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UGANDA

Cultural values and modern media as drivers of science communication

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The chapter focuses on the evolution of science communication in Uganda. The chapter starts with the influence of cultural values on the science communication field but ends by emphasising the impact of modern media on the field. It states the role of the central government and (international) non-government organisations (NGOs) in sharing scientific information. It describes the genesis of science communication training and research at universities, and how associations have formed over the years. Some of the key science communicators are identified, and opportunities for employment of science communicators highlighted. The chapter ends with a discussion of some of the challenges in communicating science, the controversies generated by the various channels, and the manoeuvres to counter the barriers to sharing scientific knowledge. The terms adult literacy, sensitisation and engagement tend to be associated with this field in Uganda.

1. Introduction

Science communication is vital in modern societies as economies try to find solutions to the challenges of energy, food, water, climate change and treatment of diseases such as HIV/AIDS, cancer and malaria. Scientific knowledge is meant to help societies develop efficient technologies that can change society for the better: it is important in decision-making if individuals and policymakers are to make informed choices in democracies; and societies depend on science in health care, food production, communication technologies, transportation, and preservation (Davies and Horst, 2016). In the case of Uganda, science communication shapes what people know about issues such as climate change,

food security, cancer and childcare. Science communication combines with aspects of cultural values and helps us understand the contemporary society we live in. Therefore, the development of the field marks an advancement in science–society relations and reflects a collaboration ‘between institutions and between the cultures of science and of institutions and the culture of the wider society’ (Bucchi and Trench, 2016, p. 151).

Since the 1970s, governments around the world have recognised the importance of the field and formed ministries of science, technology and/or research in ‘anticipation of positive spin-offs’ to national development (Schiele, 2018, p. 17). Politicians, then, either hired scientists as advisors or appointed them as ministers to mainstream science into the political systems. Uganda has had several physicians as ministers of health, the same way it has had lawyers as ministers of justice and constitutional affairs. The ‘visibility’ and influence of such scientists in public affairs, including the media, could be a ‘relevant dimension to analyse a country’s scientific culture’ in terms of the public understanding of science and the respect accorded to such knowledge and its agents (Bucchi and Trench, 2016, p. 161). Thus, scientific culture must find a place in the general culture of a society if science is to be relevant to people who can put it to good use and help society manage its lived challenges. The interaction between the cultures and institutions and the general society is usually reflected or framed through the media—both traditional as well as online/ social media.

2. Culture and science communication

The development of science communication cannot be divorced from the diverse cultural values and symbiotic meanings communities attribute to nature since time immemorial. Plants, animals, rocks, mountains and objects in the universe feature prominently in the anthropology, ethnobotany, ethnomedicine, geography, history and language of many societies in Uganda. For instance, 89 species of plants that could be used in ‘26 cultural and social purposes’ have been identified (Kakudidi, 2004). These purposes include wedding and religious ceremonies, prevention and treatment of illnesses, and sources of food. Many Ugandan tribes have plants, animals and insects as their totems. A totem signifies a mythical bond between individuals and communities. Totems symbolise religion, social cohesion and environmental protection. Totems could have formed the basis for laws and regulations as hunting, killing and exploiting of totem animals, insects and plants was/is forbidden because such actions border on hurting the ancestral spirits. Thus, cultural values create an ethical (spiritual) link between people’s culture and the environment. In many Ugandan communities a clan is the genealogy

of biological ancestry as traced through paternity lineage and the totem is the emblem of that socialisation. In some communities, names are given according to clan and it is a taboo to eat your totem. It is also a taboo for individuals from the same clan to marry or have any form of sexual relationship as a way of preventing incest and inbreeding. As a result, 'totemism can lead to environmental protection due to the fact that many tribes have multiple totems' with thousands of animals, plants and insects considered as totems (*emisiro*) among the Basoga, Baganda, Banyoro and other tribes in Uganda (Bamuturaki, 2011). There is a belief that totems and humans are 'related' and this biocultural heritage is communicated from generation to generation. Communities that have functional clan and customary land systems could be in a better position to protect the environment as exploitation has to conform with ecology (Epilla, 2014).

