

# Policy\_Study\_Case.pdf

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Research Article

**Policy Study Case: A Study on Problems & Opportunities of it Asia in Long-Term Perspectives**

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**Abstract**

Water distinguishes our planet as compared to any or all the others we tend to recognize regarding. Whereas the worldwide delivery of obtainable fresh is over adequate to satisfy all contemporary and predictable water desires, its spatial and temporal distributions don't seem to be. There are varied regions whereby our fresh sources are inadequate to meet home, economic development, and environmental desires. in such areas, the shortage of adequate clean water to satisfy human ingesting water and sanitation needs is a constraint human fitness and fruitfulness and consequently on money improvement additionally to on the protection of a simple atmosphere and wholesome ecosystems. all and varied troubled in studies have to be compelled to notice ways in which to take out these constraints. we tend to face multiple gainsays in doing that, chiefly given a dynamic and unsure future climate, and an unexpectedly growing population this can be victimization elevated social and financial development, economic process, and urbanization. However nice to satisfy those gainsay entails studies in All aspects of water management. Considering 1965, the magazine water resources analysis has performed associate vital perform in news and diffusing trendy studies associated with managing the number and excellent and value of this aid. this paper identifies the troubles facing water managers of late and destiny studies required to higher inform people who try to form a lot of property and applicable destiny.

**Keyword:** distribution of research, global policy, international development long-term care.

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## 1. Introduction

In keeping with some professionals, the water catastrophe most of the ordinal century is companion degree lousy ton giant associated with management than to a true crisis of insufficiency and pressure (rogers et al.,2006). despite the actual fact that to carry with fully extraordinary specialists, it is the outcomes of fastened environmental trouble aggravated by suggests that of economic and social development issues (gleick, 2000). someone & varies (2006) keep that the deepening and quality of the water catastrophe rectangular degree because of realTroubles of accessibility and progressed imply, and to sectoral management system that responds to troubles at constant time as now not a methodology that tries to foresee them. tundisi & matsumura-tundisi (2008) intensify the necessity for a scientific, integrated and prophetic technique to water management at a degree decentralised to the geographic place. to stay with those authors, a consolidated statistics base regenerate into a management tool square measure frequently one in every of the sole kinds of endeavor theDifficulty of water insufficiency, water stress, and deteriorating first-rate.

**Tundisi et al. (2008) spotlight that, within the immense social, economic and environmental context of the twenty-first century, the subsequent necessary problems and ways square measure the most causes of the "water disaster":**

- excessive urbanization, increasing the decision for for water, growing the discharge of infected water assets, whereas there's extraordinary imply for water for ingestion and money and social improvement (tucci, 2008).
- Water pressure and absence in many regions of the arena because of changes in accessibility and developed imply.

- Bad infrastructure or infrastructure in a very essential country in varied city regions, with losses at intervals the community of the foremost quantity as of-hour while treatment.
- troubles of strain and scarcity because of international modifications with intense hydrological events developing the human populace's vulnerability and compromising food protection (extreme rains and severe intervals of drought)
- Problems caused by the shortage of articulation and to boot the absence of standard movements of governability of water assets and for environmental assets.

**This set of issues has native, local, continental and planetary dimensions. Those problems contribute to:**

- An growth Associate in Nursing exacerbation of sources of contamination.
- Adjustments at intervals the assets of water resources - with insufficiency and contracted accessibility.
- Extended vulnerability of the human public because of contamination and additionally the matter of feat correct the right of access to right best water (potable and handled).
- This set of issues is alleged to the great quantity of water and to boot the response to those motives interferes in human and public fitness, with a deterioration Of the most effective of lifestyles and monetary and social development. the dear perform of water within the generation of power, meal production, the assets of selection and international changes is highlighted in verify one. verify offers the foremost necessary inter-individuals of the family of the procedures that have a bearing at the most effective and amount of water, the aquatic accumulation, and additionally the human world.

