GLOBAL INFORMATION SOCIETY WATCH **2020**

Technology, the environment and a sustainable world: Responses from the global South

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BENIN

TECHNOLOGY, SUSTAINABILITY, INTERSECTIONALITY: MAKING INNOVATIONS WORK FOR HUMAN RIGHTS AND THE ENVIRONMENT IN BENIN

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Introduction

Innovation in Benin's technological environment is flourishing – and many new uses of technology are being adopted by institutions, mostly in the environment, agriculture and health sectors. The question now is how to make these innovations work for human rights and a sustainable environment.

While the government's action plan supports the digital transformation with key reforms and initiatives to improve people's access to information and communications technologies (ICTs), there is an entanglement of obstacles for many communities that still do not have access to the internet and its basic determinants, for example, electricity. Using intersectionality as a lens would help address the multiple levels of inequalities or discriminations that prevent equal access to the internet, and facilitate access while taking into account specificities of multiply burdened groups.[1]

Technological innovation, while offering many opportunities to address development and environmental issues sustainably, is not a straightforward panacea in itself. Technology, as we have become aware, has a negative impact on the environment, whether through the mining of resources, energy use, or the e-waste it produces. At the same time, innovation can further exacerbate the digital divide, and reinforce inequalities even when it facilitates entrepreneurship.[2]

A system-wide commitment – including an alignment of initiatives from public and academic institutions, civil society organisations, startups, labs and funding agencies with a view to address the intersection between technology, inequality and sustainable development – seems necessary.[3]

Background

There is rhetorical and institutional commitment to sustainable development in Benin.

The institutional commitment runs from adopting relevant international instruments to the passing by the parliament of laws that have sustainable development as their focus, including the country's digital legislation,[4] environmental framework,[5] and laws on the recycling of plastic bags,[6] wildlife,[7] forests,[8] and natural resources.[9]

The country's 2018-2125 National Development Plan (NDP)[10] not only aligns with the country's long-term strategy – *Vision Bénin 2025 Alafia* – but also takes into account the Sustainable Development

1 Our definition of intersectionality focuses on multiple levels of discriminations and inequalities. It therefore applies to all marginalised communities and is not only based on race, class or gender; see Crenshaw, K. (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. *University of Chicago Legal Forum*, *1989*(1). https://chicagounbound. uchicago.edu/uclf/vol1989/iss1/8; Anthias, F. (1998). Rethinking Social Divisions: Some Notes Towards a Theoretical Framework. *Sociological Review, 46*(3); McCall, L. (2005). The Complexity of Intersectionality. *Signs: Journal of Women in Culture & Society, 30*(3); Sigle-Rushton, W. (2013). Intersectionality. In M. Evans & C. Williams (Eds.), *Gender: The Key Concepts*. Routledge.

2 Mnif, S. (2015). L'impact des changements technologiques sur les inégalités des revenus dans les pays en développement: Analyse empirique sur données de panel. *La Revue Gestion et Organisation*, *7*(1), 23-32. https://dx.doi.org/10.1016/j.rgo.2015.03.001

3 For more on the forms of political commitment, see Baker, P., et al. (2019). Generating political commitment for ending malnutrition in all its forms: A system dynamics approach for strengthening nutrition actor networks. *Obesity Reviews, 20*(S2). https://doi. org/10.1111/obr.12871

4 Présidence de la République. (2018). *Loi n° 2017-20 portant code du numérique en République du Bénin*. https://arcep.bj/wp-content/uploads/2019/07/Loi-N-2017-20-2.pdf

5 Présidence de la République du Bénin (1999). *Loi N° 98-030 DU 12 février 1999 portant Loi cadre sur l' environnement en République du Bénin*. https://sgg.gouv.bj/doc/loi-98-030/download

6 Présidence de la République du Bénin. (2017). *Loi n° 2017-39 du 26 décembre 2017 portant interdiction de la production, de l' importation, de l' exportation; de la commercialisation, de la détention, de la distribution et de l' utilisation de sachets en plastique non biodégradables en République du Bénin*. https:// sgg.gouv.bj/doc/loi-2017-39/download

7 Présidence de la République du Bénin. (2004*). Loi N° 2002-016 du 18 oct. 2004 portant régime de la faune en République du Bénin*. https://sgg.gouv.bj/doc/loi-2002-016/download

