



# Policy Brief

Diverse Notions of Justice and Security: A Preliminary Inquiry into Water Justice and Security in Himalayan Nuclear Ecosystem

**Gopal Krishna**



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In the beginning this was but the absolute Self alone. There was nothing else whatsoever that winked. He thought, "Let Me create the worlds." .... He thought, "These then are the worlds. Let Me create the protectors of the worlds." Having gathered up a (lump of the) human form from the water itself, He gave shape to it.

**-Verse 1, 3, *Aitareya Upanishad***

"If a man makes hempen sandals without knowing the size of people's feet, yet I know that he will not make them like baskets. Sandals are all like one another, because all men's feet are like one another."

**-Kung Sun Lung, ancient Chinese philosopher<sup>1</sup> quoted in *The Chinese Classics* (1895)**

The apocalypse is a process that has been going on for a very long time and will continue for a very long time. The apocalypse is now. The apocalypse is an ongoing judgment.

**-László Krasznahorkai, author of *War & War* (1999)**

Environment includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

**-Section 2 (d) of the Civil Liability for Nuclear Damage Act, 2010 and Section 2 (a) of the Environment (Protection) Act, 1986**

### **1. Introduction**

In China, the very first statement which is taught to students is that the nature of human beings is originally and fundamentally good.<sup>2</sup> The quest for comprehensive justice and security is in fact a quest for the peace in the ecological space inhabited by the human beings and non-human beings. The propensity to monetize natural capital at the cost of denuding and depleting the principal amount, the natural capital is threatening security and peace.

Kung Sun Lung, the leader of the ancient School of Names in the Chinese philosophy, proposed "to rectify the relationship between names and facts in order to transform the world"<sup>3</sup> because every statesman says his/her country wants only peace and security, but in fact, when he/she is talking about peace and security, he/she is most often preparing for war against his/her own species and the very substratum of existence. Such wrong relationship between word/name and fact/meaning must be rectified.

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<sup>1</sup> James Legge (1895). *The Chinese Classics*, Oxford University Press, New York, p. 405

<sup>2</sup> Fung Yu'Lan (1958). *A Short History of Chinese Philosophy*, The MacMillan Company, New York, p. 24

<sup>3</sup> Ibid, p.33

Echoing the voice of the 17th century, amid bloody conflicts in Europe, Thomas Hobbes, the English political philosopher used the word “peace” on 130 occasions and the word “security” 26 times in *Leviathan*, the 600-pages long book. Underlining its significance, Hobbes refers to perpetual security and perpetual tranquility as well. In fact, according to him, the State, an artificial creation of humans was established to provide citizens with a life free from fear and with a sense of security. For Hobbes, seeking peace appeared to be the same as seeking security. He wrote, “As it is necessary for all men that seek peace to lay down certain Rights of Nature; that is to say, not to have liberty to do all they list, so is it necessary for man’s life to retain some: as right to govern their own bodies; enjoy air, water, motion, ways to go from place to place; and all things else without which a man cannot live, or not live well.”<sup>4</sup> The very purpose of human obedience to the State is self-preservation, or security.<sup>5</sup> The duty of obedience ceases when the State pursues the path of death of its citizens, instead of preservation of life and the basis of the existence of human and non-human beings.

After Hobbes had underlined that the State is an artificial creation, Karl Marx recognized in his *The German Ideology* (1947) that “the State has become a separate entity, beside and outside civil society....”<sup>6</sup> but according to him, although State coordinates the interests of dominant class, the State itself has some autonomy beyond the interests of dominant classes.

Gustav Radbruch, the author of *Rechtsphilosophie-The Philosophy of Law* (1932) held that the idea of law may only be justice “in the collective consciousness of the nation which embraces the individuals and joins the generations.” But the State, which is empowered by the recognition of citizens serves a decisive role when it “lays down what is to be legal”.<sup>7</sup> This provides space for acts which are done in the name of the State.

Like in the earlier phases, in the current phase of world history, the difference between war and peace does not appear quite clear-cut.<sup>8</sup> As a consequence, the apparent peace initiatives and the words of the proponents of these efforts do not appear credible and trustworthy. The destruction of authentic relation between a word and its meaning and between fact and fiction creates irreality. The “creation of irreality” is the darkest art.<sup>9</sup> During times of insecurity, word-meaning distinction and reality-irreality distinction becomes a casualty.

Security and peace are about securing and protecting all across all the classes and their ecosystem, which State alone can ensure. Security means the quality or state of being secure. An autonomous State is expected to ensure comprehensive justice and security. Security includes prevention i.e. stop threat from arising, interdiction or prohibition i.e. keeping threat at bay if it manifests, defence i.e. when threat cannot be kept at bay,

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<sup>4</sup> Thomas Hobbes (1909). *Leviathan or the Matter, Forme, & Power of a Common-wealth Ecclesiasticall and Civill*, Oxford University Press, p.154

<sup>5</sup> Ibid

<sup>6</sup> Karl Marx et al (1947). *The German Ideology*, International Publishers Co., Inc., USA, p. 51

<sup>7</sup> Heather Leawoods, ((2000). Gustav Radbruch: An Extraordinary Legal Philosopher, Volume 2 Re-Engineering Patent Law: The Challenge of New Technologies, *Washington University Journal of Law & Policy*, [https://openscholarship.wustl.edu/law\\_journal\\_law\\_policy/vol2/iss1/16](https://openscholarship.wustl.edu/law_journal_law_policy/vol2/iss1/16) accessed on september 30, 2025

<sup>8</sup> Eric Hobsbawm, (2007). *Globalization, Democracy and Terrorism*, Little, Brown & Co., London p. 19

<sup>9</sup> Edward Snowden (2019). Preface, *Permanent Record*, Macmillan, UK. p.5

resilience i.e. saving that which is under the threat and recovery i.e. restoring what came under threat after the harm.<sup>10</sup> Amartya Sen has expressed his circumspection about human security approach because it is “far too upbeat to focus on rearguard actions needed to secure what must be safeguarded”, although “the notions of human security becomes particularly relevant”<sup>11</sup> in situations of crisis, like war and conflict including natural resource conflicts and water related conflicts.

## 2. Diverse Notions of Water Justice and Security

A comparative approach to justice which permits "systematic room for incompleteness" and identifies, adopts and rejects options, based on the superiority and inferiority of multiple principles and considerations.<sup>12</sup> The concept of justice is pluralistic in that there are several distinct considerations that determine what is just.<sup>13</sup> The conception about justice and rights cannot be detached from notions about the secure life and common good. There can be different conceptions of justice, rights, secure life and common good beyond privatized notions of justice and good life. “Justice is not only about right way to distribute things. It is also about the right way to value things”,<sup>14</sup> like secure and peaceful life. It is linked to the politics of the common good like shared sense of comprehensive security.

In ancient Greek philosophy, the term *Dikaiosune* was used to mean justice which is related to the word morality in its general sense and enforcement of law or ‘lawfulness’ in a particular sense. Disputing the contention of the sophists like Thrasymachus, who say, “justice is the benefit of the strong”, Socrates is cited in Plato’s *The Republic* as saying, “Justice is a virtue of the human soul and injustice is vice, the just man will have a good life and the unjust man will have a bad one”.<sup>15</sup> Justice is one of the characteristics of a good society. It is one of the many aspects of morality.<sup>16</sup>

The literature survey on justice provides an insight into different conceptions of justice and presents a contrast between conservative and ideal justice, i.e. render each his/her due through justice under existing laws, rules and legitimate expectations and justice by providing what is due under ideal principles of equality. There is a contrast between corrective and distributive justice, i.e. justice under which wrongdoer does not benefit from his/her faulty behaviour. and justice which entails distributing resources according to agreed principles of fairness. There is also a contrast between procedural and substantive justice, i.e. a procedure where there is absence of arbitrary inequality, which if it is followed, a just outcome is guaranteed and substantive justice which entails presumption of equality as envisaged by likes of Kung Sun Lung. The conception of justice as reciprocity, which lies between impartiality and mutual benefit in the present and in the future assumes solidarity based on shared consciousness of peace and security.

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<sup>10</sup> David A. Welch (2022). *Security: a philosophical investigation*, Cambridge University Press.

<sup>11</sup> Sabina Alkire (2010). Development: “a misconceived theory can kill” in Christopher Morris, Ed. *Amartya Sen: Contemporary Philosophy in Focus*. Cambridge University Press, New York, p.198-199

<sup>12</sup> Ibid

<sup>13</sup> Amartya Sen (1992). *Inequality Re-examined*, Harvard University Press, Cambridge, MA

<sup>14</sup> Michael J. Sandel (2009). *Justice: What’s the Right Thing to Do*, Penguin Books, London, p. 261

<sup>15</sup> Stanley Rosen (2005). *Plato’s Republic: A Study*, Yale University Press, p.39, 59

<sup>16</sup> A. Buchanan et al (1986). Philosophy and Justice. In: Cohen, R.L. (eds) *Justice. Critical Issues in Social Justice*. Springer, Boston, MA

In his *The Theory of Justice* (1971), John Rawls attempted to generalize the traditional theory of the social contract as represented by Locke, Rousseau, and Kant to offer a superior alternative and systematic account of justice to the dominant utilitarian justice. Somewhat akin to Krishna's position in *Geeta*, Rawls adopts Kantian theory of justice which is contractarian and deontological, i.e. whatever is morally forbidden cannot be accepted/acted upon, irrespective of their useful consequences, unlike consequentialists like Arjuna in *Mahabharata* who determines the worth of any action by seeing its consequences. The contractarian conception of justice is based on 'social contract', which refers to an agreement between individuals or parties based on conditional mutual consent. Rawls has presented justice as fairness. He wrote, "Justice is the first virtue of social institutions, as truth is of systems of thought.... laws and institutions no matter how efficient and well-arranged must be reformed or abolished if they are unjust."<sup>17</sup> Truth is the authentic articulation of the Reality and justice is correspondence of action with Reality.

