

The regulation of planetary health challenges

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Road to Stockholm+50 (2022) and Beyond

The Regulation of Planetary Health Challenges: A Co-Benefits Approach for AMR and WASH

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Abstract. Antimicrobial resistance (AMR) represents a global public health challenge. It has been examined through various angles, but the link between AMR and access to Water, Sanitation and Hygiene (WASH) or lack thereof has received little attention. Both AMR and WASH relate directly to the realization of the rights to health, water, and sanitation. In addition, both can affect the enjoyment of the right to environment. AMR is particularly complex from a rights perspective. Access to medicines contributes significantly to the realization of the right to health. At the same time, AMR affects the poorer sections of society who have disproportionately less access to medicines and to WASH. Rights, equality and justice should thus be at the centre of the development and implementation of law and policy concerning AMR and WASH. As we celebrate 50 years of international environmental law, it is crucial to ask some hard questions concerning the intersectional and cross-sectoral dimensions of AMR and WASH from the point of view of rights, equality, and justice. Linking the two would bring various co-benefits that the prevailing silo mentality has prevented.

Keywords: AMR, WASH, regulatory framework, human rights, inequality, co-benefits

1. Introduction

Antimicrobial Resistance (AMR) refers to situations where bacteria, viruses, fungi, and parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death. The WHO recognizes the co-existence of multiple pathways for the development of AMR in human beings and adopts a One Health approach, which links human health, animal health and the environment.¹ One of the pathways for the emergence of AMR in the environment is through water. The development of antimicrobial-resistant bacteria and genes in the environment compromises human and animal health and the environment. AMR in the environment offers a direct link with *Water, Sanitation and Hygiene* (WASH), which sits at the intersection of concerns around safe drinking water supply, adequate sanitation, and hygiene. WASH is anchored in environmental concerns since the quality of drinking water supply is affected by pollution, and inadequate sanitation contributes substantially to water pollution and morbidity. Both AMR

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¹ Bilal Aslam (2021), 'Antibiotic Resistance: One Health One World Outlook', 11 *Frontiers in Cellular and Infection Microbiology* 771510 (2021).

and WASH are strongly related to public health and in both cases, there is a direct link with water.

2. AMR and WASH as Common Concerns

AMR and WASH are often considered separately and mostly as local concerns. AMR is first a concern in specific communities in certain parts of the world. This is also true of WASH, which relates in the first place to specific local conditions in terms of water quality and (in)sanitation. At the same time, both are concerns from the local to the global levels. They are present in many parts of the world and in that sense qualify as a common concern of humankind. AMR has become a worldwide public health challenge that threatens to undo the great strides that public health has witnessed over the past century, including the central role played by antibiotics in allowing effective treatment of various life-threatening diseases. Similarly, inadequate sanitation measures affect the quality of drinking water supply. This threatens the substantial gains in access to drinking water over the past few decades since the water that ensures survival is also increasingly a source of water-borne diseases. Both AMR and WASH raise similar issues in different parts of the world, making them both issues of international concern.

AMR and WASH have their own individual focus; at the same time, several elements connect the two including the environmental dimension. The inter-connections make these issues particularly significant in the context of the Stockholm+50 anniversary. The environmental dimensions of AMR and WASH have only been considered in part or marginally to-date. Yet, addressing the specific issues arising at the individual or local level in terms of health, water or sanitation will have limited impact in the longer term if these measures are not framed within an environmental context.

AMR and WASH are closely interlinked with several human rights, including the rights to life, health, water, food, livelihood, sanitation, and environment. This confirms that AMR and WASH are multi-sectoral issues that cannot be addressed through a single-entry point. Yet, many of these links have not been explored in sufficient detail, including the link between health and environmental law. AMR and WASH are also multi-scalar insofar as local issues, such as discharge points of antibiotic resistant bacteria may have impacts up to the international level if the watercourse is transboundary. Incorporating WASH in a discussion on AMR regulation helps in understanding why these links need to be given much more prominence.

Another central dimension of both AMR and WASH is inequality and discrimination. The problems identified in terms of reducing AMR, improving access to safe water, and improving access to sanitation cannot be addressed through universal frameworks, which assume that everyone is similarly placed to take advantage of proposed measures. Indeed, economic and social inequalities are directly reflected in the way in which AMR and poor water quality and water pollution affect different people or communities. The impacts may be experienced to different extents in different countries, but global patterns can be identified.