8 Présidence de la République du Bénin. (1993). *Loi N° 93-009 du 02 juil. 1993 portant Régime des Forêts en République du Bénin*. https://sgg.gouv.bj/doc/loi-93-009/download

9 Présidence de la République du Bénin. (2012). *Loi N° 2012-29 du 10 juilllet 2012 portant autorisation de ratification de la convention africaine sur la conservation de la nature et des ressources naturelles (version révisée), adoptée à Maputo (Mozambique), le 12 Juillet 2003*. https://sgg.gouv.bj/doc/loi-2012-29/download

10 *Plan National de Développement 2018-2025*. https://www.gouv. bj/download/2/mpd_plan-national-developpement_2018-2025_ final_14_janv.pdf; see also https://www.gouv.bj/actualite/199/ le-benin-lance-son-ambitieux-plan-national-de-developpement-pnd

Goals (SDGs) and Africa's Agenda 2063.[11] The NDP is aimed at addressing economic growth, inequalities and social exclusion, but also environmental sustainability, plus effective and inclusive governance.

In line with the *Vision Bénin 2025 Alafia*, the government's digital policy aims to transform Benin into a key country offering digital services in West Africa for accelerating growth and social inclusion.

Reforms, plus the implementation of flagship projects, have improved digital access. In 2019, the overall internet penetration rate was around 48% (versus 19.40% in 2015) with 5.53 million mobile internet subscribers.[12] In 2020, a national strategy for digital security aimed at creating digital trust was developed by the government. The strategy's three-year action plan will help raise awareness of cybersecurity, guarantee national sovereignty, and strengthen security infrastructures, while providing a strong response to cybercrimes.[13]

The planned implementation of a national data centre to host applications and services, cloud computing and virtualisation, will allow safe access to public administration and private sector services and data.[14]

A centre of innovation and knowledge, Sèmè City, was created by the government, offering a space for project incubation, support for entrepreneurs, scientific training, research on big data and financing for innovation. The centre is expected to create 190,000 jobs, with 40% of these for women, by 2030.[15] Also in 2019, the government launched a platform to provide over 250 e-services from ministries, public institutions and agencies.[16]

There is an intersection between ICTs and other sectors including, for example, agriculture, which accounts for 70% of the country's employment (36% of the GDP).[17] The national strategy for e-agriculture aims at building a digitally transformed agricultural sector by 2025, which is adapted to climate change and which will ensure food and nutritional security but also economic and social development for all.[18]

This policy context has facilitated the engagement of public institutions (regulation authorities, universities, government agencies) in developing ICT-based solutions and has paved the way for startups, incubators, innovators, civil society and donor-driven initiatives.

Technology: From Tognivoh to drones

In one of his songs titled *Tognivoh* in tribute to a famous ploughman, Benin music legend Houndéfo Alokpon praised the physical strength and zeal of farmers. Considered a semi-god in the 70s, Tognivoh won hands down all ploughing competitions in Savalou, in the centre of the country.

To compare the production capacity between the age of the famous ploughman and that of precision agriculture today would be like comparing the speeds of a chameleon and an eagle. Technology has made it easier to move from ploughing with hoes to precision agriculture using drones or big data. With drones, it takes less than half an hour for the startup AgriLeap to map a field, and monitor production from the study of the soil to harvesting and yield forecasts.[19]

Global Partners, another tech startup, provides drones for agriculture, as well as for natural resources conservation in Benin's protected parks to detect illegal logging, monitor forests or estimate forest carbon. It has developed anti-poaching projects and gathered rangers, students, civil society and research organisations to facilitate community dialogue and action on drone-based solutions.[20] The startup is part of the Mono Delta Transboundary Biosphere Reserve project, an initiative aimed at utilising drones for the sustainable use of natural resources in Benin and Togo.

