PEACEFULLY SHARING WATER TO CONTROL SCARCITY AND SECURITY: INDIAN PERSPECTIVE

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Abstract:

The dawn of the twenty first century displays a picture where North- South irrespective of their economic variance is in contest to accomplish globalization through liberalization and environmental protection, to sustain the globe. This ongoing contest is often diverted by power sharing variance among countries establishing an obstacle to development and security. The environment resources are in degradable situation cause being inapt attention to preserve resources and dearth of knowledge of the government as well as the civil society. This is an authentic fact for the South where circumstances have been aggravating day to day. The degradable condition restricts them to waste time in debating on globalization and it's ill-effects. The need to urgently concentrate in protection of environmental resource for future generation. Rapid urbanization, increase population and persistent poverty and unemployment has further complicated situations. Rational planning and managerial strategy is the requisition as the resources are limited. Air and water are cause for life on earth. In contemporary world they have got entangled with development parameter as global warming and water scarcity is reaching an awful state.

Water is prime to life on earth. It is a shared resource with two hundred and sixty one international rivers covering almost one half of total land surface of the globe. Water, flow does not restrict itself to political boundaries and could often be cause for scarcity. Considering the existing water scarcity and rising hostility among nations in South Asia, a significant question will be whether water sharing among nations is peaceful or conflicting? Water scarcity is an acute problem in common faced by most South Asian countries accompanied with problems of rising population, poverty etc. Will water scarcity lead to conflict? Considering the present crisis situation the South Asian countries needs to regionally preserve their environmental resources. A fusion of efforts of both civil society and government can help to develop sustainable policies for the future.

This article is trying to critically look at how successfully India is trying to tackle its water scarcity and pollution. How successful are the water policies that exist in India to handle the rising demand for safe water. This paper also tries to test that under the prevailing conditions in India how far water scarcity would lead to conflict both internally and externally and the various causes that lead to water conflicts.

1 INTRODUCTION

Water is prime to life and is essential for development. The realization that water is of crucial importance for survival of human race is accepted not just today but since past civilizations when water was worshipped. Water has been shaping the face of earth not only as a geologic agent cutting valleys and canyons and sculpting rock formations but also as a major factor in the rise and fall of the great civilization and a source of conflict and tension between nations ***(Duda, 2000).*** Water has hence attracted the attention of political leaders and at the highest level of planning and research. Therefore the question has arisen, how strong is the correlation between water scarcity and conflict and if there is a correlation why will this type of conflict occur? ***(Schneider, 1999).*** Assuming that water scarcity will cause conflict. What are the factors that will lead to this conflict? The conflict may be based on the actual water body, i.e. the quantity of water and the effects (quality) from water development projects e.g. irrigation projects and dams. When the concern is about the amount of water present, there are several factors that may lead to water resource rivalry. These include degree of water scarcity, extent of shared water

supply among countries, and accessibility of alternate fresh water supplies ***(Gleick, 1993).*** The important question is how far sharing water resource conflict could lead to violent conflict in the present times? Will water sharing improve relations among and within nations having hostile relations?

2 WATER SCARCITY AND POPULATION GROWTH:

The world population has crossed 6 billions by the end of twentieth century. This rate was at its peak in 1990 with an increase of 87 millions ***(UN, 1998:2-29).*** Much of the growth is taking place in South where an estimated 25 to 50 percent of urban inhabitants live in impoverished slums and squatter settlements. In the densely populated countries like India, China and Indonesia, large concentration of population exists in mega-cities, leading to an increase in demand for water-related services. In 1995, 46 percent of the world's population lived in urban areas and if this trend persist it could reach to 60 percent by 2030 and 70 percent by 2050 ***(Gleick, 2000:43).*** Thus rising population is leading to an increase in demand for water and inadequate supply. This number implies an increased demand for freshwater of about 64 billion cubic meters per annum (an amount equivalent to entire annual flow rate of river Rhine**.** As nearly 2 billion people have been added to the planet since 1970, per capita availability of water is one-third lower now than it was earlier. China and India, are world's first and second most populous countries. In China the population growth rate is about 1% per year, estimated in 1998. India's population growth rate, which is substantially higher than China's, at about 1.9% per year, means about 18 million people added each year to India's current population of about 970 million. Scarcity of water is however not just related to supply but also to inequitable access to supplies ***(Gleick, 2000:43).*** The crisis has become more alarming because of its inequitable distribution between rural and urban areas as well as among nations sharing water resource. This in many cases lead to water conflicts both internally and externally.