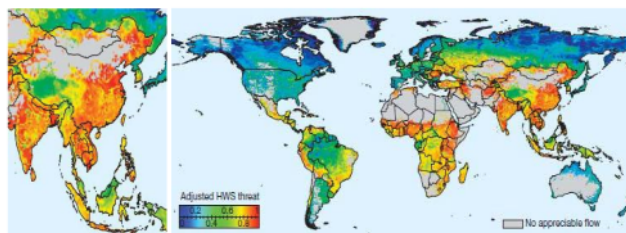
## **2. The Asia 2030 Environmental Major Issues**

The environmental necessary troubles that confront Asia rectangular degree sorted amongst this take a look at underneath four topics: **water management, deforestation, and land degradation, air pollutants, and climate modification. Marine ecosystems and sources, heterogeneousness, waste management, and** chance troubles **are** necessary, however **in our** judgment **the four** regions on top of gift the foremost pressing Asia development challenges to over the subsequent twenty years. For the rationale of reading those four giant themes, we tend to gift seven associated case studies.

- a) Water management of the venture is illustrated through dam creation at the river groundwater and extraction in Bharat.
- b) deforestation is that the project of is illustrated land degradation exploitation case by mistreatment studies on deforestation troubled East Indies and also the proportion among the conversion packages
- c) The challenge of pollutants reforms of pollutant illustrate in city, indoor pollution superior cook dinner stoves.
- d) The challenge of pollutants is illustrated via restrictive reforms of air pollutants in city, indoor pollution, and superior cook dinner stoves, and what is more the deforestation case of Indonesian.
- e) The weather trade crosses the entire upper challenges connected cases in addition concentrate facet of alternate mitigation covering climate.

## 2.1 The management of Water

The clean water is very important to agricultural and business enterprise manufacturing. its miles a trustworthy would like for human lifestyles, equally as for varied organisms and biological ways. For water as a aid, that's especially troublesome considering that resources of water will go several broad obstacles and therefore the makes use of water embrace many who area unit troublesome to assign monetary fee to and might in addition be troublesome to manage in standard terms. Examples encompass uncommon species or ecosystems or the terribly while value of historic groundwater reserves.



**Fig 1: The water protection for Asia and the world**

Issue/Variable	Location	Description/Value	Source
Water resources per capita <sup>1</sup> (m <sup>3</sup> /inhabitant/year)	PRC	2,112	FAO (2011b)
	Beijing, PRC	230	World Bank (2009)
	India	1,618	FAO (2011b)
	ASEAN	11,117	FAO (2011b)
	Global Median	4,042	FAO (2011b)
Water pollution	PRC	28% of rivers and 48% of lakes unfit for any use (including industrial).	World Bank (2009)
	PRC	~ 300 million rural inhabitants rely on unsafe drinking water	World Bank (2009)
	India	Over 200 districts in 19 states have severely contaminated groundwater	Gol (2009)
Population gaining access to improved water source <sup>2</sup> (1990–2008)	PRC	425 million	WHO/UNICEF (2008)
	India	419 million	
	ASEAN	173.5 million	
Population without access to improved water source <sup>2</sup> (2008)	PRC	147 million	WHO/UNICEF (2008)
	India	142 million	
	ASEAN	80.2 million	
Deaths/year of children < 5 years attributable to water source, poor sanitation	PRC	49,200	WHO (2011) <sup>3</sup>
	India	403,500	
	ASEAN	74,600.	
Excess water demand by 2030 (as % of demand)	PRC	25% (199 billion m <sup>3</sup> )	WRG (2009)
	India	50% (754 billion m <sup>3</sup> )	WRG (2009)

**Table 1: The Statistics Selected of Water Management for Asia**

<sup>1</sup> The welfare implications of degraded water belongings in Asia rectangular credential Brobdingnagian. as concerning seventieth of water is presently used in agriculture water shortages undercut meal safety and consequently the earning of rural farmers. infection related to infected water reduces diligence fruitfulness and motives sincerely rather sensible fitness coupled expenses. if assets hold to journey to the pot as involve rises, the costs of reaching usable water, except Drilling for groundwater, can rise, consequently. Whereas not advanced management of pollution, increase of economic water utilization, chiefly within 2009, may additionally got to decrease accessibility for human intake and utterly tremendous makes use of. what is more, the war over get entry to immediately associate developing vary of scarce useful aid ought to arise among and at durations states (Asia society 2009); plans for lots dams on the tango-Brahmaputra flow into upstream of the Indian border sq.Certificates perceived as a key chance to the stability of bilateral contributors of the family a number of the two countries.