Dedicating his book *The Idea of Justice* to the memory of Rawls, Sen recalled the judgment by Lord Hewart in *Rex vs. Sussex Justices Ex parte McCarthy* [1923] *All ER 233*), wherein he asserted that justice 'should manifestly and undoubtedly be seen to be done'. He endorsed the phrase about the need for justice to be 'seen to be done'. Hewart's foundational principles underline that there is a clear connection between the objectivity of a judgment and its ability to withstand public scrutiny. For Sen "Judgements about justice have to take on board the task of accommodating different kinds of reasons and evaluative concerns."<sup>18</sup> His book establishes that "Justice is an immensely important idea that has moved people in the past and will continue to move people in the future."<sup>19</sup> The conception of water justice is central to myriad aspects of justice, which is pluralistic.

The Brasília Declaration on Water Justice adopted during the 8th World Water Forum in Brazil by judges worldwide seeks application of environmental law principles in water management for water justice assumes significance<sup>20</sup> The ten principles of the Declaration includes water as a public interest good, water justice, land use, and the ecological function of property, indigenous and tribal peoples and mountain and other peoples in watersheds, polluter pays, user pays and internalisation of external environmental costs, good water governance, environmental integration and procedural water justice. The Brasília Declaration is significant because water insecurity and injustice is not natural.

The questions regarding water security are questions about securing and protecting water, land, food, biodiversity and ecosystem from multiple threats at different stages of harm. Unless vulnerable water systems are protected there can be no water security. It is about securing the natural capital, the substratum of existence of for the present and future generations of human beings and non-human beings. A minuscule amount of the total water on our planet (0.03%) is available as liquid freshwater at or near the land surface.

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<sup>17</sup> John Rawls (1971). *A Theory of Justice*, Harvard University Press, Cambridge, p.3

<sup>18</sup> Amartya Sen (2009). *The Idea of Justice*, Harvard University Press, Cambridge, Massachusetts, p.393-395

<sup>19</sup> Ibid, p.401

<sup>20</sup> (2018). Brasília Declaration on Water Justice, March 21, <https://iucn.org/our-union/commissions/world-commission-environmental-law/our-work/history/foundational-documents-0>

Both water availability and quality of water are inherently linked because depletion in water flow leads to deterioration of water quality. In fact, water cycle and life cycle are inseparable. One in ten persons lacks access to safe drinking water, yet water use and consequent demand increases by approximately 1% every year, primarily driven by unsustainable production and consumption patterns.<sup>21</sup> At present, half of the global population experiences severe water scarcity for at least part of the year.

The “nexus” between water, food and energy is one of the most fundamental relationships. Ecosystem services, forests and wetlands have a crucial role in the water cycle and influence availability and quality of water. The daily requirement of every human being is 20-50 litres of clean water, free from harmful chemical and microbial contaminants, for drinking, cooking and hygiene purposes. Agriculture accounts for 65-70% of global water use.<sup>22</sup> Food, industry and modern-day data centres require water for their production.

UN Convention on Law of the Non-Navigational Uses of International Watercourses came into force in August 2014 after the ratification by 36 countries. None of the countries in the Himalayan watershed have ratified it because of Article 7 of the Convention which requires that States “take all appropriate measures to prevent the causing of significant harm” to other States sharing an international watercourse in the upstream and downstream. The interests of upstream and downstream States do not seem to converge as far as exploitation of the water is concerned. The definition of the watercourse in the Convention is quite parochial; there is a need to amend it in the face of nuclear threats to water security.

The idea of water grid by linking rivers was rejected by Prof. S. R. Hashim headed National Commission on Integrated Water Resources Development Plan in 1999. But it too re-birth because of Supreme Court’s orders in 2003 and 2012. The proposal of diversion of some 39 rivers for Interlinking of Rivers (ILR) project, the world’s biggest project is likely to give birth to water security issues because “international watercourses” like Ganga, Kosi, Mechi and Brahmaputra are involved. It can adversely impact relations with Nepal, Bangladesh and China. Under Indo-Bangladesh treaty on sharing of Ganga waters, Ganga is deemed a deficit river but as part of the ILR project it is presented as a surplus river by National Water Development Agency (NWDA), an agency whose only mandate is to link major Himalayan rivers and Peninsular rivers at any environmental and human cost. The economic rationality of ILR like projects is contrary to water cycle and biological cycle because NWDA holds that there are “surplus” rivers, “deficit” rivers and water which goes o the sea is wasted. This assumption is unscientific and contrary to folk wisdom. It treats rivers as pipelines which can be twisted, mutilated and diverted for the ILR project. The project entails re-writing the geography of the Himalayan watershed. It is apparent that it is caught in a time warp. It ignores the fact that Himalayan rivers are unpredictable. This pre-climate crisis era project does not factor in greenhouse gas emissions due to colossal land use change. The project is unfolding despite opposition, giving birth to water security concerns.

The promotion of contradictory and inconsistent projects wherein they consider river water quality improvement projects in the Himalayan rivers to be different from water quantity projects like dams does not recognise that when the flow of water in the river is

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<sup>21</sup> UN (2019). World Water Development Report

<sup>22</sup> Secretariat of the Convention on Biological Diversity (2013). Water and Biodiversity – Natural Solutions for Water Security. Montreal

depleted, water quality deteriorates. Such projects are a threat to water security. This situation can lead either to violent conflicts or lasting peace, in order to secure water for all.

### **3. Nuclear water footprints: Himalayan ecosystem in global context**

Himalayan ecosystem is the region encompassing the large, young mountain ranges of Asia—the Karakoram, Himalayan, and Hindu Kush—which run from Afghanistan through Pakistan and India to China along with the Tibetan Plateau and the Indian subcontinent, which are separated by these mountain ranges and which depend on water flowing from them. The 60-page long Indian document entitled National Mission for Sustaining Himalayan Ecosystems refers to “water” on eighteen occasions. The 56-page long Mission Document of National Mission for Sustaining Himalayan Ecosystem mentioned “water security” in the context of water-stress in the region, with the drying up or blockage of many water sources and natural springs. The 65-page long revised National Water Mission document refers to “water security” for the shared purpose of promoting water security for all and in order to devise a strategy to promote water security in areas identified as vulnerable which should be implemented in ways that promote multi-disciplinary and cross sectoral partnerships across various users of water resources. But these mission documents and studies have remained confined to the ecological security in the Indian Himalayan Region as if non-Indian Himalayan Region is none of its concern. The study on Ganga river basin adopted a similar approach by ignoring non-Indian areas of the basin.

In this backdrop, it is germane to note that there is an inherent relationship between the India’s Environment (Protection) Act, 1986 and the Civil Liability for Nuclear Damage Act, 2010. The latter states that “environment” shall have the same meaning as assigned to it in the former.<sup>23</sup> The word “environment” includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.<sup>24</sup> The “environmental pollutant” means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment.<sup>25</sup> Land and water co-exist but the colonial narrative separated land and water because it was concerned primarily with revenue from the land. Food is virtual water. It is water embedded in the food and in the food production process. Water exists in river basins, watersheds, atmosphere, ocean and underground. Land erosion is linked to water flow and deforestation.

The simile of water flow for data flow for creating data grid and water grid is reminiscent of Marx’s observation regarding capitalism’s tendency towards centralisation, which ultimately overpowers the centrifugal forces of competition. Digitalisation and centralisation of data seem to entail colonisation of the ecological space and human space.

Water footprint is an indicator to evaluate water resources utilisation relative to human consumption. It is defined as the volume of water required for the production of the goods and services consumed by the inhabitants. Water footprint of a product is regarded as the volume of freshwater used to produce the certain product, measured at the place where the product was virtually produced. It refers to the total volume of direct and indirect fresh water used, consumed, and/or polluted. It usually consists of green

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<sup>23</sup> Section 2 (d), The Civil Liability for Nuclear Damage Act 2010

<sup>24</sup> Section 2 (a), The Environment (Protection) Act, 1986

<sup>25</sup> Section 2 (b), Ibid.

water footprint i.e. rainwater that does not run-off or recharge the groundwater), blue water footprint i.e. irrigation water withdrawn from ground or surface water and grey water footprint i.e. the volume of freshwater that is required to assimilate the load of pollutants. The bottom-up and top-down approaches are two principal methods applied to water footprint accounting.<sup>26</sup>

The global population is expected grow to around 8.5 billion in 2030 and 9.7 billion in 2050.<sup>27</sup> The Himalayan region is the site of water-security related concerns of almost half the world's population. It is the site of the scarcity of rainfall, dependence on agriculture, ambit of mega projects and vulnerability to environmental change. Besides the rainfall glaciers and snowmelts feed the Himalayan rivers. Himalayan geography is getting rewritten and replumbed through a series of mega infrastructure projects. This fragmented approach about the Himalayan ecosystem is resulting in ecocide, which is likely to make the region water insecure.

