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Item 16 of the provisional agenda*
Space and global health

Responses to the set of questions regarding policies, experiences and practices in the use of space science and technology for global health

Note by the Secretariat

I. Introduction

1. At the fifty-sixth session of the Scientific and Technical Subcommittee in February 2019, the Working Group on Space and Global Health of the Subcommittee agreed on the questionnaire (A/AC.105/1202, annex III, appendix II), to be circulated by the Secretariat to States members of the Committee and international intergovernmental and non-governmental organizations in accordance with the Working Group's multi-year workplan (A/AC.105/1202, annex III, appendix I). Accordingly, a communication was sent on 18 July 2019 with the invitation to provide responses to a set of questions regarding policies, experiences and practices in the use of space science and technology for global health by 16 October 2019 so that the information could be made available to the Subcommittee at its fifty-seventh session.

2. The present document has been prepared by the Secretariat on the basis of information received from five Member States, namely Algeria, Australia, Japan, Philippines and Thailand, and from the European Union.

* A/AC.105/C.1/L.383.

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II. Replies received from Member States

Algeria

[Original: French]
[16 October 2019]

Question 1

A nationwide initiative has been implemented jointly with the telecommunications and health sectors with the aim of connecting 4,000 health-care facilities through the Algerian telecommunications satellite Alcomsat-1, which was launched in December 2017.

The initiative, which is intended to meet the growing needs of the population with regard to the availability of public health services throughout Algeria, is in line with the country's commitment to the implementation of the 17 Sustainable Development Goals established by the United Nations in the 2030 Agenda for Sustainable Development.

The project, which will enter its operational phase in early 2020, will ensure equity and high-quality public services for all, under optimal conditions, throughout the country, including in isolated and sparsely populated areas.

Question 2

Such a platform should not be used commercially given the humanitarian role it would play by ensuring collaboration between the various actors involved in global health issues.

It should enable permanent, unrestricted and timely access by all actors to useful data as a means of meeting the identified global health needs by using space technology and applications.

Question 3

In order to ensure the effective use of space technology in various sectors, including public health, Algeria has fostered a collaborative approach between the Algerian Space Agency – the national body for the promotion and development of space technology – and the different agencies and ministries.

That approach has led to the establishment of a national space programme, which has been reviewed and adopted by the highest national authorities, with the principal aim of addressing various national needs through:

(a) Identification of the space systems to be established, in terms of missions and technologies;

(b) Identification of applied technology projects to be implemented in coordination with user sectors;

(c) Establishment of specialized training programmes for young Algerian engineers and specialists;

(d) Alignment of space-related research programmes with national needs.

The space programme thus serves as a national road map whose implementation over the medium to long term will contribute to the country's sustainable development as a means of fulfilling the various needs of the population.

Question 4

Algeria, which hosts a regional support office of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response

(UN-SPIDER), adheres to the principle of sharing geospatial data with the various focal points in the subregion on the basis of the relevant conditions and modalities.

Accordingly, images produced by the Alsat Earth observation satellites, accompanied by the related analyses carried out by experts at the Algerian Space Agency, are shared with requesting agencies at the national and regional levels, in particular during the crisis phase following natural disasters (floods, earthquakes, locust plagues and forest fires) and during disease outbreaks.

Question 6

Projects under development with the health sector are as follows: (a) establishment of a national health information system; and (b) development of a geographical database for malaria and re-emerging diseases (cutaneous leishmaniasis).

Activities carried out at the national and international levels are as follows:

(a) Participation by the Algerian Space Agency in a panoramic epidemiology training course organized by the space agency of Argentina, the National Space Activities Commission (CONAE), from 6 to 31 October 2008, on the development of a spatio-temporal model for epidemiological risk-mapping based on spatial imagery;

(b) The Technical Assistance and Information Exchange (TAIEX) workshop held in Algiers on 27 and 28 April 2016, hosted jointly by the Ministry of Health and the European Union, on the integration of new technologies in the provision of medical services to ensure the uninterrupted, high-quality care of patients, in particular in remote areas;

(c) A seminar held by the Algerian Society for Telemedicine and e-Health, in Oran on 31 March and 1 April 2017, on the status and potential in Algeria of telemedicine, a solution that involves the remote, safe, ethical and professional provision of health-care services through information and communications technology.