Indeed, kingdoms have been central to environmental protection. For close to a decade, the Uganda Wildlife Authority (UWA) has been using the Buganda clan system to raise awareness about environmental protection in the central region. For instance, the Queen Mother of the Buganda kingdom (Nabagereka) visited UWA in 2013 and laid the foundation stone for the construction of a monument for her totem, the cane rat (*omusu*) (UWA, 2013). This action made her a UWA ambassador on environmental protection. During the more than two-decade armed conflict from 1987 in northern Uganda, the indigenous woody plants conservation strategy involved using 'cultural law and local bye-law' (Epilla, 2014, p. 1). Rim-Rukah et al.'s study (2013) underscores the importance of beliefs in environmental protection. The study shows that 'particular ecosystems or habitats (such as sacred groves and sacred rivers/pond); and ... animals or plant species (such as totem and tabooed species) were not as endangered as other species' (Rim-Rukeh, Ierhievwie and Agbozu, 2013, p. 426). A more recent study in Zambia reveals that totemism, taboos and 'traditional authority' forbid the use of fruit trees for firewood among the Tonga (Kanene, 2016, p. 3). Thus, the clan is not only an effective component in social, political and economic organisation, but also in communicating conservation directly or indirectly. For instance, a village in Burkina Faso is reportedly living with crocodiles because the majority of the people in the locality consider the animal their totem and believe the animals and humans cannot hurt one another (Adams, 2008). These traditional beliefs are hardly respected by the scientific establishment in Uganda as many scientists are trained in and follow Western cultural norms. However, it is common for scientists to use local proverbs to explain conservation/scientific issues to ordinary people, an indicator that they believe in some of the traditions.

Several kings, including the Kabaka of Buganda, the Omukama of Bunyoro, the Omukama of Tooro, the Kyabazinga of Busoga, the Emorimori of Teso, and other cultural leaders have been key agents, especially in mobilising people for immunising against and fighting HIV. Their efforts are complemented by the religious leaders who often use their pulpits to mobilise the public for immunisation and to sensitise communities about HIV prevention, treatment and management.

2.1. Use of storytelling, drama and music for enforcing belief systems

Science communication is dependent on common understanding within the audience and its success depends on understanding the cultures, beliefs, perceptions, attitudes, fears and promises of the target population. This makes the 'arts an excellent tool for health communication' as they encourage community engagement and behavioural change through social learning (Sonke et al., 2018, p. 401). The power of the arts derives from the fact that it is a homegrown communication tool ingrained in the local cultures. Such efficiency can be achieved through music, dance, drama, recitals, rituals, storytelling, orators and village criers in enforcing the belief system since culture determines how a message is decoded. These forms of communication are embedded in many Ugandan societies, as tools of social cohesion. They are recognised, accepted, valued and trusted. In Ankole, 'rap music' locally known as *okwivuga* continues to be used to pass on messages (Mushengyezi, 2003, p. 116). In Busoga and Buganda, drums were and are used to mobilise people, and the sound of the drum could indicate the purpose for mobilisation—danger, joy, community work or just gathering to receive important information.

The mobilisation involved an official going around the village drumming at every residence and announcing whatever message the local council had for the residents—usually to do with council meetings or else with cholera awareness, immunisation campaigns, road repair or constructing a water spring. This placed responsibility for action and response onto each individual resident. It was effective in its outcome because this 'interpersonal' nature of indigenous forms not only allowed for easy encoding, decoding and feedback, but also made it incumbent on the 'message-receiver' to respond to the message because of the shared relationship with the 'senders' (Mushengyezi, 2003, p. 112). Drumming as a mode of mobilisation worked when societies were still homogeneous, speaking a common language and with less urbanisation. The increase in urbanisation and its related challenges, and the emergence of new forms of media, means that drumming is no longer an ideal form of mobilisation. New forms of mass mobilisation are expensive and require government support if science messages are to reach the intended audience.



Figure 38.1: Black-and-white colobus monkey, the totem of the Ngeye clan in Buganda.

Source: Phionah Katushabe (used with permission).



Figure 38.2: A hippopotamus, the totem of the Envubu clan in central Uganda.

Source: Phionah Katushabe (used with permission).

3. Government's support toward science communication

Deliberate science communication started in 1948 when the government launched adult literacy using music, dance and drama (Kiwanuka-Tondo, 1990). The history of deliberate science communication in Uganda is synonymous with the history of broadcasting in the country. Broadcasting started in 1954 following a recommendation by a committee chaired by the Earl of Plymouth to the British Colonial Office to explore the option of setting up radio stations in the colonies, including Uganda. Among other reasons, broadcasting was necessary to communicate issues related to education, health and agriculture (Great Britain, 1937). Following the 1945 nascent nationalist struggles in which the governed demanded fair working conditions from their employers and the Buganda kingdom, disbandment of price controls on the export of cotton, abolition of the Asian monopoly over cotton ginning and participation in electing representatives to the local government, the colonial government realised the need for a broadcast infrastructure to explain its programs and actions to the local people. Based on the Plymouth report, the Uganda Broadcasting Services was set up to promote colonial interests and suppress the rising pro-independence wave. A later committee chaired by Gervais Huxley established the feasibility of broadcasting in Uganda (Huxley, 1958). Thus, 'the colonial government's tacit recognition of the role of both the broadcast media and the indigenous languages in influencing public opinion and political consciousness' (Chibita, 2006, p. 113) can be extended to science communication as agriculture, health and other scientific issues were later to be relayed in local languages as access increased. Indeed, Kiwanuka-Tondo (1990, p. 50) argues that in societies where education facilities are insufficient, the media, especially through instructional programming, have been seen as a 'substitute for this formal education'. He argues that by the 1980s, drama had become an important component of radio content, and was used in the field of reproductive health as a driver of science communication.

