



Regional Consultation for Latin America and the Caribbean on the UNESCO Recommendation on Open Science

Wednesday 23 September 2020

11:00 – 15:00 Montevideo, Brasilia, Buenos Aires

09:00 – 13:00 Mexico, Lima, Kingston

16:00 – 20:00 Paris



EXECUTIVE SUMMARY

Open Science is a global movement that seeks to make science more accessible, democratic, transparent and beneficial to all people. In the framework of the Open Science Forum of Latin America and the Caribbean, CILAC, the Regional Consultation for Latin America and the Caribbean on the UNESCO Recommendation on Open Science was held on 23 September.

The consultation was held virtually and was organized in 4 blocks. An opening session during which the meaning of the consultation was presented and 3 thematic discussion panels on: i) Open Access, ii) Open Data and iii) Citizen Science. It brought together more than 50 prominent panelists from different institutions in Latin America and the Caribbean who made contributions throughout the day, across the panels.

The 4-hour event was broadcast in both English and Spanish on Youtube, with 2,045 people participating in the Spanish channel and 196 in the English one.

OPENING SESSION

Shamila Nair-Bedouelle, Assistant Director-General for Natural Sciences of UNESCO opened the meeting. Lidia Brito, Director of the Regional Bureau for Science in Latin America and the Caribbean, moderated the session.

The Assistant Director-General stressed the importance of ensuring equitable access to science, technology and innovation in order to reduce the knowledge gap for the benefit of all. She explained that Open Science in Latin America and the Caribbean is very important for achieving greater scientific cooperation, better distribution of research at the international level and better access to science and technology. Finally, Nair-Bedouelle thanked those present for their collaboration and participation in drawing up the Recommendation, and wished them a fruitful day.

PRESENTATION OF THE SITUATION OF OPEN SCIENCE IN LATIN AMERICA AND THE MAIN LINES OF THE UNESCO RECOMMENDATION UNDER PREPARATION

Fernanda Beigel, Chair of UNESCO's Open Science Advisory Committee, described the roadmap and process established for the development of the *Recommendation on Open Science*. She said that the last draft of the Recommendation is expected to be available by July 2021, for adoption by the UNESCO General Conference in November 2021.

In relation to the need for a recommendation, she stressed that a global consensus on the definition of Open Science has yet to be reached, an aspect on which progress is expected from the current exercise. She also explained that the Open Science movement aims to generate Open Access to science, databases, institutional repositories and the availability of platforms. The idea is that Open Science be nourished by open software. However, she stressed that Open Science is not just about Open Access and Open Data, but also about ensuring that citizens can participate in the processes and results of science. Meanwhile, openness to various types of knowledge is being discussed, including indigenous knowledge and non-hegemonic knowledge.

Beigel stressed that scientific production should be as open as possible and closed to the extent that is strictly necessary.

She also presented the history of Open Access in the region. She explained that Open Access is based on a regional intellectual platform that is at least 200 years old. From 1948 onwards, Latin America began to generate regional organisations or institutions that gradually shaped a regional circuit. In 1973, they began to create their own indexing bases, which started to evidence a circuit of publications at a regional level. Open Access developed as of the scientific and university community itself from the 1990s onwards, through journals managed by them.

Thus, in Latin America and the Caribbean, Open Access presents solid bases for a transition to Open Science. The key actions to be taken for this purpose are the following: creation of integrated national repositories that move towards Open Data; regional interoperability through platforms; alignment of the incentives and rewards of evaluation systems with Open Science and with the policies developed by the different ministries and government agencies; linking Open Science with educational resources; supporting regional initiatives that tend to reflect on evaluation systems; while guaranteeing the legal protection of intellectual property.

The main challenges for our region are: to face the risks and effects of commercial Open Science and the transfer of publication costs to authors or universities, which would damage Open Access; to make Open Science compatible with Agenda 2030, especially with ODS 17 (to reduce inequalities between countries in terms of existing hierarchies in the circulation of knowledge); to introduce Open Science as a relevant research indicator; to guarantee bibliodiversity, multilingualism and diversity of disciplines; and, finally, to consider the local limits of scientific openness.

At the end of her presentation, Beigel said that Latin Americans are a very important voice to contribute to this process..