Water scarcity causes water stress. A country experiences water stress when annual water supplies drop below 1,700 cubic meters per person. At levels between 1,700 and 1,000 cubic meters per person, periodic or limited water shortages can be expected. When annual water supplies drop below 1,000 cubic meters per person, the country faces water scarcity. Once a country experiences *water scarcity*, it can expect chronic shortages of freshwater that threaten food production, hinder economic development, and damage ecosystems**.** Based on per capita renewable water availability, India, the second most populous country despite having enough water to meet its people's needs faces severe water scarcity in some areas and this is mainly for unequal distribution. Most rainfall comes during the monsoon season, from June to September, and levels of precipitation vary from 100 millimeters a year in the western parts of Rajasthan to over 9,000 millimeters in the northeastern state of Meghalaya.

3 WATER SCARCITY: THE PROBLEM

Water, a shared resource, continues to be a catalyst for conflict or peace even in early twenty-first century. Water has thus got itself enrolled to international political arena with the rising water scarcity. The natural utility of water has declined for numerous factors resulting in augmentation of regions encountering water scarcity. Thus water scarcity is dismay for India and its neighbors. Thus in an environment of growing scarcity and competition for water a comprehensive strategy is needed to improve the productivity of water in both irrigated and rain-fed agriculture area and ensure access to water by poor.

India in well known as an agrarian economy .As on one side the population is rising similarly on the other side India's ability to feed itself is threatened by slowing agricultural productivity gains, massive product post harvest losses, and its current water use policy. By the year 2025, India could be placed on the so-called red list of 'water stressed' nations, warn scientists. Per capita water availability in India was 5,300 cubic metres (cu.m.) in 1955.The rising population

levels, urbanization and systemic abuses of water could bring it down to 1,500 cu.m by 2025. The problem gains focus for India holds more than one-sixth of the world's population, but only 4% of the globe's renewable water resources. India has good average annual surface water flow from rains and snow. An estimated 1,869 billion cum of fresh water flows into the river system of which only 690 billion cum is utilized. The country has a replenishable ground water potential of 432 billion cu.m, with an estimated 80% of the population relying on this water for their domestic needs***(Gleick, 2000:43)***.

4 WATER USERS

Before we do an in-depth discussion on the problem certain theoretical understanding is required to understand water scarcity and conflict distinctly. The main sectoral users of water are the agricultural sector, the industrial and the domestic sector or the municipal sector. Globally, agriculture is the main water user, accounts for about 67 percent of withdrawals, while industry consumes 19 percent and municipal and domestic 9 percent ***(Seckler et al, 1998)***. Regional trends vary widely among these water users. It is commonly seen that in the industrialized countries the main demand for water comes from the industries, while agricultural demand dominates in South agrarian economy. Even after the increase in the level of urbanization in Africa, Asia and Latin America, agriculture still accounts for approximately 85 percent of water consumption. Domestic or household water consumption in all regions of the world except Oceanic accounts for less than 20 percent ***(Seckler et al, 1998).*** The Indian economy being agrarian is much depended on water for food to feed its rising population.

Growth process and the expansion of economic activities inevitably lead to increasing demands for water for diverse purposes domestic, industrial, agricultural, hydropower, thermal-power, navigation, recreation, etc. So far, the major consumptive use of water has been for irrigation. While the gross irrigation potential is estimated to have increased from 19.5 million hectare at the time of independence to about 95 million hectare by the end of the Year 1999-2000.

The drinking water needs of people and livestock have also to be met. Domestic and industrial water needs have largely been concentrated in or near major cities. However, the demand in rural areas is expected to increase sharply as the development programs improve economic conditions of the rural masses. Demand for water for hydro and thermal power generation and for other industrial uses is also increasing substantially. As a result, water, which is already a scarce resource, will become even scarcer in future. This underscores the need for the utmost efficiency in water utilization and a public awareness of the importance of its conservation.