4. Education system and science communication (1960–70)

The establishment of television (Uganda Television) in 1963 was a forerunner to the launch of education broadcasting in 1964 (Sekeba, 2016). The integration of broadcasting into education was preceded by the construction of the national theatre. The Government of Uganda opened the national theatre in 1959. Apart from the premises being a venue where amateur

groups entertained city revellers, the national theatre has remained a venue for national inter-school competitions. The competitions are modelled along the Makerere College Inter-hall competitions, which started in 1947 (Twesigye, 2001), and often follow an annual theme selected by the Ministry of Education and Sports.

The Ministry of Education and Sports, in conjunction with the Ministry of Information, initiated the intensive model. The model was meant to integrate instructional radio and television broadcasting into school and college curricula. Broadcasting acted as ‘audio-visual aids’ that could even ‘substitute for teachers’ as the number of teachers was insufficient to match the growing demand for education at a time when the country needed patriotic citizens to understand the ‘challenges and aspirations’ of the ‘young’ country (Kiwunuka-Tondo, 1990, pp. 55–6). Weekly programming prioritised science, mathematics, history, geography and literature, as these were considered vital for a sovereign Uganda. At the same time, Makerere University through its college of education and external studies (formerly the extra-mural department) started sporadic adult and continuing education programs.

Further, the author avers that in the 1960s, the Ministry of Information helped the Ministry of Agriculture to promote the coffee and cotton industries, then the predominant cash crops of Uganda. This period marked the birth of farm radio and television. The content included audio and film recordings of how coffee is planted, pruned, picked, dried and packed in sacks; and how cotton is planted, pruned, harvested and ginned. The documentaries did not include processing because ordinary Ugandans were concentrating on producing the crops, and not marketing or processing the products. Marketing was the work of the Coffee Marketing Board and the Lint Marketing Board for cotton. Audios were particularly important because most Ugandans could only afford radio, and very few could afford the available black-and-white television sets (colour television was only introduced on the eve of the 1975 summit of the Organisation of African Unity (now African Union)).

5. Science communication under Idi Amin (1971–79)

When Idi Amin overthrew the Milton Obote government in the 1971 coup, broadcasting to the rural folk in selected local languages continued with minimum interruption for his first two years (Kakooza, 2012). Farmers remained a priority in Radio Uganda’s programs, and tuned into the *Calling Farmers* program, along with the *Coffee Club*, a program running in conjunction with the Uganda Coffee Marketing Board to promote coffee growing in the

country. These programs attracted extension workers, co-operative officers and parastatal staff as guests. However, instructional broadcasting for school and programs on agriculture started declining with the economy following the expulsion of Asians in 1972. Broadcasting succumbed to the brain drain at this time as professionals were wary of the security situation in the country, thereby virtually ending relevant science communication.

It is worth noting that during the liberation war that overthrew Idi Amin in 1979, several booster stations were destroyed. These included the Masaka television booster in Central Uganda and the cross-border service booster station of Radio Uganda at Bobi in Northern Uganda. Other stations were neglected. Such destruction interrupted not only science communication but broadcasting in general.

6. The post-Amin era (1980–85)

This period was marked by dramatic changes at the top of government. Uganda had three presidents in a space of roughly two years. It was only in 1981 that the new government of Milton Obote (Obote II) started rehabilitating the state broadcaster. In 1982, the government established the directorate of education broadcasting (Kiwanuka-Tondo, 1990); and at this time programming for children was introduced on both radio and television as a way of sensitising youngsters to the importance of academics in general and health in particular.

Broadcasting played a crucial role in health information campaigns during this period. Campaigns focused on preventing waterborne diseases, especially typhoid and cholera. The campaigns emphasised improving sanitation, drinking boiled water, eating cooked food and covering food to prevent contact with flies, which are agents of germs causing such diseases. Dramatisation of information messages was the key model.

A childcare campaign was started by government agencies such as the Uganda National Expanded Programme for Immunisation (UNEPI) and UNICEF in partnership with the directorate of educational broadcasting. It was important to inform, educate and mobilise the public, especially parents, to take children for immunisation against what were then the six child-killer disease—measles, whooping cough, polio, tuberculosis, tetanus and diarrhoea—and to encourage parents to utilise vaccines to immunise their children.

