 June 2021.

2 Douglas Hill, 'Alternative Institutional Arrangements: Managing Transboundary Water Resources in South Asia' (2006) 14 Harvard Asia Quarterly <https://afghanwaters.net/wpcontent/uploads /2017/08/2012-Alternative-insts-for-tbw-mgm-in-SA.pdf> accessed 23 June 2021.

among themselves. This paper limits its discussion to the Indus Waters Treaty,[3] the Ganges Water Treaty,[4] the Mahakali Water Treaty[5] and the Helmand Water Treaty[6] and articulates these treaties as the TWAs of South Asia. Although the Ganges Water Treaty and the Mahakali Water Treaty have been executed in 1996, both of them have a duration of thirty and seventy five years consecutively.[7] The Indus Waters Treaty executed in 1973 and on the basis of this treaty the Permanent Court of Arbitration gave an arbitral award in 2013.[8] Afghanistan and Iran have assigned a joint Helmand River Commissioners Delegation on 2020 to promote bilateral cooperation on water on the basis of the Helmand Water Treaty.[9] Therefore, although these TWAs of South Asia have been executed a long time ago, any discussion on all of these are still relevant.

Water is a dire need for sustainable development.[10] There is a huge demand of water in South Asia as most of the States have extensive plans to construct dams for power, irrigation, and flood control by using water from these shared water resources (hereinafter SWRs) creating aggravating tensions among themselves.[11] Water sharing in South Asian region is significant as well as contentious due to cumulative demand of water, continuation of developmental work irrespective of environmental damage, exploitation of ecosystem, mismanagement of resources, lack of regional cooperation, inadequate water policies, climate change and many other factors.[12] There are various SWRs in

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[3] The Treaty between the Government of India and the Government of Pakistan Concerning the Most Complete and Satisfactory Utilisation of the Waters of the Indus System of Rivers, 1960 is termed as the Indus Waters Treaty.

[4] The Treaty between the Government of People's Republic of Bangladesh and the Government of the Republic of India on Sharing of the Ganga/Ganges Waters at Farakka, 1996 is termed as the Ganges Water Treaty.

[5] Treaty between His Majesty's Government of Nepal and the Government of India Concerning the Integrated Development of The Mahakali River Including Sarada Barrage, Tanakpur Barrage and Pancheshwar Project, 1996 is termed as the Mahakali Water Treaty.

[6] The Afghan-Iranian Helmand-River Water Treaty, 1973 is termed as the Helmand Water Treaty.

[7] Article XII of the Ganges Water Treaty, 1996 and article 12 of the Mahakali Water Treaty, 1996.

[8] *Pakistan v India* [2013] PCA. It is termed as the 'Award in the Arbitration regarding the Indus Waters Kishenganga between Pakistan and India', popularly known as the Indus Waters Kishenganga Arbitration.

[9] 'Transboundary Water Disputes between Afghanistan and Iran', (Climate Diplomacy) <https://climate-diplomacy.org/case-studies/transboundary-water-disputes-between-afghanistan-and-iran> accessed 19 May 2020.

[10] Stephen E. Draper and James E. Kundell, 'Impact of Climate Change on Transboundary Water Sharing' (2007) 133 Journal of Water Resources Planning and Management <https://www.researchgate.net/publication/248880215_Impact_of_Climate_Change_on_Transboundary_Water_Sharing> accessed 20 June 2021.

[11] Muhammad Nawaz Khan, 'Geopolitics of Water in South Asia' (2016) 1 Journal of Current Affairs <https://www.ipripak.org.../uploads/2016/11/Article5_Nawaz-Khan.pdf> accessed 23 May 2021.

[12] Mabroor Hassana, Manzoor Khan Afridi and Muhammad Irfan Khan, 'Environmental Diplomacy in South Asia: Considering the Environmental Security, Conflict and Development Nexus' (2017)

South Asia and many challenges are associated with the management of these SWRs. Two of the major challenges are to measure the impact of climate change on these SWRs and to develop suitable mechanisms in TWAs for allocation of water while adapting the impact of climate change. Making effective principles and procedures to manage and protect SWRs on the face of climate change is a challenge that include many things, i.e., defining transboundary water, jurisdictional issues, procedure to control over extraction of water, technical know-how to manage this water allocation, and conflicting interests of States sharing SWRs. In case of defining transboundary water, different terms have been used by States in different agreements which make things more complex.[13] Many agreements added emphasis upon surface water even if groundwater is mentioned in those agreements.[14] States also have to ensure that no one over extracts water and no pollution has been made to water and environment.[15] Sometimes low level of technical knowledge on groundwater renders legal agreements difficult to arrive at between States whereas sometimes conflicting interests of States make it difficult to be a part of such TWAs.