As major portion of water in India is withdrawn by agriculture more attention needs to be given in management of irrigation systems to water needs for multiple uses. Water needs should not restrict itself just to agriculture, but for domestic uses and environmental needs. Policies and institutions must be developed and cost-effective management practices adopted to halt the environmental degradation caused by overexploitation of groundwater resources. Specific attention needs to be given to implementing policies and developing technologies suitable for adoption by resource- poor farmers in water-scarce or marginal upland and rain-fed areas. The growing scarcity and competition for water and the overexploitation of groundwater resources are putting the poor in irrigated areas at great risk*(Falkeman, 1994).* All this discussion is important for failure to handle water scarcity would further intensify poverty problems for India. Water in India acts as a means to provide food to the growing population. Water scarcity thus can lead to poverty. Prolonged exploitation of groundwater by various sectors has lead to water scarcity in India and growing population further intensifies the problem for the demand increases compared to the supply leading to a state of poverty among the masses. Water scarcity thus intensifies poverty problems as well. Irrigation has played an important role to reduce poverty through decades.

5 WATER AS HUMAN RIGHT OR ECONOMIC GOOD:

The unequal distribution of water among the rural-urban population further complicates situations of water crisis. Considering the rising scarcity of water a preventive measure to bring a check to water wastage there has been a thought on pricing water from water –users by the policy makers depending on the kind of use. This could help to prevent water wastage and help to provide clean water to the masses to drink. A common understanding on water makes people in general consider it as a collective property, which should have no price. Water is thus a social good, a human right. This kind of thought is similar to the concept of water being a unlimited resources. It is with such understanding that water throughout the past decades have been victim of prolonged exploitation which has resulted in lowering of groundwater level, contamination of water leading health problems etc. Water is life and right to life is fundamental for all citizens of India. Even according to the Universal Declaration of Human Rights, Article 25, it is essential to achieve the right to have a adequate standard of living for health and well being of himself and his family, irrespective of financial status ***(Gleick, 2000).*** Thus a minimum requirement of water for all is to be provided and this is a part of human right. However as water for life is the duty of the government similarly citizen has to also perform certain duties in return, which include protection of water which is limited and getting scarce day by day. The rising scarcity and pollution of water compels policy makers in considering the economic value of water to control water wastage both in rural and urban areas.

The pricing of water is no doubt a difficult concept to grasp by the common mass after using water free since time immemorable. Transboundary watercourses are considered generally as international public good[3], which everyone in a basin should have access to, but considering the present scenario of water conflict it is necessary to ensure that water is used efficiently. With the rising crisis, water can no longer be considered as a social commodity but made an economic commodity and priced ***(Young, 1994).*** A widely accepted solution to deal with this problem of water scarcity is appropriate pricing of water services for all users (Agriculture, Domestic and Industry). This can in turn prevent unnecessary waste from exacerbating scarcity problems while maintaining the notion of water's special relationship with people ***(Wolf, 1999).***

6 SOVEREIGNTY OVER WATER:

National sovereignty under the current world order is the basic building block and keystone of international legal agreements ***(WCW, 1999).*** The very concept of sovereignty is generally seen as an ideological and logistic barrier to international and regional cooperation of any kind. Sovereignty is a highly emotive term, which can be deconstructed into "internal sovereignty"or the relationship between the representative of state and its population and "external sovereignty" or the relation of one state with the other. When considering international watercourses both sovereignty are relevant ***(WCW, 1999).*** It has been said that sovereignty over water is impossible to define. Water is all encompassing that it does not appear to be feasible to devise a formulation of sovereignty, which will satisfy all the possible elements to which water is a factor. Water is a critical resource the possession of which confers power. Since the location and flow of water pays no attention to political and state boundaries these concepts only further makes situation complicated and acts as a barrier regional cooperation. Historically water has been a source of cooperation more than a source of conflict particularly armed conflict, but under the present scenario water is often been made the target of conflict with rising scarcity and unequal sharing arrangement. In present days water resource management becomes much more critical.