In this article, we examine AMR and WASH in relation to the discourse around planetary health. These two issues fit directly within the idea that ‘planetary health is the health of human civilisation and the state of the natural systems on which it

depends'.² We argue that there are several reasons for linking the regulation of AMR and WASH. First, there are multiple links between AMR and WASH that have not received adequate attention. These include the health, water, and environment dimensions. Existing regulatory frameworks are fragmented, and offer partial responses that do not necessarily acknowledge the close links between AMR and WASH. Secondly, AMR and WASH both need to be considered through the lens of human rights since they impact individuals and communities directly. It is crucial to add a rights perspective to issues that are still sometimes considered mostly in terms of practical solutions, such as building toilets or installing filters that can catch antibiotic resistant bacteria and genes. All this leads us to argue that there are multiple co-benefits in linking AMR and WASH much more directly than has been the case. There is also a need to consider the rights and equality dimensions of AMR and WASH. This fits within the context of the anniversary of the 1972 United Nations Conference on the Human Environment (the Stockholm Conference), which first brought together environmental issues in relation to economic development and human concerns, such as poverty. The present article offers a stepping-stone towards highlighting the need to not only consider environmental regulation broadly but also to consider more effectively the connections between topics that have not been adequately considered until now. This needs to be done concurrently at the international and national level.

3. Inter-Connected Challenges and Regulatory Responses

Addressing concerns related to WASH and tackling AMR has been progressively linked, not only through their common public health dimensions but also through common environmental aspects.

(i) WASH and Health: Identifying the Links

WASH offers an entry point for considering the connections between drinking water, sanitation and hygiene. This is significant because sanitation was for a long time a subsidiary concern to drinking water supply. The latter seemed to be a more obvious priority, given that the absence of sufficient safe drinking water is a direct cause of death. At the same time, it became increasingly clear that considering insufficient access to sanitation separately from other concerns was inappropriate. This is, for instance, reflected in the 485,000 diarrhoeal deaths caused each year by microbiologically contaminated drinking water.³ The linking of water and sanitation was progressively extended to hygiene, which broadens the scope of the sector more generally to measures meant to foster good health.

Bringing together these three sectors under the single acronym of WASH is helpful in terms of highlighting connections that are evident but not necessarily effectively addressed. The link between drinking water and sanitation can be identified, for

² Richard Horton & Selina Lo (2014), 'Planetary health: a new science for exceptional action', *The Lancet* (2014) < [http://dx.doi.org/10.1016/S0140-6736\(15\)61038-8](http://dx.doi.org/10.1016/S0140-6736(15)61038-8) > .

³ WHO (2022), Drinking-water (21 March 2022) <https://www.who.int/news-room/fact-sheets/detail/drinking-water> .

instance, through the negative impacts of untreated or partly treated sewage making its way to sources of drinking water or the impacts of leach pits – pits from which liquid seeps into the soil without treatment – that may contaminate groundwater used as a source of drinking water.⁴ It is estimated that at least two billion people use a faecally-contaminated source of drinking water.⁵ To the extent that sanitation is often water-based, linking the two sectors is an obvious choice in terms of addressing water quality issues and the negative health impacts of low-quality drinking water.

The link between water, sanitation and hygiene expands WASH beyond its strong water-centric framing and strengthens the health dimension. It also ensures that health is not seen only in terms of the negative impacts of low water quality but also in terms of positive elements addressed through hygiene measures, which may, for instance, contribute to the prevention of diseases rather than a focus on treating existing diseases.

(ii) Access to Antibiotics and AMR: Health, Water and Environment

WASH plays a critical role in Infection Prevention and Control (IPC) by reducing the transmission of resistant strains in the environment. Low- and Middle-Income Countries (LMICs) suffer a disproportionately high burden of WASH-related diseases including cholera, dysentery, diarrhoea, hepatitis A, and typhoid. Antibiotics are used as a ‘quick fix’ to treat water-borne diseases (even though the latter may be caused by viruses and not bacteria) in the absence of effective WASH measures.⁶ Such inappropriate or excessive consumption of antibiotics also contributes to the development of AMR in human beings. Similar issues arise through the widespread use of antibiotics in animal production for human consumption partly to prevent/control diseases arising from poor living conditions including water availability.

The use of antimicrobials could be reduced by 60 per cent if there was universal access to improved WASH services in LMICs.⁷ Hygiene measures are also directly relevant since appropriate behaviour, such as regular hand washing before food or after contact with faecal matter significantly reduces diarrhoeal diseases. Similarly,

4 Lovleen Bhullar (2019), ‘The Environmental Dimension of the Right to Sanitation’ in Philippe Cullet, Sujith Koonan and Lovleen Bhullar (eds), *The Right to Sanitation in India: Critical Perspectives* (OUP, 2019) 261.

5 WHO and UNICEF (2017), *Progress on Drinking Water, Sanitation and Hygiene: Update and SDG Baselines* (Geneva 2017).

6 WL Denyer & Clare Chandler (2019), ‘Quick fix for care, productivity, hygiene and inequality: reframing the entrenched problem of antibiotic overuse’ (2019) 4(4) *BMJ Global Health* doi:10.1136/bmjgh-2019-001590.