Climate change can increase or decrease the amount of water on SWRs. Although South Asian States have national climate adaptation plans, few of these States have attempted climate adaptation policies in these TWAs.[16] There are very limited scope in existing TWAs of South Asia for climate proofing initiatives.[17] Most of the TWAs of South Asia focused on rigid water allocation and infrastructure development; they do not incorporate any mechanism to mitigate the impact of climate change.[18] Whatever measures have been taken so far in these TWAs of South Asia to mitigate the impact of climate change are regarded as inadequate and inefficient. Some of these TWAs establish joint water commission with decision-making power or enforcement power while others include provisions concerning exchange of information, monitoring and evaluation, conflict resolution mechanism and water quality management. Institutional mechanisms although exist in a number of treaties; few treaties

82 Geoforum <https://www.sciencedirect.com/science/article/abs/pii/S0016718516302615> accessed 29 May 2021.

13 This scenario is prevalent in the TWAs of South Asia, i.e., Indus Waters Treaty, the Ganges Water Treaty, the Mahakali Water Treaty, the Helmand Water Treaty.

14 ibid.

15 Pollution by one State to any other State needs to pay compensation which is a general principle of international environmental law known as the 'polluter pays principle'.

16 Noah D. Hall, Bret B. Stuntz and Robert H. Abrams, 'Natural Resources & Environment' (2008) 22 American Bar Association <https://www.jstor.org/stable/40924924?seq=1#metadata_info_tab_contents> accessed 28 May 2020.

17 P. H. Gleick, *Confronting Climate Change: Risks, Implications and Responses* (Irving M Mintzered, 1st edn, CUP 1997).

18 Gretta Goldenman, 'Adapting to Climate Change: A Study of International Rivers and Their Legal Arrangements' (1990) 17 Ecology Law Quarterly 741 <http://scholarship.law.berkeley.edu/elq/vol17/iss4/3> accessed 21 May 2020.

possess the flexibility to reform those mechanisms to cope up with the impact of climate change. Sometimes monitoring, enforcement, and conflict resolution mechanisms are also absent in a large number of TWAs. Some TWAs often overlook the evaluation mechanism, enforcement mechanism and public participation. There are few TWAs that include international climate adaptation fund. In this scenario, resilience and adaptability into TWAs of South Asia are essential to address the uncertainties and variabilities associated with climate change. Existing legal and institutional arrangements require to be critically reviewed to determine whether they are resilient in the face of extreme climate events or they fail to meet the challenge of adaptation. Experts have offered suggestion to incorporate flexible allocation and responsive mechanisms, amendment procedure, and cooperative management mechanism in the TWAs to reduce the risks of possible conflict and lessen vulnerabilities to climatic change.[19]

The TWAs of South Asia have many mechanisms to distribute water among themselves yet water allocation will not be easy in the absence of any flexible mechanism to adapt the impact of climate change. These TWAs offer the potential for flexible mechanisms to adapt the impact of climate change while allocating water which can engender a sustainable future by ensuring peaceful distribution of water in this region. A flexible and adaptive transboundary water management system in these TWAs can enable effective climate adaptation. Otherwise the impact of climate change may create unavailability of sufficient water in these SWRs of South Asia causing conflict[20] (i.e., lack of water in SWRs may obstruct any development work plan of any State of South Asia which may led to conflict in this region).[21] Against this backdrop, this paper signifies inclusion of climate change clause or flexible mechanisms in these TWAs of South Asia as a possible means of mitigating and adapting to the impact of climate change. Critical review of the importance of adaptation of flexible mechanisms or insertion of climate change clause in these TWAs of South Asia has been made in this paper.

Besides the introductory and concluding remarks, this article has four sections. After the introduction, the second section articulates the general principles of law governing TWAs of South Asia (i.e., the Indus Waters Treaty,

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[19] Heather Cooley and P. H. Gleick, 'Climate-Proofing Transboundary Water Agreements' (2011) 56 Hydrological Sciences Journal; Gabriel E. Eckstein, 'Commentary on the UN International Law Commission's Draft Articles on the Law of Transboundary aquifers' (2007) 18 Colorado Journal of International Environmental Law and Policy; Stephen C. McCaffrey, 'The Need for Flexibility in Freshwater Treaty Regimes', (2003) 27 Natural Resources Forum.