7 WATER SCARCITY TO CONFLICT:

As the world is becoming more complex and globalization becoming an increasingly important international, regional and national force, traditional peace and security condition are becoming

more ambiguous and amorphous ***(Swain, 1997).*** The fall of Soviet Union and the waning of the East -West tensions have given rise to a new type of international and regional security issue called water conflict, which was then considered to be non-violent in nature. But these days the concepts are changing and water conflict has attracted increased international attention of both scholars and decision-makers ***(Wolf, 1993; 1999).*** Since unconventional security issues are gaining momentum, it has become necessary to broaden our understanding of the concept of security to encompass ideas like threats due to continued environmental degradation and resources scarcity which could endanger global and regional peace **(*Cooley, 1984*).** This unequal distribution of water leads to conflicts between states as well as between nations in sharing of dams reservoirs river and lakes ***(Biswas, 1994).*** ***Priscoli (1998)*** states that the dialogue concerning water and conflict is leading to misleading analysis of Transboundary management. ***Wolf (1999***) states that war over water are neither strategically rational, hydrographically effective, nor economically viable. Why would an attack be launched over water? A weak upstream nation might have adequate reason to attack a strong downstream aggressor but might loose. This is based on a total political game. Similarly on the other hand we may find that a strong upstream nation would have no need to attack but do so because they control the water below (***Wolf, 1999***). In many areas of the world conflicts over water resources have brought the parties to the table while other issues have divided them mainly economic and security issues. Jordan, Israel, and Palestine have discussed water issues during the 40 years of conflict that have engulfed this region. In the Mekong basin, the parties met even during the Vietnam War to discuss water-related issues. When a strong inter-basin organization is established, water resource conflicts can lead to consensus ***(Wolf, 1993)*** among nations.

Water conflicts are generally of two types. Conflicts for the quantity of water and for the quality of water. In South water conflicts are generally related to quantity. The population ratio to water resource is increasing as captured by water barrier concept ***(Swain, 1997)***. Thus sharing of water between two countries to meet their rising demand as mentioned before is one of the major causes for water conflict even in the present times. Water quality issues are easier to solve than the quantity issues ***(Swain, 1997).*** Larger conflict potential is found in quantity issues than in quality issue. With quality differences nations have found formulas for handling them (***Wallensteen, 1997***). Thus the quantity issue is most controversial in sharing water even in the present times and with rising water scarcity the chances become even more feasible.

8 INDIA SHARING ITS WATER:

On basis of the above discussion primarily we recognized that water conflict occurrence is relevant for the developing world. This necessitates urgency in judging the water sharing relations of India with its neighbors under the existing sharing principles.

Geographically Pakistan, China, Nepal, Bhutan, Burma and Bangladesh and Sri Lanka surround India from all four sides. These countries share among them some of the world's great rivers, mountains diverse wildlife, air and ocean. India has been dominant in many of the bilateral and regional agreements to manage share and preserve these resources. The most successful and simultaneously controversial efforts to manage water resources have been mainly with two rivers the Indus and the Ganges. The Indus River is shared between two countries India and Pakistan. The Indus River Basin treaty scheme signed between these two countries shared to cooperate and share water of the river is successful even when hostility exist between the two nations related to cross border terrorism issues. How long water would remain unaffected in the rising tensions between the two nations is a debatable question. The success of the Indus treaty however relaxes immediate tensions in regard to water. The attention however gets diverted towards the Ganges issues, which in the present is much more controversial. The south Himalayan watershed or hydrologically defined as Ganga – Brahmaputra Basin, counts for the northern half of the Indian subcontinent. India shares this river with Nepal Bangladesh directly and with Bhutan and China indirectly(***Shiklomanov, 1993***). The water sharing arrangement between India and Nepal – Bangladesh has never been a pleasing affair.

Nepal is protesting on disparate distribution of water. India is discontented for Nepal inviting deforestation for the lower riparian countries by building innumerable hydropower dams, which occupy a prime part for its economy's growth and development. This in turn in affecting the quality of soil and ground water of the lower riparian country. Nepal has its own reasons to explain its stand to India and vice versa. As a result of this no conclusion has yet been reached in this regard.