The question of the impact of nuclear reactors and radioactive waste on water in the Himalayan ecosystem and human habitation assumes significance because the consequences of nuclear and radiological incidents from nuclear sites are likely to have wider impact not only on human beings but also on crops, arable land/soil, bovine animals and other livestock, environment including land, water and biosphere, food and food products stored in godown. The availability of safe water in the Himalayan ecosystem is a matter of life and death. It has been acknowledged in a parliamentary report that any nuclear incident may induce radioactive contamination in surface, ground water bodies, and other water resources. It has also recognized that nuclear incident could cause environmental damage, which creates a need for an assessment of the cost of measures for any remediation which will be required for the environment impaired due to nuclear incident.<sup>28</sup>

The non-existence of preparation to meet an eventuality that may arise out of nuclear and radiological emergencies has been recorded in the Indian parliamentary report. It has recorded that disaster management structure in the country is not well tailored in meeting radiological fall out and even educated section of the people is not well aware about the implications of a serious nuclear disaster. As a consequence of a nuclear disaster of the Chernobyl type, it is quite possible that agricultural crops around 30 to 100 kms. from the site of the incident could be wiped out total. This may affect seriously the biodiversity of the crops in the radiation area and the farmer may lose their traditional variety of crops. It is also mentioned that the National Bureau of Plant Genetic Resources and Gene Bank in the country which is keeping a sample of each variety of crops ought to preserve these varieties which could be planted for further production if a variety of crops is entirely lost due to radiological emergency.<sup>29</sup>

Some 1.5 billion people depend on the water resources of the Himalayan ecosystem. Water availability and water quality is critical for agriculture, industry, security and peace.

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<sup>26</sup> Yue Zhang et al (2017), Mapping of water footprint research: A bibliometric analysis during 2006–2015, *Journal of Cleaner Production*, Volume 149, April 15, p. 70-79

<sup>27</sup> United Nations (2022). United Nations Sustainable Development Goals. United Nations, 2022.<https://www.un.org/sustainabledevelopment/> accessed on September 15, 2025

<sup>28</sup> Two Hundred Twelfth Report on 'The Civil Liability for Nuclear Damage Bill, 2010' (2010), Parliamentary Standing Committee on Science & Technology, Environment & Forests, August 18, p. 12-15

<sup>29</sup> Ibid

The indiscriminate exploitation of the Himalayan watershed is causing water stress. The decline in supply of water measured on a per capita, or per hectare of arable land, basis and then compared with a global average or with local and projected demand indicates water stress.

Glacial retreat is making Himalayan ecosystem including sources of surface water and groundwater vulnerable amid plans for hundreds of new dams in the Himalayan watershed, the increasing role of civilian and non-civilian nuclear facilities and their co-existence with floods from glacial lakes.

The disasters in the Himalayas show that water has memory. It never forgets its course but people, economists and technocrats remain deaf to the message from the rivers. The solution lies in adopting genuine watershed and river basin-based approach beyond parochial anthropocentric nation-state framework, which normalises and naturalises financialization and monetisation of natural wealth. This situation makes a case for undertaking water footprint assessment of the population in the Himalayan ecosystem in particular and the global population in general in order to situate the water consumption needs of civilian and non-civilian nuclear facilities.

#### **4. Implications of UN Treaty on Prohibition of Nuclear Weapons for Himalayan region**

As of January 2025, there are around 12,241 nuclear weapons in the world with all the nine nuclear-weapon owning states—the USA, Russia, the UK, France, China, India, Pakistan, the North Korea and Israel. In the context of Himalayan nuclear ecosystem, the question of water security has assumed huge significance because three nuclear weapon owning countries have 950 nuclear weapons, 84 nuclear reactors and 9 nuclear reactors are under construction.

The UN Treaty on the Prohibition of Nuclear Weapons (TPNW) entered into force on January 22, 2021. At present, the treaty has 95 signatories and 74 parties. The continued existence of nuclear weapons, including from any nuclear-weapon detonation by accident, miscalculation or design is a threat to the security of all humanity, and that all States share the responsibility to prevent any use of nuclear weapons. The imperative for nuclear disarmament and the urgency of achieving and maintaining a nuclear-weapon-free world, which is a global public good of the highest order, serves both national and collective security interests. The unacceptable suffering and harm caused to the victims of the use of nuclear weapons (*hibakusha*), as well as of those affected by the testing of nuclear weapons make it crystal clear that any use of nuclear weapons is contrary to the rules of international law applicable in armed conflict, in particular the principles and rules of international humanitarian law.<sup>30</sup>

Article 1 of the treaty deals with “Prohibitions”. It reads: “1. Each State Party undertakes never under any circumstances to: (a) Develop, test, produce, manufacture, otherwise acquire, possess or stockpile nuclear weapons or other nuclear explosive devices; (b) Transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly or indirectly; (c) Receive the transfer of or control over nuclear weapons or other nuclear explosive devices directly or

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<sup>30</sup> UN Treaty on the Prohibition of Nuclear Weapons, (2017).  
[https://treaties.un.org/doc/Treaties/2017/07/20170707%2003-42%20PM/Ch\\_XXVI\\_9.pdf](https://treaties.un.org/doc/Treaties/2017/07/20170707%2003-42%20PM/Ch_XXVI_9.pdf)  
accessed on September 15, 2025

indirectly; (d) Use or threaten to use nuclear weapons or other nuclear explosive devices; (e) Assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Treaty; (f) Seek or receive any assistance, in any way, from anyone to engage in any activity prohibited to a State Party under this Treaty; (g) Allow any stationing, installation or deployment of any nuclear weapons or other nuclear explosive devices in its territory or at any place under its jurisdiction or control.”<sup>31</sup>

The treaty takes cognizance of the catastrophic consequences of nuclear weapons. These consequences transcend national borders and pose grave implications for the environment, food security and human survival, and the health of current and future generations as a result of radioactive radiation.<sup>32</sup>

According to Stockholm International Peace Research Institute (SIPRI), Government of China’s nuclear arsenal increased from 500 warheads in January 2024 to up to 600 in January 2025. Government of India is estimated to have a stockpile of about 180 nuclear weapons as of January 2025. Government of Pakistan has around 170 nuclear warheads as of January 2025.

Like the other six nuclear weapon owning governments, these three governments too continue to produce nuclear arsenals<sup>33</sup> disregarding the UN treaty, which they have not ratified as yet. As and when these governments ratify the UN treaty, they would be under obligation to comply with the UN Treaty on the Prohibition of Nuclear Weapons, which entails decommissioning and abandoning of their nuclear weapons.

## **5. Decoding Resolutions, Agreements and Legislations on Nuclear Water Issues**

In the aftermath of the UN General Assembly’s first resolution dated January 24, 1946, to deal with the problems raised by the discovery of atomic energy, the UN Atomic Energy Commission was established to ‘control of atomic energy to ensure its use only for peaceful purposes,’ and ‘the elimination from national armaments of atomic weapons and all other major weapons adaptable to mass destruction.’<sup>34</sup>

Subsequent to the adoption of the UN resolution, India’s Atomic Energy Act, 1948 was enacted to provide for the development and control of atomic energy and for purposes connected with it under Section 2.<sup>35</sup> the Act states that atomic energy means the energy released from atomic nuclei as a result of the process, including the fission process, but does not include energy released in any process of natural transmutation or radioactive decay which is not accelerated or influenced by external means.<sup>36</sup> The minerals and substances used for the production or use of atomic energy or research into connected matters included Uranium, Thorium, Plutonium-Neptunium or Beryllium, Vanadium, Lithium, Ilmenite, Zircon and other minerals containing these minerals as accessory ingredients such as Uraniferous Allanite, Triplite, Columbite and Tantalite as notified in

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<sup>31</sup> Ibid

<sup>32</sup> Op. cit

<sup>33</sup> World nuclear forces, Hans M. Kristensen et al. (2025). *SIPRI Yearbook Online*, Stockholm International Peace Research Institute, Oxford University Press, <https://www.sipri.org/sites/default/files/SIPRIYB25c06.pdf> accessed on September 22, 2025

<sup>34</sup> Establishment of a Commission to Deal with the Problems Raised by the Discovery of Atomic Energy, UN Resolution No. A/RES/1(I), [https://docs.un.org/en/A/RES/1\(I\)](https://docs.un.org/en/A/RES/1(I)) accessed on September 22, 2025

<sup>35</sup> Section 2, The Atomic Energy Act, 1948

<sup>36</sup> Section 3, Ibid

the Gazette of India, 1950. The list of industries reserved for manufacture of items exclusively in the public sector under the Schedule I to Atomic Energy (Control of production and use) Order, 1953 specified atomic energy and minerals specified in it. These provisions make no reference to the impact of mining these minerals on the ecosystem and the ground water and surface water sources.

Section 18 of the Atomic Energy Act, 1962 had imposed a restriction on disclosure of information relating to plant. In fact, the Atomic Energy Act, 1948 Act, the pre-constitution law too had imposed restriction on disclosure of information regarding deleterious impact on public health, environmental pollution, nuclear damage, mass destruction, radioactive waste or adverse impact on water. But the 1962 law stated that “the disclosure of information with respect to any plant of a type in use for purposes other than the production, development or use of atomic energy, unless the information disclose that plant of that type is used or proposed to be used for the production, development or use of atomic energy or research into any matters connected therewith” was permitted.<sup>37</sup> It is noteworthy that the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025 has repealed the Atomic Energy Act, 1962 has been repealed.<sup>38</sup> Unlike its predecessor, the new law imposes blanket ban on disclosure of information. It categorically states that "the information declared as restricted information or prohibited under this section shall be debarred from disclosure under the provisions of the Right to Information Act, 2005."<sup>39</sup>

Water is at the core of all the nuclear projects. It also found reference in Rule 4 of the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 framed under the now repealed Atomic Energy Act, 1962. It required that the application for authorisation to dispose of radioactive waste must indicate the locations of buildings, producing the radioactive waste and the buildings for its conditioning, packaging and ultimate disposal, the points of discharge of radioactive effluents into the environment and the nature of occupancies and land utilisation in the neighbourhood of the above buildings and water resources of the above land and their utilisation. Radioactive waste means any waste material containing radionuclides in prescribed quantities or concentrations.<sup>40</sup> Under the Civil Liability for Nuclear Damage (CNLD) Act, 2010, radioactive products or waste was defined as any radioactive material produced in, or any material made radioactive by exposure to, the radiation incidental to the production or utilisation of nuclear fuel, but does not include radioisotopes which have reached the final stage of fabrication so as to be usable for any scientific, medical, agricultural, commercial or industrial purpose.<sup>41</sup> The Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025 has repealed the CNLD Act.<sup>42</sup> The new law mentions “water” on 9 occasions and “waste” on 15 occasions.