[20] Gareth Price (ed), *Attitudes to Water in South Asia, Chatham House Report* (The Royal Institute of International Affairs 2014).

[21] Iram Khalid, 'Trans-boundary Water Sharing Issues: A Case of South Asia' (2010) 17 Journal of Political Studies 79.

the Ganges Water Treaty, the Mahakali Treaty and the Afghan-Iranian Helmand Water Treaty). It discusses the international legal principles and basic legal mechanisms of the TWAs of South Asia. The third section provides an outline of the impact of climate change on SWRs of South Asia. It encompasses the data of carbon emission provided by the Inter-governmental Panel on Climate Change (hereinafter IPCC) and discusses the final award of Kishenganga Arbitration where the Permanent Court of Arbitration gives importance to consider the impact of climate change while allocating water for any State in the TWAs made between India and Pakistan. [22] The fourth section articulates the existing institutional mechanisms of the TWAs of South Asia fails to cope up with the impact of climate change. The fifth section ascertains the necessity to include some flexible mechanisms or to insert a climate change clause in the TWAs of South Asia. The last section contains the concluding remarks.

2. General principles of international law governing transboundary water agreements

There are some general principles of law governing TWAs which delimit the rights and obligations of riparian states over SWRs.[23] The principles that are emerged in transboundary water governance include absolute territorial sovereignty, absolute territorial integrity, limited territorial sovereignty and limited territorial integrity, equitable and reasonable utilization of water and many more.[24] Reliance on non-navigational uses of rivers such as irrigation and hydropower was increased due to over population in 19th century discovering various rules to entry into force like 'Harmon Doctrine' which was also known as the principle of 'absolute territorial sovereignty'.[25] This doctrine opined that, "a state can exercise sovereignty over its transboundary water resources irrespective of any adverse impact of such usage to other states."[26]

The principle of 'no harm' and the principle of 'polluter pays' originated in environmental jurisprudence later on abolishing the principle of 'absolute territorial sovereignty' prohibiting riparian States from causing harm to other States, and called for cooperation and peaceful resolution of disputes.[27] Another

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[22] Climate Diplomacy (n 9).

[23] Ferdousi Begum, 'Transboundary Water Agreements in South Asia: Does the Principle of Equitable and Reasonable Utilization of Water Exist' (2020) 18 Bangladesh Journal of Law 179.

[24] Charles B. Bourne, *International Water Law* (Patricia Woutersed, 1st edn, Kluwer Law International 1997).

[25] *United States v Rio Grande Dam & Irrigation Co.,* [1899] USA 690.

[26] ibid.

[27] Muhammad Mizanur Rahaman, 'Principles of Transboundary Water Resources Management and Water-related Agreements in Central Asia: An Analysis'2012 International Journal of Water Resources Development 28:3, pp 475-491, (2012) <https://www.researchgate.net /publication/230854803_Principles_of_Transboundary_Water_Resources_Management_and_Water -related_Agreements_in_Central_Asia_An_Analysis> accessed 20 May 2021.

known principle at that time was the principle of absolute territorial integrity.[28] It established the right of a lower riparian State to demand continuation of the natural flow of an international river into its territory from the upper riparian States.[29] Any development work causing bar to this natural flow should be banned.[30] Both of these principles were rejected on reasonable grounds. Another principle named limited territorial sovereignty or limited territorial integrity[31] had been emerged. It proclaimed the equality of usage of water in any transboundary water resources and enumerated no harm principle. The principle of 'equitable and reasonable utilization of water' ensures the same rule yet there are different opinion regarding what is equitable utilization.[32] States still dispute what should be the common standard for sharing of water and the proper application of the agreed standard.[33]

Among all of these, the most significant rules of SWRs of modern era are 'equitable and reasonable utilization of water', 'environmental protection', 'no harm', 'duty to notify and exchange of information'. International rules regarding shared water resources are made by the Institute of International Law (IIL), the International Law Association (ILA), as well as the International Law Commission (ILC).[34] The works of the ILA include the Helsinki Rules, 1966 and the Berlin Rules, 2004. The work of the ILC includes the 'Convention on the Law of the Non-navigational Uses of International Watercourses, 1997'. Some of these

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[28] Muhammad Mizanur Rahaman, 'Principles of Transboundary Water Resources Management and Water-related Agreements in Central Asia: An Analysis' (2012) 28 International Journal of Water Resources Development <https://www.researchgate.net/publication/230854803_Principles_ of_ Transboundary_...Asia_An_Analysis> accessed 20 May 2021.