The Ganga Brahmaputra Basin(GBB) is shared with Bangladesh. The GBB is the thirteenth largest river basin in the world with an annual runoff of about 1400 BCM per year (***Shiklomanov, 1993***) and a population of about half a billion. Spread over South Asia and the Tibetan plateau, the basin drains an area of about 1745000 square kilometer. This basin is the home of very old civilization some of, which mastered the art of transferring and using river water, and distinguish themselves as the hydraulic civilization. The GBB is bound by the Gangdise and Nyainqentanglha ranges of Tibet in the North, the Vindyas range of India in the South, the Naga Hills in the East and the Aravalli range in the West (***Bandyopadhyay,1992***).This large area is drained by an opening to the Bay of Bengal extending from near Calcutta in India to near Dhaka in Bangladesh. India and Bangladesh dissatisfaction is related more to quantity issue than quality issue as it is with Nepal. Bangladesh has been facing scarcity of water during the dry seasons leading to droughts and during the wet seasons there is disastrous flood. Thus the relation between these countries have never been very peaceful in matters of water sharing and still remains an anxiety for both governments policy makers to resolve it to better relations for future in water sharing issues. Confusion has also taken place in regard to dam building in India which Bangladesh feels causes tremendous floods. Thus considering the water sharing relations in between India and its neighbors one can conclude to state that this is an area needs to get researched so that the underlying problems which make things worse are considered and policies made to resolve them giving it a multidisciplinary and diplomatic approach. Sharing of the river water is to be done for public good to provide safe and adequate water to all. Hence this area cannot be neglected at any point considering the prime importance of water for these agrarian economies.

9 WATER SHARING WITHIN:

Water sharing inward has not been quite a peaceful affair. Numerous inter-state river water disputes have erupted since Independence. Since India is a federal democracy and rivers cross-state boundaries constructing equitable and efficient mechanisms for allocating river flows has long been important legal and constitutional issue. We have often heard of conflicts in sharing the rivers, some of which has been peacefully resolved by the Central involvence alone or joint involvence with state. But then there are some, which has created major political unrest affecting economic growth and national welfare. The three disputes in regard to water, which needs mention of being unresolved, are Krishna-Godavari dispute, Cauvery dispute and Ravi-beas water disputes. The are Krishna-Godavari dispute is between the states of Maharastra, Karnataka , Andhra Pradesh, Orissa and Madhya Pradesh. The state and the central involvence along with the courts have not been successful in solving it .The Krishna and the Cauvery dispute gained momentum with support of political parties. The Cauvery dispute between Karnataka and Tamil Nadu still continues to fester and have become persistent phenomenon of India. The Ravi-beas dispute is again between the states of Haryana, Jammu & Kashmir, Rajastan, Punjab(***Alan, 2001***). These conflicts are not just in regard to the water shared among states but also sometimes in regard to the cost- benefits aspect of various water projects. Thus differences does exist in regard to building dams projects as well. The unsolved dam conflicts even till the present time, which deserve prime mention, are those of the Narmada dam and Tehri dam respectively. There is a lot of debate in issues of decommissioning and rehabilitation policies after the World Commission of dam report was published and it continues but no sustainable solution has yet evolved. In the recent times what has been much more eye catching among most water experts is the issue of interlinking river that is considered as a measure to

deal water scarcity internally. This project has not just got support of the Central government but also legal recognition of the Supreme Court.

10 INTERLINKING RIVERS: THE DEBATE

The river-interlinking project has been in vogue of discussion and debate among water experts and policy makers trying to justify their stand for encouraging the thought of retaining the project or not. The project on interlinking of rivers from North- south is justified by its supporters to dwell due to uneven distribution of run-offs and precipitation rates during monsoons. This is considered by many to one of the prime causes for water scarcity in the country. The government participation and the attention of the Supreme Court have encouraged the project of nearly $12 billion to continue. While the Brahmaputra and Mahanadi river basins regularly face floods due to heavy run-offs, most other regions (with the exception of the Western Ghat regions) face recurrent drought situations. Drought occurs in over 80 per cent of the country's land area. This had necessitated evolving national and panchayat-level policies and organizational arrangements to develop an integrated `water management strategy before problem gets out of hand. The Ganga – Cauvery link which consisted of linking six major rivers as part of the long term plan to through canals was considered as the solution to address the water problem in the country. The huge expense was planned to be compensated by doing the work in steps. The larger goal of the government through this project was to unite all people and give a developmental impetus of unprecedented magnitude. It would create the potential to increase agricultural production and protect crop loss due to drought and floods. Through this project national Water Way and water line was considered to become a reality by implementing the project thereby encouraging navigation and promoting water security. The employment opportunity through this project would address development aspect as well.