PANEL A: OPEN ACCESS

Dominique Babini of *Consejo Latinoamericano de Ciencias Sociales (CLACSO)* moderated this panel. She began by explaining that Latin America and the Caribbean is the region that has achieved the highest percentage of Open Access to the scientific production published within the region. With this introduction, she passed the floor to the first speaker, Arianna Becerril García, *Redalyc* Representative.

Becerril García remarked that the global science communication system has shown very little success in making science a participatory, equitable and inclusive conversation. Commercial publishers have

historically restricted access to science. Open Access, today, is consolidating the problem it was supposed to solve. A new landscape of exclusion is being generated: exclusion from less developed countries is becoming entrenched and systematic. For *Redalyc*, science must be a public good, and access to it a universal right. She explained that the consolidation of Open Access requires a technological transition to achieve organic visibility outside privately owned channels, and to provide science with the capacities to insert itself into the collective intelligence base enabled by the web. Becerril García added that the academy must be allowed to control the flow of its main asset: knowledge.

Abel L. Packer, *Scielo* representative, explained that this initiative is a framework for public policy and international technical cooperation. Throughout its existence, *Scielo* has had three periods of development so far until it reached the path of Open Science.

Saray Córdoba, *Latindex* representative, expressed that the organisation has embraced Open Access since its creation. The aims of *Latindex* have been related to giving visibility and raising the quality of Latin American journals; getting institutions and authorities to recognise and support them; and promoting free access to their contents. Its proposal is based on three pillars: the first, regarding principles and values, is to promote inclusiveness, respect for cultural, linguistic and thematic diversity, the defence and protection of knowledge as a public good, the transfer of rules and procedures, cooperation work in networks, solidarity, support and reciprocity among cooperators, and the construction of shared solutions. The second one is to build strategic alliances: joining forces with other related bodies is essential. The third one regards practical activities: permanent training activities are very important.

Then, Bianca Amaro, President of *La Referencia*, explained that this organisation gathers ten countries in the region. She stressed that there is a lot of work to be done in the region, mainly in terms of convincing people. It is necessary to put pressure on the

researchers' evaluation bodies, because if we do not change the way we evaluate our researchers, we will not achieve full Open Science in the region. We must think of concrete actions to pressure the evaluation bodies. We need to teach the world that in this region we not only consume science, but we also do science. We need to change the rules that were imposed on us, which do not suit the countries of our region.

Miguel Angel Blesa, representative of *Interciencias*, explained that the region is a diverse group of nations with very different characteristics and that, therefore, the implementation of Open Science will also be very different in each of the countries. He highlighted the poor communication and internet infrastructure in several countries, which makes it almost impossible to think about open, fluid and convenient access for all. Blesa believes that in order to shape the initiative we will have to adapt to the large publishing houses. In this sense, it will be easier for the countries in the region to access the results reported by other countries than to disseminate our own knowledge, because of the cost involved. We have a great need in the region for regional publications.

The next participant was Laura Rovelli, representing *FOLEC*-evaluation systems. She said that *FOLEC* works in partnership with 26 national science and technology and higher education institutions and bodies. Some of the main ideas of the space aim to link science evaluation processes more closely to the orientation of scientific research towards satisfying regional and local needs. They also seek to place the notion of science as a universal human right and as a common public good in the international conversation; to place value on the region's cognitive matrix and on the diversity of forms of existing knowledge circulation; and to generate regional recommendations to influence evaluation policies in LAC countries in dialogue with international spaces.

She shared that in recent decades, evaluation policies based on incentives to publication as an impact factor

have limited the local autonomy of the agendas, discouraging a good part of the Open Access and research processes in interaction with society. One of *FOLEC's* objectives is that the indicators produced by *Latindex*, *Scielo*, *Redalyc* and *La Referencia* be incorporated into the evaluation processes in each of our countries. In this sense, Rovelli pointed out 4 strategic principles to be included in the UNESCO Recommendation on Open Science. *Firstly*, the productivity, efficiency and reproducibility required of Open Science should be evaluated in context, seeking diversity and inclusiveness of knowledge and interaction with society. *Secondly*, investments should prioritise public infrastructures that facilitate access and participation in science managed on a non-profit basis by the community. *Thirdly*, scientific assessment policies should value the diversity of contributions to local and international research and action agendas. *Finally*, it should be ensured that citizen science include the participation of social movements, political decision-makers and civil society organisations in the generation and evaluation of knowledge.