These collaborations were usually preceded by workshops and conferences to which print and broadcast journalists were invited—not only to be oriented about the campaign, but also to ensure coverage of the campaigns. The media messages were supplemented by posters at dispensaries, health centres, health departments and immunisation centres, schools and trading centres.

In 1987, UNICEF supported the Ministry of Education to revise the primary school curriculum to include immunisation, especially against the six killer diseases. This health education succeeded largely due to a combination of factors: the Resistance Councils (village chiefs), religious leaders, and the scouts and girl guides who supplemented health officials in disseminating information about HIV. The multiple-information-platform approach was a precursor to the fight against HIV/AIDS, which started around the same time. Prevention and basic management of HIV/AIDS skills are taught in primary and secondary schools. HIV prevention and management programs have been incorporated into the activities of local councils, religious organisations, women, youth, schools, health departments and virtually all government departments.

7. Science communication under liberalised media system

Broadcasting has been a key component of science communication from colonial times to date. Following the liberalisation of the media landscape in Uganda in 1992, several radio and television stations were opened. Currently, Uganda has about 300 radio stations and more than 30 television stations (Uganda Communications Commission, 2015). Although science is not a major component of their content, they often cover breaking stories on disease outbreaks, natural disasters and climate change. The national environmental management authority (NEMA) is working with NTV Uganda to run articles about protecting the environment in Uganda. The program, *NTV Green*, an intrinsically public relations forum for NEMA, involves the sponsor taking journalists to well-protected sites or places where NEMA is doing a good job and showing them to the public. Several broadcasting stations have programs on agriculture, which implicitly include a scientific approach to both the environment and agriculture. It is important to note that all the radio and television stations carry advertisements on malaria prevention and management. They also carry advertisements on immunisation, especially of children. It should be remembered that most of the radio stations have programs on health, where a medical practitioner is often hosted, say once a week, to talk about particular health issues. Just like the broadcast outlets, the newspapers often publish stories on health and the environment.

Online versions of newspapers also run science stories. On special days to mark international efforts in fighting diseases such as malaria, HIV/AIDS, sickle cell and cancer, the newspapers often publish pull-outs about the respective diseases. Key in all these science communication endeavours is that science must make news for it to be covered; or it must have a sponsor for the programs to run. The sponsors are usually government departments and local and international NGOs. In some cases, science is covered as business and economics. Notable among the media houses is local tabloid television *Bukedde*, which runs a science and technology segment in its popular *Agataliko Nfiufu* [Dustless News] at 10 pm, usually focusing on both local and international inventions.

Several radio stations run programs on astronomy. These include Radio Simba, Prime Radio and Central Broadcasting Services (CBS). A key science communicator of the mid-1990s and early 2000s was CBS's (Kalabalaba) Ernest Lule Basajjakabwe, whose 'strange but true stories' about American guns that fired bullets to target the enemy from crowds of people and a description of the rarely used drones to trail enemies before shooting at them are still memorable long after his death. Although he often used a sensational approach to trigger the minds of the audience to imagine the positioning and movement of the bullets and the stars, his radio programs were an attempt toward science communication.

8. Formation of the Ministry of Science and Technology

In 2016, the Government of Uganda established the Ministry of Science, Technology and Innovation (MOSTI). Headed by a cabinet minister, the ministry is mandated to plan and coordinate science and technology innovations in academic institutions, industries, agriculture, commerce and the informal sector (MOSTI, 2018). Although the ministry runs on a paltry budget compared to defence and works, its existence is a sign that Uganda considers science vital in its development, at least on the website.

9. Formation of the Uganda Media Centre

In 2005, the government created a propaganda hub known as the Uganda Media Centre to 'effectively facilitate communications of government policies, programs, and projects to the public through the media' (Uganda Media Centre, 2018). In addition to being home to the government 'wordsmen', the media centre allows cabinet ministers, ruling party members

of parliament, and heads of government departments to address the media on key issues in the country. These issues include those of a scientific nature. For instance, health ministers have used the media centre to address issues related to outbreaks of diseases and to explain why the radiotherapy machine at the National Referral Hospital was not functioning. Officers from the Ministry of Agriculture and Uganda National Meteorological Authority (UNMA) have addressed the media on issues related to climate change, especially the element of when and where the drought and floods or landslides are expected.