7 J O’Neill (2016), ‘Infection prevention, control and surveillance: limiting the development and spread of drug resistance: the review on antimicrobial resistance’ (2016) https://iif.wellcomecollection.org/file/b28552593_Infection%20prevention%20control%20and%20surveillance.pdf.

the widespread use of antibiotics for growth promotion in livestock could be phased out in favour of best practices in the production of healthy animals.⁸

Up to 90 per cent of antimicrobial doses can be excreted as an active compound or metabolites into the environment.⁹ The WHO estimates that globally, two billion people do not have basic sanitation facilities such as latrines, out of which 673 million practice open defecation.¹⁰ The practice of open defecation can lead to the spread of resistant organisms in the environment.¹¹ Sanitation also addresses ways in which human waste is managed and the consequences of inappropriate discharge into the environment of untreated or partly treated waste, which may include antibiotics that then make their way into drinking water sources. Offsite wastewater treatment plants and onsite sanitation facilities like septic tanks reduce faecal bacteria, including resistant bacteria from wastewater. However, they cannot deal with high levels of bacteria. Wastewater treatment plants are not ordinarily designed for removal of antimicrobial residues or resistant organisms.¹² Therefore, discharge of treated wastewater into the environment also contaminates water bodies leading to the spread of resistant infections.

Animal faeces accounts for 80 per cent of the total faecal biomass in the world. Yet, ensuring containment and safe use of animal faecal wastes is not a policy priority.¹³ Improper disposal of animal waste/carcasses containing antibiotic residue in the absence or poor implementation of biosecurity protocols is another source of AMR in the environment. When human and animal excreta containing resistant microorganisms is disposed of indiscriminately, it is easily washed by rain into surface water sources such as rivers and lakes, and groundwater through seepage leading to the spread of resistant infectious diseases.

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- ⁸ UNEP (2022), *Environmental Dimensions of Antimicrobial Resistance - Summary for Policymakers* at 7.
- ⁹ WHO, FAO and OIE (2020), *Technical Brief on Water, Sanitation, Hygiene and Wastewater Management to Prevent Infections and Reduce the Spread of Antimicrobial Resistance* (WHO, FAO and OIE 2020). Also see, Andrew C Singer et al (2016), 'Review of Antimicrobial Resistance in the Environment and Its Relevance to Environmental Regulators' (2016) 7 *Frontiers in Microbiology* 1728.
- ¹⁰ WHO, Diarrhoeal disease (2017) <<https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>>.
- ¹¹ David Musoke et al (2021), 'The role of Environmental Health in preventing antimicrobial resistance in low- and middle-income countries' (2021) 26 *Environmental Health and Preventive Medicine* 100; P Araya et al (2016), 'The Impact of Water and Sanitation on Diarrhoeal Disease Burden and Over-Consumption of Antibiotics' (2016) <https://amr-review.org/sites/default/files/LSE%20AMR%20Capstone.pdf>.
- ¹² CM Manaia et al (2018), 'Antibiotic resistance in wastewater treatment plants: tackling the black box' (2018) 115 *Environ Int* 312–24.
- ¹³ David M. Berendes et al (2018), 'Estimation of global recoverable human and animal faecal biomass' (2018) 680/1 *Nature Sustainability* 679–85.

AMR in the environment can undermine positive WASH outcomes. Human waste carries antimicrobial resistant pathogens and there is increased risk of infections for people exposed to these pathogens in the environment. Similarly, the discharge of effluents containing antibiotic residue from pharmaceutical manufacturing units, and the improper disposal of unused/expired antibiotics may lead to the emergence of AMR in the environment, which may reach human beings directly or indirectly. This calls for prevention or control of use of antibiotics except where it is necessary.

4. Regulating AMR and WASH: International and National Frameworks

International and national laws have progressively started responding to the challenges posed by AMR and WASH albeit to varying extent. Existing legal frameworks are fragmented and they address AMR, WASH, or their connections in a limited manner. At the international level, the legal framework is marked by the prevalence of soft law instruments and a limited engagement with the above-mentioned issues. At the national level, the example of India reveals that individual countries have started to address some of the issues. At the same time, the Indian regulatory framework, like its international counterpart, is framed more around policy instruments than statutes, and the broader connections between the different measures proposed require further coordination.

(i) International Law

The link between AMR and WASH is recognized at the international level but there is little by way of binding international law concerning health, the environment, water, and human rights. Even though AMR is viewed as a public health challenge first and foremost, international health law is silent in respect of AMR generally and the link between AMR and WASH specifically. The World Health Organization's (WHO) Guidelines for drinking water, recreational water, and safe use of wastewater include no information on antibiotics. At the same time, the link is explicit in at least two of the five objectives of the WHO's non-binding Global Action Plan on Antimicrobial Resistance 2015. Objective 3 is concerned with reducing the incidence of infection through effective sanitation, hygiene, and infection prevention measures. Objective 4 deals with the development of standards and guidance *inter alia* for the presence of antimicrobial agents and their residues in the environment, especially in water, wastewater, and food. However, the Global Action Plan is silent in respect of the discharge of antibiotic residues from pharmaceutical manufacturing industries into the environment.