Martha Esparza, *EULAC* representative, said that this year *EULAC* made a special effort to bring together academic books from more than 100 Latin American universities in one place - www.eulac.org . The Open Access and Open Science initiatives have echoed first in academic journals. She explained that we are experiencing a substantial change, a transformation in the scientific process. This has given rise to a new model that contemplates the following aspects: transformation in the way scientific information is generated and accessed; respect for copyright; creation of new knowledge from the information received; a transformation from merely quantitatively-oriented research to genuine social responsibility in order to contribute to the solution of specific local, national and regional problems; and, finally, the attempt to ensure that the books always have a reader in mind so that the contents have a destination. Esparza stressed that we need infrastructure support in three areas: cybernetic,

legal, and adequate training in the use of technological tools.

Claudia Medeiros, a representative of the *Brazilian Academy of Science*, mentioned that it is not so much a question of defining Open Science, but of understanding what Open Science is all about. She explained that for them, Open Science is a question of collaboration: who collaborates with whom and in what way. It is about increasing knowledge through global collaboration, and one way to do this is to publish scientific papers.

Sylvie Didou from *Cinvestav* (Mexico) raised the question of how to build an initiative at a regional level, how we define citizen scientific production, and what policies will be impacted by Open Science. She noted that there is a need for more information on what is being done in Open Science.

Next, Nikita Shiel-Rolle, CEO of the *Cat Island Conservation Institute* (CICI), stressed the importance of including the Caribbean in the discussions, which are often under-represented.

Iván Martínez stressed that it is important to discuss how we can include more exceptions to scientific knowledge and scientific and academic work, so as not to endanger the right to access to knowledge and culture.

Next, Ulises Hernández emphasized that the greatest contribution that Open Science can make is to make us reconsider our epistemological positions. In a definition of Open Science, it is important not to look only at Open Access, data and infrastructure, but to integrate changes in methodologies and research approaches.

Edgar Prieto, Director of the University Library of the Universidad Nacional Colombia, took the floor. He expressed that one of the greatest limitations in Colombia is the high cost over access to content that is considered to be of a high performance index by common publishers, which continues to increase.

Swamabandara expressed that the Caribbean has not fully understood what Open Science means. He said there is a conflict between publishing in high impact journals and not having our own journals. He stressed the need to recognise the Caribbean as a region.

To close Panel A, Beatriz Caputto, Inter-American Network of Academies of Science (*IANAS*) explained that when one is on the evaluation panels, the journals that count for the income of the researcher's career are the international journals. Therefore, in addition to making the effort to have our own publications, it is also necessary to work with the scientific policies of the different countries so that these journals are recognized.

PANEL B – OPEN DATA

The second panel was moderated by Wouter Schallier of *ECLAC*, who began by talking about the importance of Open Science, stressing that in that condition science is better science, because it is more inclusive, more diverse, and more interoperable. Without open, reusable, interoperable data, Open Science is not possible.

The first panelist, Maira Murrieta Costa, *Coordinator of Data Management and Governance - MCTI, Brazil* (the Ministry of Science, Technology and Innovation), said that in her country the State must guarantee the right to access education. Brazil is in third place, after Colombia and Mexico, in opening up data at the regional level. In 2016, Brazil published its Open Data policy and created a ministry to monitor the publication and openness of data. Maira Murrieta Costa said it is understandable that Open Data creates problems of industrial property, national sovereignty, and biodiversity of flora and fauna, but Brazil's Information Law does not cover these issues. Finally, she stressed that data from research carried out by the public sector should be made public.

Paola Azrilevich of *Argentina's Ministry of Science and Technology (MINCyT)* explained that in Argentina there is an Open Access Law that requires institutions to have their institutional repository infrastructures

and that data generated with public funds should be available through institutional digital repositories. It also compels institutions to have Open Access policies and to work with data management plans. Within the Ministry, some national data systems have been created and have had their portals for biological data, sea data and genomic data. Meanwhile, on the one hand, she drew attention to the need to expand the repositories, which today cover very few disciplines, and, on the other, she outlined the fact that these portals are contradictory towards researchers, when the law says that institutions have to have their own repositories. The law seeks to ensure that institutions begin to appropriate the research carried out by their researchers as its own. Together with some institutions, Argentina is currently moving forward with a data portal.