10. Government intervention in spraying tsetse flies

Through health education in the 1980s, communities in Busoga in southeastern Uganda were mobilised in a campaign against tsetse flies. They were taught and involved in making mono-screen traps using old car tyres and plant materials, identifying sites where the flies are common and placing traps to prevent outbreaks that have ravaged the area for more than a century (Lancien et al., 1990; Okoth et al., 1991). The mono-traps were occasionally supplemented by aerial spraying, and radio was used to warn people against eating vegetables during the days when helicopters were operating. Although initially a top-down approach, the participation of the people made the use of mono-traps a sustainable technology to minimise the effects of the deadly tropical flies that cause *nagana*¹ among animals and sleeping sickness among humans. Unfortunately, this disease, first detected in 1900 in the Buganda region, has spread through the country, largely as a result of animal movement from one region to another. The failure by some farmers and herdsmen to spray their animals, and poor sensitisation, means the disease keeps recurring (Yolisigira, 2015).

The government has attempted to put in place mechanisms for communicating key messages to individuals who may not have access to the mainstream media. According to Article 50 of the *Local Governments Act 1997* (amended in 2015), the village committee, headed by the village (Local Council I) chairperson, is expected to serve as the communication channel between the government, the district or higher local council and the people in the area. It is supposed to help the government to implement its programs. In practice, it is largely a top-down government conduit, although occasionally the reverse happens.

1 A disease of cattle, antelope and other livestock in southern Africa, characterised by fever, lethargy and oedema, and caused by trypanosome parasites transmitted by the tsetse fly.

11. NGOs as key players in science communication

Non-government organisations (NGOs) and inter-governmental organisations (IGOs) are key players in communicating science in Uganda. For instance, Advocates Coalition for Development and Environment (ACODE), a pro-poor public policy think tank, often conducts research and engages several stakeholders before providing alternative policies to government (ACODE, 2018). The Centre for Research in Energy and Energy Conservation (CREEC) trains communities in off-grid areas to generate renewable energy and provide appropriate sources of energy for cooking and lighting (CREEC, 2018).

The Program for Accessible Health Communication and Education (PACE) Uganda and the NGO FHI360 partner with the Ministry of Health and local governments to develop and implement behavioural change programs, including access to contraceptives, family planning services, child health, reproductive health, sex education, prevention of HIV, malaria, tuberculosis and malnutrition, among others (FHI360, 2018; PACE, 2018). Reach Out Mbuya and Reach A Hand Uganda mostly educate communities about HIV (Reach A Hand Uganda, 2018; Reach Out Mbuya, 2018). The Uganda Water, Sanitation and Hygiene NGO network collaborates with its partners through sharing information (UWASNET, 2018). The Volunteer Efforts for Development Concerns (VEDCO) supports the Uganda government's food and nutrition security through knowledge exchange with its partners (VEDCO, 2018). The involvement of all these organisations signifies the importance of health as a driver of science communication in Uganda. The United Nations Development Programme (UNDP), World Health Organization (WHO), United States Agency for International Development (USAID) and ChildFund are some of the prominent organisations sponsoring such communication.

12. Schools as platforms of science communication

Schools and universities organise annual exhibitions, where students showcase what they do in and outside class. It is common at such fairs for students to show 'tourists' what happens when two chemicals are mixed. In some cases, students showcase digital applications, locally made robots, value-added agricultural products and rudimentary cars.

Several institutions, especially those under the National Agricultural Research Organisation, organise workshops for scientists. These workshops are often instructed by communication consultants and senior journalists, with the intention of training scientists in how to disseminate their research to the public through the media. The Uganda Biotechnology Information Centre (UBIC) has organised annual essay competitions on a specific topic for secondary schools since 2016, with the aim of consolidating bioscience in the formal education system. In 2016, students wrote essays to demonstrate their knowledge about biosciences. Selected schools participate in the finals, where prizes are awarded for the winning essay and top schools (UBIC, 2016).

13. Agricultural shows, science festivals and communication

These are common in Uganda. The most popular is the annual Source of the Nile trade and agricultural show in Jinja, which has been organised by the Uganda National Farmers' Federation (UNFFE) since 1993. The show is a platform for demonstrating and identifying innovations made locally and by foreign companies to improve production and marketing (UNFFE, 2018). It is a stage for learning modern technologies in the agricultural value chain and a potential market for products. In recent times, similar shows have been organised by the Buganda kingdom in its Mengo Palace Farm Clinics by the *Daily Monitor* newspaper in conjunction with NARO at regional agricultural research institutes, and the Harvest Money Expos by *New Vision* newspaper in conjunction with the Dutch embassy in Uganda at Namboole Stadium. These shows have a component of entertainment and are accompanied by circuses and musicians to entertain revellers, considering that music is an instrument of social interaction and knowledge dissemination.

