



**GROUNDWATER AND
SUSTAINABILITY: STUDY ON
RAIPUR'S GROUNDWATER
POLLUTION AND DEPLETION
PROBELM**

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ABSTRACT

“A development is not a development if it destroys our planet. ”

This article gives an encapsulation of the concept of sustainable development. It gives an overview of the concept of sustainable groundwater resource development. The world is progressing at an alarming rate where sustainable development has become the undeniable need of the hour. As per Brundtland report sustainable development as a concept advocate the use of resources in a matter that the present demands are fulfilled without compromising on the need of the future generation.

This paper attempts at explaining how the concept of Sustainable has helped in enriching the legal environmental jurisprudence. It further provides an examination of the international legal instruments on groundwater resources viz., UNCCD and UNECE Water Convention . Further, this paper construct an analysis of The Water (Prevention and Control of Pollution) Act, 1974.

This article specifically deals with the capital city of Chhattisgarh, Raipur's groundwater depletion and how it has affected its residents. An empirical research had been conducted to this effect; an analysis of which has been reproduced in the paper.

Keywords: UNCCD, UNECE Water Convention, Brundtland report, Sustainable development, Sustainability, The Water (Prevention and Control of Pollution) Act, 1974.

INTRODUCTION AND BACKGROUND

“Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

—Gro Harlem Brundtland

CONCEPT OF SUSTAINABLE DEVELOPMENT

Genesis of Sustainable Development

The concept of *Sustainable Development* finds its root in the certitude that the Earth is being robbed out of its renewable and non-renewable resources. "With the advent of ever increasing population and the never ending demand of earth resources to cater to the demands of the mass has given soil for the concept of sustainable development to sow its seed." ¹

Resources being depleted at an unstoppable pace awakened the world to come together

¹Schwass R.D., *Introduction To Sustainable Development*, WORLD CONSERVATION STRATEGY OF

THE INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES (IUCN).



and start thinking about its check. Hence, the principle of sustainable development stems from international activity on the environment.

Definition of Sustainable Development

"The term sustainable development raised to notability in the year 1980 in the World Conservation Strategy (WCS). The concept of sustainable development became omnipresent with the publication of the *Brundtland Commission Report*² called as, "*Our Common Future*" from the World Commission on Environment and Development in the year 1987."

It defines sustainable development *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*.

This research paper is structured as follows. **First** part will lay out the framework of sustainable development and concept of water as natural a resource and the need of its sustainability. **Second** part will construct analysis of the international conventions relating to it and Water Pollution Act in India as its concomitant consequence. The **third** part provides an examination of the concept of sustainable development as an exemplar of enriching the environmental legal jurisprudence along with illustration of classic and up to the minute cases pertaining to Indian context. The **fourth** part will be the analysis of empirical research on ground water survey in Raipur city. The **fifth** part put

forth the suggestions and recommendations based on the analysis of the survey. Lastly, the **sixth** part will be the conclusion.

FRAMEWORK OF SUSTAINABLE DEVELOPMENT

The objective of sustainable development is to achieve economic and social development and at the same time to preserve and protect environment as well.³It is based on **Intergenerational Equity Principle (IEP)** as propounded by Brundtland Report that explains that every generation should exploit the resources in a manner that it does not hinder the rights of the future generation to the enjoyment of the same."

Therefore, the old adage still holds true that well explains the concept of IEP, "*We have not inherited the Earth from our forefathers, nay have borrowed it from our children.*"

1.1 Stockholm Conference 1972

The term "sustainable development" received widespread recognition in the Stockholm Conference. Principle 6 of Stockholm talks about "assimilative capacity" of the nature, "where it propagated that harm should not exceed the level where nature struggles or finds it difficult to repair the damage and to ameliorate the damage done".

However, later on in the year 1987, Principle 11 of **United Nation General Assembly**

² Gro Harlem Burndtlant, *Our Common Future*, THE UNITED NATIONS WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, 1991, (Aug. 6, 2018), <https://web.archive.org/web/20131103112536/http://grawemeyer.org/worldorder/previous-winners/1991->

the-united-nations-world-commission-on-environment-and-development.html.

