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# Water Scarcity- A Major Human Security Challenge to Pakistan

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**ABSTRACT**

Water is an essential ingredient for the preservation of life on earth. Maintaining the food chains and humanizing the life standards are closely connected to the fresh and clean water accessibility. But, declining the magnitude of water and enhancing of its demands have extended the space between water accessibility and water demand. In Pakistan like many other countries of the world particularly in Asia, high population growth rates, feudal and aristocratic dominancy over community advantageous areas, swiftly urbanization, climatic changes, local and social variances in collaboration of absence of institutional responsibility and governance malfunctions have pressurized and over-stressed the water resources of the country. Although, water is not the only threat to human security of Pakistan but an infuriating factor to worsen the human security conditions in the country. Such water-stressed conditions in the country are mostly misused by some pressure groups and non-state actors to exploit the deprived people for the purpose of the promotion of their respective agendas. Therefore, it is dire need to understand the water accessibility, accepted water allocation among provinces, water mechanisms, inconsistency and requirement in Pakistan and its connection with security threats. This paper portrays the analysis about some of the most important inclinations and challenges in the areas of water availability and demands in Pakistan and its close connection with security of common people in the country. It examines the dynamic responsible factors behind these issues and evaluates the repercussions for human development and security and also recommends some suggestions for both the state and the general public in order to face the challenge by doing more with something less.
**Key Words**: Water Scarcity, Human Security, Water Availability, Threat, Pakistan.

## Introduction

Water is undoubtedly considered an essential ingredient for the existence and survival of life. The presence of water is also confirmed on some other planets but Earth is the single planet recognized to hold the constant surface reservoirs of water which is the prerequisite for existence of life.

Almost 71% part of surface of the Earth is covered with water in which more than 99% of Earth's water cannot be directly utilized by human beings and other organisms on earth. Only 3% of all water is considered freshwater out of which 68% is in the shape of glaciers and ice caps and more than 30% exist in the form

of groundwater and just about 0.3% of all freshwaters exist in the shape of surface water in streams, rivers, lakes and swamps (Ali, July, 2015).

## Drinking Water Sources in Pakistan

There are different resources for the supplying of drinking water in Pakistan in which almost 60% of drinking water is got from groundwater aquifers directly through boreholes in houses or through big tube wells followed by piped supply for utilization purposes under the management of some municipalities or private housing societies (Rashid, June 13, 2015).

Surface water is another significant source of drinking water supplies. Surface water originated from lakes, rivers or streams is employed mostly in the rural vicinities as well as supplied through pipelines to cities and metropolitans just like Karachi (Iqbal, 2013).

Another source of usable water is spring water which has been used in Northern Areas of country and Kashmir for the purposes of drinking, cooking and hygiene. Rainwater cropping is also familiar in various areas including Kashmir where rainwater is collected for household usages. In desert areas of Pakistan such as in Cholistan and Thar Desert, the humans are populated and settled around the rain water-filled ponds called "Tobas". The collected water in ponds is used for drinking and all other domestic purposes. Although, some parts of Cholistan Desert have also the piped water supply systems (Ali, July, 2015).

## Global Water Crisis and Pakistan

The usable water has been diminishing from the Earth with every passing time and voices of water crisis have arisen in the world. The critical situation of water crisis fluctuates in different parts of the world depending upon their ecological, environmental and economic constraints. The issue of water distribution among states, its usages and administration has increasingly taken the significant position in managing the inter-state relations (Alam, February 13, 2007).