At the annual Taxpayers Appreciation Week, organised by the Uganda Revenue Authority, different government agencies offer information and provide services at subsidised prices or for free. Many government agencies share leaflets, brochures and pamphlets, and their personnel explain to the public what they do. The agencies explain to the public issues related to their health (HIV, cancer, diabetes), the environment (planting trees and managing plastics), new seed varieties, preventing accidents, and government policy on education, among other issues. The government agencies also take complaints from the public during this event.

There is also real-time moon viewing at Makerere University: Benon Fred Twinamatsiko, a lecturer at the Department of Physics at Makerere University has, since January 2014, been using a telescope to show the public how the moon moves, and how its movement affects the weather since January 2014 (Alina, 2014). The monthly event is open to members of staff at the university, children and the general public.

14. Training and research beginning at universities

Formal training in science communication started in 2002 following Makerere University's proposal to the Swedish International Development Aid (SIDA) to sponsor a regional training program—the Eastern Africa postgraduate diploma in environmental journalism and communication (Böklin, 2004). The diploma attracted students from Burundi, Kenya, Rwanda, Tanzania and Uganda.

The International Health Sciences University (now Clark University) has been involved in organising dialogues with communities living in slum areas south of the capital Kampala. Based on such dialogues, usually coordinated by graduate students, the university organises medical camps as interventions to better the lives of disadvantaged people.

In 2014, the theme of science communication was incorporated into the specialised journalism course unit taught to fourth-year bachelor of journalism and communication students at Makerere University. This theme raised science communication to the level of other themes covered in that course unit, such as politics, parliament, business, gender, climate change and conflict. Makerere's Master of Arts in Communication curriculum includes science communication not as a formal component, but through the dynamism of the lecturers/facilitators. Communication (general principles of communication) is a cross-cutting course at the university.

Attempts have been made to integrate science communication into the secondary school curriculum. In September 2018, UBIC organised a nationwide workshop for teachers to acquaint themselves with modern agricultural biotechnology research at NARO (ISAAA, 2018). Teachers were expected to pass on information to their students and communities, as a way of increasing awareness and enhancing appreciation of modern biotechnology in the country. The workshop was attended by NARO scientists, the Uganda National Examination Board and the National Curriculum Development Centre. Such moves are aimed at not only increasing knowledge, but also improving the teaching of science in the country.

In October 2018, the Department of Journalism and Communication at Makerere University in collaboration with Science and Development Network (SciDev.Net) organised a course for the training of trainers in a science communication workshop for journalism lecturers under SciDev.Net's Script program. The Script program had been launched on the sidelines of the Next Einstein Conference in Kigali, Rwanda, in March 2018 (Deighton, 2018). The aim was to integrate science journalism into the department's curricula. Through its Nairobi office, SciDev.Net has been operating in Uganda since 2002. SciDev.Net worked with the Department of Journalism and Communication at Makerere University to organise the first science communication conference in April 2019. Prior to that conference, students from humanities, social sciences and natural sciences participated in an online science communication course under the supervision of journalism lecturers.

In November 2018, the Africa Union Commission through the Platform for Aflatoxin Control in Africa concluded a two-day training course for about 30 journalists on aflatoxin communication and reporting (aflatoxin is a plant fungal disease). The training preceded the launch of a National Aflatoxin Journalist Network for public awareness about aflatoxin contamination of food and feeds (Anyango, 2018).

15. The birth of associations, conferences and meetings on science

The Uganda Science Journalists' Association (USJA) was established in 2005 as a non-profit organisation for journalists, communicators and researchers interested in advancing science communication in Uganda. Like many NGOs in Uganda, the membership numbers are unknown as mobilisation is usually activity-focused. However, there is photographic evidence that USJA has been involved in organising upcountry trainings in reporting climate change as part of mentorship in science journalism (USJA, 2018). A Facebook chat with its founder Odinga Balikuddembe revealed that the association has a membership of about 80 journalists. Although its funding is not clear, the association is a member of the World Federation of Science Journalists (WFSJ).

Health Journalists Network in Uganda (HEJNU) is another non-profit organisation committed to enabling public understanding of health care in Uganda. Its membership is drawn from journalists working in print, radio, television and online publications. With a declared membership of about 70, the association often partners with government, especially the Ministry

of Health, and civil societies to conduct training (HEJNU, 2018). Most members of the association also report about other subjects, including politics and agriculture, and could be members of associations in these areas. HEJNU uses its network to help members find sources for their stories. The association partners with local and international NGOs, such as AVAC (Global Advocacy for HIV Prevention), to organise science cafés, where health writers meet a guest scientist(s) in informal settings (AVAC, 2018). The partners usually provide the funding for its activities.

In a nutshell, the associations are still weak with fluid membership. Moreover, it is common for an association to declare as a member any participant who turns up for its event, even without subscribing. Thus, the impact of associations is limited to science streams where the project sponsors have budgets to facilitate journalists' activities. The agenda of associations is largely driven by their funders.