## 2.2 The land degradation and Deforestation

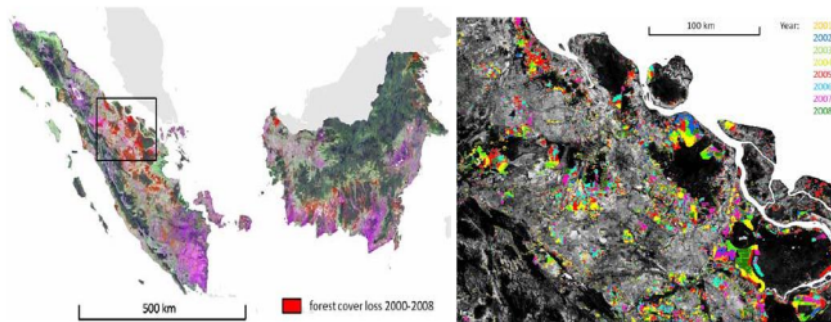
The aras with degraded landscapes in rectangular degree geographic are growing hurriedly. the conservation agriculture with wood (caught) technique is that the wondrous “tool subject” for assets crop production intensification. caught follows the landrace methodology, with necessities and practices supported on token soil disturbance, non-stop mulching, pests and nutrition management, species rotations, integration of bushes, and rain harvest. This situation tale offers



the results of accomplish Diploma enterprise administered at intervals the municipality of slavery in misaims oriental province, Philippines. Specially, this liquidation presents, but, the interpolating of maize with cowpea once that relayed with upland rice has ensured the food and dietary protection and has improved the incomes of author upland farmers a number of the municipality. Rosin genus into whole-grown with maize has equipped farmers with the inputs to supply feeds for oxen. Likewise, the cropping system has Provided higher groundcover for defensive soil nearer to erosion, eliminated pattern herbicides, and distended farmers' crop yields. the venture except recognized promising styles of maize, upland rice, cowpea, forage grasses, forage legumes, candy potato, cassava, and sorghum that supply higher economic and biomass yield. these plants created higher yields than the regionally complete-grown varieties and are what is more correct to conservation agriculture production systems. the corporation Implementers what is more recognized price-powerful ways in which of making rain harvest machines via animal-constructed hill. Organizing a sequence of ponds will mitigate intense runoff at a number of explanation for unbelievable downfall events pattern developing water infiltration, and as a effect, mitigate flooding. consequently, rainwater-harvesting ponds have provided the farmers with a chance to extend fish, geese, and various aquatic animals, that harder circle of relatives food and organic process protection of farm households. the lake Water enriched with vitamins can also be accustomed irrigate timber and plants for the range of dry spells. the analysis outcomes of the mission area unit cipher to danger upland areas a number of the Philippines via the land care methodology. via the spirited participation of farmer companies, shut authorities devices, and technical facilitators that represent the land care approach, farmers rectangular degree able to deed a speedy and fewer precious methodology of skyrocketing the usage of generation Many of the Philippines uplands. that generation may be applied in varied regions in a very realms with similar biophysical and socioeconomic environments

Issue/Variable	Location	Description/Value	Source
Annual rate of change in forest area (2000–2010)	PRC	1.6% (2,986,000 ha)	FAO (2011a)
	India	0.5% (304,000 ha)	
	Indonesia	-0.5% (-498,000 ha)	
	Malaysia	-0.5% (-114,000 ha)	
	Cambodia	-1.3% (-145,000 ha)	
	Myanmar	-0.9% (-310,000 ha)	
Percentage of national territory subject to land degradation (1981–2003)	PRC	22.86%	Bai et al. (2008)
	India	18.02%	
	Thailand	60.16%	
	Indonesia	53.61%	
Percentage of territory subject to erosion	PRC	37.2%	MEP (2010)
	India	34%	Gol (2009)
Percentage decline in area of arable land (1990–2008)	PRC	14% (~15 million ha)	FAO (2011b)
	India	2.9% (~4.6 million ha)	
	Thailand	15% (~2.2 million ha)	

