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JAMAICA

Science communication in the land of wood and water

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1. Introduction

The island of Jamaica is located in the Caribbean, with a land area of 10,831km² and a population of 2,728,864 (JIS, 1965; STATIN, 2017). The name Jamaica was derived from the original name *Xaymaca* (land of wood and water) ascribed to the island by the first inhabitants, the Tainos, who noted the abundance of mountains, springs and rivers. The Tainos were wiped out by the Spanish, who were subsequently defeated by the English in 1655. Slavery was instituted under English rule and lasted until full emancipation in 1838 brought freedom to all slaves; from that point, the nation slowly moved towards its eventual independence on 6 August 1962.

Science and technology (S&T) has always been a part of Jamaica's history. Its institutionalisation started during the British era (1655–1962), while the development of S&T infrastructure, promotion of research and development (R&D) facilities to advance agriculture, and the contribution of S&T to national development were features of the 'War Years' (1914–45) (Lowe, Brown and Magnus, 2000). From post-war to independence (1946–62), the development of Jamaica's endogenous capacity began with the establishment of tertiary institutions that trained individuals in S&T and the strengthening of the government policy in this area.

UNESCO reported that Jamaica was one of the earliest developing countries to legislate the use of S&T in exploiting natural resources, being among the first in the western hemisphere to obtain electricity, construct a railway and

increase sugar cane production through research (Villavicencio and Ponce, 1990). There have been a number of scientific achievements for this island, especially in the pharmaceutical and nutraceutical industries where patents have been obtained for novel treatments and where research is still ongoing.

The need to communicate science adequately to the populace has been recognised, even if the term ‘science communication’ is not used in the Jamaican S&T landscape. The efforts made to communicate science fall under the definition of ‘popularisation/promotion of science’, bringing scientific information to the general public to increase their scientific knowledge and create a more informed society. The following sections will take the reader through how science communication has emerged over time.

2. Planting the seed of science: Pre-independence

2.1. Earliest science institutions

2.1.1. The Natural History Museum of Jamaica

The earliest institution that catered to the dissemination of scientific knowledge was the Institute of Jamaica (IOJ) through its Natural History Division (NHD). The IOJ was enacted in 1879 and the island chemist, J. J. Bowrey was appointed as the first curator (Farr, 1985; *Kingston Gleaner*, 1879). The mission of the museum is to:

Encourage the study and dissemination of scientific knowledge of Jamaican flora and fauna. Promote the conservation of the Jamaican natural environment. Maintain collections of Jamaican flora, fauna and reference books Assist with the identification of plants and animals found in Jamaica. (Find Glocal, n.d.)

The IOJ is now home to a number of museums; the first one was dedicated to science, underscoring the importance placed on public communication. The NHD stands as one of the oldest science museums in the western hemisphere. Renamed the Natural History Museum of Jamaica (NHMJ), it is open to the public at a minimal cost of J\$400 (about US\$3). Its permanent exhibitions are generally focused on the island’s flora, fauna, geology, geography, ecosystems and ethnobiology. Other disciplines such as physics and chemistry are promoted through the NHMJ’s Education and Outreach Department. The science library of the NHMJ consists of over 10,000 volumes of scientific literature and an audio-visual facility; and although the exhibitions may be limited to natural history, they provide access to scientific information for the

general public. The museum houses the largest plant and animal collection in the Caribbean. The number of plant specimens in the museum increased from 55,000 in 1965 (JIS, 1965) to over 130,000 in 2016 (Williams, 2016), in addition to several faunal groups and insects.

The museum's location in Kingston means that individuals from more distant parishes within the island face a transportation challenge, especially relevant in early years when infrastructure was not well developed. Additionally, in the years of slavery and those immediately following, popularising science according to the NHMJ's mandate was likely limited to the colonial upper class of the later 1800s to early 1900s.

In 1955, it was reported by C. Bernard Lewis in the newspaper *The Daily Gleaner* that 'the high reputation of our museum [NHMJ] as a scientific institution in the nineties [1890s] declined after Duerden, the marine zoologist, resigned in 1901, for no full-time successor was appointed'. Duerden was the curator and, as the author noted, although regular citizens did their best voluntarily, lack of support led to a 'deplorable decline'. The decline of the sole museum dedicated to science would have had a negative impact on the efforts being made in the 1950s to popularise science.

2.1.2. Geological Society of Jamaica

The Geological Society of Jamaica (GSJ) was established in 1955 as an organisation of geologists and persons interested in promoting and encouraging the study of geology and its allied sciences (GSJ, 2015). The society promoted geology through regular field tours, public seminars and conferences, as well as publication of their activities in newsletters and journals. Field excursions and public lectures were advertised in *The Daily Gleaner*. On 10 April 1968 it was reported that the GSJ would depart from its normal program of lectures and field excursions and instead open an exhibition to the public on 'Geology in Jamaica' at the IOJ.

In 1958 the GSJ began publication of the journal *Geonotes*, which became the *Journal of the Geological Society of Jamaica* in 1965, and then *The Caribbean Journal of Earth Sciences* in 2000. It is remarkable that the journal has been freely accessible to the public since its inception. With the advent of the internet, the contents of the journal from current and previous issues dating back to 1970 are available for download free of cost.

2.1.3. Scientific Research Council

One of the most significant milestones in Jamaica's scientific history and its attempts to popularise science was the establishment of the Scientific Research Council (SRC) on 6 June 1960 as a statutory body, using the Scientific Research Council Act. Sections 5(1) and (2)(e) of the Act state:

It shall be the duty of the Council to undertake and foster scientific research in this Island and to encourage the application of the results of such research to the exploitation and development of the resources of the island.