Pakistan has rapid population growth rates as total population of the country was 40 million in 1955 but presently 188 million in 2015 and expectedly will be 262 million in 2035. At the chart of global ranking, Pakistan was at 14$^{th}$ position in 1955 but 6$^{th}$ in 2015-16 (http://www.worldometers.info/world-population/pakistan-population/). Pakistan is one of 36 most water-stressed countries in the world (Reig et.al, December 12, 2013). According to National Drinking Water Policy (NDWP), 35% of the Pakistani population is deficient to get access to safe drinking water. NDWP clarifies the term access means, "that at least 45 to 120 liter per capita per day of drinking water is available to rural and urban areas, respectively, within the house or at such a distance that the total time required for reaching the water source, collecting water and returning home is not more than 30 minutes" (National Drinking Water Policy, September, 2009).

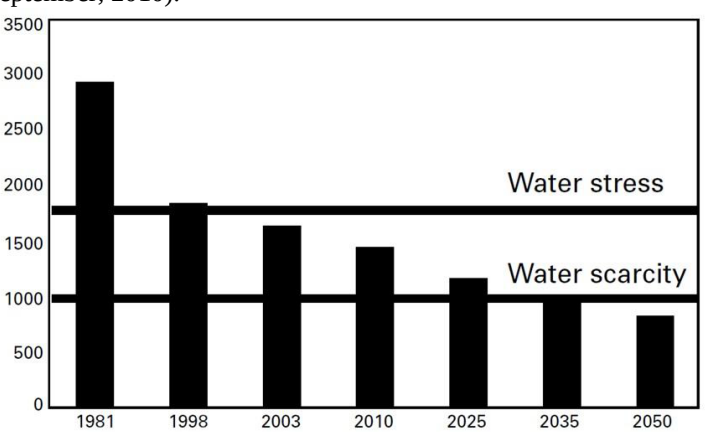
Today, Pakistan is facing the complex situation due to water scarceness,

escalating population and so on and it is urgently needed to create more resources to fulfill the incremental requirement of water for irrigation purposes. It is estimated that Pakistan has more than 180 million population in which approximately 45 million (25 %) are unable to reach the poverty line, 98 million people depend upon agriculture areas, almost 50 million have no facility of safe drinking water and 74 million people are deprived of hygienic facilities (www.pakistan.gov.pk).

History has witnessed that many nations fail but not because of natural disasters, war, scarcity, or climate changes. Actually it is due to the lack of their institutional responsibility in their national institutions and same situation has observed in "Tharparkar issue" in Sindh province. Although the draught has occurred as sporadic cycle but this time it is due to government negligence (Sindhu, March 17, 2014). Recently from 1st January to 12th January 2016, total 33 children were dead in only 12 days but death rates has increased to hundreds till May, 2016.

World Bank declared that Pakistan had become a water-stressed country in the year of 2000 when it had reached the water availability level of only 1,700 cubic meters per capita per year. But government sources clarified that Pakistan had already reached 1,700 cubic meters per capita per year in 1992 and got the status of water short country and after that decreased further to 1,500 cubic meters per capita per year in 2002 (Kamal, 2009).

The recommended level of Water scarcity is 1,000 cubic meters per capita per year and Pakistan has been expected to touch the line of water scarcity in 2035 (Iqbal, September, 2010).




Declining Per Capita Water Availability in Pakistan (meters3/capita/year) (Source: World Bank 2005).

Presently, the United Nations Development Programme (UNDP) has acknowledged the Pakistan's current water availability level as 1,090 cubic meters per capita per year (Ibid). According to world Resource Institute, Pakistan will be ranked as 23rd number in top 33 water stressed countries in 2040 (Ibid). The United Nations (UN) has already cautioned that the gradual shortage of water in

Pakistan may be the most distressing concern for the country in future. The United Nation Environment Programme (UNEP) accounts that almost two hundreds scientists from fifty countries have declared that there are two most devastating concerns for the new millennium in which one is water scarcity the other is the global warming (Iqbal, 2013).

Consequently, it may be observed that such kind of human security challenges will dominate over all other issues like political, territorial, racial, financial and cultural differences and have ability to threaten the stability of countries at local, regional and international level.