None of the international environmental law instruments refer to AMR, WASH, or the link between the two. At the same time, several principles of environmental law are relevant to the regulation of AMR and WASH. These environmental law principles include the pre-emptive principles of prevention and precaution, as well as the post facto principles of polluter pays and rectification at source. The notion of stewardship reflected for instance in the public trust doctrine where the State is the trustee on behalf of the people, and equity concerns

encompassed in the principles of intra-generational and inter-generational equity are also relevant to address unequal spatial and temporal distribution of benefits and costs of AMR and WASH. The concept of sustainable development and the integration principle must be applied to address AMR and WASH concerns to ensure a just and equitable balance between competing objectives.

International water law is largely silent in respect of WASH and includes no mention of AMR. The 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses refers to ‘vital human needs’, which is ‘sufficient water to sustain human life’ and includes drinking water and water required for food production to prevent starvation.¹⁴ However, its central concerns revolve around allocation of water between riparian states focused on use of water, rather than the protection of water and the interests and rights of individuals and communities. The international water law instrument that goes much further is the 1999 UNECE Water and Health Protocol, which aims to protect human health by better water management and by reducing water-related diseases.¹⁵ It is, however, a regional agreement and does not (yet) reflect a broader international law position. International human rights law is also relevant, and this is discussed in section 5(i) below.

Other relevant international frameworks include the Sustainable Development Goals (SDGs), which are the ‘blueprint to achieve a better and more sustainable future for all’ by 2030.¹⁶ While these goals are not legally binding, countries are expected to establish a national framework for achieving them. In 2020, two specific AMR indicators were included in SDG 3 on good health and wellbeing.¹⁷ With this development, SDGs now offer an entry point for considering not only the connections between the economic, social, and environmental aspects of development but also more directly for linking these with health and AMR. In addition, AMR could have significant effects on several SDGs.¹⁸ These include SDG 1 seeking to end poverty, SDG 2 seeking to end hunger, SDG 8 promoting decent work and economic growth, and SDG 12 promoting responsible consumption and production. In addition, WASH

¹⁴ UN, (1997), *Convention on the Law of the Non-navigational Uses of International Watercourses*, New York, 21 May 1997, UN Doc. A/51/869, Art 10. Also see, Statements of Understanding [1997] ILM 36, 719.

¹⁵ *Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, London, 17 June 1999; UN Doc. MP.WAT/2000/1.

¹⁶ UN (2015), *Transforming our World: The 2030 Agenda for Sustainable Development*, Sustainable Development Goals and Targets, in UN General Assembly Resolution 70/1; UN Doc. A/RES/70/1 (2015).

¹⁷ WHO (2021), *Global Antimicrobial Resistance and Use Surveillance System Report 2021* (indicators 3.d.2 and 3.d.3).

¹⁸ WHO, FAO and OIE (2021), *Antimicrobial Resistance and the United Nations Sustainable Development Cooperation Framework: Guidance for United Nations country teams* (October 2021).

forms part of SDG 6, which is concerned with ensuring access to water and sanitation for all. Target 6.1 is to achieve universal and equitable access to safe and affordable drinking water for all, and Target 6.2 is to achieve access to adequate and equitable sanitation and hygiene for all and end open defecation. Finally, the WHO has called for including AMR in the UN Sustainable Development Cooperation Framework, which is the agreement between the UN and each host government where the UN has a country team for planning and implementation of activities in support of the SDGs.

Overall, the international framework is structured around some of the relevant fields of international law, including health, environment, and water law. The picture that emerges is that of limited contributions and in addition, each of these contributions tends to consider either AMR or WASH but not what brings them together. Further thinking is starting to emerge in broader policy forums, such as those focused on sustainable development and the addition of AMR-specific targets in the SDGs may help in bridging the identified gaps. Yet, there is clearly a long way to go before AMR and WASH are comprehensively and collectively addressed in binding international law.

(ii) National Law (India)

In the absence of binding AMR laws at the national or subnational laws, national action plans provide the starting point for AMR regulation in different countries. The WHO expects countries to develop their own national action plans on AMR in line with the framework set out in its Global Action Plan. In 2017, the Government of India responded with the National Action Plan on Antimicrobial Resistance (NAP-AMR). However, these national action plans do not start with a clean slate. Instead, they rely on a combination of existing measures in different areas and new measures to regulate AMR. This is true for WASH-related measures.