Demian Arancibia, Head of the *Future Team of the Ministry of Science, Technology, Knowledge and Innovation of Chile*, said that during the pandemic, Chile created a platform with Open Data, which has been downloaded by more than six thousand people every day.

Alberto Majó, Advisor to the *Minister of Education and Culture (MEC) of Uruguay*, explained that there are some challenges in this area. Firstly, the need to articulate national, regional and international regulations. A distinction must be made between regulations linked to access to public administration and those related to the specifics of research. He stated that it is necessary to take into account that not all scientists, from all areas of knowledge, have the incentives to publish in an open regime, which is why it is important to incorporate the requirement for open dissemination into funding mechanisms in order to obtain funding. He stressed that it is necessary to make changes in the publications and Open Data evaluation systems, as well as in the quality of the repositories in the journals. Regarding infrastructures, he mentioned that there are problems in solving the interoperability of repositories and other data infrastructures. It must be taken into account that the management, creation and maintenance of these infrastructures has a cost. Majó said that it would be

advisable for public administrations to take action in coordinating negotiations with publishers. With regard to data, he commented that it is not easy to share and manage data as there are no standardized structures for all types of data. With scientific data, openness alone is not enough, as these data are not easy to understand by any user. And we have to take into account that opening the data is very time consuming for researchers and institutions. He said that the issue of preserving copyright must be taken into account in the framework of Open Science. Finally, he mentioned the risk of not having measures to ensure that open mechanisms do not lead to situations of lack of control and lack of rigour.

Luz Fabiola Gómez, *Focal Point for the Open Science Recommendation of Minciencias, Colombia (the Ministry of Science)*, explained that often researchers cannot carry out Open Science because of the regulations of the entities where they work. She expressed that evaluation is a very complicated issue in Colombia because measurements in closed systems are privileged. The Ministry is proposing more indicators related to the social appropriation of knowledge and citizen science to level this issue. Luz Fabiola Gómez said that it is necessary to advance technical orientations for the management of Open Data that define different types of data. On the other hand, it is essential to deliver training at different levels: technical skills for researchers, policy design and implementation for governments and the value of scientific culture for citizens. She also mentioned the need to continue provide advise to universities and research centres in the development of policies that promote Open Science.

Federico Torres Carballo, *Vice-Minister of Science and Technology of MICITT, Costa Rica*, said that it is necessary to overcome the challenges that arise between societies, which must create bridges and mechanisms to overcome asymmetries. The accumulation of large amounts of data, the development of algorithms for processing them and the interconnection of systems and digital devices must serve the purpose of ensuring that information, data and scientific products are more accessible and

more easily shared among governments, businesses, the general public and all actors in our research, development and innovation ecosystem. Costa Rica has a national repository, created in 2016. With regard to Open Data, there is a need for increased support to make Open Data and research infrastructures available. Torres said that in November the sixteenth plenary session of the Research Data Alliance will be held in Costa Rica, an activity with which they hope to attract debate on Open Data management in research towards Costa Rica and the Central American region.

He explained that Costa Rica has made efforts to promote a data and Open Science ecosystem. For example, through the promotion of Open Data with executive decrees, the launching of a national policy for the knowledge-based economy and society, and the elaboration of national strategy for cybersecurity launched in 2017. He also highlighted the digital transformation strategy within the bicentennial of Costa Rica in 2018.

Washington Segundo, from *Instituto Brasileiro de Informação em Ciência e Tecnologia (IBICT), Brazil*, said that we have a large infrastructure of repositories of institutions in Latin America, which should be used as a one information repository. We need researchers to share their research on Latin American infrastructures and, from there, share it in other international repositories.

Marcos Regis da Silva, Director of the *Inter-American Institute for Global Change Research (IAI)*, shared that when we talk about Open Data there is a certain sensitivity and empathy in terms of the rights of indigenous peoples and local communities, which must be taken into account. He gave an example of how the government of Uruguay has promoted the issue of Open Data in a very good way, and has helped IAI by making scientific data from its portal available.

Bianca Amaro, President of *La Referencia*, said that one of the actions they are carrying out is to start collecting data from various countries. In the meantime, CNPQ in Brazil is building its data

repository. She said that funders must demand the data, and evaluators must take into account those researchers who are sharing and publishing their data openly.