Benin Flying Labs develops robotics solutions on health, environment and agriculture. With drones, it mapped Dassa-Zoumè, a municipality in the centre of Benin, to develop drone-based tax collection and land management solutions.[21] Benin Flying Labs is also involved in TechnoServe's CajuLab initiative which uses drones and computer learning to collect data on 80,000 hectares of

11 *Vision Bénin 2025 Alafia* is available at: http://dsa-flash.viabloga. com/files/BEN_2025_ALAFIA.pdf; see also Pofagi, M. (n.d.). *Bénin 2025 Alafia : Sentier de développement actuel et Perspectives.* https://www.brmnbenin.org/base/docs_de_rech/Benin_2025_Alafia_sentier_de_developpement_actuel_et_perspectives.pdf; African Union Commission. (2015). *Agenda 2063: The Africa We Want.* https://www.un.org/en/africa/osaa/pdf/au/agenda2063. pdf; and https://au.int/en/agenda2063/overview

12 https://fgi.bj/wp-content/uploads/2017/12/02-Presentation-FGI_Benin.pdf; CNUCED. (2020). Bénin : *Evaluation rapide de l'état de préparation au commerce électronique.* Geneva: United Nations. https://unctad.org/fr/PublicationsLibrary/dtlstict2020d5_fr.pdf

13 The National Digital Security Strategy is available at: https:// www.anssi.bj/docs/Documentation/ANSSI_Strategie_Nationale_Securite_Numerique_vSignee.pdf

14 https://prscg.assi.bj/un-centre-de-donnees-data-center-high-tech-pour-ladministration-beninoise

15 https://semecity.bj

16 https://www.service-public.bj

17 CNUCED. (2020). Op. cit.

18 MAEP, MENC (2019). *Stratégie nationale pour l'e-Agriculture au Bénin 2020-2024.* https://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Strat%C3%A9gie%20nationale%20e-Agriculture%20Benin%25-08-2019.pdf

19 https://agridigitale.net/art-l_agriculture_de_prcision_dbarque_au_bnin_.html

20 http://www.gblpartner.com/forestry-and-conservation

21 https://adn.bj/utilisation-des-drones-pour-le-developpement-economique-et-social-au-benin-cas-de-la-cartographie-aerienne-de-la-ville-de-dassa-zounme-grace-a-la-technologie-des-drones

cashew farms in order to increase yields while protecting land. The initiative includes training 10,000 farmers on climate-smart agriculture.[22]

With its Big Data Bootcamp, organised first in 2017 and aimed at building young people's capacity on big data technologies to create innovative applications, the tech startup Rintio plans to train about 5,000 youth by 2022.[23] It organised *Agridatadays*, a conference that gathers artificial intelligence, agriculture and big data specialists to discuss big data and agriculture.[24]

In the water, hygiene and sanitation sector, the Ministry of Water and Benin's national water company (SONEB) have supported the development of several solutions. For example, the application G-d'Or helps manage the water company's subscribers, its network (to avoid water losses) and resources (financial and human). *Base de données intégrées* (BDI) is the water sector information management system; AKVO Flow is a mobile application for mapping and building an inventory for the drinking water supply system; and the mWater platform manages an information system on village water supplies.[25]

Some other public institutions support innovation. The University of Abomey Calavi supports startups through its UAC Startup Valley. In 2019, following its sixth competitive call for project ideas, it selected 82 innovative projects.[26] The Electronic and Postal Communications Regulation Authority (ARCEP) also provides grants for startups. Each year, ARCEP launches a call for innovative projects.[27] In 2019, it provided grants for five tech startups (see figure 1).
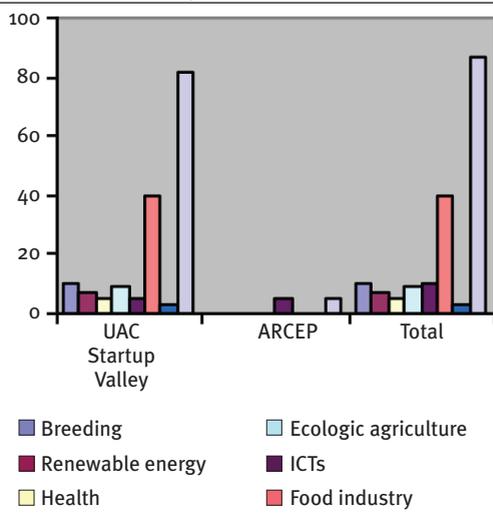
At the same time, there are several hubs, incubators and labs (TEKXL, Youth Connekt, BloLab, Iroko FabLab, KhulaTech, Solidar'IT, AgriYouth, Groupe LANDE, EtriLabs, etc.) that promote and coach innovators.