In particular and without prejudice to the generality of the provisions of subsection (1), it shall be the duty of the Council—(e) to establish and maintain a scientific information centre for the collection and dissemination of scientific and technical information.

In noting the vision for the first annual report of the SRC in 1960, Prime Minister Norman Washington Manley stated that 'Jamaica has now taken action to set up a permanent organisation for the promotion of research' (Lowe et al., 2000). The SRC is an important institution that is still relevant today.

2.2. Science communicated via media (1945 – early 1960s)

2.2.1. Print media

The year 1945 marked the end of World War II and, by that year, Jamaica was emerging from the global depression. The way in which science was communicated to the populace and how it was perceived in the immediate post-war era is interesting. The stories told by science as seeds planted in the minds of Jamaicans were examined via the archives of the country's oldest newspaper, *The Daily Gleaner*. Television sets were commercialised globally after World War II, but until they became popular in Jamaica the primary modes of communication were the newspaper and radio.

Agricultural science was an important topic, and a key government institution with responsibility for that area was the Department of Science and Agriculture (DSA). The public was advised via the newspaper on a wide range of topics such as mating and cross-breeding animals, chemistry of soil fertilisation, sugar industry research, use of science in agriculture to improve the country's economy and the R&D tasks of the DSA. One article lamented that scientific inventions were not being embraced in Jamaica to improve agricultural research. The DSA enjoyed high visibility in the print media. By 1948, *The Farmers' Page*

was a regular column dedicated to giving information on agricultural science borne out of research. The page served to address a wide range of issues such as successfully harvesting seeds, improving livestock breeding and treatment of diseases. A feature on this page noted that ‘science brought to the practice of agriculture such marvels as soil-tests and sucrose-tests, and the vast wonderful field of genetics. Science even taught us to increase our cattle herds through a kind of remote control by distant bulls’ (Broderick, 1970).

There was an undercurrent of fear in the scientific articles of 1945 because of the atomic bomb, which ended the war. A particularly scathing article, ‘A Balanced Life’, denounced the devotion to and worship of science, stating that with the new atomic science the way of life was changing too fast (Simple, 1945). Almost one month later (5 December), another author, as if in direct response, made the argument that the use of scientific discoveries is not for the purpose of advancing war but rather to improve people’s daily lives (*The Daily Gleaner*, 1945). The debate was divided: many articles centred on the destructive power of science and its use as an instrument of oppression and enslavement, while other articles sought to assuage fears by providing scientific explanations. By 1948, atomic science was reported less frequently and one article noted that nuclear energy would be a significant power resource in the future: ‘the world might have to wait another 10 years before nuclear energy could contribute “anything appreciable” to world power-resources’ (*The Daily Gleaner*, 1948).

Although agricultural and atomic science stood out in the mid-1940s, other articles focused on general science and its importance, as well as science regarding drugs, artificial insemination and health (malaria, tuberculosis and vitamin ‘P’ (now known to be a flavonoid)). In general, the science landscape of Jamaica was undergoing significant changes in this period, and the establishment of the University College of the West Indies (UCWI) in 1948 was a milestone, with the Faculties of Medicine (1948) and Natural Sciences (1949) among the first to be established. In 1951 the *West Indian Medical Journal* (WIMJ) was launched at UCWI as the first peer-reviewed scientific journal to originate in Jamaica. WIMJ is still published today with its target audience limited to scholars and medical professionals.

By the 1950s, scientific themes reported in *The Daily Gleaner* were more varied. The importance of the discovery of penicillin and streptomycin to mothers, a three-part *Triumphs of Science* series in 1950, science as a tool for warfare, geology’s importance, discovery of the electroencephalogram (EEG) in medicine, and the death of Einstein were areas covered by the media. In 1954, the newspaper began an irregular series entitled ‘Research, Discovery and Invention’, and within that inaugural year 12 articles were

published. This feature was copied from a British newspaper and highlighted new scientific discoveries, with detailed explanations for how these inventions worked to the benefit of humankind.

Eleven students graduated from the Faculty of Natural Sciences in 1952; these were the first Jamaican-trained scientists to graduate from UCWI. A news article aptly titled ‘The First Fruits’, published in *The Daily Gleaner* in 7 July 1952, highlighted this significant achievement and signalled to readers that science was becoming more relevant to the country. One of the early graduates was Kenneth Magnus, a Jamaican who went on to become professor emeritus and pioneered teaching programs and initiatives across the Caribbean (NIHERST, 2009). He started the applied chemistry program at UWI, helped to develop the science curriculum for Jamaica’s primary and secondary schools, and jointly synthesised the antibiotic Monamycin (named after the Mona campus). Another important milestone in science education occurred towards the end of the 1950s with the establishment of the College of Arts, Science and Technology in 1958.

The science narrative continued into the 1960s with the publication of science articles as well as the continuation of the ‘Research Discovery and Invention’ feature until its demise in 1964. Thirty-seven articles were published under this feature in 1960–61. It is difficult to assess the effectiveness of science articles in the print media as a way of communicating science because for that era, no readership data are available. For many Jamaicans living in the pre-independence period, copies of the newspaper would be received in their towns only occasionally, on the basis that a community member would be expected to bring the paper back when they returned from a journey. There are no data available on the literacy rate of the population or the extent of the newspaper’s reach across the island.