In Pakistan, the swift intensification of population is the main reason of destabilizing the country. Pakistan has declared itself as an agrarian country therefore agriculture is the major user of existing water. It is also reported that the prime user of water in the world is agriculture which consumes 70 to 80% of human usable water (Seitz, 1991).

But in Asian region, agriculture has been utilizing almost 86% of usable water, while industry has the share of 8% and 6% water for household utilization (Global Crisis and Water, n.d.). In Pakistan 90% of water is being diverted for irrigation purpose but agriculture is playing only 25.9% role in GDP of country which was 53% in 1947. Whereas for main crops, 78 Million Acres Fit (MAF) is being provided instead of 99 MAF water requirement (Choudhry, et.al, 2013).

Moreover, agriculture has also contributed a lot in GDP and a distinct leading employer of the country. It utilizes 45% of the total engaged employment force in the country. Furthermore, it is major source of income about 70% of the total population, principal provider of raw materials for manufacturing and the largest consumer of production of non-agricultural sectors (Iqbal, 2013).

## Water Scarcity and Human Security in Pakistan

Water scarcity in Pakistan is an extreme threat to the human security values of the country. Common man of the country has a little bit access to clean water for drinking and household use. Therefore, people do protests almost on daily basis in streets and roads over inadequate access to clean water. Sometimes, such kinds of processions become violent especially by farmers and landowners over the deprivation of their due share of water rights and face many losses. Provinces are not willing to accept any distraction or expansion upon already decided distribution of waters among them otherwise any alteration in it may lead to instigation of ethnic variances among provinces. Growing water scarceness and ecological vulnerabilities are dislocating the most susceptible societies and leave them in most dangerous social and financial circumstances. Such adverse situations lead the country towards political destabilization and create fruitful opportunities for extremist groups to maximum recruitment of annoyed people in order to promote their respective agendas (Ibid). Therefore, if no proper national plan and development policy will be defined regarding water issues on priority basis, it may surely lead to the rise of human security challenges like water

scarcity, food shortage and militancy in the country. The subsequent issues illustrate areas where water is either responsible or augmentative to insecurity in the country.

## Provincial Issues in Water Crisis

It is fact that Pakistani water managers, with the assistance of international donors have invested a lot upon the Indus basin irrigation system. But there is lot of variations among provinces on the issue of water sharing as provinces hook the water issue with ethno-nationalist reactions which have become major security concerns of the day for the country. The apparently everlasting water variances between provinces of Punjab and Sindh were settled down in Inter-Provincial Water Accord of 1991 (Khalid & Begum, January-June, 2013).

The provincial governments of all provinces signed this accord. The main reason behind mutual consensus from all provinces was the same political party government in all provinces for the first time. It was estimated that the Indus basin system has total average flow of 114.35 MAF in which the share of Punjab and Sindh was 37% each while 14% share of water for KPK and 12% share of water for Baluchistan provinces was allocated (Khalid & Begum, January-June, 2013). But the accord was severely questioned because the discussion method was not apparent and opinions from smaller provinces were neglected particularly because of the political setup of Sindh government which was suspected at the time. Moreover, the calculated official information for average annual flows for the Indus basin and consequent justifications for extra storage on the Indus River predominantly the Kalabagh dam, are suspected. Many experts opined that the higher number for flows in the Indus system was based on a shorter time frame as remain since 1977 but such higher number was inconvenient of downstream riparian of Sindh province. Another contentious issue is hydroelectric expansion because it consistently dislocates riparian societies. Nevertheless, the increasing stress on Pakistan especially in the areas of energy and agriculture brings the implications of this sort of progress to the forefront of policy discussions. Jointly narration of energy with water has aggravated the variances of provincial disputes. An extensive agitation started against the construction of the Kalabagh dam on the Indus River and declared it as way towards instigation of the water scarcity in other provinces. They were ready to allow the flow of wasted or extra water into sea but refused to accept the production of any more water reservoirs at Indus River (Khalid & Begum, January-June, 2013).