Rule 6 of the 1987 Rules required data on environmental surveillance based on analysis of ground water, soil samples and air samples. Rule 15 (2) of the Rules, makes a provision for disposal of liquid radioactive waste and solid radioactive by release into

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<sup>37</sup> Section 18 (3) (i), The Atomic Energy Act, 1962

<sup>38</sup> Section 91 (1), The Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025

<sup>39</sup> Section 39 (4), Ibid

<sup>40</sup> Section 2 (xxii), Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987

<sup>41</sup> Section 2 (p), The Civil Liability for Nuclear Damage Act, 2010

<sup>42</sup> Section 91 (1), The Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025

Sanitary Sewerage system and by burial into pits prepared in an exclusive burial ground respectively by an authorised person. The word “person” includes, any individual, corporation, association of persons whether incorporated or not, partnership, estate, trust, private or public institution, group, government agency, or any state or any political sub-division thereof or any political entity within state, any foreign government or nation or any political sub-division of any such government or nation or other entity and any legal successor, representative or agent of each of the foregoing. These provisions indicate the vulnerability of water sources which co-exist with land/soil from the cumulative load of radioactive waste from different sources. The new law mentions “environment” on 21 occasions, which includes environmental surveillance.

Notably, ahead of the news reporting regarding the possible entry of private entities like Reliance Industries, Adani Power Limited, Jindal Power and Steel Limited, Tata Power Limited, Hindalco Industries Limited and JSW Energy Limited in the atomic energy sector, and prior to the SHANTI Act, 2025, the Atomic Energy (Amendment) Act, 2015 was enacted to redefine Government company, which alone could be atomic energy sector under the 1962 Act. While introducing, the Atomic Energy (Amendment) Bill, 2015, the Union Minister of State in the Department of Atomic Energy had stated that the Atomic Energy Act of 1962 debarred any kind of a joint venture with private companies. The minister informed the parliament that the purpose of the present amendment is to provide an enabling legal basis for the Nuclear Power Corporation of India Ltd. to form a joint venture with other Government units and PSUs for nuclear power generation. The need for this has arisen to meet the immediate requirement of equity infusion to augment country's nuclear power generation capacity. Therefore, the amendment would enable the Central Government to licence the joint venture companies. It is because they also have to obtain the licence from the Government. The Government is not entering into any kind of a joint venture of a joint mechanism in the private company. But the amendment enables the Central Government to take measures for safe operation of these nuclear plants and ensure disposal of nuclear material in the event a company licensed under the Act ceases to be a Government company. This amendment paved the way for the entry of private companies.<sup>43</sup> As a consequence of the amendment, the government company meant a company in which not less than fifty-one per cent of the paid-up share capital is held by the Central Government; or the whole of the paid-up share capital is held by one or more of the companies and which, by its articles of association, empowers the Central Government to constitute and reconstitute its Board of Directors. It is significant that the 2015 amendment Act stated: “...Central Government shall take such measures for safe operation of the plant and disposal of nuclear material so vested in it, as may be necessary in accordance with the provisions of section 3” of the 1962 Act which deal with the general powers of the union government.<sup>44</sup>

In its preamble, the SHANTI Act, 2025 states that it has been enacted “to harness the potential of nuclear energy through active involvement of both public and private sectors.”

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<sup>43</sup> Title : Introduction of the Atomic Energy (Amendment) Bill, 2015, by Dr. Jitendra Singh, Union Minister of State in the Department of Atomic Energy, <https://eparlib.sansad.in/bitstream/123456789/751371/1/6347.pdf> accessed on September 24, 2025

<sup>44</sup> Atomic Energy (Amendment) Act, 2015

It is essential for effective preventive policy interventions to factor in water footprint of civilian and non-civilian nuclear activities to ensure comprehensive water security of human and non-human beings beyond anthropocentric narrative around it.

## 6. Need for a UN treaty on Prohibition of Nuclear Reactors

The seeds of UN treaty on Prohibition of Nuclear Reactors are present in the UN General Assembly's resolution of 1946 like the seeds for UN Treaty on Prohibition of Nuclear Weapons. The resolution dealt with the problems raised by the discovery of atomic energy and aimed to "control of atomic energy to ensure its use only for peaceful purposes" and to eliminate "national armaments of atomic weapons and all other major weapons adaptable to mass destruction."

Like the 1962 Act, the new law states that "radiation" means gamma rays, X-rays, and rays consisting of alpha particles, beta particles, neutrons, protons and other nuclear and sub-atomic particles and "radioactive substance" or "radioactive material" means any substance or material which spontaneously emits radiation in excess of the prescribed levels.<sup>45</sup> Unlike the previous 1948 Act, under the 1962 Act, the union government empowered to produce, develop, use and dispose of atomic energy either by itself or through any authority or corporation established by it or a government company and carry out research into any connected matters, to manufacture or otherwise produce any prescribed or radioactive substance and any articles which in its opinion are, or are likely to be, required for, or in connection with, the production, development or use of atomic energy and to dispose of such radioactive substance or any articles manufactured or produced. It is also empowered to declare as "prohibited area" any area or premises where work including research, design or development is carried on in respect of the production, treatment, use, application or disposal of atomic energy or of any prescribed substance, to provide for control over radioactive substances or radiation generating plant in order to prevent radiation hazards; secure public safety and safety of persons handling radioactive substances or radiation generating plant; and ensure safe disposal of radioactive wastes.<sup>46</sup> The new law retains these provisions. Quite like the the 1962 Act, the new law empowers the union government for compulsory acquisition of rights to work minerals i.e. to undertake mining, getting, carrying away, transporting, sorting, extracting or treating of minerals including the "rights to obtain a supply of water for any of the purposes connected with the working of the minerals aforesaid, or to dispose of water or other liquid matter obtained in consequence of working such minerals."<sup>47</sup>

In the aftermath of the enactment of SHANTI Act, 2025, Holtec, a US Small Modular Reactor (SMR) supplier which started by storing nuclear waste and moved on to decommissioning and dismantling nuclear plants, and then into the storage of radioactive material after dismantling the plants is likely to supply a US-made SMR to India, with the US having granted export clearance for a nuclear reactor to India has no experience in designing and manufacturing nuclear plants of any size. The founder of the supplier has a Himalayan connection.<sup>48</sup> A study published in the *Proceedings of the National Academy of Sciences (PNAS)* provides a comprehensive analysis of the nuclear waste generated by SMRs. The study concluded that most recent SMR designs will increase the volume and

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<sup>45</sup> Section 2 (h) and (i), The Atomic Energy Act, 1962

<sup>46</sup> Section 3, Ibid

<sup>47</sup> Section 10 (1) (e), The Atomic Energy Act, 1962

<sup>48</sup> KP Singh, its founder was born in Patna, earned his BE in Dhanbad, and his PhD from the University of Pennsylvania.

complexity of nuclear waste requiring management and disposal when compared to existing gigawatt-scale light water reactors.<sup>49</sup> The issue of “water” and waste remain relevant even in the case of compulsory acquisition for mining, treating and for disposing water or other radioactivity laden liquid matter.

India, China and Pakistan are the three countries out of the thirty-two countries which developed civil nuclear energy programmes since the birth of nuclear technology in 1942 during the second world war. A significant number of these programmes have encountered nuclear damage, accidents, incidents and environmental pollution.

According to IAEA, an “accident” is an event that has led to significant consequences to people, the environment or the facility. Examples include lethal effects to individuals, large radioactivity release to the environment, reactor core melt. Events of lesser significance are termed incidents. In safety analyses and the IAEA safety standards, the term ‘accident’ is used much more generally to mean “Any unintended event, including operating errors, equipment failures or other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection or safety”. In the context of the reporting and analysis of events, the word incident is used to describe events that are less severe than accidents.<sup>50</sup> The erstwhile, Indian Civil Liability for Nuclear Damage Act stated that “nuclear damage” means loss of life or personal injury (including immediate and long term health impact) to a person; or loss of, or damage to, property, caused by or arising out of a nuclear incident, and includes costs of measures of reinstatement of impaired environment caused by a nuclear incident, loss of income derived from an economic interest in any use or enjoyment of the environment, incurred as a result of a significant impairment of that environment caused by a nuclear incident, the costs of preventive measures, and further loss or damage caused by such measures and any other economic loss, other than the one caused by impairment of the environment. This definition has been retained in the SHANTI Act. The term “nuclear damage” occurs on 40 occasions in this 44-page long law.

Nuclear incident means any occurrence or series of occurrences having the same origin which causes nuclear damage or, but only with respect to preventive measures, creates a grave and imminent threat of causing such damage. This definition has been retained in the SHANTI Act. The term “nuclear incident” occurs on 32 occasions in the new law.

In China's Taishan Nuclear Power Plant, unit 1, west of the cities of Guangzhou, Shenzhen and Hong Kong in Pearl river delta region of Guangdong province, there was damage and leakage from fuel rod housing in June 2021.<sup>51</sup>

In India, six nuclear accidents have been reported without news about any human casualty. But environmental pollution was not ruled out.