Questions 7 and 11

Algeria is committed to leveraging space technology and its applications in the health sector, including the various applications offered by the Algerian telecommunications satellite Alcomsat-1, in particular in the areas of distance learning and telemedicine.

A nationwide project to bolster the health sector has been launched jointly by the Algerian Space Agency and the ministry in charge of telecommunications with the aim of:

(a) Ensuring the availability of experts and physicians from hospitals in northern Algeria for consultations with patients in southern regions of the country by means of videoconferences;

(b) Improving the management of patient records and facilitating the exchange and sharing of information among health professionals, including between doctors at hospitals in different regions of the country;

(c) Optimizing the transfer of patients between health-care institutions and reducing the risks and difficulties posed by the transfer of patients between distant hospitals;

(d) Enhancing the exchange between health professionals of information on diseases and epidemics.

Question 8

The project described above ensures interconnectivity between the various national hospitals and, as a result, fast and effective decision-making in remote areas with insufficient health-care staff and resources.

Question 9

Space technology and applications are used in planning and health emergency management programmes and in disaster management plans through mapping work carried out by various actors using data from Earth observation satellite systems.

The thematic maps produced using these images enable better analysis of the living conditions of the population in a given territory as part of the planning of related services, including health services, and facilitate the identification of health risks, the deployment of teams and the implementation of contingency plans in the event of a major disaster.

Australia

[Original: English]
[16 October 2019]

Question 1

The Australian Antarctic Division, an Australian Commonwealth Government agency, signed a memorandum of understanding with the National Aeronautics and Space Administration (NASA) of the United States of America in 1993, which is still in effect. This MOU specifies the terms for cooperation in the Antarctic between certain programmes within the NASA Life Sciences Division and the Polar Medicine Branch of the Australian Antarctic Division.

Question 2

University stakeholders identified an online forum as a useful platform for communication, allowing for programmes, issues and updates in the field to be posted and discussed as they arise. They noted that such a platform could be limited by institutions having restricted Internet access.

Question 3

The Australian Academy of Science established the National Committee for Space and Radio Science (NCSRS), which will deliver the plan entitled “Australia in space: a strategic plan for space science”. The Australian Space Agency is a key sponsor of the strategic plan as it aligns with the Agency’s purpose as well as its “leapfrog” approach to identifying priority areas for research and development. The strategic plan aims to both grow and transform the use of space in the broader areas of the economy, such as the health and medicine sector.

The Space Health and Life Sciences Working Group sits under the NCSRS. The Working Group is focused on space life sciences rather than health outcomes/clinical practice involvement with the space sector. The Working Group will deliver an initial report to NCSRS about how to best position Australia in the international space life sciences landscape of the coming decade by engaging in the following:

(a) Identifying opportunities and priority areas for action and leadership in space medicine;

(b) Delivering a report to NCSRS which provides a stocktaking of current and future capabilities and resources in the area; identifies national and/or international opportunities, requirements and potential innovations in the next decade; and suggests strategies and resourcing necessary to maximize new opportunities;

(c) Discussing next steps and implementation plans to advance the space medicine sector of Australia in the national context.

Question 4

In the period 2019–2020, the Australian Government Department of Health is supporting the Bureau of Meteorology and the Department of the Environment and Energy to deliver the analytical project on reducing life lost from heatwaves.

The Bureau of Meteorology operates a Heatwave Service (see www.bom.gov.au/australia/heatwave) between October and March. The Heatwave Service is a set of maps showing colour-coded heatwave severity for the previous two three-day periods, and the next five three-day periods. This allows individuals to prepare and modify their behaviour in order to cope more easily when extreme heat occurs, particularly those more vulnerable to severe heat, that is, people over the age of 65 with pre-existing medical conditions, pregnant women, babies and young children, and those with chronic illness.

The Australian Government Department of Health has previously undertaken analysis of disease outbreaks, including global geospatial representations of the exposure risk for polio in Australia.

The Australian Institute of Health and Welfare (AIHW) regularly publishes reports and web products from its health and welfare data collections that use data at various geographical levels. AIHW also undertakes spatial analysis of health and welfare data, which are often published on the AIHW website.