India's NAP-AMR sets out six strategic priorities to tackle the public health challenge of AMR. Five of these strategic priorities involve action on WASH or engagement of WASH sector actors.¹⁹ For instance, the first strategic priority is to improve awareness and understanding of AMR *inter alia* through an effective communication programme with a focus on infection prevention through hand hygiene, clean water, sanitation, biosafety in animal farms etc. The third strategic priority is to reduce the incidence of infection through effective infection, prevention, and control in healthcare settings, veterinary settings and animal husbandry, and the community. Interventions and activities include streamlining hand hygiene and sanitation as components of monitoring/performance payment within different schemes or quality programmes, increasing community awareness for good production practices (proper hygiene/sanitation/practices of IPC), hygiene, sanitation, and infection prevention in the community, and reducing environmental contamination with resistant genes, resistant pathogens, and antimicrobial residues.

There is no national water, sanitation, or health law in India. Water, sanitation, and health are state subjects according to the Constitution of India 1950. However, most states have not enacted such laws. Instead, the national government relies on non-legally binding policies to regulate certain aspects of WASH. The *Jal Jeevan* (Water

¹⁹ Arundati Muralidharan (2019), 'Water, Sanitation Can Systematically Prevent Antimicrobial Resistance in India', *The Wire* (12 December 2019) <https://thewire.in/health/india-antimicrobial-resistance>

is Life) Mission aims to provide water supply to every household by 2024 and focuses on source sustainability. The *Swachh Bharat Abhiyan* (Clean India Campaign), *Kayakalp* and *Swachh Swasth Sarvatra* initiatives address open defecation by increasing uptake of toilets. There is also growing recognition of the need for proper management of human waste. The new rural sanitation strategy combines these priorities with a shift in focus from open defecation free (ODF) to ODF Plus, that is, sustaining ODF behaviour and ensuring access to solid and liquid waste management for every village.²⁰ Effective implementation of these objectives can prevent or control the emergence of AMR in the environment. However, this strategy does not refer to AMR although it was finalised after the launch of NAP-AMR.

Insofar as AMR in the environment is concerned, the NAP-AMR explicitly attempts to address the discharge of antibiotic residues from pharmaceutical manufacturing units into the environment. Strategic priority 2 seeks to strengthen knowledge and evidence through surveillance of such antibiotic residues through the development of a national framework and standards. Strategic priority 4 focuses on reducing the incidence of infection through effective IPC including reducing environmental contamination with antimicrobial residues. One of its strategic interventions and activities is to develop and implement a strategy and operational plan to reduce environmental impact on AMR, which will include definition of standards and monitoring of antibiotic residues. The Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974 regulate environmental pollution in India. The former, through the Environment (Protection) Rules, 1986 sets standards for treatment of several types of effluents from municipal and industrial sources. However, they are silent in respect of discharge of antibiotic residue in effluents from pharmaceutical manufacturing units. In 2020, building on the commitments expressed in the NAP-AMR, the national government published the draft Environment (Protection) Amendment Rules 2020 establishing upper limits for the concentration of antibiotic residues in treated effluent.²¹ These standards were not included in the law eventually.

Overall, India's regulatory framework for addressing AMR and WASH is characterized by limited connections between the different measures proposed. Some of the measures are mostly technical, such as the proposed limits on the concentration of antibiotic residues in treated effluents. Others emphasize the social dimensions, such as the focus of the *Jal Jeevan* Mission on ensuring access to water to all households by 2024. These different elements are not well linked, in part because they are understood as falling in different domains, such as 'drinking water' and 'environment'. Beyond this, even though these measures are largely anthropocentric in scope, they remain completely detached from fundamental rights concerns. This is what we take up in the next section.

5. Adopting a Human Rights Approach to Regulation

²⁰ Government of India, *From ODF to ODF Plus Rural Sanitation Strategy 2019-2029*, Ministry of Jal Shakti, Department of Drinking Water and Sanitation.

²¹ Government of India (2020), *Draft G.S.R. 44(E)*, Ministry of Environment, Forest and Climate Change (23 January 2020).

AMR and WASH have often been addressed through specific interventions, such as construction of toilets or installation of membrane filtration systems to catch antibiotic resistant bacteria that may not be stopped by wastewater treatment plants.²² Such responses are required but they are based on a limited understanding of issues.

Addressing AMR and WASH comprehensively and effectively necessitates going beyond technocratic responses to also consider the human and environmental dimensions of these planetary health challenges. In legal terms, responses need to be framed around fundamental human rights. AMR and WASH intersect with several human rights that are related to both. AMR is directly related to the right to health and has the potential to lead to significant backtracking in its realization, something that goes against the specific stipulations of the International Covenant on Economic, Social and Cultural Rights (ICESCR), which demands progressive realization.²³ WASH is directly related to the rights to water and sanitation. Both AMR and WASH are related to other human rights, including the right to a clean environment.