³*Sustainable Development Goals*, UNDP, (Aug. 6, 2018), http://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf.



Resolution on "World Charter for Nature", i.e., the "precautionary principle" was emphasised in place of Principle 6 that talked about "assimilative capacity principle".

1.2 The Rio Declaration on Environment and Development (1992)

The "Rio Declaration also called as the Earth Summit later after 10 years further reaffirmed the aforementioned "precautionary principle". Principle 15 of Rio advocated "precautionary principle" by doing away with the need of any scientific certainty as a condition precedent to take measures instead propagated that precaution is better than care. Simply put, the rule finds its rule in Salutory theory which espouse the idea that "it's any day better to err on the side of caution and safety then being in the opposite direction where environmental harm, once done, may not be reversible."

The "precautionary principle" promote the idea of not delaying precautions due to dearth of scientific- certainty. It should not be the reason for postponing adoption of measures to avoid environmental degradation.

CONCEPT OF WATER RESOURCES AND ITS SUSTAINIBILTLY

Water is essential to life and so does its sustainability⁴ is an undisputed actuality. Although, "water is a renewable natural

resource but it should also be kept in kind that mankind should not exploit it beyond the nature's assimilative capacity⁵ where the damage done is beyond repair; beyond restoration of status quo if not any better."⁶

Importance of Water Sustainability

Life on earth will not sustain if there's no fresh water on earth.⁷ "The very speculations of the third world war having water as its subject-matter has enough force in the contention to start working towards it sustainability. And not just working but also, achieving its goal as well.

The severity of the problem is such that as many as 21 India cities are on the verge of having 20% groundwater level by the end of 2020 as per the NITI Aayog reports. To this effect, the reports also suggest that the capital of the country, Delhi, the city of Bangalore and Chennai will be left with no groundwater by the end 2020 owing to excessive abuse of groundwater."

INTERNATIONAL LEGAL INSTRUMENTS ON GROUNDWATER

2. International Environmental Treaties having Provisions on Groundwater

2.1 United Nations Convention to Combat Desertification (UNCCD)

PROCEDIA EARTH AND PLANETARY SCIENCE 11 (2015) 598 – 604.

⁷ Kwai Malak, Kwai Kut, Ankur Sarswat, & DineshMohan, *Water as key to the Sustainable Development Goals of South Sudan – A water quality assessment of Eastern Equatoria State*, PROCEDIA EARTH AND PLANETARY SCIENCE 11 (2015).

⁴United Nations Educational, Scientific, and Cultural Organisation, *Water Portal, Water Security*, (Aug. 5, 2018), <https://en.unesco.org/themes/water-security>.

⁵ Principle 6, Stockholm Conference 1972.

⁶ Sujay Raghavendra & Paresch Chandra Deka, *Sustainable Development and Management of Groundwater Resources in Mining Affected Areas*,



The UNCCD was established in the year 1994 to tackle and withstand desertification and to also alleviate the effects of drought. "This was on 17 June 1994 adopted in Paris, France and was enforced in 1996.⁸ A total of 197 countries⁹ are party to it and works towards its implementation."¹⁰

"It is pertinent to note that it is the single internationally legally binding agreement that actually links development and environment with sustainable land management. It is the sole agreement that addresses the problem of desertification. Its objective is restoration of degraded land to increase productivity¹¹. It closely operates on the line of Rio Conventions; the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) for the viable use of natural resources.¹²

2.2 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses

⁸ Stefano Burchi and Kerstin Mechlem, Groundwater in International Law Compilation of Treaties and Other Legal Instruments, UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, Rome, 2005.

⁹ United Nations, Treaty Series, vol. 1954, p. 3; depositary notification C.N.176.1995.TREATIES-6 of 27 July 1995.

¹⁰ United Nations Treaty Collection, Chapter XXVII, ENVIRONMENT, STATUS AS AT : 08-08-2018 05:00:34 EDT. (Aug. 6, 2018),

https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-10&chapter=27&clang=en.