Assuming that readership increased from 1945 to 1961, more Jamaicans would have been in a position to access scientific information via the newspaper. The public at that time would have received scientific information to improve agriculture, health and general information on the new discoveries through research. (Figure 21.1 highlights science headlines.) Access to print media may have been limited to a select number of persons, but radio broadcasts were far more widespread and accessible, particularly after 1950.



Figure 21.1: Snapshots of science articles printed in the newspaper (pre-independence).

2.2.2. Radio broadcasts

Initially in the earliest years (1939–49), amateur equipment was used for radio broadcasts. These would feature relayed programming from overseas stations (e.g. BBC and NBC Radio). The granting of the first broadcast licence in 1950 expanded radio’s reach to rural communities, which meant that more persons were able to access and benefit from any scientific content. The station, time and title of each radio broadcast were printed daily in the newspaper, and programs dedicated to science were aired continually from 1945 to 1961.

Science Notebook was a 15-minute program that aired from 1944 to 1948 on Mondays and Thursdays. The program was broadcast in the evenings anywhere between 6.30 pm and 8.00 pm (depending on the year) and in some instances there was a repeat broadcast at 10.15 pm. For the most part, what was discussed in these broadcasts was not stated in the print media.

However, a few broadcasts highlighted topics such as industrial ophthalmology (1 February 1946) and malaria (25 August 1948). *Science Notebook* was the earliest radio broadcast focusing on science.

Although the last broadcast of *Science Notebook* was in 1948, that year brought three additional science programs. *New Roads in Science and Education* was a 30-minute program that aired at 9.00 pm on Tuesdays from 1948 to 1949. *Science and Everyday Life* aired from 1948 to 1950 as a 15-minute broadcast from Tuesdays to Friday, discussing a range of topics related to everyday living such as water, minerals, the ‘Common Leaf’¹ and leather. The longest-running science program of that time was *Science Review*, which aired from 1948 to 1959, receiving both an early and late timeslot: 3.15 pm and 7.15 pm after 1955. After it ended in 1959, the new and sole scientific broadcast was *Talk – Frontier of Science*, which was the first science broadcast to air on a licensed local station, the Jamaica Broadcasting Corporation (JBC) Radio founded in 1959. *Frontier of Science* aired for 15 minutes from Monday to Friday at 2.00 pm (1960–61).

The radio content dedicated to science in the late mid-1940s to 1950s was impressive and showed a clear emphasis on communicating science to the public. The final such broadcast ended immediately before independence in 1962. The next year signalled a different approach to science communication in Jamaica, as science became more institutionalised and communication extended beyond the media.

3. Science growing branches post-independence (1962–89)

Lowe et al. (2000) noted that the first decade of Jamaica’s independence (1962–72) saw a rapid growth in public sector institutions for S&T, which was in line with a national strategy for industrialisation and modernisation. Institutions established pre-independence (NHMJ, GSJ and SRC) and continued their individual mandates to promote and educate the public, while new avenues of communicating science were instituted.

3.1. Post-independence science communication

In the years following independence, S&T research focused on agriculture, agroindustry, food technology, nutrition, minerals, energy and the environment. There was no government ministry with responsibility

¹ There is no information if the program was referring to a specific type of leaf or the biology of the leaf itself.

for science in this post-independence period, except for the short-lived Ministry of Science, Technology and Environment (January–August 1984). The Department of Science, Technology and Research was formed within the Ministry of Agriculture on 1 January 1985 and combined the functions that previously existed in the Ministry of Science, Technology and Environment. Within this department, the focus was mainly on agricultural research and natural resources conversations, but there is no further record of the department after 1986. At this point, the government's focus on science was primarily to use it as a tool for improving the economy and public lives through improved agricultural techniques.

The actual communication and popularisation of science were activities undertaken by independent groups. Although the SRC had a legal mandate to disseminate scientific knowledge, more than a decade after independence the institution noted in its 1977/78 annual report that the budgetary allocation by the government was insufficient to support its activities (*The Daily Gleaner*, 1979). This suggests that science was not sufficiently high on the government's agenda. On a more positive note, the 1977/78 report noted that the SRC at that time had achieved public acceptance that science and technology is important to national growth through a publicity campaign.

3.1.1. The Jamaican Society for Scientists and Technologists (JSST)

In 1962, the University College of the West Indies achieved independent degree-granting status as the University of the West Indies (UWI). Research scientists from UWI created the Jamaican Association of Scientists in 1966, which evolved into the Jamaican Society for Scientists and Technologists (JSST) in 1978, under the leadership of Dr Henry Lowe. The advancement and application of S&T to the nation's development was the JSST's mandate. Listed in their objectives was 'to promote public appreciation of the roles of Science and Technology in daily life and education', and among their activities was to 'provide for the delivery and holding of lectures, exhibitions, public meetings, classes, examination, seminars and conferences covering a wide variety of topical issues' (Lowe et al., 2000).

The public was invited to attend all meetings of the JSST, allowing them to be informed and also to be part of the conversation. The JSST operated from 1966 to at least 1990 and represented the second institution formed by scientists with an objective of bringing science to the public. However, unlike the first institution (the GSJ, which still operates today), the JSST dissolved in the early 1990s. During its time of operation, however, its work impacted the future science policy (discussed in Section 4).



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Figure 21.2: Table of contents for the first issue of the *Jamaica Journal* in December 1967.