AIHW is committed to providing statistical information that governments and the community can use to promote discussion and inform decisions on health, housing and community services. AIHW holds valuable data from a wide range of health and welfare data collections at a range of geographical scales, such as public health areas, Statistical Areas (levels SA2 and SA3) and smaller areas. Strict privacy and confidentiality controls are applied to small-area data. Results are sometimes unable to be reported for all areas in Australia in cases where reporting small numbers could risk disclosing private or confidential information. At the present stage, AIHW does not have a policy specific to providing open access to their geospatial data holdings. The data collections published according to geography are available at www.aihw.gov.au/about-our-data/aihw-data-by-geography.

On 26 February 2016, the Government of Australia released the Geo-coded National Address File (G-NAF) of PSMA Australia and its Administrative Boundaries datasets. PSMA is an unlisted public company owned by the nine governments of Australia, including the Commonwealth and state and territory governments. PSMA receives location data from each of the jurisdictions and standardizes formats and aggregates the data in authoritative location-based national datasets, which can be used for personal navigation applications, infrastructure planning, business planning and analysis, logistics and service planning, and government service delivery and policy development. The first release of the G-NAF and Administrative Boundaries datasets was made available for use and reuse at no cost to end users through the online data portal of the Government of Australia (www.data.gov.au) on 26 February 2016. Updated versions of the data are published quarterly.

The Government of Australia is investing 36.9 million Australian dollars for Digital Earth Australia, the digital infrastructure that uses satellite data to detect physical changes across the territories of Australia in unprecedented detail. This will be accessible for government offices, industry and individuals, allowing for a wide range of applications such as the monitoring of environmental and health changes. Examples are the use of satellite imagery to monitor disease outbreaks and to improve disaster risk reduction strategies.

Question 5

The Australian Government's Department of Health Connected Health Data programme is currently undertaking a project to geocode data within the Department's enterprise data warehouse. The enterprise data warehouse supports the data collection and storage facilities for a range of key health-related data sets.

The Connected Health Data programme aims to build a safe and secure platform for managing data access through the Department's enterprise data warehouse; expand and enhance health and aged care data to unlock the value of this information; and make health and aged care data assets available more widely within government for policy development, programme evaluation and research.

The National Health Services Directory contains geographical information for general practitioner, allied health, specialist and other health facilities and services.

AIHW is considering future investment in the geocoding of health and welfare data collections over the next few years.

Question 6

See the response to question 3 regarding the Space Health and Life Sciences Working Group.

Question 7

A strategic pillar under the Australian Space Agency's strategy entitled "Advancing space: Australian civil space strategy 2019–2028" is the "Inspire" pillar, which aims to showcase Australia's achievements in space activities to inspire young people to take up careers in science, technology, engineering and mathematics ("STEM subjects") and support growth in the future workforce. That pillar also includes the aim of identifying opportunities to increase capability in the space sector. While this strategy is not explicitly linked to the health sector, it provides a foundation for increasing capacity-building as the space health industry grows in Australia.

A university stakeholder stated that it was aware of high school-level programmes to engage students' interest in space and acquire a range of skills to develop and use space technology. An example of such a programme is found at Hamilton College in Adelaide (www.hamcoll.sa.edu.au/curriculum/space-school/).

The Space Expo and other community-based programmes conducted in Adelaide facilitate community awareness and encourage students to engage with the space programme early in their schooling. However, those programmes are focused on STEM subjects rather than medicine and life sciences.

Question 8

AIHW is developing a geospatial strategy to improve geographic information available in datasets by making improvements to data collection practices and increase adaption of geographical information in national-level reports in order to contribute to global health information.

The Government of Australia is investing more than $260 million in better global positioning systems and new ways for industry to access and use satellite imagery and PNT data that can support medical and health related applications. The investment includes:

(a) $160.0 million to deliver a satellite-based augmentation system to provide positioning capability to an accuracy of 10 cm across all of Australia, with applications in agriculture, mining and other industries;

(b) $64 million to establish a national positioning infrastructure capability that will drive productivity and innovation in a number of industries, including transport, agriculture, mining and construction by providing more accurate global positioning data;

(c) $36.9 million for Digital Earth Australia (discussed in the response to question 3).

