The challenges of technology and sustainable development: Some reflections on the future of the SDGs for minorities and indigenous peoples

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Violet, an Aboriginal traditional landowner in Kakadu, uses a flaming palm frond to set fire to an area of bushland as part of a traditional system of controlled fire management. She constantly studies the landscape and burns areas at the right time so that the fires are not too hot but can still clear underlying debris which could fuel a larger, out of control, wildfire. Nr. Cooinda, Kakadu, Northern Territory, Australia. *Credit: Matthew Abbott/Panos*

While technological advances have been linked to patterns of destructive unsustainable development, including the direct impacts of mining and other extractive industries on communal lands, they also offer new tools that open up the possibility of an alternative future. Indeed, in their widest definition, technologies are innovations developed to enhance living and social conditions, including health, well-being and the environment.

From participatory information and communication technologies (ICTs) to the use of traditional architectural design, members of minority and indigenous communities have had a specific role in maintaining and developing technological traditions: for example, minority and indigenous women have played a highly important role in developing and maintaining bodies of knowledge around traditional foods, medicine and child health.

It is also important to recognize the role of older community members in maintaining and documenting minority and indigenous languages, and to consider the ways in which technology can help or hinder the protection of unique practices and traditions. Furthermore, far from being passive recipients, minorities and indigenous peoples have themselves been the creators and users of processes and goods that we consider as technology – and some of the world's most ancient cultures have left the world with a legacy of building, medicine, agriculture and other forms of traditional knowledge that are still compelling and relevant today.

This chapter looks at the role of technology in improving lives for minority and indigenous communities, and is specifically focused on monitoring, implementing and achieving the Sustainable Development Goals (SDGs). It begins with an overview of the SDG process and its implications, before looking in more detail at the potential for improved data collection, inclusive access and the value of establishing the links between 'traditional knowledge' and 'modern technology'. Though frequently presented as contrasting visions, in practice they are often closely connected. Indeed, there is growing awareness that some of the solutions to many contemporary challenges, such as climate change, could be built on long-established minority and indigenous perspectives on environmental management, agriculture and forestry.

Minorities, indigenous peoples and the SDGs

The SDGs were adopted by the United Nations (UN) in 2015 with the aim of guiding the world towards a healthier, more inclusive and more sustainable

future. Comprising 17 goals and 169 associated targets, they build on the Millennium Development Goals (MDGs) that preceded them and are set to continue until 2030. Part of the need for the SDGs, in fact, was the failure of the MDGs to deliver on their goals for large sections of society, and, in particular, minorities and indigenous peoples. These shortcomings make the realization of the SDGs even more critical for minority and indigenous communities.

There is no doubt that, as things currently stand, the most marginalized continue to be left behind. Indigenous peoples, for example, are estimated to make up 5 per cent of the world's population but account for around 15 per cent of the extremely poor. A similar picture emerges for ethnic, linguistic and religious minorities, who are also frequently confronted by similar barriers to inclusion. Recognizing these disparities is essential as even apparent success stories can conceal stark challenges for certain groups. Denmark, for example, was ranked as the highest performing country in the Sustainable Development Report 2019, an independent ranking of national progress towards achievements of the SDGs. Yet Greenland, an autonomous territory of Denmark with a majority Inuit indigenous population, still struggles with high poverty rates and the disruptive experience of post-war modernization, leading to such acute social issues as alcoholism and one of the highest suicide rates in the world. Development, in and of itself, does not inevitably bring positive outcomes for minorities and indigenous peoples if it is not rights-based and participatory.

This is the dilemma that today's technologies pose. There is, understandably, much optimism around their potential to help deliver momentum to achieving the targets of the SDGs. Yet unequal access to technology, particularly in the twenty-first century, could create further barriers to change for minorities and indigenous peoples, affecting access to multiple aspects of well-being. It is not hard to see how rolling out sophisticated computer software for education in schools or investing in more centralized, high-tech health care systems could exacerbate the isolation of some communities from these services if a concerted effort is not made to overcome the social, economic and political discrimination they face.