16. Who are the science communicators?

There are jobs in science communication in several areas, including journalism, public relations and communication officers in hospitals, environmental protection agencies, and research institutes and science communication trainers. Communicators fall into a number of different categories, as listed below.

Researchers: In partnership with their universities or funders, researchers often address the media about their findings. Scientists working at the meteorological centre may talk to the media when they anticipate severe weather conditions, such as drought or floods. Scientists at NARO often address the media about new seed varieties and biotechnology related issues.

Policymakers: Sometimes ministers and government departmental directors share research findings with the public. The politicians sometimes simply refer in passing to scientific results outside their line of duty during public gatherings, yet their prominence makes journalists quote them on science issues.

Journalists: These are major sources of information on science. They often meet scientists by appointment or by invitation to discover the latest results. Journalists are targeted when major science journals publish impactful results likely to make global news. They can be invited to attend the launch of scientific reports, receive emails or search for this information to fill gaps in their stories.

Development partners (USAID, John Hopkins School of Public Health, PACE, Uganda Health Communication Alliance): These institutions often sponsor scientists to do research and own the findings. They regularly publish findings on their websites as accountability to their funders, but also for the public to access the information.

NGOs: Just like IGOs, NGOs will pay researchers to do work, but the NGOs publish it as their work. These findings give credibility to such institutions.

Communication officers: Part of their job is to attend exhibitions and spend long hours explaining what the scientists did. They can act as gatekeepers to the scientists as they direct journalists to the appropriate scientist(s). Communication officers may appear on talk shows and write opinions on behalf of the science organisations.

17. The terminology of ‘science communication’

Science communication in Uganda goes by several terminologies: adult literacy, training, sensitisation, education, engagement, participation, information sharing and knowledge exchange. Although there are no clear demarcations between the terminologies, the use of the term ‘adult literacy’ seems to be phasing out. The involvement of stakeholders is seeing a surge in the use of other terms to symbolise science communication.

‘Adult literacy’ is used in reference to people who missed school or for people who want to acquire new knowledge and skills outside the formal education system. In the context of science communication, this issue is addressed by workshops where adults learn about new agricultural technologies and prevention of hygiene-related diseases.

The concept of ‘sensitisation’ is commonly used in relation to teaching communities about immunisation, condom use, HIV and avoidance of unnecessary use of antibiotics.

‘Training’ is a term used by many NGOs in their outreach. For instance, CREEC uses the term to refer to the diffusion of information in making renewable energy accessible. PACE and FHI360 use the term ‘support’ to refer to their outreach activities. Reach Out Mbuya and Reach A Hand Uganda use the term ‘educate’ to denote contact with some of the beneficiaries. Other terms used by the NGOs include ‘engagement’, ‘participation’, ‘information sharing’ and ‘knowledge exchange’.

18. Challenges, controversies and manoeuvres

The biggest challenge is that the country has few scientists. Coupled with this challenge is the fact that very few are willing to talk to the public and the media. This means that most of the scientific findings remain in the laboratories and academic journals to the disadvantage of the taxpayers who are supposed to benefit from such research. Many journalists have established working relationships with scientists for purposes of easing the tension between the two groups, and for knowledge sharing to the benefit of the public.

The political instability of the 1970s and 1980s affected the dissemination of messages. A change in government had meant a change in programming, and often health (science) programs were affected. In some cases, the government was unable to operate the national broadcaster according to the planned schedule. Although there is a fear that such a scenario may occur again (Uganda has never changed power peacefully), the availability of multiple FM radio stations, private television channels and online publications suggests that the effect can be minimised in a situation of a similar political disturbance.

Radio in the period 1970s and 1980s faced a problem of credibility as propaganda was the key component of program content when the country had a single broadcaster. This problem has metamorphosed as the new sources of information, especially social media, are associated with fake news. Many science journalists try to use scientific sources of information, but the general scribes are not under any obligation to stick to laboratory findings and they often use political sources in their stories, even those on science.

Superstition persists among many communities. There are still individuals opposed to immunisation and women who insist on delivering babies at home and not in hospitals. Some people associate HIV and mental illnesses with witchcraft. Such beliefs make people reluctant to adopt scientifically proven ideas. There is irrational use of communication channels to promote quackery and unscientific options in the place of science. For instance, Ugandan media platforms carry a lot of messages from herbalists trying to explain scientific phenomena. This compounds the superstition around scientific explanations to issues. There are also religious controversies. Uganda is a religious country and every weekend the faithful voluntarily congregate. Unfortunately, some religious cults discourage their members from seeking medical services, taking children out of immunisation programs and sending them to school.