A human rights-based approach to AMR and WASH recognises that regulatory responses to these two challenges must be based on the idea of universality and the entitlements of individuals as well as communities. A focus on rights also leads to the identification of inequality as a key concern. International human rights, which are premised on universal entitlements are not particularly well suited to address structural inequalities, which pervade many countries and must be addressed as a central component of domestic measures to address AMR and WASH.

(i) Linking Water, Sanitation, Environment and Health

WASH relates directly to the realization of the rights to health, food, livelihood, water, sanitation, and the environment. The ICESCR recognises some of these rights explicitly as in the case of Article 12 on the right to health and Article 11 on the right to an adequate standard of living, which includes the right to adequate food.²⁴ Further, the Committee on Economic, Social and Cultural Rights (CESCR) has adopted general comments, which are non-binding but authoritative interpretations of certain provisions of the ICESCR. These include general comments on the rights to health, water and food. As a result, the rights to water, sanitation, and the environment form part of the right to health and/or the right to an adequate standard of living.

AMR is particularly complex from a rights perspective. On the one hand, access to essential medicines, of which antibiotics are one example, contributes significantly to the realization of the rights to life and health.²⁵ On the other hand, excessive use or

²² Pawel Krzeminski et al (2020), 'Combined membrane filtration and 265 nm UV irradiation for effective removal of cell free antibiotic resistance genes from feed water and concentrate' (2020) 598 *Journal of Membrane Science* 117676.

²³ UN (2016), International Covenant on Economic, Social and Cultural Rights, New York, 16 December 1966, 993 *UNTS* 3.

²⁴ Ibid.

²⁵ R Laxminarayan et al (2016), 'Access to effective antimicrobials: a worldwide challenge' (2016) 387 *Lancet* 168–75. See also Claire Lougarre and AM Viens, 'The Role of the Right

misuse of antibiotics may lead to AMR and the denial of several human rights. In addition, improper disposal of antibiotic effluent/antibiotics through human waste into the environment could lead to the emergence of AMR in the environment and undermine the realization of the rights to life, health, food, livelihood, water, sanitation, and the environment, in the first instance, for individuals and communities living and working in the vicinity of the affected water bodies but later affecting the rights of other people because of the ability of AMR to travel from one medium to another as well as across domestic and national borders. However, neither law scholarship,²⁶ nor drafters of AMR regulation engage with the rights-based approach to AMR generally,²⁷ or with specific reference to the link between AMR and WASH. At the same time, realization of these rights is an important requirement for the implementation of the SDGs discussed in section 4(1) above.

A perusal of the general comments concerning the rights to health, water and food reveals opportunities for recognition of the link between AMR and WASH. According to General Comment 14 on the right to health, the term ‘improvement of all aspects of environmental and industrial hygiene’ in Article 12.2(b) of the ICESCR comprises the requirement to ensure an adequate supply of safe and potable water and basic sanitation and the prevention and reduction of the population’s exposure to harmful substances, such as radiation and harmful chemicals or other detrimental environmental conditions that directly or indirectly impact upon human health.²⁸ The emergence of AMR makes potable water less safe. Further, arguably, AMR can be described as ‘detrimental environmental conditions that directly or indirectly impact upon human health’.²⁹

General Comment 15 on the right to water recognises the different uses of water including personal and domestic uses, securing livelihoods, and realising the right to adequate food by ensuring sustainable access to water resources for agriculture.³⁰ It interprets ‘to ensure environmental hygiene’ in Article 12 of the ICESCR to

to Health in a “Hidden” Pandemic: Antimicrobial Resistance’ EJIL: Talk! (8 December 2021) <https://www.ejiltalk.org/the-role-of-the-right-to-health-in-a-hidden-pandemic-antimicrobial-resistance>

- ²⁶ cf. Susan Rogers Van Katwyk et al. (2020), ‘Exploring Models for an International Legal Agreement on the Global Antimicrobial Commons: Lessons from Climate Agreements’, *Health Care Analysis* (2020)
- ²⁷ UN (2021), Exceptions include South Centre, ‘Draft General Comment on Land and Economic, Social and Cultural Rights’, Written Contribution to the United Nations Committee on the Economic, Social and Cultural Rights (26 July 2021).
- ²⁸ UN Committee on Economic, Social and Cultural Rights, *General Comment No 14: The Right to the highest attainable standard of health* (Article 12 of the International Covenant on Economic, Social and Cultural Rights), UN Doc E/C.12/2000/4 (2000).
- ²⁹ Ibid para 15.
- ³⁰ UN Committee on Economic, Social and Cultural Rights, *General Comment No 15: The Right to Water* (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), UN Doc E/C.12/2002/11 (2002).

encompass taking steps to prevent threats to health from unsafe and toxic water conditions.³¹ This includes the protection of natural water resources from contamination by harmful substances and pathogenic microbes. Further, the obligations of the State corresponding to the right to health and the right to water include prevention or control of environmental pollution. This obligation extends to environmental pollution resulting from antibiotics discharged into the environment. Finally, the core content of the right to adequate food, as set out in General Comment 12, encompasses food free from adverse substances.³² The term ‘adverse substances’ could extend to antibiotic-resistant genes.