3.1.2. The *Jamaica Journal*

The *Jamaica Journal* is an academic journal published by the IOJ and its first issue was made available in 1967 (see Figure 21.2). In accordance with the updated IOJ legislation of 1978 to research, study, encourage and develop culture, society and history, the journal features articles related to these three aspects. The first issue included a section entitled 'Science for the Layman',

where scientific topics were explained in a format and language that could be easily understood by the general public. The contents of the journal from the first issue to the current one are freely available online to the public.²

From 1967 to March 2015, there have been 139 science articles published in the *Jamaica Journal*. It is noteworthy that 100 of these articles were published from 1967 to 1989, but only 39 from 1990 to 2015, representing a significant decline in output. In the immediate post-independence period, most issues contained several science-based articles, but in more recent issues only a few articles are published, and sometimes only one. Since the very beginning, there have always been more articles in the sections dedicated to art and culture.

In the earlier years of the journal up to 1988, Thomas H. Farr contributed eight articles, and from 1984 to 1997, John Rashford contributed seven articles. Throughout the journal's history, there have been contributions from a wide range of scientists in many different fields, and these have been grouped into six categories in Figure 21.3.

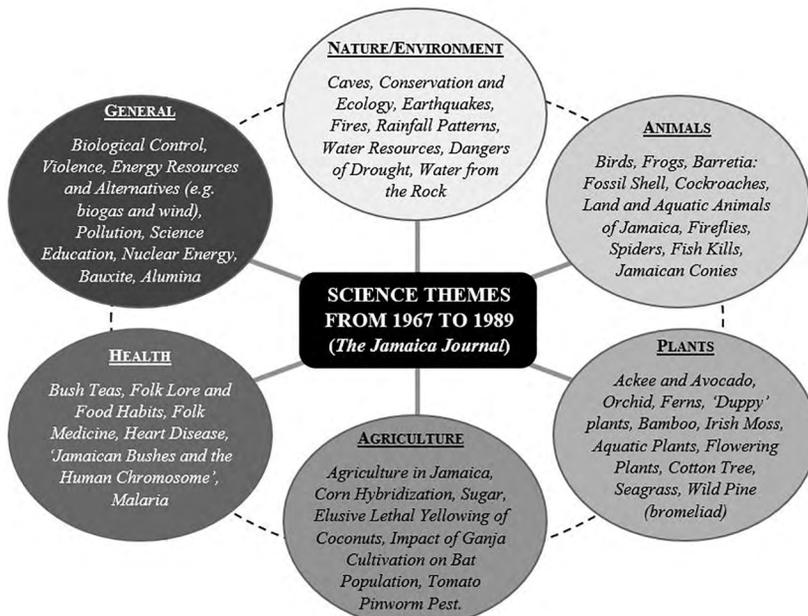


Figure 21.3: Themes covered in articles under six categories under the science sections of the *Jamaica Journal* from 1967 to 1989.

2 Digital Library of the Caribbean – The Jamaica Journal: www.dloc.com/UF00090030/00059/allvolumes?search=jamaica+%3djournal.

3.2. Science in the media post-independence (1962–89)

3.2.1. Post-independence printed media

From the 1960s to 1980s, *The Daily Gleaner* continued to publish science articles that would be both points of information and points of controversy for the public. In 1970, for example, there was an article ‘Prepare Yourself for Staggering 70s’ that covered the growth of ‘test-tube’ babies, artificial manipulation of human eggs and the fact that men would have a contraceptive pill by the end of the 1970s. We now know that the latter has only just reached a trial phase, but the author wrote with such conviction that the average reader may have felt that all that was predicted was likely. Other articles of the time covered cancer, contraceptives, nuclear science and pollution.

By the late 1970s, there were more articles in the print media on the use of natural herbs for treating illnesses (e.g. ‘Ganja and the Treatment of Glaucoma’ and ‘Nerves need Calming? Drink Soursop’). ‘Science and You’ featured every Sunday in *The Daily Gleaner* from 1978 to 1982 and a variety of topics were discussed, such as ‘The Issues Beyond’ by Dr Henry Lowe, which looked at the future of science where oil would be depleted between 2000 and 2005. An example of the impact that ‘Science and You’ had on the audience can be found in a letter to the editor (2 April 1980), which responded to ‘The Return to Solar’ and highlighted the need for solar energy to be used at the National Chest Hospital.

By the 1980s, there was much dialogue on the need for a national science policy and, from the government’s perspective, science continued to be an important driver of economic growth, primarily through improved agricultural practices. Martin Henry, who studied both communication and science (discussed further in Section 4.2.1), wrote in an article published 17 January 1982 that the entire society awaited a science policy:

Nor can we overlook the role of an informed society in the success of any government planning. For many of our people, even among the educated ones, science is a sort of magic word shrouded with mystique. A widespread and basic understanding of science ought rightly to be one of the fundamental goals of national education. The fulfilment of this goal ensures that science-based change cannot be foisted onto an inexperienced population by a paternalistic government. (Henry, 1982)

From the excerpt above, the tenets of science communication are described without the author specifically using that term.

3.2.2. Post-independence broadcast media

Post-independence saw a move towards more local content being broadcast via JBC, with JBC TV airing its first television broadcast one year after Independence Day on 6 August 1963 (Jamaicans.com, 2006). By the 1980s, JBC had television, two radio stations and regional radio stations. From 1965 to 1970, JBC Radio aired a 30-minute feature *Science Corner* and the program was also aired by the Jamaica Information Service (JIS) radio station. As with the pre-independence broadcasts, varied topics were covered.