The debatable question in this regard is would interlinking rivers help to tackle water crisis successfully or lead to further conflicts and economic unrest in the country. A simple reason given by most for opposing the project is it is unscientific, unfeasible to achieve though the goal is unique. The mega-project budget intends to be sometime greater than country's present GDP ***(Bandyopadhyay, 2003)***. If this project was unique and effective in managing water crisis then why have the developed nations not gone for it much before, since their economy could head the cost easily than *us.* Some experts also find it as judicial activism or error . This kind of project was mission impossible leading to greater chaos and intensifying water problems instead of solving. This would instead of solving water conflicts further complicate matters and all that taken up with such huge cost. The canals to be built to link the rivers so that water from Ganga could be used for meeting the water demand for the south would be nothing but a path for water conflicts for this would lead to huge rehabilitation. This would also lead to destruction of cultures, communities, and ecosystems, creating conflicts between states e.g in Cauvery and between state and people, as in Narmada. Thus the conflict would be not for one or two but the countrywide. This would thus lead to chaos and conflicts. The canals, designed for carrying irrigation waters rather than large peak flows, will not be sufficient to control or divert floods in the northern states but will transfer silt. Several large dams built to provide the head and storage required to supply the canals will permanently submerge fertile lands, forests, village communities and towns, leaving millions of people displaced or dispossessed. Any attempt to obtain full information, question impacts and demand just compensation requires sacrifice by communities living on the natural resources.

Water is not cement or concrete - it is life. Just distribution and full appreciation of its economic, financial, environmental and social dimensions must be part of the planning process. The 73rd amendment and the Tribal Self-rule Act direct that people's consent and consultation cannot be sidelined. The common people should be considered before such projects are taken up, along with scientific experts to study the feasibility of the project.. A balanced water cycle demands a holistic policy that promotes forest cover, prevents erosion, enhances ground water through micro-watershed structures, and provides for desiltation and maintenance of existing

tanks, lakes and reservoirs. Agricultural practices and public distribution system should be in tune with the diversity of diets based on local conditions rather than on water intensive monocultures. A vigilant judiciary should punish corrupt administrations for non-implementation of environmental regulations, right to life, livelihood. Linking of rivers is a disastrous idea from environmental point of view where there is immense risk of linking toxic river with a non-toxic and harm human life on earth. Thus drawbacks of the project just reflects the negligence of the government to consider these aspects. In simple words it exposes the fact that the government has not done enough homework before implementing the project.

11 RESOLVING WATER CONFLICTS:

Rising water scarcity leading to water conflict, has raised awareness among policy makers and planners. Cooperation is a means to resolve conflict *(Allan, 1998).* Trasnsboundary management is an important measure to overcome conflict but that also needs some precautions to be successful.

- In order to promote better management within Transboundary River and lake an evaluation of the experience gained with existing transboundary water authorities, committees and Commissions is useful.

- Establishment of Transboundary River and lake Organization to manage with well defined objectives planning, development and conservation of transboundary resources.

- Further support in development of legal and institutional mechanisms for proper coordination is required.

- Encourage promoting exchange of data on the components of water cycle in terms of quantity and quality through established international program.

- Finally support establishment of mechanism such as World Water Forum or Council to specialize water among government, international bodies, non-governmental organization and private sector bodies ***(Young, 1994).***

Box: 1

World Commission on Dams:

3.2 Strategic Priority 7: Sharing Rivers for Peace, Development and Security (Policy Principles):

- National water policies make specific provisions for basin agreements in shared river basins.
- Riparian states embrace an approach that equitable locates the benefits that can be derived from water
- No dams are built on shared rivers in cases where riparian states raise objections that are upheld by an independent panel.
- For the development of projects on rivers shared between political units within countries legislative provisions is made to embody priorities of gaining public acceptance, recognizing entitlements and sustaining rivers and livelihoods
- External financing agencies should withdraw their support for agencies, planning or facilitating the development of dams on shared rivers in contravention of the principle of good faith.