Consequently, a controversy began in Sindh and the general masses were exploited to stand against the construction of Kalabagh Dam. Dam controversy was polarized as another insult imposed on them by Punjabis through the deprivation of Sindhis' due share of water. Same elements in Khyber Pakhtunkhwa (KPK) also started agitations against the construction of Kalabagh Dam. They were frightened that it would flood green fields in the province.

Moreover, Balochis also came out against the dam because they had apprehensions regarding Pat Feeder Canal originated from the Indus on their territory and this dam would put adverse impacts on it. But, it is fact that no other province has the intensity of anti-dam sentiments in Sindh. Furthermore, in the case of construction of Bhasha Dam, all the provinces including Sindh are contracted for its construction in the upper Indus, upstream from Tarbela. The concerned departments have started stirring up with preliminary arrangements for its construction. However, a dearth in lower Pakistan same as in late 1990s after the construction of the dam, could lit the fire to construct an impression that Bhasha Dam is part of the problem (Mustafa et.al, 2013).

Conclusively, extreme civil disturbances are possible in Sindh same as to the assumption of unrest in Kalabagh. Such kind of situations has been exploited by the ethno-nationalist elements in all provinces especially in Sindh in order to promote their respective agendas.

## Groundwater Scarcity in Pakistan

Generally the groundwater resources of Pakistan exist in the Indus Plain which is expanded from Himalayan Mountains to Arabian Sea. The Plain has the length of about 1,600 Kilometers and has a prevalent upon aquifer, which has been becoming the extra source of water for irrigation. The reason behind the building of this aquifer is that it has the capability to recharge directly from natural rainfall, river flow, and persistent leakage from the conveyance-system of canals, distributaries etc. in the irrigated lands during the previous 90 years. This aquifer has the capacity of about 50 MAF but is being oppressed to an amount of about 38 MAF by thousands of private and public tube wells (Mustafa et.al, 2013).

In Balochistan province, the groundwater is obtained by using dug wells, tube wells, springs and karezes and it is the most important reliable resource of water for irrigation purposes. The main reason behind this method is that approximately all the rivers and usual streams are momentary in nature and flow only seasonally. It is projected that it has overall existing capacity of about 0.9 MAF and 0.5 MAF which has been already used. A fallacy has been created as the aquifers are not constant but are restricted to basins owing to geologic settings. The basins of Pishin Lora and Nari has been observed as overexploited in grounder waters and considered as a threat to dry up the aquifers in future (Mustafa et.al, 2013).

The water related to human security issues are highly depended on groundwater particularly in Balochistan province. The region has got the concentration of world because of the constant Taliban belligerency in Afghanistan, Af-Pak border areas and the associations of these militants with global terrorist networks. No concentration has been given to the local rural political economy and its expected connections to the topographies of aggression in the region. Baloch uprisings are initiated to get maximum provincial autonomy and self-control over its natural capitals. The groundwater conditions in Balochistan are already unsubstantiated, and the current uprising in the province is

deteriorating the situation. The region is mostly depended on ground waters to carry on cropping and rural sources of livings (Shah, 2009).

But current declining ratio of ground waters in Balochistan may lead to the water scarcity not only in the region but also in the urbanized Quetta valley. "Karez system" in Balochistan province is considered the most important means for tapping groundwater. Karez system is an underground conduit that inactively valves the groundwater in the piedmont and brings the water by gravity to the "daylight point" to channelize into irrigation trenches or ditches for cropping and household utilizations. This method is generally economical and inexpensive as it simply inactively valves the groundwater unlike expensively working of electric pump (Mustafa & Qazi, 2008).

These electric water pumps were installed in the region in the name of agricultural innovation incorporation with intense financial assistance of electricity during the last decade of twentieth century. (Shah, 2009) Several big farmers in the region were capable to install these tube wells and develop agricultural productivity. But, these electric tube wells have led to quick diminishing in the water level and declining of the karez system in Balochistan province (Shah, 2009)..