Science Review was broadcast on JBC Radio in 1972, and it is uncertain if this program was the same as that which aired from 1948 to 1959. According to an article published in *The Daily Gleaner* on 10 September 1972, Alma Mock Yen was responsible for compiling educational broadcasts on JBC, and the *Science Review* series she selected had local and international reports on advances, improvements and problems in S&T. Another science program *JBC Radio Science Magazine* aired for at least one year in 1975.

Television was another means by which science could be communicated to the general public. JBC had an 'Educational TV' component from its inception; and featured from the 1970s to 1980s different science segments such as *Science Grade 6 (to 9)* and *Science I, II and III*. The former dealt with science topics being taught in the classroom and was aimed at students, while the latter dealt with general science matters and was aimed at the wider public.

3.3. Increased science focus

At the United Nations Conference on Science and Technology (UNCST) in 1979, Jamaica made a significant contribution and commitments to the Vienna Programme of Action (VPA) that emerged from the conference (Lowe et al., 2000). The Jamaican national paper prepared for the conference highlighted the state of S&T and in particular noted that a state of S&T consciousness must be produced so ordinary citizens can become aware of, and appreciate, modern S&T in their lives. The following is an excerpt from the paper presented at the UNCST:

At the community level, the mass media, science and technology museums, accessibility to nature and wildlife preserves and annual science exhibitions may be used to popularise S&T, and create a better national awareness of the importance of these assets in every life. These avenues may promote a more deductive approach to national issues and will undoubtedly attract the youth to scientific endeavours ... The public should also be educated regarding the benefits of employing scientific methods to the conservation of energy, water and other diminishing resources. (Lowe et al., 2000)

This was the first instance where the government communicated its intent for science on the global stage post-independence. This formally recognised the need for science to be promoted to the general public and the statements communicated this intention to the world by sharing them on the global stage.

Following the Vienna Conference, the roles and functions of the SRC were re-examined in 1979, taking into account its legal responsibility to develop and promote S&T (Section 5 of the Scientific Research Council Act). In the following years, the SRC became more visible to the public and even provided channels for the public to request and receive information from the US Department's National Technical Information Service. The research being carried out by SRC featured in the newspaper under the section 'Scientific Research Council Supplement'.

The SRC had an active public education campaign using roving exhibitions at parish libraries and public exhibitions. These exhibitions featured contributions made by the SRC to national development and covered topics such as agroindustry, microbiology and industrial fermentation (e.g. making fruit wine). Additionally, in its attempt at ensuring that the public was sufficiently informed, the SRC not only disseminated information on science, but also published a directory of all scientists active in Jamaica for the year 1986 (SRC, 1986). The directory listed their qualifications from BSc to PhD, along with the specific field of science and place of employment for each person. Altogether, 674 scientists from 16 fields were listed, with the majority working in civil engineering (182), chemistry (112) and electrical engineering (88). Although agricultural science was important from a national perspective, only 40 agricultural scientists were in the directory. As the first directory of its kind, it is possible that an accurate account of agricultural scientists was not captured, or these scientists may have migrated to other countries.

The first National Science and Technology Conference was held in 1987, an activity that started with the revamped SRC. The conference was held annually up until 2008 (only a few years missed) and then biennially up to the current year (19–20 November 2018). The two-day conference is free to the general public and presents a wealth of information under different themes, most of which address the use of S&T in national development. The main objective of these conferences is to provide a forum for scientists, technologists, entrepreneurs, business persons, policymakers, students and members of the public to share their knowledge and experiences, as well as an opportunity for us to sensitise the nation on the importance of S&T for national growth and development. The conferences are generally well supported by the public and professionals, and 334 persons registered as attendees in 2018. Actual numbers were probably higher. The conference takes the format of a series of public lectures on topics such as health, nutraceuticals and innovation,

and conference proceedings are available to the public free of charge at the National Library of Jamaica. The institution of these conferences was an important event in the history of promoting science.

4. Science producing fruit: Policy era (1990–2008)

At the annual awards dinner of the JSST in 1981, the Honourable Dr Ronald Irvine (minister assigned to S&T affairs) spoke of the government recognising the need for a national science policy and challenging scientists and technologists to draft one within six months for presentation to the political directorate (*The Daily Gleaner*, 1981). In response to this challenge, a National Science Policy Committee was formed and at its inaugural meeting on 11 June 1981, Dr Arnoldo K. Ventura, the director of the SRC, was elected chairman. This began the process towards the development and promulgation of the first national science policy in 1990.

The foreword of the National Science and Technology Policy of 1990 (GOJ, 1990) was written by then Prime Minister P. J. Patterson. He highlighted that the scientific community had long advocated for a science policy that ‘would guide the development and application of science and technology in the country and form part of the national strategy for development’, and this formed the basis for the policy’s development. The policy’s main goal was to increase the role of S&T in the attainment of economic and social development by bringing about social transformation, removing injustice in the society and improving the quality of life.

The National Science and Technology Policy outlined the importance of the public’s awareness of S&T in part of Section 10:

In the end, the support of science and technology must come from the people. This can only be maintained in the face of competing priorities if the work done is worthwhile and is appreciated as such by the general public as well as by the scientists and technologists. Thus every effort will be made to increase public awareness of S&T and of their social implications, and to involve as much public participation as possible, in decisions which could have a significant and critical influence on the lives of the people of Jamaica (GOJ, 1990).

The mechanism by which awareness was to be increased was the widespread dissemination of information through media, information services, publications, S&T centres and museums, exhibitions and fairs, as well as seminars and other efforts to popularise appropriate aspects of S&T.