[29] Muhammad Mizanur Rahaman, 'Principles of Transboundary Water Resources Management and Ganges Treaties: An Analysis' (2009) 25 Int. Journal of Water Resources Development 159.

[30] Tamar Meshel, 'Swimming Against the Current: Revisiting the Principles of International Water Law in the Resolution of Fresh Water Disputes' (2020) 61 Harvard International Law Journal 135.

[31] It asserts that every riparian State has a right to use the waters of the international river yet at the same time, it is under a corresponding duty to ensure that, such use does not harm other riparian States. It asserts the equality of all riparian States in the usage of the water of the international river.

[32] See, (n 25).

[33] Joseph W. Dellapenna, 'The Berlin Rules on Water Resources: A New paradigm for International Water Law' (2006) World Environmental and Water Resources Congress <https://ascelibrary .org/doi/abs/10.1061/40856%28200%29250> accessed 30 May 2021.

[34] The IIL and the ILA are both non-governmental organizations established in 1873. The IIL is a smaller organization whose membership is made by election and invitation. The ILA is comparatively a larger organization and its membership is open to all international lawyers through recommendations. Both institutions adopt resolutions and rules which aim at codifying international law. However, those resolutions and rules do not have a formal standing and are not legally binding *per se* though they possess a considerable authority as they reflect the established customary principles of international water law from the expertise and respectability of the members of both institutions. The resolutions of the IIL emphasize the obligation not to cause significant harm to other riparian States. The resolutions and rules adopted by the ILA emphasize the principle of reasonable and equitable utilization of shared water resources.

principles are the basis for management of water of any SWRs of South Asia yet the main problem is ensuring supply of adequate water in the era of climate change.

3. Impact of climate change on shared water resources

Climate change has widespread impact on the water cycle of a region which will adversely affect agricultural production, ecosystem, quality and quantity of water and water-related infrastructure. The demand of water is increasing in South Asia for hydropower, irrigation, navigation, fisheries, ecosystem etc. while the availability of water is decreasing for many reasons; one of which is climate change.[35] Rising temperature of the earth due to climate change will impact the overall environment and ecosystem including wildlife, flora and fauna.[36] In the Paris Agreement, 2015, the world leaders agreed to reduce 'global temperature rise' below 1.5-2°C.[37] The Intergovernmental Panel on Climate Change (hereinafter IPCC)[38] publishes reports on global warming. It has the scientific basis of proving the impact of climate change and it is doing so on a regular basis. Increase of carbon emission led to global warming is provided by the sixth assessment report of IPCC.[39] "The likely range of total human-caused global surface temperature increase from (1850–1900) to (2010–2019) is 0.8°C to 1.3°C, with a best estimate of 1.07°C."[40] "Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018."[41] This scenario of changing climate has an overall impact upon the ecosystem including SWRs.

Climate change can impact the shared water resources in two ways; long term impact which threatens the balance of ecosystem or short term impact which can cause flood, drought or any other impact on water.[42] It may cause water scarcity by reducing rainfall; or water availability by increasing it in some region; sometimes heavy flow of water may occur due to melting of

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[35] Golam Rasul and Bikash Sharma, 'The nexus approach to water–energy–food security: An option for adaptation to climate change' (2015) 16 Climate Policy 682.

[36] Gareth price, Rethinking Water-Climate Cooperation in South Asia, (2016) 13 ORF Issue Brief.

[37] The Paris Agreement, 2015 is an international treaty on climate change.

[38] In 1988, the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) established IPCC. The United Nations General Assembly endorsed it to provide periodic scientific assessments concerning climate change, risks associated with it, its implications, procedure for adaptation and mitigation strategies.

[39] Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (2021).

[40] ibid.

[41] ibid.

[42] M. Monirul Qader Mirza and Q. K. Ahmad (eds.), *Climate Change and Water Resources in South Asia* (A.A. Balkema Publishers 2005).

glacier or snow which may create flood to the banks of the river.[43] Geographically the South Asian region is integrated by rivers which mean that if Nepal is affected by flood, it will also affect India; if India is affected by flood, then it will affect Bangladesh and Pakistan.[44] Climate change can also cause decrease of water, which can create drought.[45] The frequency and intensity of flood and drought may increase due to climate change which will insecure the life of the inhabitants residing besides the river basin of Indus, Ganges, Brahmaputra, Meghna and many other river basins of South Asia.[46] Changes in temperature and rainfall have a long term impact on the ecosystem of water.[47]