¹¹The Economics of Land Degradation, (Aug. 6, 2018), <http://www.eld-initiative.org/index.php?id=1&L=ugidjaxfnhflft%22>.

¹² United Nations Convention to Combat Desertification, About the Convention, (Aug. 6, 2018),

This treaty is a result of the request made to the United Nations by the International Law Commission¹³ to come up with international guidelines for water use on the same lines of The Helsinki Rules (UNECE Water Convention, 1992) on the Uses of the Waters of International Rivers."

"United Nations Convention on the Law of the Non-navigational Uses of International Watercourses commonly known as UN Watercourses Convention was adopted by the United Nations in the year 1997 in New York".¹⁴

The objective of the treaty "is to conserve all waters that cross international boundaries that includes both surface and ground water.¹⁵ UN aimed at conservation and management of the water for the present and future use and need. It took almost 17 years to come into force finally in August 2014.¹⁶

This treaty has only been ratified by 36 countries as of now but is surely seen as

<https://www.unccd.int/convention/about-convention>; <https://www.unccd.int/>.

¹³ Statute of the International Law Commission, 1947, United Nations, 2005.

¹⁴ United Nations Convention on the Law of the Non-navigational Uses of International Watercourses General Assembly resolution 51/229, annex, Official Records of the General Assembly, Fifty-first Session, Supplement No. 49(A/51/49), United Nations, 2014.

¹⁵ International Water Law, Research Guide International Law, PEACE PALACE LIBRARY, (Aug. 7, 2018),

https://en.wikipedia.org/wiki/Convention_on_the_Law_of_the_NonNavigational_Uses_of_International_Watercourses.

¹⁶ Stephen C. McCaffrey, Convention on the Law of the Non-Navigational Uses of International Watercourses, ENVIRONMENTAL LAW, AUDIOVISUAL LIBRARY OF INTERNATIONAL LAW, NEW YORK, 21 May 1997.



crucial step towards establishing international law governing water".¹⁷

WATER POLLUTION ACT IN INDIA

The Water (Prevention and Control of Pollution) Act, 1974

It is pertinent to note that India is signatory to the resolution passed by the United Nations Water Conference 1977, which provides, as follows:

" All people whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in a quantum and of a quality equal to their basic needs."

The Water (Prevention and Control of Pollution) Act, 1974 (hereinafter referred as "Water Act") Act was to prevent and to check on water pollution. "It was India's first step and the very first attempt towards environmental pollution and it is applicable to water bodies including subterranean waters, rivers, streams, inland waters, and tidal waters." It was adopted in the year 1974.

The provisions of this Act stems from the sagacious mix of "*Precautionary Principle*" and the "*Polluter Pays Principle*" of sustainable development.

This is a complex yet "comprehensive legislation that provides for pollution control boards at the centre and states both. Section 17 of this Act clearly lays down the functions

of water pollution board¹⁸ to counter water pollution.¹⁹

To this effect the Supreme Court in *A.P. Pollution Control Board v. M.V. Nayadu*²⁰ held that the underlying principle and spirit behind this Act is that all citizens of India should get clean drinking water.

The courts have in many cases made its stance very about seriousness of check on water clear by pulling up State Boards for dismal discharge of their functions".²¹

In *D.K. Joshi v. Chief Sceretary, State of U.P.*²² the Supreme Court passed an order to ensure availability of clean and unpolluted drinking water in the city of Agra. The court had passed this order in a PIL filed under Article 32 of the Constitution.

Likewise, "in the famous case of *M.C. Mehta v. Union of India*²³ the court had ordered for shutting down the tanneries plant as it was discharging its effluents in the river Ganges without installing primary treatment plants.

Furthermore, in *Ramji Patel v. Nagrik Upbhokta Marg Darshak Manch*²⁴ the Supreme Court had ordered the Central Pollution Control Board to come up with their report so to curb even any minute possibility of contamination or for that matter pollution of drinking water".

Therefore, "it evident that the judicial intervention by the courts has led to the implementation of this Act in actuality to attain the object of Water Act to provide

¹⁷ UNECE, UN Watercourses Convention.