Although a national science policy was in place, there was no ministry responsible for science from 1991 to 2003. Up to 1999 there was instead a science unit staffed by three individuals within another ministry (usually the Office of the Prime Minister). Science primarily resided in the divisions with responsibility for planning and development and, by 2002, the staff complement was reduced to a sole S&T director. The scope of the work carried out by the person within this role is uncertain, but for the government responsibility of science to rest solely on the shoulders of one individual would have had negative implications for the growth of science.

4.1. National focus in the policy era

The promulgation of the S&T policy was accompanied by a five-year development plan for S&T, which highlighted, among others, the challenges and inadequate appreciation of the importance of innovating technology in society (PIOJ and Ministry of Finance, 1991). The loss of qualified professionals leading to the deterioration of the S&T sub-sector and minimum budgetary support for R&D. These issues hampered S&T activities needed to increase awareness and appreciation for S&T in society. Section 5.5 of the plan—‘Promotion of S&T in Society’—indicated an increase in efforts to raise public awareness on S&T by disseminating information through the media and information services, establishing S&T centres and museums, as well as hosting exhibitions, fairs and seminars, among others, but these events did not happen at the necessary scale.

The plan projected the establishment of a national museum of S&T, as well as the development of science parks, but, up to the present, these tasks have not been accomplished. The absence of a Ministry of Science and accompanying science portfolio is a factor that likely impacted the establishment of these institutions. The S&T policy also gave rise to the establishment of a National Commission on Science and Technology (NCST) in 1993, which has responsibility for fostering and advancing the national policy and strategy for S&T in Jamaica. However, a low staff complement and limited funding have provided challenges to the NCST in attempting to fulfil these objectives.

4.1.1. First science and technology survey

In 1992, a report was published by Trevor Hamilton and Associates entitled *Analysis of the public perceptions of science and technology in Jamaica* as part of a UNDP/Jamaican Project entitled ‘Strengthening Endogenous Capacity in Science and Technology through Stakeholders Policy Dialogues’. According to Trevor Hamilton and Associates (as cited in Henry, 1998), the study reported that awareness of S&T was generally low among businesses, media,

workers, government officials and women. Unfortunately, the 1992 report is no longer available in the public or private domain to review what the findings of the survey were.

4.2. Key persons involved in science communication

4.2.1. Martin E. D. Henry

Martin Henry, previously referenced in Section 3.2.1, was responsible for the radio program *Science Serving Us* along with the broadcaster Alma Mock Yen. The 15-minute program began airing in Jamaica in 1991 with an aim to promote the dissemination of science to non-scientific audiences. Prior to its broadcast, selected journalists were given exposure and basic training in scientific journalism through a workshop sponsored by the Inter-American Development Bank (IDB) in 1986 entitled ‘Science and Technology by Radio for Non-Scientific Audiences’. The workshop was facilitated by Alma Mock Yen.

Science Serving Us was highly successful and aired up until 2003. In his 1998 thesis that analysed the program, Henry noted that science was frequently reported, with matters related to AIDS and the environment being covered by the mass media (Henry, 1998). He also indicated that scientists were rarely called upon to comment on current affairs, give interviews and speak on talk shows; this was probably a result of the media’s general disinterest in matters of science. The Caribbean School of Media and Communication (CARIMAC), which graduated 1,000 media professionals from 1974 to 1995, did not produce any graduate who specialised in science journalism. This was the reality of Henry’s time even with the new S&T policy being in place. *Science Serving Us* was thus developed as a way of bridging the knowledge gap between scientists and the public.

Science Serving Us was aired on Sundays in time allotted for government broadcasts via JIS on four radio stations. The program adopted an ‘edutainment’ format, where a representative of the audience had a one-on-one light and upbeat conversation with a credible expert. The broadcasts were based on local events and research conducted by UWI, SRC and others. The feedback was overwhelmingly positive with many persons indicating that they regularly listened. The program received over 2,000 letters from its inception up to 1998, and 90 per cent of letters received requested a transcript of the broadcast, such was the desire for the knowledge given. Although at the time there were more males in S&T disciplines, there was a higher percentage of females (58 per cent) who tuned in to the program. Negative feedback was not received, and one broadcast, ‘Flame of Life’, won the 1995 Pan American Health Organization

radio broadcast award. In response to the death of prisoners from asphyxia in 1992, 'Flame of Life' discussed respiration, gas transportation by the blood, physiological consequences of oxygen deprivation, and other scientific matters.³

Science Serving Us was not without its challenges, and a major blow to its efforts was received when the sponsorship of the timeslot ceased. The program experienced resistance from the radio stations and some stations allocated it to 'graveyard' timeslots. The fact that the program had high listenership and was well received did not influence their decision as the media opted for more 'entertaining' content. The program aired on and off with many changes of radio stations and survived until 2003, after which it was fully taken off air.

Martin Henry highlighted the work done on *Science Serving Us* in an article 'Science and the Media' published in *The Daily Gleaner* on 25 November 1998. By then the program was only aired on one station on Sundays at 6.15 pm. He noted the lack of science journalism as an issue and, in response, he along with Professor Aggrey Brown, Director of CARIMAC, developed a course Science, Society and Media (SSM). The course was developed for trainee journalists and was equally applicable to trainee and practising scientists. SSM was an elective course offered by CARIMAC from 1997 to 2000 and was taken by about 50 students, some of whom are active journalists today. The course, however, was discontinued due to a decreasing number of students, and to date there has been no other course that can be considered its equal in the field of science journalism.