A further challenge is the lack of funding. Most projects do not budget for dissemination, although some science institutions have started factoring in the aspect of dissemination in their project proposals. This can be used to fund media coverage. The costs of disseminating information in a commercial environment are high, and it is expensive to design high-quality messages that meet the demands of the scientists. This issue is exacerbated by the proliferation of newspapers, radio and television stations and online publishers, which makes it hard to justify the selection of a few in the face of a stringent budget. Uganda has many news outlets. While multiple platforms are a blessing, they provide a challenge when it comes to choosing the channel to use for a specific message. While channels tend to be associated with certain audience profiles, editorial manoeuvres demand that news outlets capture the biggest possible size of the inelastic audience. Often, media houses adjust to eat into the audience of both related and unrelated channels. The challenge for science communication is that the difficulty in choosing an appropriate channel combines with other social, economic, political and cultural factors to make the message ineffective.

Jargon and cultural attitudes pose a further challenge. Because most scientists are not trained in communication, they tend to use technical terms that are hard for journalists to translate to laypeople. Many journalists are taking it upon themselves to learn how scientists work and are then translating their terminology to ordinary people in their stories, but this learning must match the journalists' passion for the subject and scientists' passion for public media engagement. Scientists can be reluctant to participate in the work of dissemination. Many consider that they are hired to do laboratory work, thereby making science outreach a charity exercise.

Training would help overcome part of the difficulties, encouraging scientists to use simpler terminology and helping bridge the gap between scientists and journalists, but there is a general inadequacy of trainers as science communication has not been mainstreamed in the curricula of universities. There are attempts, however, to incorporate modules in journalism and communication at Makerere University. Some agencies such as SciDev.Net often organise workshops for journalists to improve the way they report, but such training is still rare.

Finally, there are cases of politicians hijacking technical subjects such as environmental protection and genetically modified organisms (GMOs). Politicians determine whether a forest should be degazetted or not. Recently they have hijacked the subject of GMOs, politicised it and pushed the scientists into silence. As a result, the law to legalise or ban GMOs has been shelved because members of parliament and some NGOs have succeeded in making the issue of GMOs emotive.

19. Conclusion

Science communication in Uganda has evolved alongside cultural values attached to health and the environment. The participation of cultural and religious leaders in backing key science messages, and the use of music, dance, drama and comedy, has enhanced science messages. The government broadcaster, now UBC, and later other forms of media, has significantly supported the sharing of scientific findings and learning about such issues and events. Initially, the deficit approach was common, particularly as the technology did not allow serious participation before mobile phones became numerous. Now new forms of communication have democratised science communication to the level of engagement. NGOs have largely influenced the move toward multiple-way communications. Increasingly, the field is providing jobs to researchers, journalists and communication officers, although the possibilities for employment are still limited. Science communicators are researchers, policymakers, journalists and communication officers. However, with public relations entering science institutions and training of trainers intensifying the future of the field is promising.

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Timeline

Event	Name	Date	Comment
First interactive science centre established.	Open Forum on Agricultural Biotechnology (OFAB)	14 December 2007	Coordinated by Uganda National Council of Science and Technology
An association of science writers or journalists or communicators established.	Uganda Science Journalists Association	2005	2014: Health Journalists' Network in Uganda
First university courses to train science communicators.	No direct course on science communication	None	2014: Makerere University introduced this topic in its specialised journalism workshop

COMMUNICATING SCIENCE

Event	Name	Date	Comment
First national conference in science communication.	Makerere University 19th Annual Media Convention	April 2019	Organised by the Department of Journalism and Communication, with funding from SciDev.Net's Script Project
National Science Week founded.	No national event but individual universities/ research institutes organise exhibitions		
First significant radio programs on science.	Radio Uganda program focused on coffee and cotton.	1960	This was the birth of farm radio in Uganda
First significant TV programs on science.	Programs focused on agriculture	1963	Uganda Television, now Uganda Broadcasting Corporation
First awards for scientists or journalists or others for science communication.	National awards in categories of agriculture, environment, and health organised by the African Centre for Media Excellence (ACME)	2013	2017, 2018: The Open Forum on Agricultural Biotechnology organised competitions for journalists with the best winning a trip
Other significant events.	First Science Communication Conference hosted at Makerere University	25 April 2019	

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This text is taken from *Communicating Science: A Global Perspective*,
edited by Toss Gascoigne, Bernard Schiele, Joan Leach, Michelle
Riedlinger, Bruce V. Lewenstein, Luisa Massarani and Peter Broks,
published 2020 by ANU Press, The Australian National University,
Canberra, Australia.

doi.org/10.22459/CS.2020.38