¹⁹ Water (Prevention And Control of Pollution) Act, 1974 [Act No. 6 of Year 1974].

²⁰ (2001) 2 SCC 69.

²¹ *State of M.P. v. Kedia Leather and Liquor Ltd.* (2001) 9 SCC 605.

²² (1999) 9 SCC 578.

²³ AIR 1988 SC 1037.

²⁴ (2000) 3 SCC 29.



unpolluted and clean drinking water to every citizen.

However, it is of paramount importance to note that the courts have also interpreted *Article 21* of the Constitution²⁵ that Right to Life also means right to access to clean water and the State has an obligation to provide the same".

STUDY ON RAIPUR'S GROUNDWATER POLLUTION AND DEPLETION ISSUE

RESEARCH METHODOLOGY

The researcher has opted "empirical form of research for the survey of groundwater in Raipur (Chhattisgarh's capital). To this effect, the researcher has collected primary data by means of surveying various people belong to different age groups by questionnaire. Hence, the data assimilated is quantitative in nature". The researcher has used the capital city of Chhattisgarh, Raipur as her subject-matter of the research.

The research is exclusively focused on the residents of the "Raipur city, as the sample for study; reason being the groundwater in Raipur city is degrading and depleting at a high pace, and the residents would be in a better position to provide the first hand experience in things like, if they felt summer was hotter than recent years and if they were affected by any disease due to consumption of the such water etc.

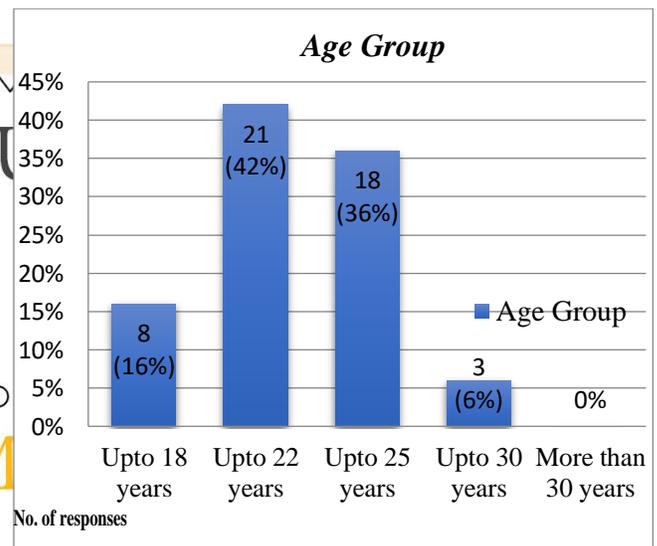
Thus, empirical method of research was adopted in order to understand the plight and to gather the opinion of the residents alongside their stance and attitude towards the protection of the environment. A well

tabulated questionnaire was circulated in order to conduct the survey".

DATA DESCRIPTION

1. SAMPLE SIZE AND DESCRIPTION

The primary data has been collected by conducting survey through questionnaire circulated to people of various age groups. "The participants are all residents of Raipur or the people who've moved to the capital city, Raipur in recent years and are currently residing in Raipur." **The sample size is 50.**

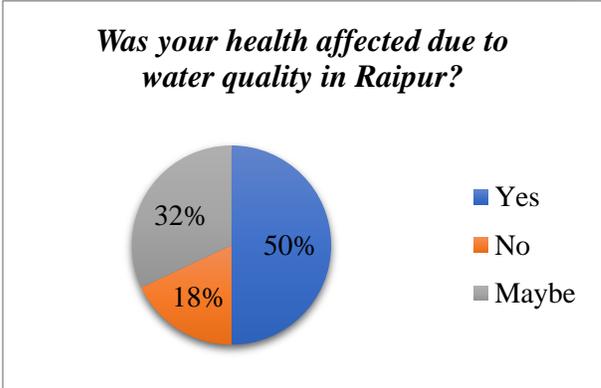
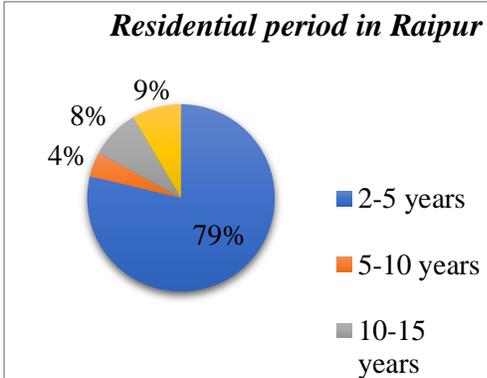