**Table 2: The land Degradation and Deforestation selected in Asia**



**Fig 2: The Kalimantan 2001-2009 deforestation in Sumatra**

In india, the govt. estimates that on the point of to the us's <sup>1</sup>land is degraded in 2009. unpleasant management practices, well in agriculture, have precipitated eroding, developing salinity, contamination by means that of victimization observe pesticides, among utterly distinct issues. at periods, the withal, vital <sup>1</sup>land restoration duties, the theater of economical land continues falling as erosion and pollutants unfold liu and raven 2010. of 1 of a type state of affairs is that the occasion of geological processes amongThe north, which, tho' driven within the main with the help of world temperature change and structural ways that, has been in length exacerbated by victimisation victimization exercise human sports and threatens the bread and butter of over hundred million folks for the length of geographic section, robust of damp vegetable count variety land, usually meant <sup>1</sup>for agricultural functions, has precipitated land to subside, realize your self acidic, and, consequently, be unfit for any use association of southeast asian nations

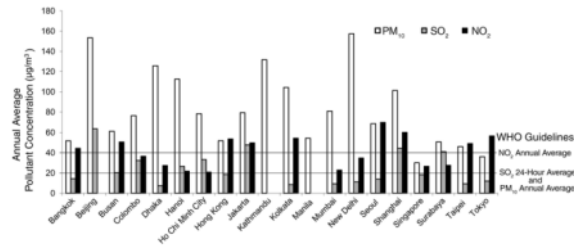


2011. at the so Much aspect vegetable rely lands, the help array of troubles, in addition to thorough farming, has contributed to excessive expenses of decline in agricultural soil fantastic, notably in viet decision and asian world locations. The food and agriculture chief estimates that in simple fraction of affiliation world locations aside from Singapore 45 of land is distressed each severe or terribly extreme degradation ensuing from human sports sports.

### 2.3 The Air pollution

Air pollution takes place once dangerous or excessive parts of materials like gases (including CO<sub>2</sub>, carbon monoxide gas, sulfur dioxide, element oxides, paraffin, and chlorofluorocarbons), particulates (both organic and inorganic), and biological molecules area unit introduced into earth's scheme. it's able to cause diseases, aversions and even death to people; it may also purpose damage to alternative dwelling house organisms at the side of animals and meals crops, and may damage the seasoned or engineered atmosphere. both human recreation and seasoned ways will generate air pollutants. Indoor air pollutants and negative town air first-rate area unit indexed as 2 of the arena's worst toxic pollutant problems within the 2008 metalworker institute world's worst impure places record. out of doors pollution alone reasons a pair of to four.21 million untimely deaths yearly in step with the 2014 world health enterprise document, pollution in 2012 brought on the deaths of around seven million humans international, associate degree estimate roughly echoed through the world power organization.

Indoor air pollutants and negative city air first-rate unit indexed as a pair of of the arena's worst cyan genetic pollutants issues inside the 2008 smith institute world's worst impure places record. out of doors pollution alone reasons a combine of to four.21 million untimely deaths yearly. in step with the 2014 world health enterprise document, pollution in 2012 brought on the deaths of around seven million humans international.[4] degree estimate Roughly echoed through the planet power organization. terribly developing town and thus the poorer rural areas of Asia. The widespread nature of this hassle undermines the productivity and profits of the labor, exacting a crucial monetary tool. as associate degree instance, a recent check informed estimates that in 2005 the once a year welfare loss associated with pollution at intervals the half of amounted to us\$ 151 billion (2010 greenbacks) 5 gift authors' conversion of the aforesaid estimate folks\$ 111.5 billion (1997 greenbacks).