Question 9

Briefings of the Bureau of Meteorology are routinely incorporated into summer-preparedness activities. Their briefings provide a weather outlook for the likelihood and types of natural disasters forecast for the summer season. These are used to inform jurisdictional risk management strategies before summer begins.

Ambulance authorities use geospatial tracking for their assets. Global positioning trackers are also worn by Australian Medical Assistance Teams on deployment overseas.

Question 10

The Australian Space Agency's strategy entitled "Advancing space: Australian civil space strategy 2019–2028" has listed "'leapfrog' research and development" as a national civil space priority area. Space medicine and synthetic biology are listed as areas of opportunity within research and development that can grow and transform Australia's space sector.

See the response to question 3 regarding the space health and life sciences.

Question 11

The SmartSat Cooperative Research Centre (https://smartsatcrc.com/) is currently considering a "mapping project" to identify cross-sectoral dependencies of space technology.

See the response to question 3 regarding the Space Health and Life Sciences Working Group.

Japan

[Original: English]
[18 October 2019]

Question 1

In 2015, the Japan Aerospace Exploration Agency (JAXA) and National Center for Global Health and Medicine (NCGM) of Japan signed a cooperation agreement. Under that agreement, NCGM developed and improved terminals for collecting biological information, shared clinical information such as physiological tests at medical institutions in developing countries and others through the use by NCGM of satellite communication technology of JAXA, established a monitoring system, and examined the possibility of providing support for improving technologies of disease diagnosis and giving instructions for improving the lifestyle of patients with lifestyle diseases.

Question 2

The Office for Outer Space Affairs could possibly collaborate with the Future Earth Health Knowledge-Action Network ("Health KAN") platform. Health KAN is a global research programme designed to provide the knowledge needed to support transformations towards sustainability. It focuses on systems-based approaches, which seek to deepen our understanding of complex Earth systems and human dynamics across different disciplines.

Question 3

In Japan, the Basic Plan for Space Policy was created pursuant to article 24 of the Basic Space Law (Law No. 43, 2008). The Basic Space Plan, a comprehensive space policy of Japan, has been issued four times, in 2009, 2013, 2015 and 2016. The current Basic Space Plan includes, like its two predecessors, a section referring to the

promotion of international cooperation in the space activities of Japan, which can be understood as the implementation by Japan of the Space Benefits Declaration (General Assembly resolution 51/122, annex) of 1996, a non-legally binding instrument. The Space Basic Plan of 2015 includes the following: to contribute to enhancing the space capabilities of developing countries to address their development goals by utilizing the space technology of Japan, in cooperation with relevant international organizations such as the World Bank; to take measures to jointly develop satellites, engage in hosted payload programmes, joint utilization of space-based data for solving various human security issues including energy shortage, climate change and disaster mitigation; and to promote cooperation for science and technology, as well as nurturing human resources projects.

Question 4

In Japan, there is an open and free platform called “Tellus”, which is aimed at creating a new business marketplace using governmental satellite data. Tellus contains not only governmental satellite data but also a great amount of commercial ground and satellite data. By using the cloud, graphics processing units (GPUs) and storage computing resources, the services are made openly and freely available, with some limits.

Question 5

There is an existing effort for the geotagging of patients and infections, conducted by NCGM.

Question 6

There is cooperation in the field of atmosphere and health in the Monsoon Asia and Oceania Networking Group (IGAC-MANGO). The main objective of IGAC-MANGO is to form a cohesive network of atmospheric scientists in the Asian monsoon region, facilitate collaboration between Asian and international scientists, and foster the next generation of scientists in this region. IGAC-MANGO plans to use data acquired from Japanese satellites.

Questions 7, 8, 9 and 11 (a), (c) and (d)

Not applicable.

Question 10

Please refer to the Japanese expert’s presentation delivered in the meeting of the Working Group in February 2019.

Question 11 (b)

NCGM is engaged in tele-epidemiology in the Lao People’s Democratic Republic.