It is also important to view technology through the conceptual and epistemic lens of minority and indigenous communities, and of all groups within these communities. This means looking

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at technology as a form of power, and not seeing it simply as a neutral tool. Indeed, it is important to recognize that technology has often been a double-edged sword for minority and indigenous communities, and one frequently used by dominant cultures to gain control over their lands and ways of life. For example, technologies such as modern information media frequently act as drivers of exclusion, as they are not adapted to the diverse members of ethnic, religious or linguistic minorities or indigenous peoples, or people in need of assistive technologies. The failure to tailor these technologies to the specific physical, cultural or linguistic needs of minorities is evident even within the context of the SDGs: the UN's materials on the SDGs are only widely translated into the six official languages (Arabic, Chinese, English, French, Russian and Spanish), particularly disadvantaging linguistic minorities and speakers of indigenous languages.

Nevertheless, indigenous peoples have been able to play a much more prominent role during the SDG discussions than before, as reflected in the inclusion of six direct references to indigenous peoples in the key 2015 UN General Assembly Resolution 70/1, Transforming Our World: The 2030 Agenda for Sustainable Development. Building on this, the UN Permanent Forum on Indigenous Issues has issued a number of briefings and reports highlighting the importance of ensuring that indigenous peoples remain at the heart of the SDG process. Their demands include the implementation of the SDGs with full respect for the rights of indigenous peoples, taking steps to ensure indigenous peoples are visible in the data and review of the goals and targets, with relevant indicators for indigenous peoples included at a national level. Equally importantly, they have called for full and meaningful indigenous participation in implementation, follow-up and review.

It is important to recognize that the demands made by the well-organized advocacy of the UN Permanent Forum for Indigenous Peoples are as relevant for ethnic, religious and other minorities, which by definition, are a highly diverse group and not easily represented under one voice or umbrella. Minority community organizations and coalitions, such as those representing Dalits and Afro-descendants, have also produced research and briefings for campaigns around the SDGs. These repeatedly draw attention to the needs of minorities and consideration of the achievement of the SDGs from the perspective of these groups.

Indeed, the SDGs are fundamentally about equality and inclusion. When the 2030 Agenda for Sustainable Development was adopted by UN member states, they pledged to ensure that 'no one will be left behind'. Goal 10 is very clear: 'Reduce inequality within and among countries.'

Improving the visibility of minorities and indigenous peoples in the SDGs

One of the most pressing issues around achieving the SDGs, especially for minorities and indigenous peoples, is how to make visible the progress of these diverse groups. All 17 SDGs, spanning a range of issues including poverty (Goal 1), zero hunger (Goal 2), health and well-being (Goal 3),

THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

Goal 1 End poverty in all its forms everywhere

Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3 Ensure healthy lives and promote well-being for all at all ages

Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5 Achieve gender equality and empower all women and girls

Goal 6 Ensure availability and sustainable management of water and sanitation for all

Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10 Reduce inequality within and among countries

Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12 Ensure sustainable consumption and production patterns

Goal 13 Take urgent action to combat climate change and its impacts

Goal 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

education (Goal 4) and gender equality (Goal 5), use a series of measurable indicators to assess each goal and monitor progress towards achievement of the overall aim of sustainable development. From the inception of the goals, indigenous and minority activists have lobbied for the inclusion of specific indicators related to their communities and the problems they face. Minority and indigenous communities have also advocated for their *conceptualization* of the goals to be taken into consideration. Poverty, for example, is conceptualized very differently by different minorities and indigenous peoples – and the very concept is highly culturally specific and diversely constructed.

In this context, the first issue to look at is how technology can lift the 'persistent invisibility'[1] of the experience of minority and indigenous communities in official statistics and data. The key aspect here, which has been the focus of campaigns by minority and indigenous organizations for decades, is the disaggregation of official data to identify the specific situation of minority and indigenous groups.

Just as importantly, disaggregated data can then measure progress to improve the lives of these groups. In Canada, the National Collaborating Centre on Aboriginal Health has made this a central concern, arguing that 'fully disaggregating data helps to expose hidden trends' and 'can make vulnerable groups more visible to policy makers'.[2] Similar initiatives have been undertaken by minority organizations. For example, the Asia Dalit Rights Forum (ADRF) has country chapters that work with the national government, civil society and local communities on data collection, consultations and monitoring to support the realization of the SDGs. Recognizing that caste barriers continue to undermine progress, Dalit activists have also called for more 'caste-sensitive' indicators to monitor progress in narrowing social inequalities.