However, the agricultural productivity is developing but many users of old karez system for water utilizations are facing lot of troubles because their karezes have been dried. Karez was considered a source of livelihood and a symbol of identity and position in the community. If a farmer unluckily loses his water right, he has to lose his social status and to leave the area to adjacent cities or has to accept jobs as farm laborers in the fields of tube well owners.

The persistent abstraction of groundwater has led towards over-pumping and subsequent diminishing of water levels in many places. Most affected areas among these are Lahore, some areas of Balochistan and several thickly inhabited urban areas of the Punjab and Sindh. It is urgently needed to recharge the depleting aquifers on priority basis.

## Rural to Urban Migration and Water Crisis

Pakistan has a rapid flow of migration from rural to urban areas as total urban population was 19.9% in 1955 but 38.9% in 2016 and expectedly will be 45.9% in 2035 and 50.3% in 2050 (http://www.worldometers.info/world-population/pakistan-population/).

Pakistan has been facing a blend of variances with in society and public turbulences due to increasing of water scarcity in the country. The severe water shortage in Karachi is intensifying the apprehensions in its society and has strengthened the flow of illegal water trade. The city has to handle a population above 22 million inhabitants. The city has to face water scarcity of almost 1.9 giga-liters per day whereas more than 33% water of the mega city is wasted due to insufficient infrastructure and water stealing (Lehane, April 9, 2015).

It is predicted that the urban population in Pakistan is growing at the rate of 3% per annum and expectedly will reach to near to half of the population of Pakistan till 2025. It will lead to the emergence of many injurious challenges for the country. Necessary facilities for common man which are already immature in the big cities, this urban population intensification will aggravate those deficits. It is estimated that nearly 15.3 million people presently do not have the facility of safe water and approximately more than 93 million people, almost half of country's population, have very limited access to sufficient sanitation (Lenance, Apri, 2015).

The tendency of horizontal expansion puts more stress on provincial administrations to guarantee that service supplies are sufficient for these populations. It is reported in an official report that Pakistan provides accommodation to six thousand people in one square kilometer in urban areas whereas Dubai provides accommodation to almost two lacs people in the same area (Hasan & Mohib, 2010). The expansion of slums "katchi abadis" particularly in mega cities of Pakistan has augmented the water insecurity for the residents. Most of these slums have much deficiency in the access to essential clean water and sewage amenities. These communities have to look at private water vendors for clean water provision who charge very expensive prices for clean water (Hanan & Mohib, 2010).

It is estimated that 95% available water in Pakistan is consumed in rural vicinities for cropping and agriculture whereas; the sector adds almost only 24% in the Gross Domestic Product (GDP) of the country. Approximately, 50% population of the country is directly reliant on agriculture sector for their earnings. Agriculture sector and rural inhabitants have affected the water security of the country and urban cities in two aspects as firstly the growing water shortage is an imperative reason for the contemporary rural-urban relocation tendencies and secondly, the speedy declining of surface and ground waters, augmented water contamination and a gradually inconsistent climate changes are stressing rural populations to relocate to urban areas in looking for livelihood and better prospects. Increasing urbanization in Pakistan is responsible for reducing the country's agricultural outputs by declining in the availability of rural workforce. It is fact that 70 % foreign exchange of the country is earned through agriculture. But low productions in agriculture cause the increasing in food prices which negatively influence the urban poor who are migrants from rural areas (Kugelman & Hathaway, 2009).