Remote sensing is one of the efficient ways of tackling environmental health. One example of Japanese initiatives is the air pollution monitoring using Himawari data. Himawari is a Japanese geostationary meteorological satellite used for weather forecasting, and it could monitor particles such as desert dust and air pollutants, which affect the quality of the atmosphere. Also, the Global Change Observation Mission–Climate (GCOM-C) has the capability of observing atmospheric particles (including desert dust and PM2.5 particulate matter) on a global scale, and it will also contribute to air pollution monitoring. One idea is to utilize those data to predict areas where people suffer from health problems due to air pollution.

Question 11 (e)

Japan would like to suggest that the Secretariat designate a health expert, not just outer space experts, to be in the Working Group.

Japan would like to point out that current lack of access to the necessary data (e.g., weather data) may hinder the effective research in the fields of space and global health. The lack of access is often caused by the price and the difficulty of understanding how to attain data. The common data platform may possibly solve those difficulties.

Philippines

[Original: English]
[29 October 2019]

Question 1

There are still no formal cooperative arrangements directly addressing the health sector and space activities. However, the Philippines recently enacted the Philippine Space Act (Republic Act No. 11363), which mandated the development of the Philippine Space Policy. Under the Space Policy, two of the six development areas focused on health sector (e.g., national security and development; and hazard management and climate studies).

Furthermore, in the Philippines there is an existing joint collaboration of the eHealth Steering Committee with the Department of Health, the Department of Science and Technology, the Department of Information and Communications Technology and the Philippine Health Insurance Corporation (PhilHealth). This joint partnership aims to advance the use of information and communications technology, harnessing its utilization in health sectors, including the achievement of universal health care. One of the major planned activities of the partnership is the development of the Philippine Health Information Exchange, which will allow the exchange of information among patients, health providers and health facilities. The group is open to the possibility of harnessing space technologies for Internet connectivity, to reach remote areas, especially geographically isolated disadvantaged areas.

Question 2

Having a dedicated platform is a welcome development for the health sector. The platform can be patterned on the International Telecommunication Union–World Health Organization partnership on e-health. The partnership provided a policy framework for their member States that helps those States to publish their own strategic toolkit for the development of an e-health national strategy plan. This also led to the capacity-building activities between information technology and health practitioners.

Question 3

There are still no existing or planned policy and governance mechanisms for the effective use of space-based technologies in support of global health.

Question 4

The Government currently has an open data-sharing platform (www.data.gov.ph) for use by its executive branch and other government departments through its Open Data Philippines initiative, led by the Department of Budget and Management and the Department of Information and Communications Technology.

Question 5

Under the Philippine e-health partnership mentioned above, the proposed Philippine Health Information Exchange will allow the sharing of information among all stakeholders in the health area, for patient care, surveillance, monitoring and health decision-making. There is also an ongoing initiative of the Department of Health on

geotagging its health facilities nationwide under the Health Facility Enhancement programme.

Question 6

There is still no existing coordination programme related to capacity-building relevant to space science and technology in the field of global health. However, there are non-government and international initiatives such as the Asia eHealth Information Network, which advocates and works closely with the Government on its capacity-building programme for the use of information and communications technology in the health sector.

Question 7

The Department of Science and Technology–Advanced Science and Technology Institute (DOST-ASTI) Philippine Earth Data Resource Observation Center (PEDRO) initiative and Remote Sensing and Data Science (DATOS) initiative, as well as the collaboration with the University of the Philippines on the STAMINA4Space programme can be used as a venue for outreach to young health professionals in terms of promoting skills and abilities in the efficient use of space technology products. This can and will be explored in the near term.

Question 8

No existing mechanisms are in place for the decision-making process related to global health.

Question 9

Space technology and applications can be integrated with the health-related emergency planning and disaster management through hazard mapping, use of light detection and ranging (LIDAR) technologies for vulnerable areas, disaster response and building resilient health facilities.

Question 10

None.

Question 11 (a)

Pilot testing of the uses of TV white space and satellite communication technologies has been conducted in some remote areas. Satellite communication for telemedicine as provided by private companies for offshore facilities.

Store-and-forward communication from small satellites in low Earth orbit has been implemented in the Philippine microsatellite Diwata-1 and the Philippine nanosatellite Maya-1. They are currently being tested, and future implementations are intended to target applications in the area of public health, such as the collection of health data from and distribution to geographically isolated and depressed areas in the Philippines.