Technology can be of huge importance in these processes, in particular ICTs that allow official data, such as census, health and education information, to be easily disaggregated by individual populations. Other digital tools, such as informal mapping and citizen-led data production, also offer significant potential. It is worth noting that the most effective approaches combine technological innovation with a commitment to inclusion and empowerment. After all, the historic absence or under-reporting of minority and indigenous populations in many national censuses has often been the result of discrimination or political calculations due to their geographic or social isolation from the centres of power in their countries. Indeed, high-cost technologies could compound these issues by acting as an excluding force, pushing poorer or remotely located communities further into the shadows.

Disaggregated data collection should therefore include, among other elements, the active involvement of

1 UN Department of Economic and Social Affairs, *State of the World's Indigenous Peoples: Implementing the United Nations Declaration on Indigenous Peoples, 2019*.

2 National Collaborating Centre on Aboriginal Health, 'The importance of disaggregated data', 2010. Available at: https://www.nccih.ca/docs/context/FS-ImportanceDisaggregatedData-EN.pdf

members of minority and indigenous communities in identifying and collecting information. The Indigenous Peoples Major Group (civil society organizations working on the SDGs have been grouped by the UN into thematic clusters, known as 'major groups') articulated this very clearly in a policy statement on the SDGs, calling for 'the inclusion of cultural identifiers in national census and population data', the identification of relevant indicators for indigenous peoples 'with their full and meaningful participation' and 'community based monitoring and information systems' to complement national measurements.[3]

There have been significant attempts to use ICTs to support monitoring of SDG progress for minority and indigenous communities by empowering them in the data collection process. For example, the Indigenous Navigator is an online platform designed to support communities in measuring and assessing their rights. The Navigator includes a toolkit for indigenous users to teach themselves how to evaluate and monitor their rights, including their progress towards the SDGs. Each domain highlights the right of indigenous peoples and its relevant SDG target. Importantly, the initiative has taken a holistic approach to the provision of this technology by providing extensive education and capacity development in the use of these technologies. During the project's pilot phase, for example, a community questionnaire was tested with indigenous communities in various countries in Africa, Asia and the Americas, and the website includes training materials, tools and online courses to help indigenous peoples to understand and develop their own indicators.[4]

In Nepal, for example, the pilot phase worked with two indigenous communities. Tahal Thami, the director of one of the local partner organizations for the project there, highlighted the strong investment that community members felt through their engagement as direct participants in data collection. He also highlighted that the process had the added benefit of raising awareness among local residents on their rights and a broader exploration of how they could engage officials and donors with their own views for 'a self-determined development', as he described it: 'It opened an opportunity to reflect on the concept of poverty. Poverty was realized to be not only about economic concerns in pecuniary terms, but more so about lack of other intangible matters such as powerlessness, illiteracy and having no voice, among others.'

The role of technologies in delivering the SDGs

Technology does not simply have a role in making progress visible within the SDGs for minorities and indigenous peoples but also has a significant role in delivering

3 Indigenous Peoples Major Group, 'Policy Brief on Sustainable Development Goals and Post-2015 Development Agenda'. Available at: https://sustainabledevelopment.un.org/content/documents/7036IPMG%20Policy%20Brief%20Working%20Draft%202015.pdf

4 Indigenous Navigator, 'Indigenous peoples: Disaggregated data needed for monitoring SDGs'. Available at: http://nav.indigenousnavigator.com/index.php/en/news/120-indigenous-peoples-disaggregated-data-needed-for-monitoring-sdgs

A large sign gives information in English about Covid-19 on the street in Kashmir, India.

Credit: Atul Loke

many of the targets. This section considers the potential of technology to support the implementation of sustainable development.