Sustainability

Several civil society groups use technology to draw the attention of policy makers to environmental sustainability. For example, to address the issue of the fishing techniques used by fishers of the Nokoué

FIGURE 1.
Startups supported by UAC Startup Valley and ARCEP in 2019

Legend:
- Breeding
- Renewable energy
- Health
- Ecologic agriculture
- ICTs
- Food industry

Lake in Cotonou that destroy the ecosystem, the NGO Benin Environment and Education Society (BEES) invited the Ministry of Fisheries for a field visit on the lake to map it using drones. Following the data visualisation, the ministry sorted out wastes from the lake and planned to acquire drones for its surveillance. BEES uses the same technique (mapping with drones plus advocacy) to educate people or lobby duty bearers to protect human rights and the environment.[28]

Another important issue for civil society engagement is climate change. A lack of proper awareness of climate change can increase vulnerability of populations.[29] Climate change is an obstacle to the social and economic development of rural populations,[30] and its impact on family farming can lead to conflicts between farmers and herders.[31] The rise in average temperatures is also expected to lead to an increase in diseases such as malaria. Because

22 https://www.commodafrica.com/19-08-2019-les-drones-au-service-de-lindustrie-du-cajou-au-benin

23 http://rintio.com/?p=243

24 https://www.techenafrique.com/tag/rintio

25 Ndaw, F., & Adokpo Migan, S. (2015). *Etude sur la valorisation du potentiel des TIC dans le secteur eau, assainissement et hygiène étude de cas : Benin*. http://documents1.worldbank.org/curated/en/998821471595059286/pdf/107195-FRENCH-WP-PUBLIC-TIC-Rapport-Benin-Final.pdf

26 https://uacstartupvalley.com/documents

27 ARCEP. (2019). *Rapport annuel d'activités de l'ARCEP*. https://arcep.bj/wp-content/uploads/2020/04/Rapport-Annuel-2019-ARCEP-BENIN.pdf

28 https://observers.france24.com/fr/20180308-benin-drones-lac-noukoue-peche-acadja-volent-secours-environnement; https://www.bees-ong.org

29 Idrissou, Y., et al. (2020). Perception du changement climatique par les éleveurs de bovins des zones tropicales sèche et subhumide du Bénin : comparaison avec les données météorologiques. *Cahiers Agricultures, 29*(1). https://doi.org/10.1051/cagri/2019032

30 Niang, I. (2009). Le changement climatique et ses impacts : les prévisions au niveau mondial. In IEPF, *Adaptation au changement climatique*. Liaison Énergie-Francophonie.

31 https://agrifambenin.wordpress.com/2015/01/09/impact-des-changements-climatiques-sur-lagriculture-familiale-au-benin; Vissoh, P. V., et al. (2012). Perceptions et stratégies d'adaptation aux changements climatiques : le cas des communes d'Adjohoun et de Dangbo au Sud-Est Bénin in L'Afrique face aux changements climatiques. *Cahiers d'Outre Mer, 260*. https://doi.org/10.4000/com.6700

of this there is the need for an adaptation policy agenda that promotes sustainable behaviour, and addresses inequalities.[32] This should promote climate resilience and epidemiological surveillance,[33] and political and social dialogue as well as sectoral and intersectoral adaptation policies.[34]

ICTs also act on the environment in terms of the consumption of energy and raw materials, pollution and e-waste, and impact on natural resources and biodiversity.[35] Therefore, beyond e-waste collection campaigns,[36] and the legal framework on the environment and on digital issues,[37] a national environmental protection policy to address e-waste is a public health emergency.

In its concluding observations on Benin's third periodic report, the Committee on Economic, Social and Cultural Rights called to increase people's resilience to natural disasters, urging the government to raise awareness of the harmful effects of pesticides on people's health, and to support farmers in the transition to agro-ecological practices.[38]

The causes of environmental problems such as the short-sighted exploitation of natural resources, the lack of a long-term global vision, profit and over-consumption must be tackled.[39] An environmental and health impact assessment is necessary, and it should be systematic and based on the precautionary principle of sustainable development. This would allow the development of people- and community-centred indicators for measuring social and ecological progress.[40]

Finally, to educate people on all the issues raised, e-learning initiatives (like the government's digital content project)[41] can be used for generating and sharing knowledge through mass and social media.

Intersectionality

Is such a green and ICT rush sufficient to reach SDG targets and meet people's rights? To make all these solutions work for the people, multiple-level disparities must be addressed and ICT indicators adjusted using an intersectional approach.