Nikita Shiel-Rolle continued, saying that especially in the Caribbean islands there is a need for access to data in order to survive the current crisis. We have to think that this meeting is going to have consequences for all the inhabitants of our region, so we have to be clear about the reason for the meeting.

Anne Clinio added that the issue of Open Data has to be related to the growth of anti-scientific thinking in the region. Opening data can often create problems for scientists and public policy. She suggested that the UNESCO Recommendation should address this issue.

Saray Córdoba expressed that a very important part of the strategy of the state of journals in Latin America, which is so unequal, is the training of editors. There, the actions that can be taken to change the editing culture towards the inclusion of data in the magazine portals is very important.

Claudia Medeiros, Coordinator of the *FAPESP Programme of Research in eScience and Data Science (FUNDAÇÃO DE AMPARO À PESQUISA DO ESTADO DE SÃO PAULO, BRAZIL)*, explained that Open Science “does not fall from the sky”: it requires a change in attitude, a change in culture, education, sustainability, funding, and a new mentality. It also requires recognition of the work.

Martha Esparza, Coordinator of the *National Altextto Network of Mexican University and Academic Publishers*, said that *EULAC* has made efforts to create an Ibero-American catalogue, and to this end is bringing together books from academic publishers. They are also seeking to create a database of national and regional evaluators throughout Latin America.

Finally, Edgar Prieto mentioned that among the initiatives they have carried out in Colombia, they have dedicated an important effort to scientific journals through cooperative processes of training publishers. Through *SciELO*, they have given greater

visibility to their publications and national publications.

PANEL C – CITIZEN SCIENCE

Mariano Fressoli of the *Research Centre for Transformation (CENIT)* moderated this panel. He began by talking about the importance of participatory practices, which have very little space in Open Science policies. He said that Open Access is not enough to promote knowledge; if we want to re-legitimise science it is necessary not only to share knowledge, but also to collaborate with citizens and the public.

Noela Invernizzi, President of the *Latin American Association for Science and Technology Social Studies (ESOCITE)*, was the first panelist. She said that the literature on Open Science tends to refer primarily to some variants, such as having citizens involved in the generation of knowledge, especially in the data collection phase, within initiatives promoted by scientists. Increasingly, attention is also being paid to newer experiences such as *Do it yourself science*, and *Open Labs*, where the initiative can involve citizens and other actors. In some cases, this is used to capture ideas for innovation. However, public participation in science and technology takes many more forms, which need to be taken into account. For example, in the last two decades, experiences of science and technology for social inclusion have flourished in Latin America. These experiences still remain quite marginal and would need to be integrated.

She expressed that there is also a long experience of developing alternative knowledge, such as the one applied to organic agriculture or traditional medicines, which is sometimes in contradiction with mainstream scientific paradigms, but which is often co-opted and privatised. Invernizzi added that the place for activist public participation is less clear. Activist participation, which brings together citizens and scientists, has produced a significant body of counter-evidence, developing science not made by the dominant scientific agencies, in response to the harmful effects of scientific and technological

development. The question that Invernizzi is asking is how to include the science produced by activism.

Juan David Reina-Rozo, from the Institute of *Environmental Studies at the National University of Colombia*, began by saying that science and technology are activities that have been developed over centuries by rural and urban communities, which have shared their knowledge with the aim of remaining in their territories and transforming their world according to cultural and spiritual values. However, at present they have invisible barriers to access to codified knowledge, created from our scientific institutions. Formats that, although freely accessible, are not part of a format for the production of community knowledge. This shows an asymmetry in the profit and use of knowledge production. He explained that many times these processes end up being documented in languages, formats and registers that are external to the collective dynamics of urban and rural communities in our region.

Reina-Rozo identifies 4 challenges for research around the biocultural and community science perspective: the institutional and legal framework of our countries, the emphasis on inventories and measurement of knowledge in biodiversity, local communities seen as data providers, and the incorporation of these groups in the technology and innovation system of the countries. Finally, he called for awareness raising in research programme training, broadening the concept of science to other knowledge building systems.