A rights-based approach to AMR and WASH must also consider the interlinkages between rights. The lack or inadequacy of sanitation and measures for the realisation of the right to sanitation may pollute the environment, degrade environmental resources, and/or infringe other rights.³³ The right to sanitation includes treatment of human waste before reuse or disposal. Treated wastewater may be used to augment water supplies and to irrigate or fertilize crops,³⁴ thus promoting the realisation of the rights to water and food respectively. However, the right to water (which includes the right to subsistence agriculture at the very least) and the right to food itself may be violated where untreated or partly treated wastewater and wastewater residuals are used for irrigation.

(ii) *Promise of Environmental Justice for AMR and WASH*

International human rights law offers a good framework for considering AMR and WASH through the lens of individual entitlements. At the same time, it is constrained to an extent by its universalist framing, which is insufficient for addressing certain problems that perpetuate inequality, such as systematic discrimination against certain groups of people. In other words, an environmental justice perspective needs to be added to address the broader dimensions of equity that are not well captured through the lens of individual human rights.

Environmental justice offers an entry point to consider the differential impact of economic and social policies on the least well-off and the most marginalised. It is also specifically framed around the idea that inequality cannot be effectively tackled by looking only at individuals and that the sum of individual harms is not necessarily equivalent to the harm to the whole affected community.

³¹ Ibid para 8.

³² UN Committee on Economic, Social and Cultural Rights, *General Comment No 12: The Right to adequate food* (Article 11); UN Doc E/C.12/1999/5 (1999).

³³ Loretta Feris, ‘The Human Right to Sanitation: A Critique on the Absence of Environmental Considerations’ (2015) 24(1) RECIEL 16; Owen McIntyre, ‘Environmental Protection and the Human Right to Water: Complementarity and Tension’ in Laura Westra, Colin L Soslone and Donald W Spady Eds. (2012), *Human Health and Ecological Integrity: Ethics, Law and Human Rights* (Routledge 2012) 225.

³⁴ A Pruden (2014), ‘Balancing water sustainability and public health goals in the face of growing concerns about antibiotic resistance’ (2014) 48 *Environmental Science and Technology* 5–14.

Some of the issues of particular concern regarding AMR and WASH are gender inequality and social inequality, such as caste inequality. They constitute central factors explaining differential access to medicines or differential burdens in ensuring access to water, such as where women bear the duty of fetching drinking water where it is not available through a tap within the house. Other issues include differential access to water, for instance, where some social groups get access to a given source of water only once others have met their own needs; differential access to sanitation in the case of women waiting for the cover of night to go out or refraining from going to a public facility because of the cost involved; and differential access to soap and to medicines.

Many of the issues arising in the context of AMR and WASH can only be effectively addressed by tackling inequalities. Environmental justice provides a way to link this with the rights framework. It highlights the need to consider not only whether the rules introduced are fair but also whether their application leads to results that are fair for everyone. Thus, the question is not only whether everyone has access to a toilet but whether everyone can effectively use them. Similarly, the issue is not only whether AMR can be reduced but also whether the most vulnerable to diseases that can be easily cured with antibiotics get access to the necessary medicines. Simply building sanitation infrastructure or reducing AMR will not necessarily foster substantive equality and ensure that the poorest and most marginalised preferentially benefit from the measures taken.

6. AMR and WASH Regulation: Fostering Co-Benefits

Concerns emerging from WASH and AMR can be broadly framed around SDGs, as reflected in the addition of AMR-related targets in 2020. AMR and WASH each have multiple dimensions and multiple connections. One of the less-studied connections is the environmental one. At this juncture, it is critical to consider the synergies that can be obtained by addressing the environmental dimensions of AMR and WASH concurrently.

The sustainability framework is a good starting point for doing so because it recognises that there are multiple links between the environment, society, and the economy. The need to consider all three together while avoiding giving a priority to the economy has been recognised for decades in the context of sustainable development debates. This was clearly framed at Rio in 1992 in the context of the integration of environment and development,³⁵ and further refined by 2002 in Johannesburg with the framing of the relationship as a triangular one including economic, environmental, and social aspects.³⁶

The 1972 Stockholm Declaration carved the space for addressing the environmental dimensions of WASH and AMR, where it specifically articulated that ‘through the rapid acceleration of science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale’.³⁷ The widespread use of

³⁵ United Nations (1972), *Report of the United Nations Conference on the Human Environment*, 5-16 June 1972, Stockholm; UN Doc. A/Conf. 48/14/Rev.1; [United Nations Conference on the Human Environment, Stockholm 1972 | United Nations; NL730005.pdf \(un.org\)](#) (accessed on 31 May 2022).