Most TWAs of South Asia are based on the assumption that future water supply and quality of water will remain unchanged.[48] Existing mechanisms in the TWAs of South Asia never address any solution to the long term impact of climate change although some mechanisms are mentioned there to face short term impact, i.e., flood and drought.[49] "These international agreements fail to have adequate mechanisms for addressing changing climate conditions."[50] Absence of institutional mechanisms to manage these events make these TWAs weak. The parties to these TWAs of South Asian region should modify these TWAs as per the requirement to adapt the impact of climate change.[51] The law of treaties itself will not ordinarily permit unilateral modification or withdrawal under changing circumstances, including climate change rather parties will be required to work within the framework of existing treaties to respond to any change.[52]

The impact of climate change has been taken into account in a dispute between Pakistan and India regarding water distribution by Indus Waters Treaty, 1960. The Permanent Court of Arbitration (PCA) has taken into account the impact of climate change on the flow of water of the Kishenganga/Neelumwhile giving the final award on 20 December, 2013 in that

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[43] David Michel Amit Pandya (eds.), *Troubled Waters: Climate Change, Hydro politics, and Transboundary Resources* (The Henry L. Stimson Center 2009).

[44] Golam Rasul and others, 'Beyond hydropower: towards an integrated solution for water, energy and food security in South Asia' (2019) 37 International Journal of Water Resources Development 466 <https://www.tandfonline.com...019.1579705?needAccess=true> accessed 23 June, 2021.

[45] Anton Earle, Ana Elisa Cascao, Stina Hansson, Anders Jägerskog, Ashok Swain, and Joakim Öjendal (eds), *Trans-Boundary Water Management and the Climate Change Debate* (Routledge 2015).

[46] Ibid n 7.

[47] Richard Davis and RafikHirji, 'Review of Water and Climate Change Policies in South Asia' (2019) International Water Management Institute <http://www.iwmi.cgiar.org/Publications/Other/PDF/sawi-paper-2.pdf> accessed 12 May 2021.

[48] ibid.

[49] ibid, n 14.

[50] ibid, n 19.

[51] ibid, n 11.

[52] Vienna Convention on the Law of Treaties, 1969.

arbitration. The Court has observed that, flow of water may differ significantly due to many factors including climate change and minimum flow requirement needs to be reconsidered due to the impact of climate change.[53] This case establishes our argument that, the TWAs of South Asia should take into account the impact of climate change on SWRs.

4. Institutional mechanisms fail to adapt the impact of climate change on the transboundary water agreements of South Asia

This section discusses how the prevailing mechanisms are structured and failed in terms of handling climate change implications on water allocation in the TWAs of South Asia. Two kinds of mechanisms are prevailing in the TWAs of South Asia to adapt the impact of climate change; i.e. institutional mechanisms and flexible mechanisms. There are many institutional mechanisms in TWAs of South Asian region including joint basin development and joint river management procedure, dispute resolution procedure, amendment procedure and many more that might enhance the efficacy of regional cooperation to ensure just and equitable distribution of water in South Asia yet these mechanisms are not sufficient enough to mitigate the impact of climate change. These mechanisms are discussed in this section to understand how they have been failed to adapt the impact of climate change on the TWAs of South Asia.

4.1. Joint river management procedure

TWAs create 'joint river management organizations' that are expected to manage these rivers jointly. It is an example of inter-state co-operation, public participation, and exchange of information in these TWAs. These commissions work to resolve disputes between States depending upon how much power they possess, i.e., they may possess the power to negotiate between States. The effectiveness of these commissions depends upon their independent authority, decision making power, sufficient resources and ability to balance between interests of States and overall interests of the SWRs. Developing formalized communication between parties through the establishment of joint management institutions can overcome the rigidity of TWAs and serve as a venue for conflict resolution. The TWAs of South Asia can include any provision to mitigate the impact of climate change on SWRs if the members of these Commissions cooperate each other. Against this backdrop, the Permanent Indus Commission[54] (Pakistan-India), the Mahakali River Commission[55] (India-Nepal), and the Indo-Bangladesh Joint Rivers Commission [56] (Bangladesh-India) are established

[53] Para 117 and 118 of the Final Award of the Indus Waters Kishenganga Arbitration. See, ibid n 9.
[54] Indus Waters Treaty 1960, art VIII.
[55] Mahakali River Treaty 1996, art 9.
[56] Ganges Water Treaty 1997, art VII and IV.