Question 11 (b)

No initiatives have been recorded.

Question 11 (c)

None.

Question 11 (d)

The use of satellite imagery for disaster response is being extensively and effectively pursued by DOST-ASTI in the PEDRO and DATOS initiatives. The

STAMINA4Space programme, through images from the Diwata-1 and Diwata-2 microsatellites, supplement and complement these efforts.

The use of amateur radio satellites is being promoted. An amateur radio unit is included among the payloads of the Philippines Diwata-2 microsatellite and is now being used by the community. It is also being continuously promoted to various groups, including the Office of Civil Defense and the local government units. The STAMINA4Space programme plans to coordinate with the Department of Health and relevant stakeholders to train health workers in various health centres in using amateur "ham" radio as a means of communication in unserved areas and/or in times of emergencies.

Question 11 (e)

There is an ongoing exploratory discussion between the University of the Philippines Manila and DOST-ASTI (with the participation of the Philippine Council for Health Research and Development of DOST) on the potential use of space technologies (e.g., remote-sensing satellites and ground-based sensors) for health applications such as monitoring pollution in the country.

Thailand

[Original: English]
[28 October 2019]

Question 1

The Faculty of Public Health cooperates with the Geo-Informatics and Space Technology Development Agency (GISTDA) and with the National Electronics and Computer Technology Center (NECTEC) to provide a platform for information on health and health-related issues on the basis of space information, such as for communities and villages.

Question 2

Space information is crucial for global health, in particular for creating a health risk map, which can provide significant information for global health protection and prevention. The United Nations can simply organize a platform of health sectors and academia to share spatial information and spatial health information such as in the form of a risk map or a land use map.

Questions 3, 5, 7

No information is presently available on the national point of contact.

Question 4

Based on current information available, GISTDA offers a service to provide geospatial information for public use with permission.

Question 6

The Asian Institute of Technology and the geospatial group formed by KMUTT and GISTDA offer several short training courses on spatial technology and spatial health information for the public.

Question 8

The Ministry of Public Health uses space data for human resource allocation and the prevention and control of infectious diseases.

Question 9

Space technology can be used to identify level of health risks which can be used for a prevention and protection plan. Also, the information of space can provide information for a comprehensive context and system to support integrated plans for prevention, protection and evacuation to reduce loss of life and disaster-related losses.

Question 10

To develop a platform of space and health data-sharing; and to provide capacity-building for using health-related space technology.

Question 11 (a)

Telemedicine and telehealth in Thailand

According to World Health Organization standards, communities should have one doctor for every 439 people, but in Thailand there is only one doctor for every 2,065 people. To solve this problem, the Government of Thailand began development of its telemedicine programme, which recognized that using digital infrastructure to provide public health services is crucial for Thailand, whose population is rapidly ageing and in just 20 years, from 2002 to 2022, will go from an ageing society to an aged society – the fastest pace among developing countries. This programme is a joint effort of the Public Health Ministry and the National Broadcasting and Telecommunications Commission (NBTC), is a vital part of addressing concerns about rising medical costs and insufficient health-care access at 32 hospitals in rural areas in eight provinces, encouraging the adoption of new technologies and remote medical care. The operation of telemedicine is conducted through the NBTC Universal Service Obligation (USO) Net. The USO Net infrastructure covered 3,920 remote villages nationwide, or 600,000 households, as of June 2019.

The project focused on four illness types: high blood pressure, diabetes, eye disease and skin disease. These account for over 70 per cent of hospital cases. The eight provinces seeing the service first are Chiang Rai, Kamphaeng Phet, Kanchanaburi, Kalasin, Phetchabun, Surin, Songkhla and Surat Thani.

The budget is part of the NBTC five-year funding for the operation of hospitals. In the pioneering phase, 180 million baht have been budgeted to purchase and install digital equipment for telemedicine. In addition, telemedicine is expected to reduce expenses for both patients and state-run hospitals by a combined 38 billion baht annually after full implementation in four years.