12 NEED FOR A NATIONAL WATER POLICY

The above discussion clarifies that water is a prime natural resource, a basic human need and a precious national asset, which is in crisis. Planning, development and management of water resources thus need to be governed by national perspectives. Water is part of a larger ecological system. Releasing the importance and scarcity attached to the fresh water, it has to be treated as an essential environment for sustaining all life forms. Water is scarce and precious national resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the States. It is one of the most crucial elements in developmental planning. As the country has entered the 21st century, efforts to develop, conserve, utilize and manage this important resource in a sustainable manner have to be guided by the national perspective. Floods and droughts affect vast areas of the country. One-sixth area in India is drought-prone. Out of 40 million hectare of the flood prone area, floods affect an area of around 7.5 million-hectare per year. Approach to management of droughts and floods have to be co-ordinated and guided at the national level. Planning and implementation of water resources projects involve a number of socio-economic aspects and issues such as environmental sustainability, appropriate resettlement and rehabilitation of project-affected people and livestock, public health concerns of water impoundment, dam safety etc. Common approaches and guidelines are necessary on these matters. Moreover, certain problems and weaknesses have affected a large number of water resources projects all over the country. There have been substantial time and cost overruns on projects. Problems of water logging and soil salinity have emerged. Complex issues of equity and social justice in regard to water distribution are required to be addressed. The development and overexploitation of groundwater resources in certain parts of the country have raised the concern and need for judicious and scientific resource management and conservation. All these concerns need to be addressed on the basis of common policies and strategies.

12.1 Indian National water Policy 2002

The new National Water Policy (2002) is a positive step towards integrated development and augmentation of usable water resources, considering the human, social, regional and environmental aspects. The policy was adopted by the Center in April 2002 after The September 1987 water policy. This policy for the first time, recognized water as a precious `national asset', a part of larger ecosystems that is to be treated as an essential environment for sustaining all life forms. The policy emphasizes planning, development and management of water resources in a national perspective through well-developed information system and river basin organizations for the integrated and multidisciplinary management of entire drainage basins. It has prioritized water allocation starting with drinking water, irrigation, hydropower, ecology, agro-industries and non-industries, navigation and other uses. It details the various elements required for effective implementation, including environmental-developmental factors and methodological aspects ranging from groundwater, flood control, sea erosion, rehabilitation and inter-State distribution to project planning, participatory approach, private sector participation, etc. For the first time, it asserted the `polluter pays' principle to manage polluted waters, and legislation to preserve existing water bodies from encroachment and water quality deterioration. However this policy inspite of its merits has its drawbacks as well as commented by various researchers. This policy failed to highlight the importance of rainwater harvesting and encouraging concepts of common pool which were successful water shed management strategies of the recent time in India. Non-conventional methods for utilisation of water such as through inter-basin transfers, artificial recharge of ground water and desalination of brackish or sea water as well as traditional water conservation practices like rainwater harvesting, including roof-top rainwater harvesting, need to be practiced to further increase the utilisable water resources. Promotion of frontier research and development, in a focused manner, for these techniques is necessary..

12.2 Policy measures to watershed- management

The National Commission on Water Resources recently estimated that the total water requirement, depending on low and high demand scenarios, would be for irrigation alone in 2050 between 628 cu. km (low) and 807 cu km (high). For industrial development it is 81 cu km; and for the energy/power sector 63-70 cu km (high and low demand scenario respectively). Irrigation will continue to have the highest requirement, followed by domestic water use, including drinking and bovine needs. The estimated utilisable water resources in 2050 barely match the total water requirement. Thus an integrated management of water resources has to be based on the understanding that water is integral to the ecosystem and a national natural resource whose quantity and quality determine its utilisation. Existing legal requirements make it mandatory to carry out an EIA (Environmental Impact Assessment) study. Adequate safe drinking water facilities should be provided to the entire population both in urban and in rural areas. Irrigation and multipurpose projects should invariably include a drinking water component, wherever there is no alternative source of drinking water. Water allocation in an irrigation system should be done with due regard to equity and social justice.

Optimal use of water resources necessitates construction of storage's and the consequent resettlement and rehabilitation of population. A skeletal national policy in this regard needs to be formulated so that the project-affected persons share the benefits through proper rehabilitation. States should accordingly evolve their own detailed resettlement and rehabilitation policies for the sector, taking into account the local conditions. Careful planning is necessary to ensure that the construction and rehabilitation activities proceed simultaneously and smoothly.