respectively under the provisions of Indus Waters Treaty, Mahakali Water Treaty and Ganges Water Treaty. The Helmand River Water Treaty does not include any provisions of joint river mechanism although it has provided that, both the Member States of this Treaty should appoint a Commissioner and a Deputy Commissioner who will work as the representatives of the respective States while implementing the provisions of the Treaty and distributing specific amount of water between these States. [57] Inclusion of the provision of granting specific amount of water to the other Party in the treaties of this South Asian region is an indicator that, these joint river management procedure is a failure to cope up with the impact of climate change as water variability in this SWRs of South Asian region can be changed due to the impact of climate change that reduces the chance of allocating fixed amount of water in any season. Existing procedure of joint river mechanism in the TWAs of South Asia is inadequate to address this issue as impact of climate change can be a bar to specific water allocation to any State causing dispute between States. An effective joint river commission can help to change the present rigidity of the TWAs of South Asia.

4.2. Dispute resolution procedure in the TWAs of South Asia

There are some available mechanisms in the TWAs of South Asia for settlement of disputes, i.e. negotiation, mediation and adjudication. All of the TWAs of South Asia have the provision of allocating fixed amount of water without any provision of taking into account the impact of climate change that has a huge impact on water allocation. Providing less or more water than the fixed amount of water as has been mentioned in these TWAs of South Asia originates dispute between States. The existing dispute resolution procedure prevailing in the TWAs of South Asia fails to address this impact of climate change. Moreover, there is no amicable way to resolve this dispute (that has been arising as States are getting less or more water due to climate change) in these TWAs of South Asia.

Any question concerning the interpretation or application of Indus Waters Treaty or any existence of fact which might constitute a breach of this Treaty must be examined by the Indus Water Commission first.[58] Then any neutral expert may examine it. In case of any dispute, the Commission should inform it to the Government. Both of the Governments will try to resolve it by negotiation and mediation. There must be a 'Court of Arbitration' to resolve this issue. The Indus Waters Treaty is an example of a successful mediation yet the unforeseen threat of climate change challenges it as in case of arising dispute due to distribution of water between States, there is no immediate provision to resolve the dispute.

[57] Helmand Water Treaty 1973, art 2 of the Protocol No. 1.
[58] ibid n 11.

The scope for dispute resolution provided in the Ganges Water Treaty is very limited. It does not include a specific dispute resolution mechanism. The preamble of the Treaty mentions that both Parties wish to find a fair and just solution without affecting the rights and entitlements of either State. The Joint Committee (comprised of an equal number of representatives from both Parties and answerable to the Indo-Bangladesh Joint Rivers Commission) is responsible for examining any difficulty arising out of the Treaty implementation.[59] If the dispute still remain unresolved, it should be referred to both the governments that would meet urgently at an appropriate level to resolve it by mutual discussion. Both the governments recognize the need to cooperate with each other to find a solution to the long-term problem of augmenting the flows of the Ganga/Ganges during the dry season.[60] It therefore does not give the Joint Committee any power to resolve any dispute and there is no provision for mediation or arbitration. The Treaty chose diplomatic means rather legal procedure to resolve any dispute arising from its implementation. It does not specify the time frame for the settlement of any dispute. There is no obligation for the Parties to seek resolution of the dispute. The dispute resolution mechanism of the Ganges Treaty has been extensively criticized as it does not provide any flexible room for arbitration to settle any dispute which makes it less effective. The treaty does not settle down any procedure to resolve any dispute arising due to the impact of climate change.

The Mahakali Treaty provides a detailed dispute resolution and arbitration mechanism if any dispute is not resolvable by the Mahakali Commission. An arbitration tribunal composed of three members conducts all arbitration.[61] One arbitrator must be nominated by Nepal, one by India, with neither country able to nominate its own national, and the third arbitrator is to be appointed jointly, who shall preside over such tribunal.[62] In the event that the Parties are unable to agree upon the third arbitrator within 90 days after receipt of a proposal, either Party may request that the Secretary-General of the Permanent Court of Arbitration at 'The Hague' to appoint an arbitrator, who shall not be a national of either country. The decision of the arbitration tribunal is final, definitive and binding.[63] There is no provision for the venue of arbitration, the administrative support of the arbitration tribunal and the remuneration and expenses of its arbitrators which must be agreed upon by exchanging notes between the Parties.[64] Both the Parties may also agree by such exchange of notes

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[59] Mark Zeitoun and NahoMirumachi, 'Transboundary water interaction I: reconsidering conflict and cooperation' (2008) 8 International Environmental Agreements: Politics, Law and Economics.

