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## An urgent call for innovative ideation to save the world: A spotlight on the global water crisis

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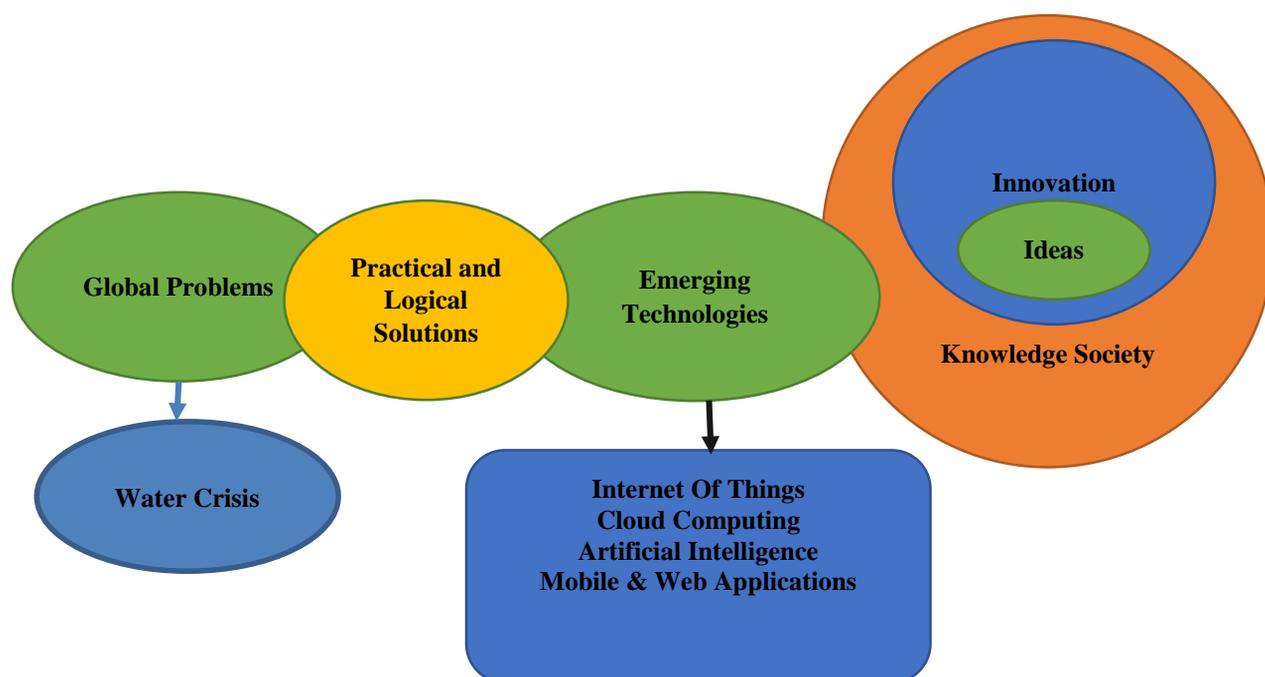
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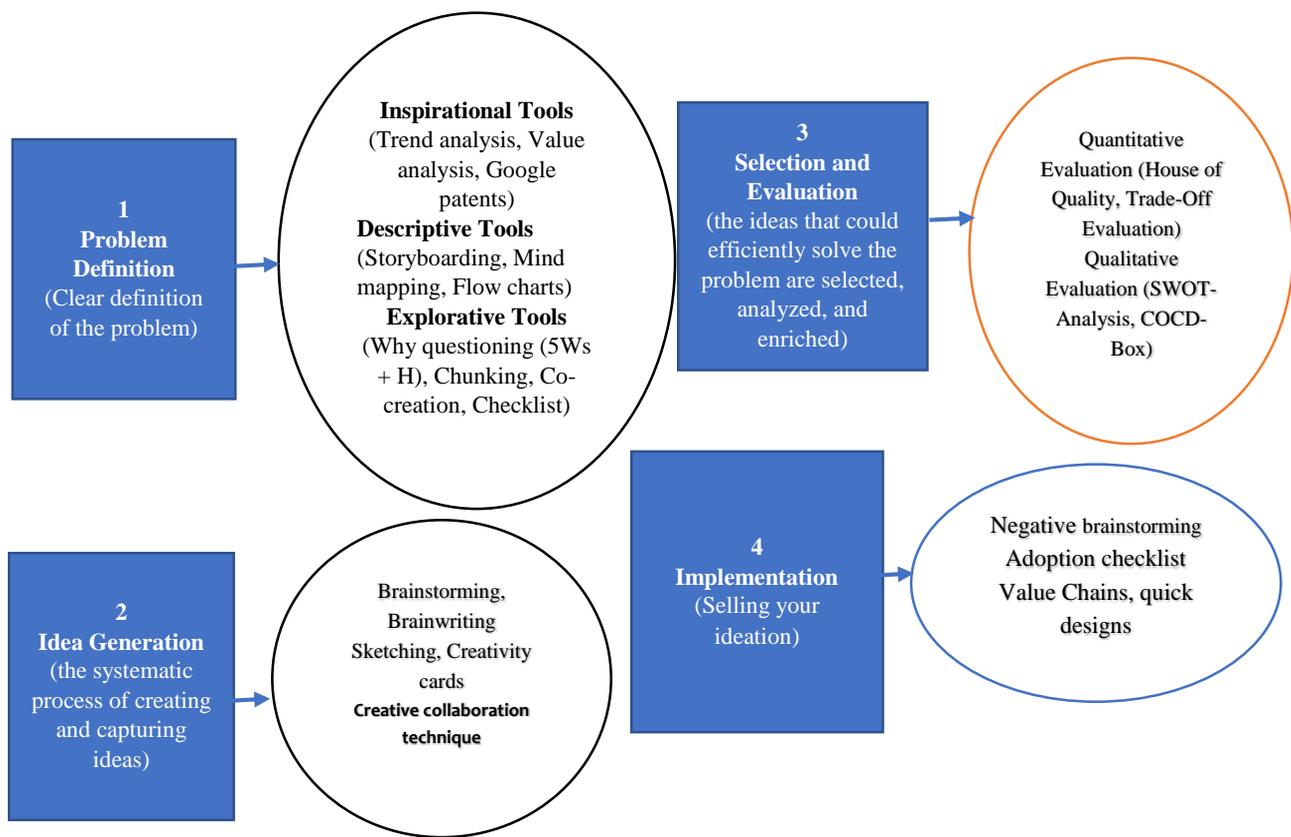
Our planet, when viewed in space, is aesthetically pleasing. On March 30, 2017, when the 10th French ISS astronaut, Thomas Pesquet, shared his view of the planet while in space. He said that 'The planet is truly a jewel we must not take for granted' (Mollard, 2017). Indeed, the planet was designed in such a marvelous way to support the diversities of life on it. Yet, Pesquet admitted that our planet is not fragile owing to the daunting challenges plaguing it. These challenges are diverse. Research scientists have constantly hinted that among the myriad of global problems, those that undergird human existence include those that threaten the environment, health, food, energy, water, education, and security. These difficult-to-handle global problems have been exacerbated as a result of the recent COVID-19 pandemic. This has made it very crucial that we collectively come together to save the world. Now, the resource that has become an utmost significance is water resources. The global statistics on water resources look very gloomy. The International Telecommunications Union (2010) estimates that close to 1.2 billion people globally reside in water-stress. It is projected that in 2025, water scarcity or water stress would affect about 1.8 billion people, with two-thirds of the human population living in water-stress areas (National Geographic Society, 2010). What has made matters worse is climate change ravaging the various territories of the world, which would affect the quality, quantity, and availability of the water resources on the planet (UN World Water Development Report 2020). In fighting against the COVID-19 pandemic, water is crucial. The World Meteorological Organization (2021) reiterates that the most effective strategy in combating the infection and spread of the COVID-19 is through the constant washing and sanitizing of the hands. Regrettably, the scarcity of water among a significant number of global countries, especially in the rural areas, poses a high threat of exacerbating the virus.