Martin Henry was one of very few in the country who had received formal training in both science and communication. At the time of his death on 29 May 2019, he was still writing science-based articles for the newspaper and serving as editor-in-chief for the University of Technology's *Journal of Arts Science and Technology*.

4.2.2. Dr Arnaldo Ventura

Dr Arnaldo Ventura may not have been trained in science and communication but his efforts at promoting science are noteworthy. Dr Ventura is known internationally for promoting S&T as a mechanism to alleviate poverty; his passion developed after his work in under-privileged communities showed the painful reality of the lives of many persons. He believed that science could be leveraged as a tool to solve economic and social problems, and when he became executive chairman of the SRC in 1977, the position provided an avenue to put his ideas into action. In the years leading up to the policy era

3 In October 1992, in a horrible example of overcrowding and police negligence, 19 men were confined in an 8 x 7-foot cell at the Constant Springs lockup in Jamaica. Three men died of asphyxiation (Human Rights Watch, 1993).

in 1990, Dr Ventura used television, newspapers and booklets to promote science and encouraged the media and citizens to develop a greater awareness of S&T.

In 1992, as special advisor to the Prime Minister, he wrote a booklet entitled *An ABC to S&T: An Introduction to Science and Technology*. The introduction noted that ‘This publication is written primarily to provide in the simplest way possible, an explanation of the importance of science and technology to society’ (Ventura, 1992). The 16-page booklet was written in simple language, provided definitions and explanations of S&T, demonstrated S&T’s role in poverty reduction and used large fonts, as well as illustrations (Figure 21.4) to enhance the learning experience. For example, in defining science’s importance, Ventura wrote that ‘Science allows us to predict happenings and consequences with some degree of accuracy, as in the cases of outbreaks of diseases and the effects of pollution on our lives’.

Selecting the right foreign technology or creating the appropriate methods here, will depend on having more local scientists, engineers and technicians. Also, every worker who takes an interest in his work can suggest ways to improve the technology on his job.

Parents should encourage their children to learn more about science. Encouraging some of them to become scientists is a



Parents should encourage their children to learn more about science.

patriotic duty. It would be ideal, if every Jamaican became ‘science minded’, so that whatever they do, they can do better.

Figure 21.4: An Illustrated Page from *An ABC to S&T* booklet.

4.3. Science activities of the 1990s to early 2000s

Two important events that have become staples for science communication were launched in the late 1990s: November was declared Science and Technology Month in 1997, and UWI Research Days were established in 1998. ‘November is Science and Technology Month’ was the title of the government bulletin published in the newspapers on 3 November 1997 as it highlighted the proclamation made on Friday, 31 October by the Governor-General Sir Howard Cooke. It was noted that this new annual celebration ‘represents a part of the SRC’s continuing effort to foster a culture of science in the population and to encourage greater application of technology in our social affairs and development strategies’ (*The Gleaner*, 1997). To date, November as S&T month has various activities open to the public and, likewise, the

UWI Research Days showcase, over a three-day period, the research being done at the university. There have also been several activities in various private and public sector organisations that are involved in scientific research and that aim to educate the public on such activities.

5. Growing science in the *Vision 2030* era

In 2009, Jamaica ushered in a new era with the launch of the *National Development Plan: Vision 2030*, a roadmap that shows the steps needed to attain ‘developed’ status by the year 2030. ‘National Outcome #11 – A Technology-Enabled Society’ addresses the need for science, technology and innovation (ST&I) to be integrated into all areas of development. One key action given is the implementation of a national public education program on S&T (PIOJ, 2009). The *Vision 2030* plan states that Jamaica should popularise an ST&I culture as a viable agent of ‘social and economic transformation’ as a key objective. Although a national communication strategy for S&T is lacking, *Vision 2030* provides an avenue through which such a strategy could be launched. *Vision 2030* created a national shift in priorities and highlighted the need for a new S&T policy. This has led to the release of a new *National Science, Technology and Innovation Policy: Catalysing National Development 2019–2029*, which was tabled in parliament as a ‘green paper’ in November 2019 (Ministry of Science, Energy and Technology, 2019). Public consultations on the policy began in March 2020 and it is anticipated that the policy will be promulgated by the end of 2020.

This period has also brought changes at the government level. By 2013, there was a named science ministry (Ministry of Science, Technology, Energy and Mining). However, while there were established divisions for technology, energy and mining, there was none for science. Therefore, although ‘science’ was in the name of the ministry, capacity was minimal due to there being no established posts to drive the science mandate. The year 2016 saw a change in administration and the establishment of a Ministry of Science, Energy and Technology and, in 2018, a Science Division was established with three posts. Two of the three posts were filled in 2020 and, at the time of writing, the recruitment is being finalised for the third post. This is indicative of a shift in priorities at the national level, where science is now no longer the sole responsibility of entities such as SRC and NCST. The government will now play a more direct role in leading the national S&T agenda for the country, and activities that have been lagging from 1990 (science museum and scientific parks) are now more likely to be lifted from paper to reality. Additionally, the

Minister of Finance declared that as of the 2019/20 financial year, funds will be made available in the national budget for research and development to drive innovation.

At present, there is still no course offered at the local universities that pair science and communication. In a recent survey of 52 S&T graduates from UWI, 95 per cent of respondents agreed that the communication of science to the public should be taught to postgraduate students, and 65 per cent disagreed that there were sufficient avenues to communicate their science to the public (Oliphant, Mattocks and Monroe, 2018). This shows that scientists have a desire to receive training on methods of effectively communicating their work.