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<sup>49</sup> Lindsay M. Krall, Allison M. Macfarlane and Rodney C. Ewing, Nuclear waste from small modular reactors, *Proceedings of the National Academy of Sciences* (PNAS), May 31, 2022, <https://doi.org/10.1073/pnas.2111833119> accessed on February 20, 2026

<sup>50</sup> (2009). INES: The International Nuclear and Radiological Event Scale, User's Manual, 2008 Edition, International Atomic Energy Agency, Vienna

<sup>51</sup> Zachary Cohen (2021). US assessing reported leak at Chinese nuclear power facility, *CNN*, June 14, <https://edition.cnn.com/2021/06/14/politics/china-nuclear-reactor-leak-us-monitoring/index.html> accessed on September 24, 2025

On May 4, 1987, there was refuelling accident at Fast Breeder Test Reactor at Madras Atomic Power Station located at Kalpakkam, on the coast of Bay of Bengal at about 80 kilometres south of Chennai, Tamil Nadu. It was designed by Indian government on its own. The ruptures in the reactor core, resulted in a two-year shutdown. In later years, the Environmental Survey Laboratory at Kalpakkam studied atmospheric, terrestrial and aquatic samples for radioactivity to evaluate the impact of operating two pressurised heavy water reactors and has compared the findings with Chernobyl accident period.

On September 10, 1989, there was accident at Tarapur Atomic Power Station, Maharashtra, which was built by General Electric of USA. The operators at the plant detected that the reactor was leaking radioactive iodine at more than 700 times normal levels. Its repair took more than a year. Later, on May 13, 1992, a malfunctioning tube caused the Tarapur Atomic Power Station to release 12 curies of radioactivity.

A paper entitled “Planning and Management Op Environmental Pollution Control at Tarapur Nuclear Power Station Site” by Environmental Survey Laboratory, Boisar, Thana District, Maharashtra had recorded that liquid and gaseous radioactive effluents were discharged to the environment from the station based on measurement and investigation carried out during 1965-1969. In the marine environment the contamination above the base line due to radioactive waste releases from the plant was detected up to 16 km along the shore line on both sides. The land and air radioactive contamination due to station operation was detected. The study found that wide open leafy type of vegetables like spinach, radish leaves had considerable foliar absorption of direct deposited radioactivity but vegetables and fruits with protective covers receive the radioactivity along with the mineral uptake from soil water system. It was found that almost all the activity coming down in rain water was absorbed in the soil column.<sup>52</sup> The results of environmental studies carried out at the Tarapur reactor remain relevant for the other nuclear facilities like fuel reprocessing plant and radioactive waste treatment plants.

On March 31, 1993, the Narora Atomic Power Station, Bulandshahr, Uttar Pradesh in the Ganga river basin faced fire at two of its steam turbine blades, damaging the emergency cabling of the heavy water reactor and almost leading to a core damage. In later years, a glaring omission has come to light. The “Pollution Assessment: River Ganga”, a treatise has been published by Central Pollution Control Board (CPCB), in association with the State Pollution Control Boards of Uttarakhand, Uttar Pradesh, Bihar, and West Bengal based on their monitoring network which quantify water quality of the Ganga and suggests measures for improving the quality, does not refer to pollution caused by Narora Atomic Power Plant. The water quality data collected and collated by CPCB under National Water Quality Monitoring Programme and Assessment of sources of Pollution drew on the collection and collation of data by State Pollution Control Boards of Uttarakhand, Uttar Pradesh, Bihar to provide insight to the contribution of pollution from River Kali and River Ramganga. The treatise records that “The Narora barrage constructed mainly for the water supply to Atomic Power Plant and from this barrage, Lower Ganga Canal system of capacity 9000 cusec was constructed in early eighties. A parallel canal system of 4600 cusec was added later by the state of UP. These three irrigation canal systems divert fresh water from the river for irrigation which affects the flows downstream of Narora particularly up to Allahabad.” It also reveals that “substantial amount of flow, conveyed through a feeder canal originating from the

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<sup>52</sup> I.S. Ehat (1970). Planning and Management of Environmental Pollution Control at Tarapur Nuclear Power Station Site”, Environmental Survey Laboratory, Boisar, Thana District, Maharashtra,

barrage at Kalagarh on the river Ramganga, is introduced into the river Ganga just downstream of Garhmukteshwar to ensure sufficient quantities of water for Narora Atomic Power Plant.”<sup>53</sup>

The treatise mentions the Narora Atomic Power Plant on two occasions but maintains silence about radioactive radiation and waste and related contamination of the river. This silence is quite articulate about the state of pollution load from the nuclear plant. It demonstrates a classic case of adoption of an Ostrich policy under the apparent influence of Department of Atomic Energy and the proponents of nuclear energy.

Like the India’s Narora nuclear power plant, Bangladesh has built a nuclear reactor with Russian assistance at Rooppur in Pabna District on Ganga River, 140 km west of Dhaka, country’ capital. The construction work on the second nuclear power plant has also started in Bangladesh.

On February 2, 1995, there was leakage of radioactive helium and heavy water from the Rajasthan Atomic Power Station, Kota, into the Chamabal river, necessitating its shutdown for two years for repairs. This nuclear plant is located on the left bank of the Chambal river at the Rana Pratap Sagar dam. Rawatbhata nuclear power station, Chittorgarh, near the Maharana Pratap Dam too is on this very river. The Chambal river basin forms the western section of the Ganga river basin.

The workers at Rawatbhata nuclear power plant, a part of the team carrying out maintenance work at nuclear plants across the country to prevent Fukushima-like disaster in future were reportedly exposed to nuclear radiation on June 23, 2012.<sup>54</sup> There was another leakage on July 16 2012 at this very nuclear plant. The unit-4 of the plant was shut down for maintenance when one of the seals in a moderator pump gave away spilling radioactive heavy water outside and exposing four workers.<sup>55</sup>

The water supply for the nuclear plant is always a concern because water is a coolant for reactors. The residents of Ganga river basin appear to be in dark about the vulnerability of the water-catchment area in the Ganga (Padma) river basin.

The frequency and intensity of landslides, cloudbursts, and Glacial Lake Outburst Floods (GLOFs) demonstrate unscientific infrastructure development and catastrophic environmental crisis. The “unscientific infrastructure development”, involves extensive hill-cutting and deforestation, dumping of muck into rivers, disruption of natural springs and aquifers and loss of forest soils critical for carbon sequestration disregards the environmental burden on vulnerable landscapes. A June 2025 study revealed 811 landslide zones along the Char Dham road corridor, predominantly triggered by hill-cutting. The Himalayan ecosystem which supports almost half of world’s population faces grave unprecedented threat from ecosystem destruction and river destabilisation.

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<sup>53</sup> (2013) Pollution Assessment: River Ganga', Central Pollution Control Board (CPCB), (Ministry of Environment and Forests, Government of India, July, p.6-7, <https://cpcb.nic.in/wqm/pollution-assessment-ganga-2013.pdf>

<sup>54</sup> Anupam Chakravartty (2012). Two workers exposed to nuclear radiation at Kota: Health hazards unlikely says Nuclear Power Corporation of India Limited, *Down to Earth*, June 29

<sup>55</sup> Kalyan Ray (2012). Another leak at Rajasthan nuclear plant Accident is second in a month, *Deccan Herald*, July 25, <https://www.deccanherald.com/content/266831/another-leak-rajasthan-nuclear-plant.html> accessed on September 27, 2025

This undermines their water security and food system of the residents of the Himalayan region.

Besides these threats, there are at least four nuclear power plants in the Ganga river basin. There are proposals to build one nuclear plant in Bihar and one more nuclear power plant in Bangladesh. The proposal to build one in Haripur, West Bengal has been shelved due to bitter democratic protest but the proposal is still on the horizon. In reply to a question posed to the Prime Minister who heads the Department of Atomic Energy, Dr. Jitendra Singh, Union Minister of State for Personnel, Public Grievances & Pensions and Prime Minister's Office informed the parliament on March 12, 2025 that the site at Haripur in West Bengal was accorded 'in principle' approval by the Government of India in 2009 for its setting up in cooperation with Russia. The land acquisition for the project has not been initiated by the state government, therefore, the construction of the project has not commenced.<sup>56</sup>

In Pakistan's Karachi nuclear power plant, Sindh, located on the Arabian Sea coast, approximately 18 km east of Karachi heavy water leaked from a feeder pipe to the reactor. The leakage took place during a routine maintenance shut down on October 18, 2011.<sup>57</sup> In general, the nuclear reactors appear to be accident-prone.

*The Fukushima Daiichi Accident*, a five-volume report by the Director General, International Atomic Energy Agency (IAEA) is a document of the 59th IAEA General Conference (2015). It was prepared with assistance from 46 countries including China, India and Pakistan. The report captures the key events that happened before, during and after the accident at the Fukushima Daiichi nuclear power plant (NPP), operated by the Tokyo Electric Power Company (TEPCO).