Later, Julieta Arancio, from the *Gathering of Open Hardware for Science*, stated that if Open Science wants to change things, we must stop thinking of science as a black box of publications. We need to develop our own tools and democratise them for access by all. We need to generate projects that include people not represented by academia. In a context of so much questioning of the science and technology system, access to infrastructure, tools and spaces for doing science contributes to its democratisation. She said that Open Science policies have to create the conditions so that more and more

diverse people can do better science in a distributed manner. Open hardware and software are key if we want to increase and diversify the regional production of scientific knowledge, strengthening our scientific and technological sovereignty. We cannot talk about Open Science if the tools for doing it are still closed.

Valeria Arza from *CENIT* added that the capacity of citizen science to mobilise resources to generate knowledge and put new issues on the agenda is well known, but we know less about how to achieve a public policy that takes ownership of the agendas that arise from citizen science projects. To do this, Arza explained that three things are required: firstly, confidence in the validity of citizen data; secondly, a political interest in authorising these agendas; and finally, a capacity to implement the solutions that arise from these agendas. There are project initiatives that have called themselves "citizen social science", where it is postulated that co-researchers are not mere observers of a scientifically constructed phenomenon, but participate in these projects because they have a political interest in changing reality. These co-researchers can contribute knowledge to the processes of generating solutions because they have personal and situated experience of what works and what does not. He said that from the social sciences we can help shape these projects and build strategic alliances with public policy actors or in other institutionalised spaces. Social sciences can help to build bridges between citizen science and public policies to promote transformation. However, several obstacles remain to be overcome in terms of capacities, resources and evaluation systems. Arza stressed that in order to drive projects with transformative capacity, a rethinking of science policy is required.

Joaquin Cochero, from *Red Iberoamericana de Ciencia Participativa (RICAP) (Ibero American Participative Science Network)*, expressed that the opening up of science is a necessary process, but understanding it only as an update of scientific publications, data, or research resources, is not enough to promote a true democratisation of knowledge. Citizen science can provide a direct link. Cochero said that in a first

mapping of the region, which they carried out in nine countries, they found that there are almost 700 documented citizen science initiatives. This shows that there is not just one citizen's science, nor is there just one methodology, but there are a lot of points in common. For example, it is recognised that participatory science is not only a source of generating scientific knowledge or collecting data in an open and transparent manner, but also plays a role in facilitating transparency and publication of the various forms of knowledge, not just academic knowledge. Citizen science needs to be strengthened, but this requires the development of infrastructure, capacities, the generation of networks between actors, and the adaptation of funding sources and evaluation mechanisms.

Sarita Albagli, from *IBICT Brazil*, asked what it means to generate a global consensus on Open Science and citizen science. The construction of this consensus must necessarily consider the situated character of these terms, both because of the different realities in which they are developed, and because of the different motivations, perspectives and priorities that occur in different contexts. Albagli stressed that the notion of openness and citizen participation varies between a pragmatic vision (increasing volume, speed and quality), and a democratic one, broadening the scope of the right to investigate. On the other hand, she stressed the growing role of new technical information and communication means in these initiatives, including the Internet and artificial intelligence, putting the importance of citizen control and governance over these data infrastructures.

Albagli explained that the role of citizen science should not be limited to helping to fill information and knowledge gaps, but also to presenting innovative solutions. It is necessary to have an attitude of listening to and considering different points of view. Building a consensus requires considering the unequal positions in power relations in which open and citizen science is inserted.

Manuel Tironi, added that in order to open up science it is imperative not only to think about its access and

circulation, but also how we draw the line between science and politics, and how we think about and redefine our involvement with the communities we work with. It is necessary to get involved in the very problems that these communities are experiencing. We need to overcome the paradigm of complementarity when it comes to accepting the other knowledge; that it ceases to be "other".

Edgar Prieto commented that the initiatives should not be about doing a big research project, but about the sustainability of the ecosystem.

Nikita Shiel-Rolle continued by adding that often people in the communities are not so interested in data, so we have to think about how to bring science to them in a way that is relevant to their lives, in a way that meets their needs. Science initiatives have often been designed for middle-income, upper-middle class people in the northern hemisphere, which makes them very different from the needs of representative communities in Latin America and the Caribbean. Science must be adapted to our local communities, reflecting their realities.