Pakistan must handle the issue while tackling constant food security challenges with minimum rural workforce. Water accessibility is also another restraint to agricultural productivity. Water losses in the industry are prevalent and water losses through expired and damaged canal systems need imperative concentration to improve in order to maintain the water accessibility in the country. Increasing rural to urbanization in Pakistan is resulted in the nonexistence of employment prospects for migrants. It has led to the growing of urban turbulences in big cities as witnessed in Karachi on daily basis. Constructed water

scarcity situation in the irrigation system has led not only to rural to urban migration but has resulted in the creation of rural unrest in the country (Hasan & Mohib, 2010). Many rural areas like Southern Punjab have been exploited by extremist due to such unrest in order to get youth recruitment for the promotion of their extremist agenda. The metropolitan city of Karachi has faced a lot of aggressive riots in history predominantly in the areas of slums like in Lyari. Inhabitants of Lyari had to face severe dilemma of water accessibility or deficiency which was resulted in the emergence of increasing riots with governance structures. The main reason behind this inconsistency is corruption and illegitimate distraction of the water supplies to elevated profit settlements provided by the same system. Consequently, annoyed people of the area did many demonstrations that changed into water riots (Hasan & Mohib, 2010).

One more dilemma of water crisis in Karachi is the access of water from water tanker. These tankers are mostly owned by a water mafia which creates artificial scarcity of water in the area in order to charge expensive rates of water and for this purpose it remains always in finding the ways to hack water supply line from government and private sector actors. They do their work in a systematic way (Qutub, 2005).

Water pollution has a serious threat to the health of common man in the country mostly for women and children. Contaminated ground and surface water has left no other option for residents to pay the heavy prices for clean water or has to face the threat of disease from unimproved water resources. Ill-health challenges correlated to waterborne infections have a direct effect upon the health security of common man of Pakistan. The ongoing inadequate water drainage and sanitation situations are a devastating menace to public health in Pakistan. It produces many diseases called waterborne diseases. The occurrence of dengue fever in Pakistan, predominantly in Lahore city in 2011 and 2012 has questioned the human security values of Pakistan and bitterly threatened the lives of common man in the country.

## Climate Change and Water Issues

Ecological degradation has also severely affected the lives of common man and the poor of the country. Almost one-fourth population of Pakistan is poor and undoubtedly reliant on natural resources for its earnings. But the agriculture is most dangerously affected by global warming which has gravely disrupted the weather of the country. Global warming has seriously disrupted the flow and quantities of precipitation that agricultural sectors receive annually on regular basis.

Pakistan has declared itself as an agrarian country which has its more than 47% population directly connected with agriculture for the earning of their livelihood. The agriculture sector has share of 24% in GDP of Pakistan and about 70% of foreign exchange is got from agriculture only (Saeed ur Rahman, September, 2010).

Maple Croft an organization in United Kingdom (UK) had positioned Pakistan at 28th number amongst most severely affected countries of the world in 2010 (Jamal, January 14, 2009). Unless it maintains stable growth rates, its economy will suffer immensely.

Indus valley is considered the agriculture hub of Pakistan but currently is endangered by vulnerabilities of Climate Change and bitterly threatened by global warming. Climate change has impacted the agriculture in all respect and caused the losses of billions of dollars to Pakistan. It has directly impacted to more than 100 million people whereas more than 180 million people, expectedly 240 million in 2035, are under indirect threat of climate change in Pakistan (Pakistan Most Vulnerable to Climate Change, February 5, 2010).

Production of most water-consuming crops just like sugarcane is not easy to crop in the scenario of Climate Change. Conclusively, the pricing of sugar has doubled in previous years and has created public turbulences and political instability.