Question 11 (d)

Disaster and health emergency management: Thailand became the first country of the World Health Organization South-East Asian Region group to obtain classification for its emergency medical team

Thailand founded the Emergency Medical Team, which was developed from the medical emergency response teams established in every province in 2013 to respond to disasters in the country. The Department of Medical Services of the Ministry of Public Health was the Emergency Medical Team coordinator and focal point in response to emergency situations and disasters in the country and the region. Emergency medical teams are an important part of the global health workforce. Because they go where needed in the shortest time possible with the assistance of global positioning systems (GPS) and deliver quality care appropriate to the situation, emergency medical teams can help substantially reduce the loss of lives in public health emergencies.

Because South-East Asia is prone to natural disasters and at risk of climate change-related and other health hazards, the countries of the World Health Organization (WHO) South-East Asian Region group have been investing in strengthening emergency response capacities as a flagship priority since 2014.

Last year, that regional group passed a resolution to strengthen emergency medical team capacities in order to further bolster emergency response. Those efforts are in line with the WHO global goal of ensuring 1 billion more people have better protection from health emergencies.

Thailand has become the first country of the WHO South-East Asian Region to receive WHO classification for its emergency medical team. This classification makes the Emergency Medical Team of Thailand the twenty-sixth team in the international roster of WHO-classified internationally deployable medical teams.

In addition, Thailand set up a three-year plan for the period 2019–2021 to become an internationally recognized learning centre and training centre, in cooperation with WHO.

Question 11 (e)

The Faculty of Public Health does not currently have any planned initiatives related to any of the above issues.

III. Replies received from the European Union

European Union

[Original: English]
[17 October 2019]

Questions 1, 3, 5, 6 and 11(a)–(c)

Not applicable.

Question 2

The Joint Research Centre of the European Commission is developing the Epidemic Intelligence from Open Sources (EIOS) platform with the World Health Organization and other health surveillance communities. The EIOS platform may be an appropriate platform for accommodating space-based information. (More information is available at https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/inform-epidemic-risk-index-support-collaborative-risk-assessment-health-threats.)

Question 4

The European Union has an open data policy. Data from projects of Copernicus and the Joint Research Centre are made available, including on the Centre's open data platform. (More information is available at https://data.jrc.ec.europa.eu/.)

Question 7

The Joint Research Centre's Disaster Risk Management Knowledge Centre develops publications aiming at transdisciplinary learning, including with the space and health sector. The 2017 publication "Science for disaster risk management 2017: knowing better and losing less" covers health and space and is increasingly used as an academic syllabus. (More information on the Knowledge Centre's publications is available at https://drmkc.jrc.ec.europa.eu/knowledge/Challenges-Sharing.)

Question 8

The Joint Research Centre's Global Human Settlement Layer (GHSL) and Database provides a harmonized division between urban and rural areas based on remote sensing. GHSL provides a means of reporting statistics related to the Sustainable Development Goals in a harmonized manner. In addition, the Global Human Settlement Database already provides statistics of more than 50 databases in

areas such as health, air pollution and urban greening (see https://ghsl.jrc.ec.europa.eu for publications and data). The Global Human Settlement Layer is a contribution to the Group on Earth Observations (GEO) Human Planet Initiative.

Question 9

The Joint Research Centre's research on floods, forest fires, droughts and heatwaves uses space-derived data and information to derive knowledge on current and future mortality and morbidity. The studies of the Projection of Economic Impacts of Climate Change in Sectors of the European Union based on Bottom-up Analysis (PESETA) are an example (see https://ec.europa.eu/jrc/en/peseta-iii), as are the Copernicus Emergency Management Service (see https://emergency.copernicus.eu/), the GEO Global Wildfire Information System, the Global Flood Awareness System and the Global Drought Observatory.

Question 10

Science for policy support work relevant to the field of space and global health that is being done at the European Commission's Joint Research Centre includes the following:

Urban green spaces

Urban green spaces have many functions that can moderate the impact of climate change and help prevent diseases and thus alleviate public health expenses in the context of ageing societies. The importance of green spaces for health is recognized in the Parma Declaration on Environment and Health (World Health Organization (WHO), 2010) in which Member States of the WHO European Region reconfirmed their commitment "to provide each child by 2020 with access to healthy and safe environments and settings of daily life in which they can walk and cycle to kindergartens and schools, and to green spaces in which to play and undertake physical activity". Similar visions are expressed in target 11.7 of the Sustainable Development Goals and the WHO Action Plan for the Implementation of the European Strategy for the Prevention and Control of Noncommunicable Diseases for the period 2012–2016 (WHO, 2012).