According to the first volume of the IAEA's report on Fukushima Daiichi accident, which provides the description and context of the accident, on March 11, 2011, Fukushima Daiichi nuclear power plant was "overwhelmed" by the tsunami waves generated by the Great East Japan Earthquake off the Pacific coast of Japan. As a consequence, the primary and backup power systems and equipment, as well as the ultimate heat sink systems and structures, of all six units on the site were flooded. The off-site power loss which occurred before the tsunami due to the earthquake damage to the transmission system, caused the loss of on-site power sources and/or on-site power distribution systems. Units 1–5 of the Fukushima Daiichi plant faced extended station blackout events, which exceeded nine days in Units 1 and 2, and 14 days in Units 3 and 4. The nuclear units were unable to cope with the extended loss of electrical power and plant heat removal, and the reactors of Units 1, 2 and 3 suffered damage as the fuel overheated and melted. The reactor pressure vessels that enclose the reactor cores were eventually breached in those units, and radioactive material escaped from the reactors. The radioactive material confined in the primary containment vessels was further released directly to the environment. The radioactive releases resulted in radiological exposure of the workers at the site and the general public residing in the surrounding

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<sup>56</sup> Dr. Jitendra Singh, (2025). Reply of Union Minister of State for Personnel, Public Grievances & Pensions and Prime Minister's Office, Lok Sabha  
<https://cdnbbsr.s3waas.gov.in/s35b8e4fd39d9786228649a8a8bec4e008/uploads/2025/03/2025032125354266.pdf> accessed on September 28, 2025

<sup>57</sup> Faisal Aziz (2011). Leak at Pakistani nuclear plant, but no damage, *Reuters*, October 20 accessed on September 25, <https://www.reuters.com/article/us-pakistan-nuclear-idUSTRE79J13720111020/>

communities and caused radiological contamination of the environment in those areas. In order to reduce radiation exposures, people within a radius of 20 km of the site and other specified areas, were evacuated, and restrictions were placed on the distribution and consumption of food and drinking water from the area.<sup>58</sup> The report implies that post nuclear accident, the food and water and their sources become insecure.

In the second volume of the report which deals with safety assessment, IAEA claims that “All nuclear accidents result from a failure to maintain one or more of three fundamental safety functions”, as described in IAEA Safety Standards Series on Safety of Nuclear Power Plants Design. These are: control of reactivity; removal of heat from the core and confinement of radioactive material and control of operational discharges, as well as limitation of accidental releases. It has recorded the accident at the Three Mile Island nuclear power plant had occurred owing to the loss of the second safety function, but releases were minimized because the containment successfully prevented any significant radioactive release to the environment. The Chernobyl accident had occurred owing to the loss of the first safety function, and in the case of Fukushima plant, no containment was available, resulting in the core being exposed to the environment and a very large release of radioactive material. The accident at the Fukushima Daiichi plant occurred owing to the loss of the second and third safety functions as a result of an unanticipated severe external event — an earthquake followed by a resultant tsunami of extreme height. The report undertook assessment of the failure to maintain the second and third safety functions at the reactors.<sup>59</sup>

It emerges from the report that accidents in and around nuclear power plant are unexpected, unpredictable and unpreventable. There is no design which can guarantee safety from nuclear power plants. All the pretensions of being surprised in the face disasters, accidents and incidents appear fake because by now the certainty about imminent catastrophe has been established.

The Fundamental Safety Principle of IAEA states: “The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation”. This includes protection of water sources and their allied ecosystem. IAEA’s safety principle 2 states: “An effective legal and governmental framework for safety, including an independent regulatory body, must be established and sustained”.<sup>60</sup> The need for an independent regulatory agency is acknowledged only to be ignored. The fact is that like IAEA, China’s Atomic Energy Authority, Indian Atomic Energy Regulatory Board, and Pakistan Atomic Energy Commission are conflict of interest ridden because these institutions are both the promoters and regulators of nuclear energy. In such a situation, the nuclear energy plants do not have and cannot have independent regulatory body.

The third volume of the report admits that before the accident at the Fukushima Daiichi nuclear power plant, there were separate arrangements were in place for responding to nuclear emergencies and natural disasters at the national and local levels. “These arrangements did not envisage the need to respond to a nuclear emergency and a natural

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<sup>58</sup> (2015). *The Fukushima Daiichi Accident*, Technical Volume 1, Description and Context of the Accident, International Atomic Energy Agency, Vienna

<sup>59</sup> (2015). *Ibid*, Technical Volume 2, Safety Assessment

<sup>60</sup> *Op,cit*, p144

disaster occurring simultaneously” and creating severe environmental and radiological conditions.<sup>61</sup>

The international and national proponents and the regulators of nuclear reactors will have the victims believe that they could not visualise a scenario where nuclear emergencies and natural disasters could occur together, making their watershed and ecological space unfit and insecure for human and non-human habitation.

The fourth volume of the report provides the estimate of the magnitude and form of radioactive releases during the accident at Fukushima nuclear power plant to the atmosphere and directly into the surrounding sea. It captures the movement of the discharged radionuclides through air and water and the eventual deposition of the atmospheric activity on land in Japan and other countries worldwide besides the open oceans. It provides information on releases in the environment, and specifically on non-human beings like animals and plants from the marine, terrestrial and freshwater environment. The report admits that “it is difficult to evaluate the direct release from the site to the ocean during the first few weeks of the accident.”<sup>62</sup>

The radioactive forms of elements are called radionuclides. Radium-226, Cesium-137, and Strontium-90 are examples of radionuclides. Radionuclides (or radioactive materials) are a class of chemicals where the nucleus of the atom is unstable. Human activities, such as operating nuclear power plants can release radionuclides into drinking water. Long-term cumulative exposure to radionuclides in drinking water causes cancer, anaemia, osteoporosis, cataracts, bone growths, kidney disease, liver illness, and immune system impairment.

The fifth volume of the IAEA report states that the Act on Special Measures Concerning the Handling of Radioactive Pollution provides a description of the categories of waste generated during the off-site remediation of areas affected by the nuclear accident. It records the contaminated materials which are categorized by origin and type. Categories include soil, branches and leaves, waste produced by industrial activities, ash from incineration of combustible refuse collected in the municipalities, sewage sludge and sludge from water treatment plants. It also takes note of domestic Waste sludge water and industrial waste sludge water and the secondary waste generated during water treatment.

These findings of the IAEA report are significant because Fukushima has Abukuma river besides fourteen other rivers, such as the Kuji, Ukedo, Odaka, Maeda, Kuma, and Tomioka. In the Abukuma river plain, many tributary rivers meet with the Abukuma river, which runs into the Pacific Ocean. The Uda, Mano, Niida and other rivers also run into the Pacific Ocean. The Tadami river and many tributaries meet the Agano river, which runs to the Sea of Japan. Lake Inawashiro and many small lakes are located in the mountain area on the east side of the basin. A network of 30 sites was set up in 2011 and 2012 to monitor water levels, discharge, and the transport of radionuclides from rivers into the ocean. By now it abundantly clear that direct releases of radionuclides to the ocean also occurred through runoff of contaminated water from the flooded plant, release of low-level waste and drainage of contaminated groundwater. It admitted that radioactive material became attached to suspended sediments and got deposited onto

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<sup>61</sup> (2015). *The Fukushima Daiichi Accident*, Technical Volume 3, Emergency Preparedness and Response, International Atomic Energy Agency, Vienna, p.4

<sup>62</sup> Ibid. Technical Volume 4, Radiological Consequences, p.33

riverbed sediments and plants. The dispersal and deposition of radioactive material migrated through the environment and led to elevated activity concentrations in soil and marine sediments and in plants and animals, including food. It led to additional radiation exposures of residents of the affected areas.<sup>63</sup>

The findings of the IAEA report on Fukushima disaster are reminiscent of the blast which occurred at the No.4 reactor in the Chernobyl Nuclear Power Plant, near Pripjat city in the then Soviet Ukraine on April 26, 1986. The Pripjat River passes through the exclusion zone established around the site. The Pripjat River flows from northwestern Ukraine to its confluence with the Dnieper River, Ukraine's most important river, on which its capital city of Kiev is located. Some 28 million people downstream depend on the Dnieper River for water and food. The city of Pripjat, with a population of 45,000, was completely evacuated after the Chernobyl disaster and is now a ghost town.<sup>64</sup>

Amid concerns regarding material degradation due to neutron irradiation, dynamic stresses, thermal fatigue, creep, corrosion and erosion of most of the structures, systems and components of nuclear power plants, the concern regarding the liquid wastes remain in need of constant attention. The liquid waste originates mainly in Pressurised Heavy Water Reactor (PHWR) at the personnel showers, active laundry, heavy water upgrading plant, reactor building sump, heavy water cleanup rooms, laboratories and decontamination centre as active chemical waste. The liquid waste generated at the plant is collected in tanks at the Liquid Effluent Segregation System, which is located in the service building. Thereafter, the waste is pumped to the Treatment and Disposal System of the Waste Treatment Plant. After treatment of liquid waste, sampling and monitoring is diluted with condenser cooling water/blow down water and discharged to the environment water body through a single point.<sup>65</sup>

In such a backdrop, like the UN treaty on nuclear weapons, pursuant to the UN resolution of 1946, Article 1 of the proposed UN treaty on Prohibition of Nuclear Reactors too will deal with "Prohibitions". Its proposed draft will read: "1. Each State Party undertakes never under any circumstances to: (a) Develop, test, produce, manufacture, otherwise acquire, possess or stockpile nuclear reactors; (b) Transfer to any recipient whatsoever nuclear reactor devices or control over such reactors directly or indirectly; (c) Receive the transfer of or control over nuclear reactors directly or indirectly; (d) Use or threaten to use nuclear reactors; (e) Assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Treaty; (f) Seek or receive any assistance, in any way, from anyone to engage in any activity prohibited to a State Party under this Treaty; (g) Allow any stationing, installation or deployment of any nuclear reactors in its territory or at any place under its jurisdiction or control."