For instance, access to assistive technologies is especially important for members of minorities and indigenous peoples who also live with disabilities. Accessible and assistive technologies such as screen-readers for visually impaired persons, wheelchairs for physically impaired persons, subtitles for hearing-impaired persons and video calls to facilitate communication in sign languages can lower or eliminate barriers to education, training and employment, health care, and political and social participation. According to the World Health Organization (WHO), 'assistive technology reduces the need for formal health and support services, long-term care and the work of caregivers. Without assistive technology, people are often excluded, isolated and locked into poverty, thereby increasing the impact of disease and disability on a person, their family and society.'[5]

These issues are especially pertinent for minority and indigenous persons with disabilities, who face intersectional discrimination, as members of a marginalized community and as a result of their mental or physical impairment. These barriers are specific to minority or indigenous persons with disabilities as they are not experienced by either their non-disabled minority or indigenous counterparts or their disabled counterparts from other dominant groups. A recent example is the lack of information available on Covid-19 in accessible formats and in culturally appropriate, indigenous mother-tongue languages, which specifically affecting the ability of minority or indigenous persons with disabilities to protect themselves against the virus.

5 WHO, 'Assistive technology', 18 March 2018. Available at: https://www.who.int/news-room/fact-sheets/detail/assistive-technology

As with other technologies, the issue is not simply the presence or absence of technologies but also the extent to which those available are tailored to the specific needs and preferences of certain communities. For instance, indigenous peoples may take a different view of what constitutes 'disability' and even challenge the concept itself. An International Labour Organization (ILO) report on this theme reports that 'the ancestral Māori conception of humanity embraces difference and uniqueness, seeing disability as a natural part of one's being, and not as an impairment. Indigenous peoples' rejection of the concept of impairment as linked to a limitation was also evident in indigenous peoples in the Americas.'[6] This perspective will clearly inform the nature of assistive technologies required. The fact that persons with disabilities from some indigenous communities have found standard equipment, produced externally without their involvement, ill suited to their particular context points to the necessity of ensuring their involvement at every stage. Inclusive access hinges not only on the numbers in physical possession of a particular technology but also their ability to shape its design and development from inception.

ICTs, if imposed insensitively or without consultation with communities, can pose their own challenges to non-majority cultures and values. Nevertheless, when accompanied by a rights-based approach, television, film and other multimedia content can support the delivery of essential services, such as education and health, to otherwise excluded populations. In Taiwan, for example, the Indigenous Peoples Cultural Foundation has developed the Taiwan Indigenous Television (TITV) channel to tackle a wide range of issues faced by indigenous peoples across the country, including loss of language, cultural attrition, and lack of access to health information and educational opportunities more generally. The TITV network is attempting to overcome these barriers by using the channel to reach a diverse range of communities.

In remote settings, where minority and indigenous communities are physically isolated, access to food, education, medicine and energy can be especially challenging. In these settings, technology can play a vital role in helping communities access services. For example, telemedicine has considerable potential to deliver health services to isolated communities. In Australia, the Aboriginal Community Controlled Health Service (ACCHS) is a specially designed service which aims to provide culturally appropriate health care to indigenous Australians, particularly in remote settings. A recent study evaluating this programme found that the 'telehealth' achieved positive results because, crucially, it was managed by local residents with an emphasis on 'holistic and culturally appropriate care', which enabled the technology to enhance access to indigenous health workers while reducing the burden on the community.

Remote minority and indigenous communities can also benefit from modern technologies to access electricity and energy. The track record

6 Rivas Velarde, M.C., 'Indigenous persons with disabilities: access to training and employment', ILO discussion paper, 2015.

A Baka man in the Congo Basin climbs up a tree to collect honey.

Credit: Graeme Williams

of many development programmes in this area, including many which have enjoyed funding from international donors, is mixed: indigenous communities in particular have been subjected to violence, displacement and dispossession of their ancestral lands not only to accommodate fossil fuel extraction and mining but also hydroelectric dams. Many of these projects, even those justified on environmental grounds, still represent the sort of one-sided and exploitative use of technology that SDG 17 implicitly cautioned against, calling instead for 'knowledge sharing on mutually agreed terms' and 'the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms'.