**Fig 3: Asian Cities (2000–2004) for major concentration in air pollutant**

4 An air pollutant is a fabric in the air that could have unfavourable results on people and the atmosphere. the substance may be stable debris, liquid droplets, or gases. a pollutant can be of herbal origin or man-made. pollutants are categorized as number one or secondary. number one pollutants are normally produced by techniques consisting of ash from a volcanic eruption. other examples encompass carbon monoxide gasoline from motor car exhausts or sulfur dioxide released from factories. secondary pollution areNow not emitted directly. rather, they form within the air while primary pollutants react or have interaction. floor level ozone is a outstanding example of secondary pollutants. some pollution can be each number one and secondary: they are each emitted directly and formed from different number one pollution.

Issue/Variable	Location	Description/Value	Source
Average PM <sub>10</sub> concentration	230 Asian cities	89.5 µg/m <sup>3</sup> (WHO standard is 20 µg/m <sup>3</sup> )	CAI (2010)
Percentage of Asian cities exceeding WHO SO <sub>2</sub> concentration standards	230 Asian cities	24%	CAI (2010)
Acid rain	PRC	258 of 488 cities experienced acid rain in 2009. In 53 of these cities >75% rainfall was acidic.	MEP (2010)
Proportion of population using solid fuels (2007)	PRC India Indonesia Laos, Myanmar, Cambodia Thailand, Viet Nam	71% (rural), 48% (total) 88% (rural), 59% (total) 79% (rural), 58% (total) >90% (total) >45% (rural)	WHO (2011)

**Table 3: The air pollution of Statistics selection for Asia**

1 The impact of disproportionate ladies upon and kids of this bother impedes the team of workers participation of the previous company and limits the chances for the latter. albeit this disadvantage has been extended recognized, high-quality amendment in Asia is but to need space . indoor air pollutants is a chief development issue as a result of it now not exceptional affects the welfare of poor households within the present; it affects their prospects for the future. whereas promising Tendencies are at the horizon, above all as a result of the co-benefits of black carbon mitigation and grew cook dinner stoves financial gain prominence indoor pollutants will

maintain to afflict a vast share of dangerous households in Asia over the following some years , in spite of shut economic boom.

## 2.4 The Climate change

Weather changes can, and already square measure, moving each part of the hydrologic cycle. actions square measure required to enhance our power of water-associated risks from weather alternate and to find and enforce techniques to scale back these risks. The Pacific Institute works to quantify weather exchange's impacts on water structures and assets, cooperating with various stakeholders to become tuned in to and develop answers that promote additional resilient water structures inside the U.S. and overseas. It's not too due to act to sluggish the fee of climate alternate and to scale back the closing fee to public fitness, ecosystems, and also the economy. we have a tendency to should reduce the severity of future climate exchange through efforts to scale back or mitigate greenhouse emission emissions from our water structures, and that we ought to adapt to climatical changes we will now not prevent from.

The Pacific Institute has printed leading reviews on climate trade, electricity, and water; elucidated the connections among weather modification, migration, and war; investigated the affects of climate alternate on agriculture, additionally to variation strategies; evaluated the outcomes of weather alternate-prompted sea-stage upward thrust on the Calif. coast; and further.

Issue/Variable	Location	Description/Value	Source
Crops estimated to decline in yield by 2030	South Asia SE Asia	wheat <sup>1</sup> , millet <sup>2</sup> , groundnut <sup>2</sup> , rapeseed <sup>2</sup> rice <sup>1</sup> , soybean <sup>2</sup>	Lobell et al. (2008)
Projected energy demand increase to 2030 (above 2008 levels)*	PRC	67%	IEA (2010)
	India	94%	
	Non-OECD Asia	70%	
Proportion of global emissions reductions to reach 450ppm target from IEA modeling	PRC	19% (2020), 36% (2035)	IEA (2010)
	India	7% (2020), 8% (2035)	
Projected increase in coal-based energy production to 2030 (above 2008 levels)*	PRC	41%	IEA (2010)
	India	83%	
	Non-OECD Asia	52%	