The Secretary-General of the World Meteorological Association, Petteri Taalas feels that the challenge in meeting Sustainable Development Goal 6, which is achieving clean water and sanitation (World Meteorological Organization, 2021) is unacceptable in this 21st century. Why? Because of the amazing times we live in (Rochon, 2018). Now, humans are making giant inroads in innovative technology (Young & Sauter, 2020), and as such, it is critical at this age and time that we innovative great ideation to remedy the water crisis facing the continent. In truism, the sustainable solution to the global water crisis lies in technological innovation in water technologies (Figure 1). However, we don't just need technology but the right technology (Dewit et al., 2012) in ameliorating the global water crisis. What then constitutes the right technology for the efficient management of global water resources? Foremost, the right technology must have been developed based on a deep comprehension of the nature of the water problems. Also, it must be context-specific related to a particular location and people, solving the locally distinctive water challenge. The water technology must be simple in its construction, use, and maintenance such that it doesn't require huge financial resources to develop and maintain it. Of equal importance are its efficacy and sustainability. All these crucial ingredients of the right water technology are driven largely by the innovative ideation that ignited the development of the water technology (United Nations Conference on Trade and Development, 2011).



**Figure 1:** A flow chart showing how to tackle the global water crisis  
**Source:** Author's construct

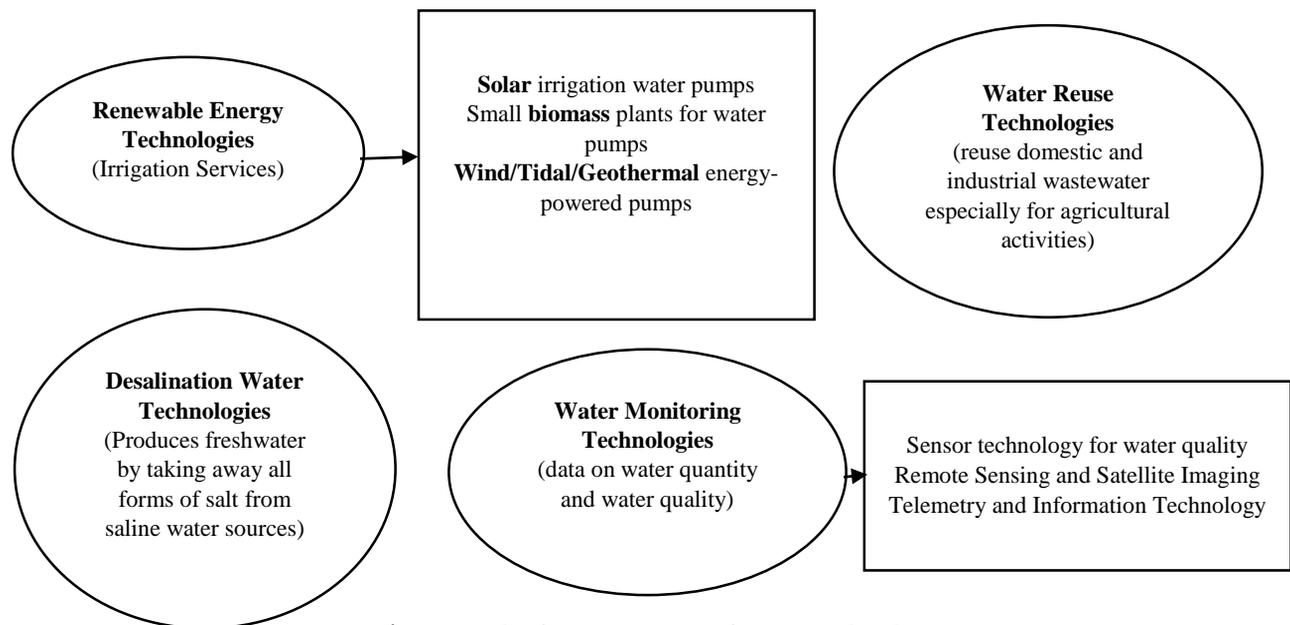
Innovative ideation is a systematic process of generating, developing, and communicating new ideas and solutions (Bocken et al., 2011). There are two ways of generating innovative ideas related to creativity (Björk et al., 2011). One way is creating ideas from nothing. The other way is re-engineering existing ideas in new forms to offer a better solution to the problem (Adom, 2014). Thus, the existing ideas serve as research walls or key insights for birthing the new and innovative ideation. That said, innovative ideas that can offer breakthrough solutions must be novel or original (Dorow et al., 2015) and focus-driven (Cooper, 2001). For innovative ideation to be realized, four procedural steps need to be followed (Figure 2). The first stage is identifying and diagnosing the nature of the problem. This is important in the generation of a pool of workable ideas that greatly take cognizance of the problem in all its aspects. Therefore, investigation of the problem among the affected population through research surveys is crucial in this first stage of ideation. Dewit et al. (2012) outline various tools to assist in the definition of the problem. These include inspirational tools (trend analysis, value analysis, google patents), descriptive tools (storyboarding, mind mapping, flow charts), and explorative tools (why questioning (5Ws + H), chunking, co-creation, the checklist). The second stage is the generation of practical and workable ideas to solve the problem defined with great clarity. Tools for generating and capturing ideas include brainstorming, brainwriting, tactful use of creative cards, sketching, and other forms of creative collaborations. These refreshing idea generation sessions, when carried out well will lead to breakthrough ideas that can produce innovative technologies.