Even 'green' development can generate disastrous human impacts for communities if undertaken without free, prior and informed consent (FPIC) or respect for land rights. By way of contrast, a solar energy project in rural Argentina funded by the World Bank – frequently criticized for its sponsorship of infrastructure programmes with poor human rights outcomes – was able to deliver sustainable energy to hundreds of households through a 'bottom-up' approach that combined small-scale, off-grid solar technologies suited to remote communities with a substantial capacity-building component to support local residents in adopting the new technologies and overcoming information barriers.

In situations of conflict, particularly in remote settings of environmental conflict, technology can facilitate the documentation and protection of the rights of minority and indigenous communities while also protecting vital ecosystems. For example, an award-winning community mapping programme in Cameroon and the Democratic Republic of Congo aims to connect isolated forest communities and central policy-makers to support the inclusion and participation of marginalized forest dwellers. The programme helps forest communities to map their land interactively and protect the forests. This mapping project has supported 800 forest communities across the Congo Basin to produce maps of their lands and resources covering over 5 million hectares. In 2016, MappingForRights was recognized by the UN Framework Convention on Climate Change (UNFCCC) as part of the UN Momentum for Change awards.

For land-based communities, this is an example of the ways in which technologies can support SDGs on climate change (Goal 13), sustainable management of terrestrial resources (Goal 15), just, peaceful and inclusive societies (Goal 16), and sustainable development overall (Goal 17).

Activities such as community mapping and documentation, using ICTs such as satellites, mobile phones and the internet, can also support ocean-reliant minority communities. Simple modern technologies can help fishermen and women protect their ecosystem and fellow species. The Food and Agriculture Organization (FAO), for instance, has looked at how both physical and institutional technologies can be used to support and protect small-scale sustainable minority fishing communities.
What these examples perhaps demonstrate most clearly is that it is not simply the technologies themselves, but also how they are applied which determines the extent to which they deliver positive change to minorities and indigenous communities. Consultation, participation, capacity development and culturally appropriate design are as critical to the sustainability of a technology in these contexts as engineering, electronics or other 'hard' elements in its make-up.

An alternative vision of development

Technology has a significant role to play in the attainment of the SDGs for minorities and indigenous peoples – bringing the best of minority and indigenous technological understanding together with advances in sustainable technologies internationally, including in ICTs and in education, medicine, architecture and planning. Ethnic, linguistic and religious minorities and indigenous peoples have a rich history of multiple and

Indigenous children wearing face masks against the spread of the coronavirus in the Parque Das Tribos. In view of the rampant pandemic, representatives of indigenous organizations from the Amazon region have asked the international community for urgent support. Manaus, Brazil.

Credit: Lucas Silva/ Alamy

diverse technologies, spanning science, language and the arts, that are still in use today. This might include visible cultural assets, such as traditional water management systems and physical infrastructure, but also intangible heritage such as herbal medicines and other forms of knowledge that represent a wider understanding of technology.

Given that more than half of the world's population now lives in towns and cities across the world, SDG 11 ('To make cities and human settlements inclusive, safe, resilient and sustainable') has particular relevance for minorities and indigenous peoples, as indigenous city-dwellers are often overlooked: despite the fact that there are millions of indigenous urban residents living in cities across the world, 'the common image is of isolated communities cut off from the modern world, largely disengaged from the challenges and advantages of the urban future.'[7] In practice, however, large numbers of indigenous peoples are living in urban areas and their numbers continue to grow as many others migrate to cities, driven there in search of work and services, or the need to flee violence or displacement from their places of origin. Indigenous people have themselves proposed a more nuanced and participatory approach to the monitoring of Goal 11, informed by their own experiences of discrimination and exclusion in cities. The Indigenous Peoples Major Group proposed a number of sub-indicators in this area, for example, including the 'number of appropriate human settlements provided to indigenous peoples', the 'proportion or level of participation of indigenous peoples in planning and management', and 'provision of access for indigenous peoples to their religious and cultural sites and access to and repatriation of their ceremonial objects and human remains'.[8] Similar indicators have already been used to assess the situation of minority groups in cities, demonstrating the value of disaggregated data-gathering systems when these are in place to monitor SDG progress. In the United Kingdom (UK), for instance, indicators monitor the inclusion of black and minority ethnic groups in a wide variety of parameters, including education, housing, work and health care. ICTs play a prominent role in these efforts and also help advocacy groups to disseminate findings to a wider audience.