Approximately all of the water resources in Pakistan are instigated from the melting of Himalayan glaciers but increasingly rising global temperatures due to climate change has speeded up glacial melting. It has been resulted in two ways firstly in the extensive flooding and secondly if the glaciers melt away rapidly, there will be no water resource for the country in future. The Korakaram glaciers, Rakaphoshi glaciers and Nangaparbat glaciers are the most important resources of waters in Pakistan. It is argued that that escalating global warming probably could devour the glaciers in almost upcoming 40 years because out of almost 5000 glaciers in the region, 90% are expectedly in different extent of melting. It has fingered upon the future of water resources in Pakistan which is already termed as water stressed country. Climate change had afflicted the loss of around 3.57 billion dollars to Pakistan during eighteen years in 2009. The report identified the caution of calamity in five major areas such as increasing in sea heights, glacial drawbacks, floods, regular rising high temperature, and high level of occurrences of dearth. The precipitation in summer and the winter seasons has been diminished by 30% each. The dams are about to dry due to slashing of water supplies. It has severely affected the production of hydroelectricity and has reduced the power supply to almost all parts of the Pakistan. All such situations have led the country towards urban insurrections which are most injurious to nation (Saeed ur Rahman, September, 2010).

Another major challenge to Pakistani water sector due to climate change is the timing, location and strength of flood and famine vulnerabilities, which influence economic safety and examine the reactions and attentiveness of concerned departments. The record monsoon precipitation in the northwest of Pakistan in 2010, it was examined that thousands of people and transportations had been affected at intensity level due to rainfall. It was estimated that over to 21 million people were exaggerated and almost 1.8 million houses and infrastructure were broken (Mustafa & Wrathall, 2011).

But the most important issue of that flooding was that the government had

failed to deal the situations positively and well in time, therefore new ways had been opened for some religious organization to insert themselves into the efforts for assisting of flood effects and consequently get strong support and admiration from flood sufferers. They did all this for only to get maximum recruitment from annoyed and neglected people for the promotion of their agenda.

Similarly, in the late 1990s and in the beginning of 21st century, an acute form of water scarcity was witnessed in southern Pakistan only because of climate change. There was a substantial rural to urban relocation was witnessed and even in some cases whole communities were displaced and migrated. Furthermore, the continuing Baloch uprisings in Baluchistan started in 2000 also burdened the famine (Mustafa et.al, 2013).

Another most alarming issue is that most of nuclear reactors in Pakistan are installed on the river banks just as the Indus River along with Chashma Barrage. If any nuclear accident will occur unintentionally at that site, it could possibly infect a large part of the Pakistan's food supply. However, the particulars of nuclear installations are not openly accessible and even any research on this issue is not published. But it must be clearly understood that the importance of the river should be linked with the country's agriculture rather than anything else (Mustafa et.al, 2013).

Conclusively, the detachment between the growing expectations of politically oriented population and the incapability of the Pakistan's institutes to address to these human security challenges is increasingly being resulted in the emergence of security lapses connected to social unrest in the society.

## Conclusion

Water as an essential ingredient of life and plays an important role in the economy of any country but high population growth rate and lack of national water strategy and negligence from all stakeholders in the preservation of water are main factors responsible for the increasing of water shortage in Pakistan. It is true that water is not a sole responsible factor for human insecurity but also a prominent contributing factor in destabilizing the Pakistan. Water is an essential ingredient because the scarceness and low quality of water bitterly intimidate the earning of the Pakistani people.

To resolve the water issues in the country, an integrated approach equally addressing to supply and demand of water is necessarily required. Resolution of problems regarding water scarcity should be accessed from the principles of doing more with less. Because doing nothing will aggravate the situation and it is not a good option. Moreover, Pakistan has no capacity to discover new water resources or so on. Delaying tactics to deal with its water insecurities will simply aggravate the situation and possibly resulted in the surfacing of violent riots among water stakeholders in the country.

Pakistan will have to build up the mechanism of its institutions in order to provide maximum services to its rapidly increasing urban societies. To address any

problem in any state, management is the most important factor. In Pakistan, the techniques of taking out of waters in both surface and groundwater resources are not sound and also deteriorating the economy and human security values. It is need of the hour to make necessary alterations in agricultural productions in order to preserve the country's future food security. It will be indefensible to cultivate the crops of high water-consuming like sugarcane particularly in a semiarid country. These crops should be imported from water-rich countries.