**Figure 2:** The Four procedural steps in innovative ideation  
**Source:** Author's Construct

The third stage is the toughest yet, very important to the ideation process is the selection and evaluation of the best ideas. The ideas are compared with a set criterion. With the aid of a checklist, the poor and 'distant' ideas not directly related to the problem are removed. Important questions worth pondering over at this stage include whether the idea addresses the needs of people and meets the requirements outlined in the problem statement. Another important question is whether the idea offers an additional value than the available solutions or strategies. Other crucial questions are whether the idea meets budgetary requirements and its technology available. The best ideas selected are further refined and enriched. Dewit et al. (2012) recommend both quantitative and qualitative tools that could be used for this purpose. Though not exhaustive, the quantitative tools include the House of Quality and Trade-off evaluation, while the qualitative tools comprise SWOT- Analysis, and COCD-Box. The last stage is selling and presenting the evaluated innovative idea to users of the eventual technology that would emerge from it. Tools such as negative brainstorming and adoptive checklist are for convincing the end-users on the appropriateness of the innovative idea while in presenting the innovative idea, quick designs, value chains, and storyboards are often used (Dewit et al., 2012).

In relating innovative ideation and the eventual technologies to the effective management of the water resources, two areas in water management are often highlighted in the literature. The first is the technology taking charge of the water supply. Water supply aims at increasing the productivity of water. The second is storing water, both surface water, and subsurface water. These duos are often referred to as the twin-track approach (IUCN, 2016). Technologies for the water storage are given more emphasis because it is asserted to hold the greatest prospect of improving water management (McCartney, Rebelo, Xenarios & Vladimir, 2013). This is because it ensures a balance between demand and supply of water resources in shorter periods while finding efficient approaches in reusing wastewater from domestic and industrial effluents. In the field of agricultural activities, water storage technologies are crucial in making water available in all seasons for irrigation purposes. I see the current water technologies in five categories. They are water monitoring technologies, water reuse technologies, desalination water technologies, nutrient recovery water technologies, and desalination water technologies (Figure 3).



**Figure 3:** The five categories of water technologies

**Source:** Author's construct

Water monitoring technologies offer real-time information on the quality and quantity of water for management decisions. They tactfully utilize sensor and remote sensing technologies, satellite imaging, telemetry, mobile, and web applications to provide timely data to monitor the quantity and quality of water. Water reuse technologies also provide an efficient strategy for recovering wastewater from domestic homes and industries to be reused in irrigation activities for agricultural production. The quality of saline water is improved via the use of desalination water technologies that work at removing salt to produce freshwater for consumption purposes. Finally, nutrients in water such as phosphorus and nitrogen that could have been pollutants in disturbing the purity of water are safely removed using nutrient recovery water technologies. However, other local-context water problems are equally grey areas innovative ideation could be implemented in solving. The above-suggested water technologies are not exhaustive, but they are rather illustrative of the potential areas for ideation in water technologies.