Discussions of urban planning and technologies are frequently dominated by the paradigm of 'smart cities'. Though spanning a range of approaches, the field has nevertheless attracted (alongside much investment and rhetorical support from governments) considerable criticism for its emphasis on technological innovation at the expense of social inclusion, with minorities often overlooked or sidelined in their plans. At their worst, they can actively disempower these groups: for example, Amnesty Tech, Amnesty International's unit focusing on emerging technologies, has

7 Stephens, C., 'The indigenous experience of urbanization', in P. Grant (ed.), *State of the World's Minorities and Indigenous Peoples 2015: Focus on Cities, London*, MRG, 2015.

8 Indigenous Peoples Major Group, 'Policy brief on Sustainable Development Goals and Post-2015 Development Agenda', *op. cit.*

accused China of co-opting 'smart' urban technologies in Xinjiang to further embed its repressive 'digital police state' in the lives of the Muslim Uyghur minority.[9] The potential for technologies to subject individuals and communities to surveillance and discrimination, whether intentionally or indirectly, is playing out in cities across the world. There is no guarantee that a city built on the best technologies will be fairer or more inclusive for its minority and indigenous residents if the right checks and protections are not in place.

Yet there is a wealth of knowledge and practice that minorities and indigenous peoples can offer as an alternative technological system in relation to contemporary challenges such as urban planning, architecture and interior design. Indeed, this is perhaps one of the most fertile areas for the interface of traditional and modern technologies in building and construction. Some recent initiatives in Canada demonstrate how productive an indigenous-led approach to architecture can be. In Vancouver, a radical plan to develop a new urban quarter called Sen̓ákw, on the site of a Squamish village of the same name razed to the ground a century ago, was approved in December 2019 by 87 per cent of voting Squamish Nation members. The development will be characterized by a unique architecture strongly informed by the community's traditional design, reinterpreted for contemporary needs. Importantly, too, it breaks the long history of urban exclusion in Canada that has seen its indigenous communities resettled to the urban periphery.

Finally, indigenous peoples and minorities have always made a very strong case for their role in the protection of the planet – a major goal of the SDGs as a whole and the focus of Goal 13 ('Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy') and related goals around sustainable development and environmental protection. There are some significant win-win projects across the world that benefit from traditional approaches to environmental stewardship encompassing both the conservation of endangered species and the protection of minority or indigenous communities in these areas. Many of these programmes depend heavily on technology for capacity building, monitoring and dissemination of their results. For example, an innovative programme in Papua New Guinea aims to preserve a threatened species of tree kangaroo while supporting economic development for local minority groups – all supported through an international collaboration of scientists and local peoples.

This example points to two important and related points around technology. First, that technology should be understood in a broad and holistic fashion, spanning not only the latest developments in science, energy and engineering but also established systems of knowledge belonging to minorities and indigenous peoples that are still relevant to today's challenges. Second, that some of the most effective programmes can combine modern technologies with

9 Begault, L. and Khazrik, J., 'Smart cities: dreams capable of becoming nightmares', Amnesty International, 28 June 2019.

traditional knowledge and community capacity building. This is especially evident in attempts to address climate change: there is now increasing recognition that minority and indigenous knowledge systems and resource management approaches offer an important element in global adaptation, and may be cheaper and more sustainable than some of the resource-intensive 'technological' solutions being proposed. After all, indigenous organizations had been sounding the alarm on climate change for decades before governments belatedly recognized it as a policy concern.

In their statement 'Commitments for Action on Climate', the World Indigenous Peoples' Initiative to the UN Climate Action Summit in September 2019 argued for a rights-based response to the climate crisis that included, among other elements, access to 'the development of renewable energies in accordance with our self-determination and FPIC'.[10] The statement goes on to elaborate a detailed set of recommendations to 'implement and promote a rights-based approach and access to and implementation of renewable energy development, for a just transition away from fossil fuels'. This is just one example of how minorities and indigenous peoples are actively engaging with the latest technologies, but from a perspective grounded in human rights – in the process challenging conventional narratives around 'development' that overlook these dimensions and have frequently proved devastating for communities.