The availability of or exposure to green spaces can be assessed using Earth observation data by calculating the normalized difference vegetation index, which indicates the light-absorbing capacity of vegetation derived from satellite data. The normalized difference vegetation index measure of how much live, green vegetation is present in a given area and is an indicator of an area's "greenness" (Pettorelli and others, 2005).

At the Joint Research Centre, in the framework of the Global Human Settlement Layer, changes in the availability of green spaces in the period 1990–2014 were studied while taking into consideration changes in the normalized difference vegetation index and in the built-up areas across 10,323 urban centres around the globe (European Commission, 2018). The urban centres were spatially delineated following a harmonized definition of cities and described using a set of thematic attributes describing the environment, socioeconomic characteristics and exposure to natural hazards of the cities, summarized in the Urban Centre Database (Florczyk and others, 2019).

The methodology used by the Joint Research Centre for building on the Urban Centre Database combined with time series of high-resolution normalized difference vegetation index composites made it possible to conduct an in-depth study of the long-term trajectories of urban green spaces and showed an overall trend of increased green spaces between 1990 and 2014 in most cities. That greening effect is observed in most of the world's 32 megacities (Corbane and others, 2018) (see https://ghsl.jrc.ec.europa.eu).

Disaster risks

Disasters are an important aspect of the space and health nexus. Disasters have direct health impacts (mortality, morbidity and psychological trauma), as well as long-term impacts (e.g., cholera after floods, respiratory disease after forest fires, cancer after technological accidents). Forecasting disasters and accurately assessing damage are essential in proactive and reactive disaster management and reduce health consequences. Remote sensing and space technology have a long track record in such disaster management processes. The Copernicus Emergency Management Service is the result of decades of research and development that has been operationalized in a value-adding processing chain. Its early warning and monitoring component uses space data assimilated in hydromet models or directly (e.g., optical, microwave and thermal data for flood and drought monitoring, and available satellite sensor data for near-real time wildfire monitoring). The mapping component uses all available sensors to provide rapid damage assessments or risk and recovery products. The European Flood Awareness System, which is a component of the Copernicus Emergency Management Service, was developed and tested at the Joint Research Centre.

Equally important for health applications is the accurate mapping of the worldwide population. The Global Human Settlement Layer produces new global spatial information, evidence-based analytics and knowledge describing the human presence on the planet. (More information is available at https://emergency.copernicus.eu.)

Wildfires

Wildfires pose a serious threat to human populations, producing negative effects on human health and increasing death tolls. The use of remote-sensing techniques has become common among forestry and civil protection organizations. Remote sensing permits the near-real time assessment of fire spread, which can be used to assess fire effects – including the health effects – at a very low cost, which complements necessary field campaigns for the in situ assessment of damage and the planning of restoration measures (San-Miguel-Ayanz and others, 2017).

The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in European Union countries and provides the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe. The Joint Research Centre implements EFFIS in the context of the Copernicus Emergency Management Service. (More information is available at http://effis.jrc.ec.europa.eu.)

Waterborne health threats

There are ongoing discussions with the World Health Organization on the potential use of the Joint Research Centre Global Surface Water Explorer (the maps were created using Landsat satellites data) to assess waterborne health threats, in order to assist with respect to the following areas: transport process assessment, seasonal stratification, attenuation processes and the mapping of connectivity and disruptions (for pathogens, pesticide/nutrient run-off, aquaculture, mining and urban contaminants), and ship/road/rail/air traffic contamination of surface water.

Impact of environment and climate

The Joint Research Centre is setting up programmes to link health-related parameters with environmental/climate/pollution parameters in order to better understand their relationships. Evidently, space application technology may be an extremely important data source. However, so far the Centre is still exploring the different possibilities with interest, but has not yet set up any concrete application.

Question 11 (d)

See above.