[60] Ganges Treaty 1996, art VIII.

[61] Mahakali Treaty 1996, art 11(2).

[62] ibid.

[63] ibid, art 11(3).

[64] ibid, art 11(4).

on alternative procedures for settling differences arising under this Treaty. The Mahakali Treaty offers an elaborate and advanced mechanism for dispute settlement yet it does not take into account the long term impact of climate change and has no flexible provision to settle disputes arising due to the impact of climate change.

Under the Helmand river treaty, in case of any difference in the interpretation or the application of the treaty, the parties should make an attempt to solve the issue through diplomatic negotiation; in case if it is not resolved, then the parties should use the good offices of a third party.[65] Lastly, the treaty seeks the help of arbitration to resolve the dispute.[66] It has the provision to make an 'Arbitral Fact Finding Mission' and then an 'Arbitral Tribunal' if the dispute does not resolve through the previous procedure mentioned above. The provision of diplomatic negotiation is criticized on the ground of political instability in both of these States. This Helmand treaty also does not bear any provision taking into account the impact of climate change.

The above-mentioned dispute resolution procedure in the TWAs of South Asia is time-consuming, rigid and expensive. Under any treaty of South Asian region, these dispute resolution mechanisms do not have the power to settle any dispute arising for not providing fixed amount of water mentioned in the TWAs of South Asia due to the impact of climate change.

4.3. Amendment procedure of the TWAs of South Asia to include better provisions to mitigate the impact of climate change

An easily accessible amendment procedure in these agreements can help States to include any necessary provisions to adapt the impact of climate change, i.e., climate change clause. States can make special provisions to define the changing nature of climate and periodic review of it in the TWAs. For example, the 1944 Water Treaty of the river Colorado[67] has the provision of adding 'Minutes' in their treaty. They can put any provision in the frame of 'Minutes' which later on becomes the part of the original treaty. In case of changing circumstances of climate, the treaty makers can input provisions in the treaty to adapt the impact of climate change as per the situation demands and it becomes the provision of the original treaty. But the TWAs of South Asia do not have any provision of amending these agreements in case of necessity to include any better arrangement to transboundary water management.

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[65] Afghan-Iranian Helmand-River Water Treaty 1973, art IX.

[66] Protocol 2 of the Afghan-Iranian Helmand-River Water Treaty, 1973.

[67] The Colorado River is predominantly in the United States and crosses the Mexican border on its way to the Gulf of California. The Colorado River Treaty is signed between USA and Mexico on February 3, 1944 and it was entered into force on November 1945. It is popularly known as the 1944 Water Treaty.

There is no amendment procedure in the Indus Waters Treaty and the Helmand Water treaty although the latter one has provisions for short term impact of climate change.[68] The Ganges Water Treaty provides that both of the Governments can make a review of the water sharing arrangement after every five years (or before that, if necessary) on the basis of equity, fairness, and no harm principles.[69] They can make necessary adjustments of water sharing management by doing this. The Mahakali Water Treaty provides that, both the Parties can make a review of the treaty after every ten years (or earlier, if necessary) and make necessary amendment.[70] Therefore, the TWAs of South Asia bears rigidity in terms of inclusion of any new provision to mitigate the impact of climate change.

All of these institutional arrangements (i.e., joint river management, dispute resolution procedure and amendment procedure) are necessary yet new institutional arrangements must be put in place to reduce the impact of climate change. For example, to establish a regional institution for cooperation among states in case of dispute arising from the allocation of water. There are many examples of such institutions in South Asia although those are not operational, i.e., South Asia Water Initiative (SAWI). There should be some space for participation of civil society, i.e., South Asian Solidarity on Rivers and Peoples (SARP), Imagine New South Asia (INSA), South Asia Social Forum (SASF), Climate Action Network South Asia (CANSA). The capacity of these institutions depend upon the cooperation from the member states of TWAs of South Asia.

5. Necessity to include flexible mechanisms or climate change clause in the transboundary water agreements of South Asia

Adapting to the impact of climate change is going to require changes in the institutions and policies that have been put in place under the TWAs of South Asia.[71] The capacity of countries to adapt to the impact of climate change and ensuring water flow depends on the degree of flexible mechanisms that are incorporated in their TWAs. Inclusion of flexible mechanisms in any such TWAs means the ability to cope up with the impact of climate change easily and in time of necessity. Flexible mechanisms include climate related water management issues i.e., water allocation mechanism, maintenance of water quality, availability of water and minimum water flow mechanism, provisions of flood control and protection of environmental ecosystem.