2. SURVEY QUESTIONS

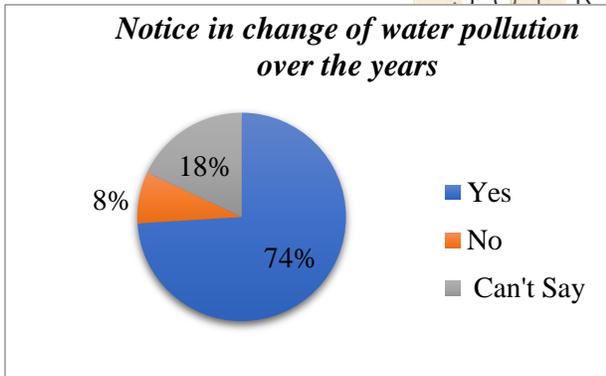
The following survey questions were part of the questionnaire and its responses are depicted below as follows:-

1.1 Residential period in Raipur

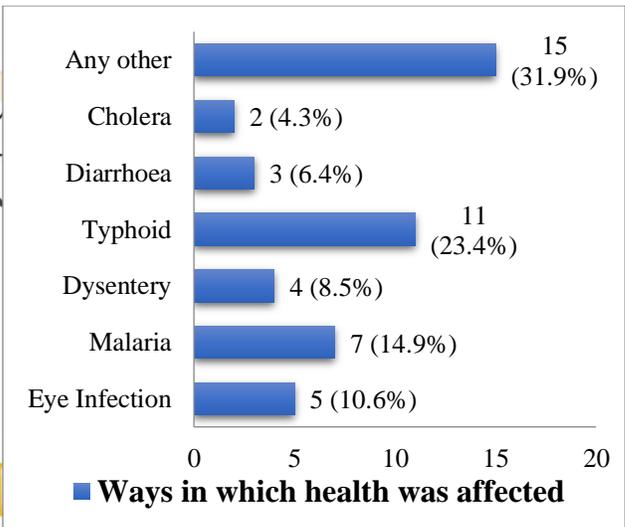
²⁵ The Constitution of India, 1950.



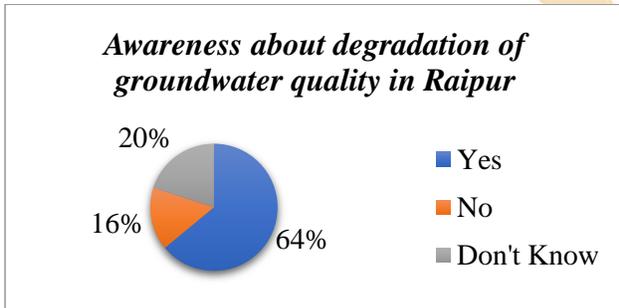
2.2 Notice in change of water pollution over the years