³⁶ UN, *Johannesburg Declaration on Sustainable Development*, Adopted at the 17th plenary meeting of the World Summit on Sustainable Development, 4 September 2002, para 5.

³⁷ UN (1972), *Stockholm Declaration*, para 1, n.35.

antibiotics and the rapid increase in access to toilets reflect some of the advances and evidence new environmental challenges resulting from modernisation. The Stockholm Declaration also asserted at the time that '[i]n the developing countries most of the environmental problems are caused by under-development'.³⁸ This is noteworthy because some of the main challenges the world faces in terms of AMR and WASH today originate in developing countries. At the same time, this is misleading because some of the challenges posed by AMR and WASH are global in scope and require international cooperation. This is, for instance, the case with manufacturing of antibiotics (especially active pharmaceutical ingredients), for which the world is largely reliant on China and India.

AMR and WASH intersect at various levels. Overall, the better the level of sanitation, the lower the problem of AMR.³⁹ The points of contact are multiple in the broader context of the discourse on sustainability linking the environment, society, and the economy. These links have been known for quite some time. The problem is that they are not being addressed concurrently. From one perspective, this is not surprising because even the links between water and sanitation took decades to be effectively recognised. The links between health and the environment are today well reflected in policy terms insofar as the SDGs include a health goal but this does not extend to binding legal instruments.

At present, the most immediate way of ensuring environmental justice for all in respect of AMR and WASH is to approach the connections between the two through environment-related rights. The rights to water, sanitation and health are all directly connected with the right to environment and more broadly the right to life. All these rights are increasingly well recognised at the international level and firmly entrenched in many countries, as in the case of India where the rights to water, sanitation and environment were derived from the right to life by the Supreme Court already in the 1990s.

One of the many connections between these rights is environmental pollution, which affects everyone but often disproportionately affects the most marginalised and the poorest. This remains often the last link in the chain because the immediately visible issues are elsewhere. This could be the health concerns that individuals face in terms of AMR, or the contamination of drinking water caused by inadequate sanitation. Yet, the environment is what links these different elements together. The 50th anniversary of the Stockholm Conference offers an appropriate moment to reflect on the fact that the environment remains too often a side concern in debates that are in fact centrally concerned with environmental quality. AMR and WASH are just one point of entry for linking different issues around the environment. They are also a key point of entry because of the increasingly widespread negative consequences of AMR and inadequate access to drinking water, sanitation, and hygiene.

7. Conclusion

Over the past few decades, WASH has become an increasingly central concern of policymakers. More recently, AMR has become a key worry from global public health as well as planetary health perspectives. WASH and AMR are significant concerns from a health, water, and sanitation perspective. More broadly, what links them

³⁸ Ibid para 4.

³⁹ European Union, 'EU researchers find link between resistance to antibiotics and sanitation' (8 March 2019) https://ec.europa.eu/info/news/eu-researchers-find-link-between-resistance-antibiotics-and-sanitation-2019-mar-08_en .

together is the environment. An environment of good quality, such as good water quality, promotes access to drinking water, reflects better access to sanitation and limits the development of antimicrobial-resistant bacteria and genes. These environmental issues are of particular concern in many LMICs, but they also represent a global concern as the adverse impacts of AMR and lack of WASH can escape national borders.

The links between AMR and WASH have been made for quite some time, including in various soft law instruments at the international level and policy instruments at the national level, such as in India. The big gap that remains is in terms of binding legal frameworks. At the international level, there have been talk of various legal instruments, including on AMR but there does not seem to be much traction at this point towards their formal adoption. In this context, the best way to ensure that the links between AMR and WASH are effectively addressed is through the rights framework. The progressive realization of various related rights at the international level and the long-standing recognition of the rights to water, sanitation, health, and the environment in a country like India offers much scope for considering the links between AMR and WASH from a planetary health perspective and developing suitable regulatory responses.

The benefits of addressing AMR and WASH together have been confirmed by the COVID-19 pandemic that has highlighted the direct links between health, the environment, and patterns of development. In a context where environmental policy at the international level is framed around bringing together the environment, society, and the economy through the discourse of sustainable development, the 50th anniversary of the Stockholm Conference offers an apt opportunity to advance the discourse.

The failure of policymakers to address interconnected issues concurrently has led to dramatic adverse consequences for billions of people around the planet, not just in health terms but also in terms of livelihoods and social relations. This state-of-affairs needs to be addressed urgently in the context of AMR and WASH where there are increasingly numerous negative human health and environmental health consequences. In other words, addressing AMR and WASH together is one step towards ensuring planetary health.