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[68] Helmand Water Treaty 1973, Article XI.
[69] Ganges Water Treaty 1996, Article X.
[70] Mahakali Treaty 1996, Article 12.
[71] Ibid n 39.

5.1. Water allocation mechanism in the TWAs of South Asia

Allocating water in a manner acceptable to all parties in time of limited availability of water is one of the most difficult aspects of TWAs of South Asian region. Water allocation mechanism includes water availability, water flow variability, getting minimum water, maintenance of water quality and many more things. Water allocation rules and mechanisms can be done by including a provision in the TWAs of South Asia (i.e., climate change clause) or through separate instruments in the same treaty (i.e., annexure). All of the TWAs of South Asia have the provision of fixed water allocation. The impact of climate change can result a decrease in water flow of the SWRs in time of dry season; thus, changes may happen to the supply, quality and demand of water. Therefore, States may not be able to draw that fixed amount of water from the SWRs. It may cause dispute between States.

There is inequality in South Asian region in terms of usage of water. Climate change in this case makes the situation more vulnerable. There is a concern about water flow variability. Management of flow variability has often been an important component of TWAs. Generally lower riparian States depend on water availability in the basin. Sometimes upper riparian states also stressed to get development projects occurring on the bank of the SWRs using its water as every state in South Asia wants to make barrage or dam by using the water of SWRs either for irrigation or for producing electricity. Sometimes these agreements give priority of water usage but may not have provisions to cope up with the actual need for a growing population. Bangladesh and India stated their intention to increase water supply of the Ganges River during dry period but did not specify how or when such work would take place. These TWAs of South Asia do not make any joint effort or develop any infrastructure to supply water to the other states in a situation of water scarcity.

5.2. Extreme drought and flood control mechanism in the TWAs of South Asia

Vulnerability increases due to constant water variability and scarcity. The establishment of joint water management or joint commission for creating flood-control mechanism to manage unexpected over flow of water is a major concern for any TWAs of South Asia. South Asian States should address this issue in their TWAs to enhance their capacity to face these circumstances as it is a flood or drought prone area. Almost all of the TWAs of South Asia provides mechanisms to this short term impact of climate change (i.e., flood control mechanism) yet existing provisions to control flood or drought in the TWAs of South Asia is not adequate enough to manage this.

5.3. Protecting environmental ecosystem

TWAs of South Asia put little attention to ecosystem or long-term sustainability of the SWRs while making provisions for using water. There is a need to preserve fisheries, natural species, flora and fauna in case of international water management on the face of climate change which is imperative for sustainable development. This should be included in the climate change clause of the TWAs of South Asia.

The need of incorporating flexible mechanisms in the transboundary water agreements of South Asian region is obvious as flexible and adaptive transboundary water management can enable effective climate adaptation. These flexible mechanisms can be included as a climate change clause in the TWAs of South Asia to mitigate the impact of climate change.

6. Concluding remarks

Existing provisions of TWAs of South Asia are inadequate to mitigate the impact of climate change. Moreover, lack of participation, transparency, exchange of information and advanced technology made these treaties unworthy to some extent. New arrangements for such agreements are necessary in the context of a changing climate. Building regional transboundary water management institutions through co-operation among States to adapt the impact of climate change is necessary from the view point of water crisis in South Asia. Every SWR has its own special characteristics and those of South Asian States are not any exception. It needs unique solution to meet up the need of the people living beside this basin area. The member States of these TWAs can think of taking into account the inclusion of flexible mechanisms or climate change clause to mitigate the impact of climate change on these SWRs. They can include the provision of creating an effective negotiation between States to create an adaptation procedure to settle any kind of dispute in an easy and quicker way. There is a significant and proactive role for international development institutions to provide technical assistance and funds to strengthen this region while dealing with transboundary water governance. It can nurture the relationships among States and find long-term solution for managing their SWRs in a manner that would reasonably and equitably address the need and demand of all of them. Therefore, transboundary water management of South Asia needs cross border large scale collaboration among States, joint implementation of research agenda, technology transfer to the developing countries, systemized monitoring and integrated policy approach. The time is ripe for the countries of South Asian region to consider new clauses in such TWAs to develop, design and strengthen their legal regime regarding the SWRs in order to adapt the impact of climate change on the basis of principles established by customary law, the codified law and prevailing international practices.