Water resources management is sensitive and complex, and requires an integrated approach and framework for policy formation, a legal and institutional set up, finance, and prioritization of projects. There are several complex legal issues concerning the integrated development of inter-State rivers, allocation of river waters, inter-basin transfers, ground water utilisation, water rights and people's participation, resulting in several disputes. Matters have been compounded because `water' is a State subject and there is no comprehensive Central legislation, making the enforcement of various provisions difficult. Acts such as the River Boards Act, 1956, the Inter-State River Water Disputes Act, 1956, have not been able to provide solutions and ensure equitable sharing of water between States. The pollution of water resources is on the rise despite Acts such as the Water (Prevention and Control of Pollution) Act, 1974, the Environment (Protection) Act, 1985, and such rules as the Hazardous Wastes (Management and Handling). Therefore, the entire legal system responsible for regulating the conservation, use, distribution and control of pollution has to be amended to speed up the resolution of disputes. Management of the water resources for diverse uses should incorporate a participatory approach by involving not only the various governmental agencies but also the users and other stakeholders, in an effective and decisive manner, in various aspects of planning, design, development and management of the water resources schemes. Necessary legal and institutional changes should be made at various levels for the purpose. Associations and the local bodies such as municipalities and gram panchayats should particularly be involved in the operation, maintenance and management of water infrastructures / facilities at appropriate levels progressively, with a view to eventually transfer the management of such facilities to the user groups / local bodies.

Conservation of Water by efficient utilization in all the diverse uses. Conservation consciousness should be promoted through education, regulation, incentives and disincentives. The resources should be conserved and the availability augmented by maximizingretention, eliminating pollution and minimizing losses.

13 CONCLUSION.

Preventing and Resolving Water conflict is thought to have created concern among most researchers, policy makers and planners or managers. However it is a regret to state that very few people have realized the importance of these new and emerging factors as a serious threats for the future. Thus it should be a conscious effort among researchers to bring it to the consciousness of the policy makers, government as well as the society so that things can be practically worked out. As water scarcities become more acute and population rise is at its peak any kind of unscientific step would lead to further chaos and confusion. Water conflicts in river basins donot however occur over night, they simmer for a number of years on the backburner before they reach critical proportions. Hence urgent attention is required in terms of the importance of the issues.

REFERENCES:

Allan, Tony (1998): "War and Water" , International Committee of the Red Cross, Forum

Biswas .A (ed.), (1994): "International Water Conflict *".* Oxford University Press: (185).

Cooley, John K., (1984): "The war over water," *Journal of Foreign Policy*, Vol: 54(pp: 3-26)

Coscrove, W.J, Rijsberman, F.R. (1999): World Water Vision: Making Water Everybody's Business, World Commission on Water for the 21st century, Draft Report [November]

Duda.A, et'al (2000): "Addressing the Global Water and Environmental Crises through Integrated Approaches to the Management of Land, Water and Ecological Resources", *Water International*; Vol: 25 (1).

Gleick, P. (1993): "Water and Conflict: Fresh Water Resources and International Security". *International Security*, 18 (1), pp: 79-112.

Gleick, P.H (2000): The World Water: The Bennial Report on Fresh Water Resources, Island Press, Washington D.C.

Priscoli, J, (1998): "International Conflicts Related to Transboundary Water", *Leadership for Environmental and Development, 1998* (Available online)

Seckler, D (1996): The New Era of Water Resources Management from Dry to Wet Water Saving, Research Report; International Irrigation Management Institute, Colombo.

Shiklomanov, I.A (1998): Assessment of Water Resource and Water Availability, Stockholm Environment Institute, Stockholm

UN, (1999): *World Population Prospects, The 1998 Revisio*n, Volume 1, Comprehensive Tables, New York.

Wallensteen, P. Swain, A (1997);"International Fresh Water Resources: Conflict or Cooperation", *Comprehensive Assessment of the Fresh water Resources of the World*; Stockholm Environment Institute (SEI)

WCD, (2000): Dams and Development: A New Frame Work to Decision Making, Earth Scan Publications, U.K.

Wolf A, (2000): Development of Transboundary Waters: Obstacles and Opportunities, Department of Geosciences, Oregon State University, Contributing Paper for WCD Thematic Review V.3 River Basins.

Wolf A, et'al (1999): “International River Basins of the World”, in *International Journal of Water Resources Development,* Vol. 15(4); pp: 387-427.

Wolf, A (1993). "Water for peace in the Jordan River watershed," *Natural Resources Journal, Vol:33: pp:797-839*

World Commission on Water for 21st century, (1999): "National Sovereignty and International Water Courses" Green Cross International.

Young, G, et'al (1994): Global Water Issues, Cambridge University Press. New York.