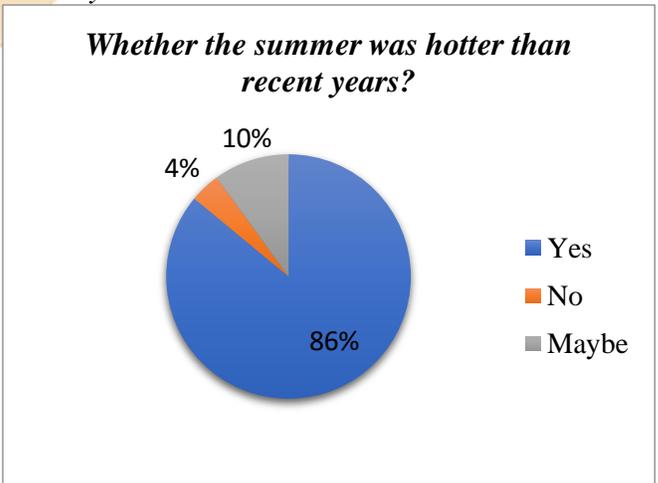
2.5 Ways in which health was affected



2.3 Awareness about degradation of groundwater quality in Raipur



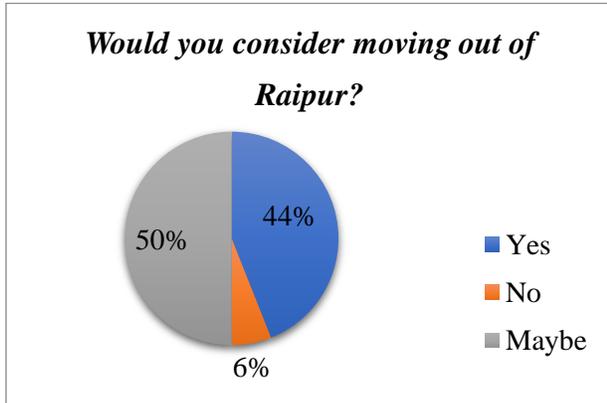
2.6 Whether the summer was hotter than recent years?



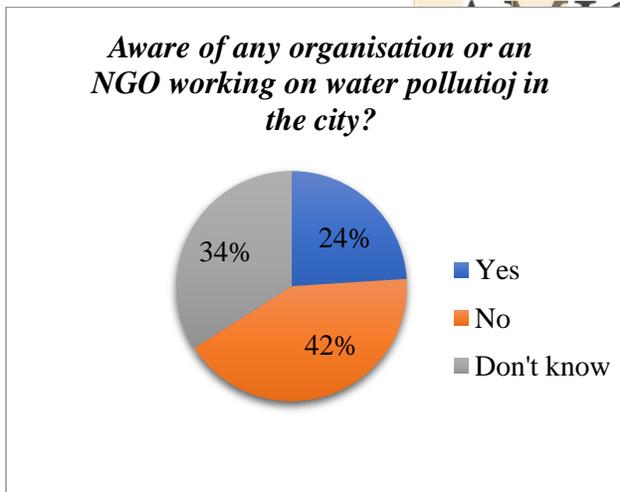
2.4 Was your health affected due to water quality in Raipur?



2.7 Would you consider moving out of Raipur?



2.8 Aware about any organisation or an NGO working on water pollution in the city



pollution, awareness about the concept of sustainable development, and so on. Therefore, all the figures stated are reproduced after mindful analysis of the responses received by the sample size.

Furthermore, one of the important aspect about shift in the weather during summer time was also felt by the people. Raipur city marks as high as 50 degree Celsius during summer especially in the month of May and June".

1. Condition of water pollution in the city

According to the survey, 74% people have actually felt change in the level of water pollution over the years in the city and 64% people are aware about the degradation of groundwater which is the prime subject-matter of the analysis. "The analysis of the survey depicts that a major chunk was aware about the degradation of the groundwater.

2. Impact of water pollution on the health of residents of Raipur

The consumption of polluted water leads to many waterborne diseases. It affects the health of the people if polluted water enters into human body leading to variety of ailments and some sickness. Therefore, it was important to understand as to how the pollution has affected the health of the residents.

DATA ANALYSIS

Since Raipur is facing the problem of groundwater depletion, "it is of paramount importance to understand the opinion of the residents of the city. However, at the same time it is pertinent to understand their knowledge of water pollution, environment

The participants were inquired about the ways in which the water pollution had affected their health and their day-to-day activity. The researcher has analysed how the residents were affected by different waterborne diseases and its impact on the health in the long run. They participant were affected by diseases like eye infection,



dysentery, malaria, typhoid, diarrhea, and cholera".