There are gender disparities in almost all sectors, including ICTs. The report from the Beijing Platform for Action's review in 2019 stressed that significant efforts are needed for gender equality in education, employment, income and access to resources in Benin.[42]

Also, in a rapid assessment of e-commerce readiness in Benin conducted in 2020,[43] the UN Conference on Trade and Development (UNCTAD) highlighted a set of obstacles to universal access to digital services, including electricity and illiteracy. Electricity is a determinant of digital access, but only 42% of the population have access to electricity – 72% in urban areas and 17% in rural areas. Poverty is also a key determinant. The household multidimensional poverty rate in the country is 56.1% in rural areas versus 23.7% for urban areas.[44] The average consumption of the poorest 20% of the population decreased from USD 0.84 per person per day in 1999 to USD 0.44 in 2015, while for the rest of the population, it rose from USD 2.81 in 1999 to USD 3.28 in 2015.[45] The UNCTAD report noted that the cost of weak data volume (less than 1 gigabyte) is 30% to 50% higher in Benin than in six of the seven other countries of the West African economic and monetary union.

Accessibility is dependent on cost, access to infrastructure and digital devices, but also quality. UNCTAD's report stresses that 51.5% of complaints received by ARCEP in 2018 related to operational issues and the quality of services, while only 20% of the population is connected to broadband and 3G/4G internet.[46]

32 Akponikpe, P. B. I., et al. (2019). *Etude de Vulnérabilité Sectorielle face aux changements climatiques au Bénin, Secteur : Agriculture.* Climate Analytics gGmbH. https://climateanalytics.org/media/pas-pna_benin_va_agriculture.pdf

33 Osse, R., et al. (2019). *Etude de Vulnérabilité Sectorielle face aux changements climatiques au Bénin, Secteur : Santé.* Climate Analytics gGmbH. https://climateanalytics.org/media/pas-pna_benin_va_sante.pdf

34 Boko, M., Kosmowski, F., & Vissin, E. (2012). *Les enjeux du changement climatique au Bénin.* Konrad Adenauer Stiftung. https://www.researchgate.net/publication/287196158_Les_enjeux_du_changement_climatique_au_Benin

35 Houédanou, S. (2019). Le numérique et la protection de l'environnement au Bénin. Paper presented during the conference *Le numérique et la protection de l'environnement au Bénin.* https://www.researchgate.net/publication/330910943_Le_numerique_et_la_protection_de_l'environnement_au_Benin

36 https://www.agenceecofin.com/gestion-publique/2605-29267-benin-plus-de-20-tonnes-de-dechets-informatiques-collectees-par-mtn

37 Article 32 of the Digital Code stipulates that a decree will be adopted for the regulation of the management and treatment of e-waste.

38 Committee on Economic, Social and Cultural Rights. (2020). Concluding observations on the third periodic report of Benin, E/C.12/BEN/CO/3. https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=E/C.12/BEN/CO/3&Lang=En

39 People's Health Movement. (2000). *People's Charter for Health.* https://ruralindiaonline.org/library/resource/peoples-charter-for-health

40 Ibid.

41 http://revealingbenin.com/programme-dactions/programme/numerique

42 Direction de la Promotion de la Femme et du Genre. (2019). *Examen national approfondi sur la mise en œuvre du Programme d'action de Beijing au Bénin.* https://www.uneca.org/sites/default/files/uploaded-documents/Beijing25/benin-beijing25.pdf

43 CNUCED. (2020). Op. cit.

44 INSAE. (2016). *Principaux indicateurs socio démographiques et économiques* (RGPH-4, 2013).

45 Development Initiatives. (2020*). Les P20 au Benin: De la consultation au consensus.* https://devinit.org/resources/p20-benin-consultation-consensus/p20-benin/#downloads

46 CNUCED. (2020). Op. cit.

Of course, the government is taking several initiatives to address inequalities. In 2019, 40 community digital centres were opened. In 2020, the government planned to open 26 multimedia centres (with three for people with disabilities), in addition to existing community ICT centres established in 2015 and 2016. Moreover, to promote gender justice, there was a Women's Digital Month in May 2019,[47] followed by the launch of Amazons of Digital, a competition for women innovators organised in partnership with the International Network of Women Engineers and Scientists (INWES).[48] But the structural causes of all of the abovementioned determinants should be tackled and their combined effects taken into account.

Conclusion

Innovation offers prospects for tackling development issues, and there is a wide range of startups using ICTs to address environmental issues.