The proponents of UN treaty on Prohibition of Nuclear Reactors recognise that a threat to the security of all humanity, and that all States share the responsibility to prevent it. The unacceptable suffering and harm caused to the victims of the use of nuclear reactors like the ones in Chernobyl and Fukushima make it crystal clear that continued use of

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<sup>63</sup> Ibid. Technical Volume 5, Post-accident Recovery. p.100, 102, 107

<sup>64</sup> (2020). Dredging of river near Chernobyl could spell disaster for 28 million in Ukraine, *Down To Earth*, September 3, <https://www.downtoearth.org.in/pollution/dredging-of-river-near-chernobyl-could-spell-disaster-for-28-million-in-ukraine-73200> accessed on September 25, 2025

<sup>65</sup> Tanvi Jayaraman (2016). Rajasthan Atomic Power Station I and II: History, Structure, and Impact, submitted at Stanford University, March 5, <http://large.stanford.edu/courses/2016/ph241/jayaraman1/>

nuclear reactors is contrary to the international principles like precautionary principle and inter-generational equity and rules of international humanitarian law. The nuclear disasters, accidents, incidents and ghost towns create a compelling need for an international law to phase out nuclear reactors to prevent imminent ecocide.

## Conclusion

In a significant development, India's senior most political leaders like Dr. Murali Manohar Joshi and Dr. Karan Singh, civil society representatives and scientists have appealed to the Chief Justice of India to review the Supreme Court's controversial judgment dated December 14, 2021 which upheld the road widening under the Char Dham Pariyojana in the ecologically fragile Himalayan region amid recurring and escalating natural disasters across the Himalayan region—including the Kedarnath Tragedy (2013), Glacial Avalanche – Rishi Ganga (2021), Chamoli Glacier Burst (2021), Himachal Pradesh Floods (2023) and Dharali Mudslide and Avalanche (2025), cloudbursts in Rudraprayag, and landslides in Uttarakhand, Himachal Pradesh and Jammu & Kashmir. The letter appealed to the Chief Justice of India to conserve the Himalaya in the context of the "existential crisis" in the state of Himachal Pradesh but the situation is similarly precarious and critical all over the western Himalaya including Jammu & Kashmir. The impact on these areas has far reaching consequences downstream and if the course is not corrected now, the entire nation will bear the brunt. They have sought review of Court's judgement in the matter of Chardham Pariyojana which permits an unsuitable road design in the highways feeding to the border areas in the Himalayan terrain. "This judgement, if not reviewed will lead to irreparable and immediate impact in the Bhagirathi Eco sensitive zone (BESZ) which is the origin valley of the National River Ganga and is also the site of the recent Dharali disaster."<sup>66</sup> Neither the letter nor the judgement factor in the vulnerability of the Himalayan watershed from the nuclear power plants in the region.

So far, the only comprehensive study of the Himalayan river basins has been undertaken by China and India with regard to Mekong and Ganga basins. But their study is confined to 24 % and 79 % of the region respectively which comes under their national boundaries. Like Ganga, China's Mekong River rises in the Himalayas, flowing for 4,763 km through China, where it is known as the Lancang River, Myanmar, Lao PDR, Thailand, Cambodia and into the sea from Viet Nam. India's river basin approach remained confined to only 79% of Ganga basin, which is in India. It did not include 13 % of Ganga basin that is in Nepal, 4 % in Bangladesh and 4 % in Tibet, China. The question as to how does Ganga river basin approach affect the policies of industry, power, agriculture, urban development, health and environment by the Himalayan governments remains unaddressed. The Mekong Agreement of 1995 for cooperation among all basin countries and stakeholders had made a case for a whole-of-basin approach. The Mekong-Ganga Cooperation between India and five Association of Southeast Asian Nations (ASEAN), namely, Thailand, Vietnam, Laos PDR, Cambodia and Myanmar cannot be deemed a whole river basin approach in the absence of China. With regard to Ganga too, there is no such agreement embracing all the basin countries as yet. There are an estimated 167 hydro power plants in the Mekong basin and 39 hydro-electric projects in the Ganga basin. A river basin is the catchment area or

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<sup>66</sup> (2025). Joint letter of Dr Murl Manohar Joshi, Former Union Minister and Dr. Karan Singh, Former Union Minister addressed to Chief Justice of India, September 26

watershed of the river itself, including tributary and distributary streams, and the immediate surrounding land.

At present, the Ganga river basin approach in the Himalayan watershed has failed to create a compelling logic for and a cumulative Environment Impact Assessment (EIA) even as the river channel and its catchment is being amputated from the flood plains. The Ganga basin and its human and non-human beings face threat from civilian and non-civilian nuclear projects, world's largest infrastructure project to divert 39 rivers including Himalayan rivers for Interlinking of Rivers project besides threat from projects like Ganga waterway, Ganga Expressway, Uttarakhand's Bhairon Ghati, Loharinag-Pala, Pala Maneri and Maneri Bhali hydro-projects, religious tourism projects like Chardham Mahamarg Vikas Pariyojana comprising of 53 infrastructure projects without EIA, some 191 heavily polluting industries in the Ganga basin in India, Nepal, Bangladesh and Tibet, China, Farraka barrage, Bihar's interlinking of rivers project and Kosi High Dam.

The UNDP's Human Development Report of 1994 recognised that water faces biggest environmental threat. It regards water scarcity as a factor in ethnic strife and political tension. It referred to the silent emergencies caused by polluted water and degraded land which puts lives and livelihoods at risk. The 136-page long report referred to "water" on 57 occasions.<sup>67</sup> The report introduced a new concept of human security, which equates security with people rather than territories, with development rather than arms. It

UNDP's special report of 2022 entitled *New threats to human security in the Anthropocene: Demanding greater solidarity* underlined that natural systems provide food and water provide besides ecosystem services such as watershed protection, and climate control. But in 123 countries an increase in wealth between 1990 and 2014 has been accompanied by a decline in natural capital. It refers to "water" on 54 occasions, "water security" on three occasions and "nuclear threats" ten times. The report draws attention towards the Global Health Security Index, a joint project of the Johns Hopkins Center for Health Security, the Nuclear Threat Initiative and The Economist Intelligence Unit which measures countries' capabilities to take preventive and mitigation measures. The UNDP recognises that cyberwarfare can disrupt electricity grids and water system.<sup>68</sup> It makes a case for recognition of imminent disruption due to nuclear initiatives.

Disregarding the approach of the UNDP, United National Framework Convention on Climate Change (UNFCCC) and the G-77 group of countries, which focuses on human security, some members of the UN Security Council (UNSC) have been unsuccessfully attempting to establish a natural security narrative for water crisis and environmental crisis. UNSC has failed to do in 2007, 2011 and 2020 and 2021 because of opposition from Russia, China, India and G-77 countries. It is apparent that the natural security narrative emerged out of a report entitled "National Security and the Threat of Climate Change", from a US government-funded national security think tank, the Center for Naval Analyses. The Military Advisory Board and the study team that authored the report received briefings from the U.S. and U.K. intelligence community, climate scientists, and business and state leaders. The US military report recommended, "Military planning should view climate change as a threat to the balance of energy access, water

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<sup>67</sup> (1994). Human Development Report, United Nations Development Programme, Oxford University Press, New York

<sup>68</sup> (2022). *New threats to human security in the Anthropocene: Demanding greater solidarity*, United Nations Development Programme, United Nations Development Programme, New York

supplies, and a healthy environment, and it should require a response.”<sup>69</sup> This 35-page long report refers to “water” on 117 occasions.

World Economic Forum (WEF) was quick to adopt this approach in 2011.<sup>70</sup> In February 2023, WEF’s annual meeting took the position that “Water security is a national security issue.”<sup>71</sup> This was followed by WEF’s publication as part of its WEF annual meeting in January 2025.<sup>72</sup>

NATO’s Parliamentary Assembly too published a report entitled “Turning The Tide: Addressing the Impact of Water Insecurity on Allied Security” in November 2024. This report underlines that extreme droughts and resulting water scarcity significantly reduce the nuclear energy production capabilities.<sup>73</sup> These efforts indicate that there are attempts underway to pursue the national security narrative instead of water justice and human security narrative despite failure at the UNSC.

In the face of imminent nuclear incidents, accidents and disasters and the insecurities of the Himalayan floods, landslides and cloudbursts, the human and non-human communities of the Himalayan ecosystem constitute a community of same fate whose vulnerability is common. The discourse regarding Iran’s nuclear energy program and IAEA’s role in it underlined that IAEA’s claim about it being a ‘Atoms for Peace’ agency is not neutral and nuclear energy programs are not as innocent as they are made out to be by the propaganda of its proponents.

It is significant that IAEA acknowledges that water security—its availability, quality, management and protection is a critical issue in human development and environmental and economic sustainability.<sup>74</sup> What it does acknowledge is that the Agreement between the World Health Organization (WHO) and the IAEA which was signed in 1959 is conflict of interest ridden. Although there no real convergence of between the objective of the WHO and IAEA, this agreement was signed factoring in a situation where it might become necessary to terminate it. WHO’s objective is to promote “the attainment by all peoples of the highest possible level of health”. The IAEA’s mission is to “accelerate and

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<sup>69</sup> (2007). National Security and the Threat of Climate Change, Military Advisory Board, Center for Naval Analyses, Virginia, USA, [https://www.cna.org/archive/CNA\\_Files/pdf/national%20security%20and%20the%20threat%20of%20climate%20change.pdf](https://www.cna.org/archive/CNA_Files/pdf/national%20security%20and%20the%20threat%20of%20climate%20change.pdf) accessed on September 29, 2025

<sup>70</sup>(2011). Water Security Water Food Energy Climate Nexus, [https://www3.weforum.org/docs/WEF\\_WI\\_WaterSecurity\\_WaterFoodEnergyClimateNexus\\_2011.pdf](https://www3.weforum.org/docs/WEF_WI_WaterSecurity_WaterFoodEnergyClimateNexus_2011.pdf)

<sup>71</sup> (2023) Water security is a national security issue: What's needed now, World Economic Forum, February 8, <https://www.weforum.org/stories/2023/02/water-security-national-security-issue/>