The planet needs saviors, selfless technopreneurs who are determined to generate innovative ideas that could be rejuvenated into the right technologies to arrest her myriad of challenges. This viewpoint is an urgent call to all research scientists and students globally to bring their hands-on deck as we save the world through innovative ideation. We must remember that 'we all share the same neighborhood' (Ross, 2012), and as such, we must put our creative minds to work as we collectively generate innovative ideas to save the beautiful planet for our generation and generations yet unborn.

## References

1. Adom, D. (2014). *General knowledge in art*. Adom Series Publications Limited.
2. Björk, J., Vincenzo, F. D., Magnusson, M., & Mascia, D. (2011). The impact of social capital on ideation. *Industry and Innovation*, 18(6), 631-647.
3. Bocken, N., Allwood, J. M., Willey, A. R., & King, H. (2011). Development of an eco-ideation tool to identify stepwise greenhouse gas emissions reduction options for consumer goods. *Journal of Cleaner Production*, 19(12), 1279-1287.
4. Cooper, R. G. (2001). *Winning at new products: accelerating the process from idea to launch*. Perseus.
5. Dewit, I., Bois, E. D., Moons, I., & Jacoby, A. (2012, September 6-7). *Idea market: Implementing an ideation guide for product design education and innovation*. [Paper Presentation]. International Conference on Engineering and Product Design Education, Artesis University College, Antwerp, Belgium.
6. Dorow, P. F., Davila, G., Varvakis, G., & Vallejos, R. V. (2015). Generation of ideas, ideation and idea management. *Navus Florianópolis I SCI*, 51(21), 51-59.
7. International Telecommunications Union (2010). *ICT as an enabler for smart water management*. Technology Watch Report.

8. IUCN (2016). *Managing groundwater sustainably*. Available at: <https://portals.iucn.org>
9. McCartney, M., Rebelo, L., Xenarios, S. & Vladimir, S. (2013). *Agricultural water storage in an era of climate change: Assessing need and effectiveness in Africa*. International Water Management Research Report 152.
10. Mollard, P. (2017, March 30). *Earth is a jewel, says astronaut after six months away*. Available at: <https://phys-org.sdn.ampproject.org/v/s/phys.org/news/2017-05-earth-jewel-astronaut-months.amps?>
11. National Geographic Society (2010, January 26). *Freshwater crisis*. Available at: <https://ap-nationalgeographic-com.cdn.ampproject.org/v/s/api.nationalgeographic.com/distribution/public/environment/>
12. Rochon, S. (2018, November 26). *Why can't we solve humanity's biggest problems?* Available at: <https://medium.com/@sylvain.rochon/why-cant-we-solve-humanity-s-biggest-problems-bc6880812ab3>
13. Ross, J. A. (2012, October 15). *We all share the same neighborhood*. Available at: <https://www.momsleanairforce.org/we-all-share-the-same-neighborhood/>
14. UN World Water Development Report (2020, March 21). *Water and climate change*. Available at: <https://www.unwater.org/publications/world-water-developemtn-report-2020/>
15. United Nations Conference on Trade and Development (2011). *Water for food. Innovative water management technologies for food security and poverty alleviation*. United Nations
16. World Meteorological Organization (2021, March 22). *Water challenge: Clean water for handwashing*. Available at: <https://public.wmo.int/en/resources/coronavirus-covid-19/water>
17. Young, A., & Sauter, M. B. (2020, June 21). *21 most important inventions of the 21st century*. Available at: <https://247wallst-com.cdn.ampproject.org/v/s/247wallst.com/special-report/2020/01/06/21>

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