5.1. Recent progress in science popularisation/ promotion

In November 2014, a private sector organisation, GraceKennedy, through its Grace & Staff Community Development Foundation, opened the island's first STEM (science, technology, engineering and mathematics) centre with the intention of disseminating knowledge of STEM to young people in underprivileged communities. The centre offers classes on a weekly basis to dozens of students, and most of the teachers are professionals who volunteer their services. With its brightly coloured walls, murals and high-tech equipment (such as a 3D printer), the centre has become a beacon of light in the downtown Kingston community where it resides.

Additionally, the SRC has continued to offer a wide variety of activities that are geared towards promoting science:

- **National science & technology fair:** this island-wide event brings together primary, secondary and tertiary students to showcase their science-based inventions and innovations under thematic areas. Many excellent ideas and innovations are displayed on this platform, presenting ideal business and investment opportunities.
- **Schools' science & technology societies:** this program occurs in both primary and secondary institutions across the island and serves as an avenue to strengthen science education and teaching strategies in schools.
- **Essay, oratory & poster competitions:** these competitions are open to primary and secondary students and seeks to engage those with an interest in the creative arts on the importance/relevance of science. The essay component has been a useful training ground for students who wish to convey the extent to which science is important.

- **Open day:** this event involves displays from educational, research-based, financial and implementation entities that showcase the application of science in our lives, and is open to the public.
- **SRC in the community:** this showcases the services offered by the SRC in various communities across the island, with specific emphasis on the manufacturing and agro-processing sectors.
- **National innovation awards:** this competition encourages and supports innovations among members of the public who applied scientific or technological approaches in addressing matters of importance.
- **Prime Minister's Medal for Science and Technology:** highest award granted to an individual who played a major role in advancing the ST&I agenda leading to positive impacts on socioeconomic development.
- **SRC Young Scientist and Technologist Award:** this award recognises young scientists/technologists (40 years old or younger) for the excellence of their work and potential contribution to Jamaica's development. This award is presented at the biennial S&T conference.

5.2. Presenting science via media

A lot has changed in the science landscape from the 1940s to current times. Although S&T has progressed far beyond what the writers of that time predicted, the communication of such progress has declined in its representation in the media in Jamaica. Whereas there were dedicated media features such as *Science and You* in the past, science is mainly communicated in the current print media via columnists' contributions or in response to a particular issue (e.g. outbreak of Chik-V and ZIKA viruses). There was, however, a weekly feature published in *The Gleaner* entitled 'Ounce of Prevention' by Dr Tony Vendryes up to the time of his passing on 2 May 2019. In general, most of the science-related articles in the print media are related to health and the environment, as radio broadcasts focus mainly on health and agriculture.

JIS, as a government entity, continues to broadcast on all radio stations in time allotted for government broadcasts. The subjects of these broadcasts were examined from January 2013 to October 2018 to determine how many science topics were covered.⁴ Only 346 of 17,502 topics broadcast were science-related (2 per cent). The topics related to energy, agriculture, climate change, natural disasters and different aspects of health.

⁴ See jis.gov.jm/radio_programs/.

6. Conclusion and future outlook

Since pre-independence, Jamaica has made strides in S&T research and, along the way, the public has been engaged via different media and events. Activities geared towards science popularisation and promotion are carried out primarily by the government through the SRC and secondarily by other entities, both private and public. However, more work is required in the area of science communication that engages not only schools but also the general public. It can be surmised that the concept of 'science communication' is not yet embedded in the psyche of policymakers as evinced by the fact that, despite the country's successes in S&T, there is no targeted approach to communicating science and training science communicators. The lack of a science ministry and/or division in the years following the 1990 policy is indicative of the extent to which science was prioritised, as ministries are formed based on the political priorities of the ruling party.

Examining Jamaica's history in the preceding sections shows a decline in science communication via the media channels, which suggests that part of the general public is not on the receiving end of the information being presented. In the past, by contrast, with radio and newspapers being the main modes of communication, science features were presented weekly and thus would be difficult to ignore.

In this current era of the internet, a number of entities share their 'science' via social media but most, with only a few followers, are limited in their reach. The absence of science journalism as a distinct field of study suggests that most journalists currently reporting do not have adequate capacity to write on science matters, nor are scientists adequately equipped to communicate with the public at large. With the recent changes to the government structure, where a science division has been established and budgetary allocation made for R&D, an important signal has been sent that science is critical. It is expected that these changes will give rise to increased levels of interaction and dialogue that will require effective modes of science communication. In conclusion, Jamaica is not short of scientists or low in its research output, but the modes of communication need to be improved so the dialogue can flow backwards and forwards from scientist to non-scientist for the benefit of society.

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Timeline

Event	Name	Date	Comment
First interactive science centre established.	Natural History Museum opened	1879	Primarily focused on science
First national (or large regional) science festival.	First National S&T Conference	1987	
First university courses to train science communicators.	'Science, Society and Media' offered at UWI Mona (CARIMAC)	1997–2000	Short-lived because of decreasing demand
National Science Week founded.	November declared Science and Technology Month	1997	
First significant radio programs on science.	<i>Science Serving Us</i>	1991	First local science broadcast
First significant TV programs on science.	<i>Educational TV</i> on JBS TV; <i>Science I, II and III</i>	1970s – 1980s	Aired general science information

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