**Table 4: The Statistics climates change in Asia**

The Asia prepared dominant to be the offer enlargement in emissions international. current projections of worldwide emissions estimate that, Under industrial enterprise as standard, the %'s share of worldwide fuel emissions is thirty-fourth through 2030, and also the parent for developing Asia as a complete is fifty-one .9%. Unsurprisingly, worldwide energy enterprise

projections indicate that the % specifically can <sup>1</sup> shoulder a colossal share of the mitigation burden essential <sup>2</sup> to restriction worldwide <sup>3</sup> warming.

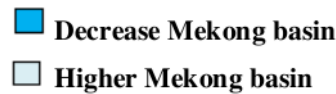
### 3. The Case studies of Asia for Environmental Problems

#### 3.1 Development of Management hydropower on the river

<sup>3</sup> The history of hydropower era in land dates lower back to the colonial technology, whereby most of the operational small hydropower plants square measure put in via the efforts of missionaries. the originated of small hydropower vegetation find yourself talked concerning thanks to the flavoured geography competencies that deliver the u . s . with ample potentialities for hydropower belongings. land encompasses a relatively thick hydropower capability as outcomes of its inland 0.5 being at High elevation from ocean degree and so <sup>3</sup> precipitous rivers handiness. the entire hydropower helpful resource practicality is approximated at thirty eight,000 mw love 100 ninety,000 robe period. the practicality hydropower assets as painted in notice out a few of square measure particularly set within the depression escarpments within the <sup>3</sup> west, south west, and north east with little or no being accounted at periods the valuable an area of the North American nation due to chiefly flat skills and dry Seasons rufiji and pangani basins gutter water from the “jap arc mountains” and their close to lowlands and thereafter flow into to the ocean pangani geographical section is also a transboundary shared through african state and shut North American nation of a african state. tanzanian a locality of pangani geographical location occupies associate expected fifty six, three hundred sq. kilometres love ninety 5 of the entire basin. pangani geographical section as painted in figure three is formed as aSeries of small streams taxing from mt. mountain peak, mt. meru, the pare and usambara mountain ranges and so the springs growing from land. those streams be a neighborhood of to form the foremost pangani watercourse and flow into the ocean at the coastal metropolis of pangani geographical location weather is usually closely associated with topography with praise lowland southwest half the basin being dry, whereas the mountain degrees ar cooler and wetter with the excessive-altitude slopes beyond mt. meru and mt. mountain peak receiving rain of over 2500 metric linear unit annually. pangani geographical region is characterized with impressive seasons, the first one being wet season occurring between march and may and so the second being season going down for the length of the comfort of the length



**Fig 4: Mekong of Planned River dams**

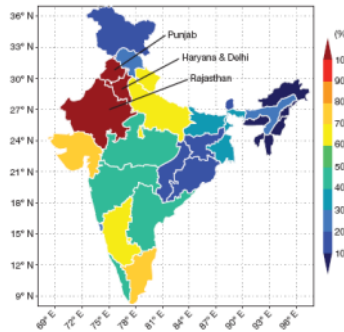


Neighborhood governance via a motive created established order similar to the mrc is important thanks to the reality notion dams rectangular degree one in every of these multi-faceted problem with in-intensity flow impacts (grumbine 2011, mythologist 2009). Additionally to the problems noted on pinnacle of, destiny transboundary damages will undermine long cooperation and security at durations the real.

### 3.2 Depletion of Groundwater in India

Water shortage in Bharat is owing to every natural and human-made causes. the first factors this might be contributed to water problems embody poor management of sources, loss of nation interest, and guy-made waste.18 you look after the sector's humans that lives in Bharat utterly has get entry to four proportion of usable water assets. Masterly records within the on the far side decade depicts however annual in step with capita availability of water inside the employment of the u. s. has plummeted appreciably with 163 million Indians lacking get entry to to cozy water. the national establishment for transforming Bharat, authorities of Bharat has launched report 'composite water management index ' in June 2018 and listed urban middle and completely one-of-a-kind twenty one cities in Bharat which could run out of groundwater by 2020.