Mariana Varese stressed the invisibility of citizen science. She said that it is important that the UNESCO Recommendation includes the approaches of different actors to citizen participation. She asked what the Recommendation can do to eliminate existing inequalities, especially from the perspective of public participation when we talk about Open Science. Those who enter the game with more resources are more likely to make more use of resources and minimize the risks associated with Open Science. Finally, when talking about Open Science, it is important to think about the protection of the rights of the participating citizens in relation to their privacy and security.

Saray Córdoba then spoke about the role of public universities: public universities have recently been abandoning support for Open Science tools, such as Open Science journals, repositories and portals. This constitutes a change in the behaviour of universities,

which requires a call from our scientific and intellectual community for universities.

Claudia Medeiros then pointed out that a good example of citizen science is the collective development of software.

Winston Mellowes, *President of the Caribbean Academy of Sciences (CAS)*, said that more opportunities must be created to attract young people to science. We need to identify concrete measures for free access and Open Data, and to be able to bring citizens closer to science. We need to establish a process that involves all stakeholders and is truly inclusive. Science must be brought closer to the citizens on foot.

Fernán Federici Noe, from *Tecno X*, expressed that it is necessary to promote an ecosystem of industrial development that leads to technological autonomy. The Covid highlighted a lack of technological autonomy and sovereignty. Many of the technologies needed for diagnosis are in the public domain, but there has been no distributed development of these technologies capable of filling the needs of each region. Policies and structures are needed to encourage these developments based on open and free technologies.

Ulises Hernández mentioned 3 key aspects for the consolidation of Open Science. First, that funding takes into account the diversity of actors, communities and institutions, to allow local problems to be addressed. Second, the need to deploy infrastructure at the government level that makes data and results visible. If we consider science a right, the State must create the conditions to ensure its access and use, both in the city and in the rural environment. Finally, with regard to the evaluators' evaluation models, he highlighted the need to generate alliances with communities so that what it is addressed from universities also involves processes of transfer and training and education for people who are not scientists but are interested in addressing their problems from a scientific perspective.

Noela Invernizzi, shared that it is necessary to generate a common definition of the concepts to avoid a definition that is as generic as it is rhetorical. It would be necessary to work on a definition that is programmatic; that integrate dimensions of citizen science in a realistic way. In the definition of Open Science, a role must be built for citizen science that really allows these practices to be incorporated in a realistic way. On the other hand, Invernizzi expressed that not all knowledge literature is inherently beneficial. It is necessary to identify in which situations the opening up of knowledge can put some oppressed social sectors, with scarce power resources, in disadvantage or at risk. Open Science needs to be redefined with research ethics rules that protect these people.

Finally, Abel L. Packer expressed that there is a very strong resistance from the actors of scientific production when implementing Open Science practices. The advancement of Open Science requires intervention, leadership and proactivity from all actors. It is not an isolated activity. The advance must be holistic. Today, all research is done and communicated according to evaluation systems. Therefore, we need the evaluation system to be able to implement Open Science practices. Openness, in turn, must take care of what is scientific, since anti-scientificisms use scientific research problems to diminish its value.

CLOSING WORDS

To close the Consultation, Guillermo Anlló thanked the panelists on behalf of UNESCO, highlighting the richness of the event.

Next, Fernanda Beigel highlighted that the text being drafted includes all the elements that have been raised in the Consultation. She stated that she took special note of the democratising nature of science and the point made by the last panel in relation to citizen science. It must be clear how to approach the practices of Open Science and citizen science in terms of knowledge and situated practices. She highlighted the need for a more articulated regional strategy, with more dialogue, especially with the Caribbean region; and she stressed the importance of indigenous communities defining the place they will have in Open Science.

Lidia Brito thanked everyone who took part in the Consultation. She especially thanked the UNESCO Advisory Committee for Open Science, the ADG, colleagues at Headquarters and the UNESCO LAC team.

Lastly, she pointed out the obligation we have to create a regional strategy that allows for integration, and stressed the importance of regional cooperation to ensure joint action in Open Science for LAC. Furthermore, she pointed out that the science-policy-society interface is crucial for Open Science.

Finally, Shamila Nair-Bedouelle, Assistant Director-General of Natural Sciences of UNESCO, closed the event by thanking everyone, stressing the importance of the contributions collected in the regional consultations for the drafting of the UNESCO Recommendation on Open Science.