<sup>72</sup> (2025). Water security: How to ensure access to water in a changing world, World Economic Forum, January 14 <https://www.weforum.org/stories/2025/01/water-security-changing-world-wef25/> accessed on September 29, 2025

<sup>73</sup> Merle Spellerberg (2024). Turning The Tide: Addressing the Impact of Water Insecurity on Allied Security, Report of Sub-Committee on Resilience and Civil security, Committee on Democracy and Security, Parliamentary Assembly, North Atlantic Treaty Organisation (NATO), November, <https://www.nato-pa.int/download-file?filename=/sites/default/files/2024-12/046%20CDSRCS%2024%20E%20rev.1%20fin%20-%20WATER%20INSECURITY%20-%20SPELLERBERG%20REPORT.pdf> accessed September 30, 2025

<sup>74</sup> Water, International Atomic Energy Agency, <https://www.iaea.org/topics/water> accessed on September 30, 2025

enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

The fact is that IAEA is both the promoter and regulator of nuclear energy. There does not seem to be any instance in its history to illustrate that it has promoted peace, health and prosperity of human and non-human beings. Since the 21st anniversary of the Chernobyl disaster in April 2007, efforts commenced to persuade the WHO to abandon its the WHO-IAEA Agreement. The protest has continued through the WHO's 62nd World Health Assembly in 2009. The scientific case against the agreement appears robust. The treaty can be abandoned by invoking Article XII of the Agreement. It states: "1. This agreement shall be subject to revision by agreement between the World Health Organization and the International Atomic Energy Agency on the request of either party. 2. If agreement on the subject of revision cannot be reached, the agreement may be terminated by either party on 31 December of any year by notice given to the other party not later than 30 June of that year."<sup>75</sup> The European Committee on Radiation Risk (ECRR) too called for its abandonment at its conference held in 2009 in Lesbos, Greece.

IAEA organised a program on 'Water Security in a Changing World' jointly with the United Nations Educational, Scientific and Cultural Organization (UNESCO) alongside the IAEA's annual General Conference in 2022. Jodie Miller, Head of the Isotope Hydrology Section in IAEA's Department of Nuclear Sciences and Applications observed, "The question of how to save water and maintain water quality is a top priority for the international community, and nuclear science contributes to unlocking the answers to it."<sup>76</sup>

The Atomic Energy Commissions in China, India, Bangladesh and Pakistan are structurally both the promoter and regulators of nuclear energy facilities on the lines of IAEA. Nuclear project proponents have attempted to normalise the abnormality of entrusting the responsibility of regulation to the possible perpetrators of acts of omission and commission. This is what Atomic Energy Commissions and IAEA have been doing. The structural weakness of the public institutions is an invitation to incidents, accidents and disasters. Such institutional structures for regulation and grievance redressal do not inspire even an iota of confidence. Their beneficial owners are subject to limited liability regime and they seem to have been made immune from criminal liability for their dereliction of duty and complicity in causing industrial disasters in the Himalayan nuclear ecosystem.

Responding to the necessity to make people and their environment safe for the present and future generations, three countries-Italy Germany and Taiwan have permanently closed their nuclear plants in 1990, 2023 and 2025 respectively. Spain and Switzerland are planning to phase-out their nuclear reactors. After the Three Mile Island accident in Pennsylvania, USA in 1979, it did build any new nuclear reactor. Several European countries have abandoned the construction of new nuclear power plants-Austria in 1978, Sweden in 1980 and Italy in 1987 voted in referendum to oppose or phase out nuclear power. The result of a recent analysis of data from the IAEA regarding current

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<sup>75</sup> World Health Assembly, (1959). Agreement between the World Health Organization and the International Atomic Energy Agency. World Health Organization.

<https://iris.who.int/handle/10665/110055> accessed on September 30, 2025

<sup>76</sup> (2022). How nuclear science helps increase water security in a changing world, September 30,, <https://smartwatermagazine.com/news/international-atomic-energy-agency-iaea/how-nuclear-science-helps-increase-water-security-a> accessed on October 2, 2025

decommissioning plans by the Internationales Wirtschaftsforum Regenerative Energien (IWR) in Münster, Germany has revealed that after the nuclear accident in Fukushima, Japan, a total of 37 nuclear reactors in Europe were permanently shut down by the end of 2024. This trend of decommissioning nuclear power plants continues. The number of decommissioned nuclear reactors in the European Union, the UK, and Switzerland is all set to reach to 52 by the end of 2030, with a total capacity of 43,000 MW, in the aftermath of the Fukushima nuclear accident. UK leads with the shutdown of 18 reactors, followed by 17 by Germany, 5 by Spain, 5 by Belgium, 4 by Sweden, 2 by France, and 1 by Switzerland.<sup>77</sup>

As an alternative to nuclear energy, potential of renewable energy in the Himalayan ecosystem is enormous. The Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN) has shown that 77 per cent of the world's energy supply could be met by renewables by mid-century if backed by the right enabling public policies. The findings, from over 120 researchers in this report referred to the character and assessment of external costs and risk from release of radionuclides due to low-probability accidents or due to leakages from waste repositories in a distant future, which is required to be considered by discussion and judgment in the society.<sup>78</sup> This IPCC's report 1076-page long report mentions “nuclear” word on 364 occasions although according to IAEA, the share of nuclear energy sources in total global primary energy is only 4.7 %.<sup>79</sup> It also seems to be referring to installed capacity of nuclear power plants and not to the actual production of energy.

The water consumption in nuclear power plants is between 20 and 80 % more than coal-fired facilities with similar capacity, poses a challenge. Its daily water consumption ranges from 35 to 65 million litres, taking into account the particular reactor design and cooling systems.<sup>80</sup> This along with the findings of SRREN make a case for adoption of an approach which does make water sources insecure for the human and non-human beings.

For preventing any nuclear incident which may induce point source and non-point source of radioactive contamination in surface, ground water bodies, and other water resources, there is an immediate need to undertake study of the impact of nuclear contaminated water on human beings, animals, plants and crops in the Himalayan ecosystem.

The countries in the Himalayan ecosystem are yet to draw lessons from nuclear disasters of Hiroshima, Nagasaki, Chernobyl and Fukushima. These disasters create a compelling logic for a White paper on the environmental impact of nuclear testing for 950 nuclear

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<sup>77</sup> (2025). Nuclear Power Plants: 37 Nuclear Reactors Permanently Shut Down in Europe Since Fukushima, Münster, February 21 <https://www.renewable-energy-industry.com/news/press-releases/pm-8407-nuclear-power-plants-37-nuclear-reactors-permanently-shut-down-in-europe-since-fukushima> accessed on September 23, 2025

<sup>78</sup> (2012). *Renewable Energy Sources and Climate Change Mitigation: Special Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York

<sup>79</sup> Energy supply, IAEA, <https://www.iaea.org/world/energy-mix> accessed on September 27, 2025

<sup>80</sup> Ravikumar Jayabal (2025). Next-generation solutions for water sustainability in nuclear power plants: Innovations and challenges, *Nuclear Engineering and Design*, Volume 432 February, <https://www.sciencedirect.com/science/article/abs/pii/S0029549324008574> accessed on September 30, 2025

weapons in the three nuclear weapon owning countries, for building 84 nuclear reactors and for the nine upcoming nuclear reactors and their water footprint on the ecosystem. The lessons and the insights from the countries which have given up the civilian and non-civilian nuclear path, the problem of radioactive waste and the health cost provide a scientific basis for exploring the possibility of adopting UN treaty on Prohibition of Nuclear Reactors. The shared consciousness of peace and security led to adoption UN Treaty on the Prohibition of Nuclear Weapons. It paves the way for a similar treaty to prohibit nuclear reactors.

In conclusion, Himalayan ecosystem faces apocalypse due to unquestioned acceptance of the narrative of the promoters of nuclear technologies in the name of atoms for peace. The process of deformation and decay of language of peace and security must be resisted in an “attempt to regain the unimpaired strength of language and words; for words and language are not wrappings in which things are packed for the commerce of those who write and speak. *It is in words and language that things first come into being and are.* For this reason, the misuse of language in idle talk, in slogans and phrases, destroys our authentic relation to things.”<sup>81</sup> The destruction of the true relation between a word and its meaning destroys justice, peace and security. For instance, the acronym “SHANTI” does not refer to peace by any stretch of imagination. The misuse of language in writing, speaking and mass communication by the advocates of nuclear commerce is destructive of the very elements of life and a shared sense of ecosystem and water insecurity. It is evident that State’s power, peoples’ power and knowledge are disassociated from environmental consciousness although ecological space is the substratum of all sound and unsound economic and non-economic activities. The way nations in the Himalayan watershed has been made vulnerable to nuclear incidents by the states demonstrate that the attempt to make the trajectory of the states “converge with that of nation” has floundered.<sup>82</sup> The consciousness of security of the Himalayan ecosystem is essential for ensuring comprehensive justice from the perspective of water security, environmental security, food security, epidemiological security, and security of life. Without such consciousness there cannot be solidarity, which is a pre-condition for expediting the adoption of an international law by the communities of shared risk and the States to phase out nuclear reactors in order to gain a sense of water security, environmental peace and just co-existence of human and fellow non-human beings.

*\*Gopal Krishna, the author of this Policy Brief, is a law, philosophy and public policy researcher and a practising advocate, and Member of CRG.*

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<sup>81</sup> Martin Heidegger (1959), *An Introduction to Metaphysics*, Yale University Press, New York, p. 13-14

<sup>82</sup> Partha Chatterjee, *For a Just Republic: The People of India and the State*, Permanent Black and Ashoka University, 2025, p, 47