Considerations about the productions of new dams should also be deeply analyzed. But it must be kept in mind that if there are any hurdles in the productions of new dams, there are also other sources to enhance the reservoirs of water and energy just as renewable and alternative methods. Concentration should be given to understand the utilization of life cycle of water for main fabrication methods and it will guide to explain the problems and policy options. It is the dire need to create more water reservoirs just like Kalabagh Dam which has led the country to intra-provincial controversies but it could be resolved through sound and active negotiations by involving all the stakeholders of this issue. National interest must be given the status of top priority over all local and provincial concerns. It is fact that social disturbances, economic instability, and political weaknesses have already overwhelmed the Pakistan. To resolve the water scarcity issue should not only be considered as the security lapses but also a way to lead the country towards public harmonization, ecological sustainability and national harmony.

## Recommendations

It is fact that understanding of a problem is considered the first step towards its resolution. Active, vibrant and strong institutional approach incorporation with political and social determination is mandatory to address the challenges of water scarcity in Pakistan. Water scarcity is an international subject and International organizations such as United Nations Environment Programme and United Nations Water Division are functioning to resolve these issues by supporting those countries which are incapable to curb these issues owing to political, environmental or economic grounds. Pakistan has also approved its National Drinking Water Policy in 2009 in order to provide the safe and drinkable water to its people at their doorsteps. It is estimated that till 2050, Pakistan will get the status of sixth-most populous country at international level and current trend of rural to urban migration shows that its maximum population will be devastatingly urbanized. During this period, it is also anticipated that the water accessibility for single person will be declined till 60%. Most injurious reason to Pakistan's water insecurity is the weak governance. Issue of water scarcity may be due to actual grounds but can be better handled if the requisite governance organizations are in active position. Humanizing those responsible organizations and concentrating on water scarcity will also be helpful for greater domestic constancy and safety.
Subsequent strategies and measures to progress water security in Pakistan have

been recognized:

- Concentrate on developing of water storage capacity to make sure a secure supply of water for the whole year, predominantly as precipitation turns into more irregular and snowmelt decreases. It may be helpful to lessen the impact of flooding.
- Minimize the water depletion through the implementation and improvement of technologies and the promotion of maintenance observance. The adoption of method of water metering and utilization charges will be helpful for this.
- Evaluate the economic worth of water as the water pricing should be finalized because it will create effectiveness in water consuming and raise funds for the up gradation of infrastructure and services. There must be a mechanism of water usage billing instead of flat charges and for this purpose water metering method should be introduced. It is also obligatory to stop the illegitimate siphoning and business of water.
- Develop and spend in the handling of wastewater will be supportive to overcome the water scarcity in Pakistan. More plants and best sewerage infrastructure must be built for better treatment of wastewater. It will be obligatory to regulate the industrial waste treatment rather than voluntarily. To improve the sanitation and sewerage infrastructure is necessary for health related issues.
- Expansion of urban population should follow the model of vertical expansion. It is need of the time to make arrangements for the creation of appropriate districts to sluggish the horizontal expansion and substitute urban sprawl can progress the capability of increasing populations to get access to essential facilities and services.
- It is dire need to improve water utilization competence in agriculture. Pakistan has much problematic water wastage in the agriculture which is widespread and it is mostly due to the loss of water through broken and leaking of canal systems. It necessitates imperative concentration. The advancement and up keeping of irrigation system is urgently needed to enhance the utilization of water on priority basis.
- The national consent on the issue of Kalabagh dam must be created by involving all stakeholders. The allegations from other provinces as Sindh and KPK must be addressed and must be burdened with the provision of alternate development packages in these provinces. The flow of clean water should be decreased to drop into the sea.
- The culture of water Politics must be discouraged. The feeling of national unity must be existed instead of the feeling of provincialism. The frightening issue of water shortage in Pakistan urgently requires the political vision and realistic policy making approach.

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