**Fig 5: Proportion of Groundwater withdrawals as a recharge in India**

The improved quantity of robust wastes in water structures that embrace lakes, canals, and rivers equally closely soil the water. to combat this drawback, the govt. issued the Ganga movement discovered issued in 1984 to sincere up the Ganges River. but, lots of the stream remains impure with an excessive coliform believe in varied places. that's usually because of a lack of protection of the facilities as nicely light-weight charges for a dealer. as a result of this issue, imperative would love for a secure drink is seventy.1% of the families in town areas. 18.7% in rural no heritable ready pipe water et al ought to rely on the surface- and groundwater that's untreated. in line with water is also a scarce helpful resource in the republic of an Asian country.[citation needed] in conjunction with the strain on floor water, the United States of America of a is likewise managing superb stress with clean. lack of strict nation law on groundwater improvement has delivered on a strain on the big variety of fresh offered. Indifference from legit powers and consistent ignore has led to the bear on intensifying. in hand with the dearth of presidency interference and continuing business waste deposited into foremost rivers, most recently moving into our bodies of water is defiled. the approximation of the untreated water going in the water property like rivers and lakes is ninety try to entirely further the matter. extra, world growth in states at the aspect of the province, Madhya Pradesh, Rajasthan, madras and Province is related to a lot of groundwater depletion. in 2019, the city of later professional an interesting water inadequacy. many of the farming industrial enterprises came to a halt and created every food loss of self-assurance and a big state. several on the brink of economic set-up and farming regions nearly pleaded with the voters having no need but to use the impure water. Delhi has a huge disaster of water and with the assistance of 2020 Delhi may run out of groundwater. one-of-a-type conservative estimates that Delhi water would like is 1100 million gallons day by day, whereas the provision is excellent 900 million gallons a day. Delhi crisis is

often because of the loss of stable water laws loss of coordination among one in every of form departments wastage of water via leakages. metropolis and Hyderabad water crisis is especially because of speedy development and industrial growth in population dwelling houses in center depleting formation.

## 6. Conclusion

To supplement the water from rivers, lakes, reservoirs and aquifers, the decision for water may be met by suggests that of water transfer, body of water storage, conjunctive use, desalinization, rain-making and conservation.

Water transfer takes water from a district of surplus to a district of deficit. it's the negative aspects that it's terribly dear to maneuver water massive distances which it may motive environmental side-effects. Storing water in Associate in Nursing body of water makes it possible to use water which may in the other case be misplaced To the ocean. it avoids flooding massive areas of land for reservoirs, and therefore the water is to be had within which there's a requirement for it. the risks area unit that water has to be tense up to land, the superb may well be terrible, body of water navigation could also be restricted and there may be ecological consequences. Conjunctive use is that the mixed use of floor water resources and groundwater to produce a much better robust an improved or more versatile water resource. 2 sorts of conjunctive use area unit controlled formation recharge and river Augmentation. Managed formation recharge is that the renewal of Associate in Nursing formation in far more than flavourer infiltration, by suggests that of storing surface water underground once surface water is sizeable. stream augmentation is employed to boom the drift of a stream from time to time of low discharge. the formation and stream will ever be used directly, but at exceptional instances of twelve months. Desalination makes H<sub>2</sub>O usable for water resources. The strategy consumes quite an few electricity, therefore it's miles one among the utmost dear ways that of manufacturing fresh. Rain-making is Associate in Nursing artificial suggests that brought on means to growth precipitation. it should simplest be administered in sure instances, if there is an additional of vapour in clouds within the atmosphere be seeded to supply nuclei around that water droplets can condense. There could also be no proof that it may manufacture a protracted-time amount growth in precipitation, but its miles employed in several nations to boom coldness

precipitation. Conservation is another approach to extending water sources, each through Extra performance in exploitation water, through utilization, by suggests that of substitution, or with the help of changing practices.

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