3. Awareness about Environment Protection

The data analysis also indicates towards the fact that majority belonged to the age group between 22-25 years and it shows that the youth is aware about groundwater depletion. But the data also reflects that the educated mass don't possess knowledge about environmental problems, as 76% of them had no awareness about the NGO's and organisation that are working towards the improvement of groundwater in the city. "However, only 24% have only heard about such NGO's and different organisations working to this effect. This survey further reflected the dismal knowledge about the protection of the environment, the mass sure is aware about the problem but they lack knowledge about what can be done to improve or eradicate environment pollution.

4. Thoughts on moving out of the capital city of Chhattisgarh, Raipur

Chhattisgarh is a newly formed state in the year 2000 and is not even 20 years old as of now. Raipur, being its capital has a lot of scope and potential for development. Raipur has also been included in the smart city plan of hon'ble PM, to transform cities into smart cities.

Therefore, it was important to know the thoughts of residents of the place if they consider living in the same city of they plan to move out. Thus, according to the survey, 44% people wants to move out of Raipur and 50% are not sure about to continue living there". These statistics of the survey points to

an alarming need of improvement in the water pollution level. As Raipur has no dams and the majority rely on groundwater for daily consumption, therefore, urgent concrete measures are required to improve water quality.

On the other hand, only very few are optimistic that there should be some improvement in the near future to this problem.

SUGGESTIONS AND RECOMMENDATIONS

The researcher would like to put forth various recommendations that can effectively combat the water pollution in Raipur. "Some suggestions are based upon the survey conducted in order to gather the perspective of the residents of the city, whereas others are based on general analysis of all other legal provisions available. The recommendations are framed keeping India's obligations to various international conventions in relation to water pollution and sustainability", per se.

1. Groundwater depletion is a direct consequence of excessive pumping of water. "It could be for industrial purpose or industrial purpose and alike, therefore, a check should be there on excessive pumping of water. Misuse of groundwater should be regulated.
2. As Chhattisgarh is the rice bowl of the nation, lot of groundwater is used for irrigation purpose. The state should endeavour to promote use of surface water for such purposes. To this effect, use of surface water should be promoted.
3. Since Raipur is being nominated in the smart city project the government should keep in mind that necessary precautions should be



taken before heading the way of development. Any development at the cost of ruining the nature is only going to be detrimental in the long run".

4. The government should provide incentive for rainwater harvesting and cheaper methods to harvest rainwater should be invented.
5. Government should make it mandatory to obtain license before digging out personal bore wells. "There should be a proper check on the numbers of bore well to be dug by residents and collective use of one bore well by many should be encouraged to avoid digging of surplus bore wells many a times.
6. 3 R principle of Reuse, Reduce and Recycle should be implemented not only in letter but in spirit. Reduction in the use of water is also one way of generation of water for the future generation.
7. Strict laws should be made on deforestation, "as it results in decrease in rain and also lack of trees causes less water to seep into the ground.
8. Nowadays the phenomenon of urbanisation is on its peak, but it should also not hamper the nature's capacity to replenish its resources".
9. Most importantly "awareness about environmental protection should be spread by resorting to new ways of reaching the mass, for instance social media could be used as a platform to further the idea of environment protection and sustainable development.
10. Budget allocation should have some shares allotted to protection of environment".

The aforementioned recommendations are an attempt by the researcher to improve upon the problem the city is facing, however the list of recommendations are illustrative as there are various other ways which could be resorted to in order to tackle pollution level.

CONCLUSION

"Sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship and strengthen governance. "

-Ban Ki-moon

Therefore, to conclude in the light of the above statement the researcher is of the opinion that although the country is making efforts to combat environmental pollution and to promote sustainable development yet the resources are being depleted at a high pace. Thus, it is upon human to develop and at the same time use the resources in a clever manner as it does not exploit it.

The earth is being robbed out of its resources "like never before in the race of development where, there shall be not clear winner but earth will be the undisputed loser. Proper check mechanism needs to be in place to check the reckless use and abuse of the natural resources. Man should keep in mind that these resources are not consequence of human labour but are a gift of nature that should be protected and respected in its entirety". ***Thus,*** the principle of sustainable development should be promoted wholeheartedly by the nation.