However, to achieve this in a sustainable way, the most vulnerable groups and the entanglement of inequalities must be taken into account in all initiatives. This means initiating policies that address people's right to technology, while both securing their right to health and environment and considering social determinants. An integrated approach that includes research and encourages civil society engagement, and an agenda that helps align all efforts from government, donors, startups, the media, literacy centres and fact-checking platforms, can make it happen. Policy makers, researchers, donors and other actors in the sector should learn from initiatives like Farm Radio International's gender-responsive ICT-for-scale project,[49] and undertake research to map inequalities.

It is also important to develop and promote initiatives that are at the intersection of environmental science and digital innovation such as, for example, Future Earth and Concordia University's Leadership in Environmental and Digital Innovation for Sustainability (LEADS) project. This is aimed at offering training and further research on climate change, system-based approaches to sustainable development and digital innovation, so as to accelerate the transition towards sustainability.[50]

Finally, there is a real need to use an intersectional approach to address the multiple inequalities that people (especially youth, women, people living with disability, with HIV or in rural areas, etc.) face in accessing technology. The government should work on progressive policy agendas – inspired by initiatives such as The Shift Project's sustainable digital society, which is based on a synergy between digital and energy transition[51] and informed by economic, social and cultural rights.

Action steps

The following action steps are necessary in Benin:

- Support gender-sensitive research on technology and sustainability, and adopt a system-based approach to sustainable development. Researchers should develop people-centred indicators for measuring social and ecological progress,[52] and use an intersectional approach to adjust those indicators.

- Strengthen accountability and oversight. This includes building the capacity of public institutions, the media and civil society organisations (including women farmers' organisations) to monitor the inclusiveness and sustainability of digital policies. Civil society organisations should also submit shadow reports to UN human right bodies.[53]

- Support the media and fact-checking platforms to encourage the development of reliable local language content on sustainable development and human rights.

- Support blockchain innovators and labs in adapting their solutions to environmental issues facing vulnerable communities.[54]

47 https://www.youtube.com/watch?v=H2bS0BFZcAM
48 https://numerique.gouv.bj/public/ amazonedunumerique/a-propos
49 Farm Radio International. (2017). *Research brief: Harnessing ICT to scale-up agricultural solutions.* https://publications.farmradio. org/research-brief-harnessing-ict-scale-agricultural-solutions
50 https://futureearth.org/2020/06/19/future-earth-co-leads-new-program-for-sustainability-trainees-in-the-digital-age; https:// create.futureearth.org

51 https://theshiftproject.org/wp-content/uploads/2018/11/ Rapport-final-v8-WEB.pdf.
52 People's Health Movement. (2000). Op. cit.
53 The National Integrity System (NIS) takes into account 13 pillars including public institutions, civil society and the media; Transparency International. (2016). *Evaluation du Système national d' intégrité du Bénin. Rapport 2016.* https://www.transparency. org/en/publications/evaluation-du-systeme-national-dintegrite-du-benin-resume-executif#; see also the African Integrity Indicators at https://www.africaintegrityindicators.org/data; one of the recommendations of the Committee on Economic, Social and Cultural Rights following Benin's third periodic report was to revise the legal framework, especially the Digital Code, so as to facilitate civil society's work; Committee on Economic, Social and Cultural Rights. (2020). Op. cit.
54 For more on the use of blockchain for sustainable development, see Denis Le Sève, M., Mason, N., & Nassiry, D. (2018). *Delivering blockchain's potential for environmental sustainability.* ODI. https://www.odi.org/sites/odi.org.uk/files/resource-documents/12439.pdf

Technology, the environment and a sustainable world: Responses from the global South

The world is facing an unprecedented climate and environmental emergency. Scientists have identified human activity as primarily responsible for the climate crisis, which together with rampant environmental pollution, and the unbridled activities of the extractive and agricultural industries, pose a direct threat to the sustainability of life on this planet.

This edition of Global Information Society Watch (GISWatch) seeks to understand the constructive role that technology can play in confronting the crises. It disrupts the normative understanding of technology being an easy panacea to the planet's environmental challenges and suggests that a nuanced and contextual use of technology is necessary for real sustainability to be achieved. A series of thematic reports frame different aspects of the relationship between digital technology and environmental sustainability from a human rights and social justice perspective, while 46 country and regional reports explore the diverse frontiers where technology meets the needs of both the environment and communities, and where technology itself becomes a challenge to a sustainable future.

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