Crucially, the SDGs focus on sustainable development. In particular, there is the call in Goal 17 for 'knowledge sharing on mutually agreed terms' and 'the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms' – a far cry from the exploitative and one-sided use of technologies that characterizes much of the activities of mining, oil and other extractive industries. This is what distinguishes the vision of the SDGs from the socially and environmentally destructive activities frequently carried out in the name of development by governments, corporations and donor agencies.

Conclusion

The outbreak of the Covid-19 pandemic, besides threatening to undermine much progress in the SDGs, has also brought to the surface the underlying inequalities minorities and indigenous peoples face not only in health but also education, livelihoods and other key areas. The heavy tolls even in industrialized countries like the UK, where emerging data suggests that death rates among those with a sub-Saharan African background and those with a Pakistani background in hospitals in England are around 2.5 times higher than for white

10 Indigenous Peoples Major Group for Sustainable Development, 'Statement of the indigenous peoples constituency on the session: "Linking National, Regional, and Global Dimensions of the 2030 Agenda for Sustainable Development", 20 May 2020'. Available at: https://www.indigenouspeoples-sdg.org/index.php/english/all-resources/ipmg-position-papers-and-publications/ipmg-statements-and-interventions

British people, show that 'development' alone is no guarantee of protection from the devastation of the virus. Good governance and human rights have also been important factors in determining the success of different countries in their response.

It is therefore more important than ever to recognize that technologies, while often presented as 'neutral', can replicate discrimination without a clear rights-based approach. To continue to move towards the targets of the SDGs, with minorities and indigenous peoples at the heart of that process, we need to ensure that social inclusion and sustainability underpin these approaches. With every new technological advance, as with any development, it is important to look at how patterns of exclusion have contributed to unequal service access, and how technology might either help or exacerbate this situation. All too often, the design and implementation of technology initiatives lack minority or indigenous peoples' participation, or consideration of their social, economic or political implications. With this in mind, some principles to help ensure that technologies support rather than hinder sustainable development are listed below:

- *Ensure technologies work to improve visibility for minorities and indigenous peoples in data monitoring.* Lack of visibility, particularly in terms of disaggregated data, remains perhaps the greatest challenge facing both minorities and indigenous peoples. Data tools and other technologies, including citizen-led ICTs, could help deliver a clearer and more inclusive evidence based on the inequalities they continue to experience.

- *Overcome physical and social barriers to access and availability of essential services.* Geographic exclusion and other constraints around services still exist for minority and indigenous communities. If they are not implemented in an inclusive fashion, technologies could compound rather than alleviate these constraints: for example, if technologies are unaffordable for the most marginalized communities. Poverty can and has prevented many communities from accessing services more generally. Technology, and particularly the high cost of technologies, could make their availability dependent on external income sources such as international donors.

- *Ensure that technologies are delivered accessibly and equitably for minority and indigenous users.* Access to information and knowledge in general has often been obstructed for indigenous and minority communities. New technologies could compound this if communities are not provided with the tools to use these effectively and on their own terms. Technology-led service delivery, such as telemedicine and online education platforms, should therefore be accompanied by adequate training and capacity development for communities.

- *Recognize and address the power dynamics inherent in many mainstream technologies.* Most digital technologies are designed by majority institutions and developed in dominant languages. Tools-based resources offer a way forward, but these resources need to be culturally appropriate and disseminated more widely in many indigenous and minority languages. For many peoples, oral transmission of knowledge and communication is key, and this is currently a significant barrier to some technologies being meaningfully accessed and used by these groups.

- *Ensure participation is central to every stage of technological delivery, including upstream design and development.* Perhaps key to this challenge is the move from technologies designed 'for' minorities and indigenous peoples to those made 'with' and 'by' them. This can include ways in which minority and indigenous peoples conceptualize the SDGs and the role of technology in achieving them. Starting from this point, technology can look very different.

- *Take steps to integrate local perspectives on technology.* This requires a holistic approach that encompasses traditional knowledge as a living and evolving set of technologies in their own right. Many programmes have successfully combined new technologies with local approaches to various challenges, including climate change adaptation, to ensure more effective development outcomes for communities. ■