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Committee on Economic, Social and Cultural Rights**General comment No. 25 (2020) on Science and economic, social and cultural rights Art. 15.1.b, 15.2, 15.3 and 15.4*****I. Introduction and basic premises**

1. The intense and rapid development of science and technology has had many benefits for the enjoyment of economic, social and cultural rights (Hereinafter: ESCRs). At the same time, the risks and the unequal distribution of these benefits and risks, have prompted a rich and growing discussion on the relationship between science and ESCRs. Several important documents on this issue have been adopted, such as the so-called “Venice Statement”,¹ the 2005 UNESCO Declaration on Bioethics and Human Rights,² the 2017 UNESCO Recommendation on Science and Scientific Researchers,³ the reports of the special rapporteur on cultural rights⁴ or the Committee 2005 General Comment 17 on “the right of everyone to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the author”. In this context, UNESCO, some international conferences and summits⁵ the Special Rapporteur on Cultural Rights, some important scientific organizations and publications⁶ have spoken of the “human right to science” to make reference to all the rights, entitlements and obligations related to science.

2. In spite of these developments, science is one of the areas of the Covenant that State Parties give least attention to in their reports and dialogues with the Committee. These circumstances have led the Committee, after a wide consultative process, to develop this General Comment on the relationship between science and ESCRs.

3. The Committee focuses primarily on the “right of everyone to enjoy the benefits of scientific progress and its applications” (art. 15.1.b), as it is the right most frequently invoked

* Adopted by the Committee on Economic, Social and Cultural Rights at its sixty-seventh session (17 February-6 March 2020).

¹ Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (17th July 2009) SHS/RSP/HRS-GED/2009/PI/H/1 (Hereinafter: The 2009 Venice Statement).

² Universal Declaration on Bioethics and Human Rights, Resolution 15 adopted by the General Conference of UNESCO (21st October 2005) (33 C/Res. 15) (Hereinafter: The 2005 Universal Declaration on Bioethics).

³ Recommendation on Science and Scientific Researchers of the Resolution 15 adopted by the General Conference of UNESCO at its thirty-ninth session (13th November 2017) (39 C/Res.15) (Hereinafter: The 2017 UNESCO Recommendation).

⁴ Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications (14 May 2012) (A/ HRC/20/26) (Hereinafter: the 2012 Report of the Special Rapporteur on Cultural Rights).

⁵ Declaration by the head of States and governments. XXVI Cumbre Iberoamericana de Jefes de Estado y de Gobierno at <https://www.segib.org/?document=declaracion-de-la-xxvi-cumbre-iberoamericana-de-jefes-de-estado-y-de-gobierno>.

⁶ SCIENCE, Editorial nov.2018: Define the Human Right to Science: <https://science.sciencemag.org/content/362/6418/975>.

in relation to science. However, the purpose of this General Comment is not confined to this right, but also to develop the relationship more broadly between science and ESCRs. The Committee will also examine the other elements of article 15 related to science, especially the obligations of State parties to take steps for the conservation, development and diffusion of science (art 15.2.), to respect the freedom indispensable for scientific research (15.3) and to promote international contacts and co-operation in the scientific field (15.4). The Committee will also show the relevance of article 27 of the Universal Declaration of Human Rights (Hereinafter: the UDHR) for this analysis.

II. Normative content

“Scientific progress and its applications”

4. According to the definition of UNESCO in 2017, science is “the enterprise whereby humankind, acting individually or in small or large groups, makes an organized attempt, by means of the objective study of observed phenomena and its validation through sharing of findings and data and through peer review, to discover and master the chain of causalities, relations or interactions; brings together in a coordinated form subsystems of knowledge by means of systematic reflection and conceptualization; and thereby furnishes itself with the opportunity of using, to its own advantage, understanding of the processes and phenomena occurring in nature and society.” UNESCO adds that “the sciences” signifies “a complex of knowledge, fact and hypothesis, in which the theoretical element is capable of being validated in the short or long term, and to that extent includes the sciences concerned with social facts and phenomena”.⁷

5. Thus, science, which encompasses natural and social sciences, refers both to a process following a certain methodology (“doing science”) and to the results of this process (knowledge, applications). Though other forms of knowledge may claim protection and promotion as a cultural right, knowledge should only be considered as science if it is based on critical inquiry and open to falsifiability and testability. Knowledge which is solely based on tradition, revelation or authority, without the possible contrast with reason and experience, or which is immune to any falsifiability or intersubjective verification, cannot be considered science.

6. The UDHR refers to “scientific advancement”, and the Covenant refers to “scientific progress”; these expressions emphasize the capacity of science to contribute to the well-being of persons and humankind. Thus, development of science in the service of peace and human rights should be prioritized by States over other uses.

7. Applications refer to the particular implementation of science to the specific concerns and needs of the population. Applied science also include the technology deriving from scientific knowledge, such as the medical applications, the industrial or agricultural applications, or the information and communication technologies.⁸

“Enjoy the benefits”

8. The term, “benefits” refers first to the material results of the applications of scientific research, such as vaccination, fertilizers, technological instruments and the like. Secondly, benefits refer to the scientific knowledge and information directly deriving from scientific activity, as science provides benefits through the development and dissemination of the knowledge itself. Finally, benefits refer also to science’s role in forming critical and responsible citizens who are able to participate fully in a democratic society.

“Take part in cultural life”

9. The right to enjoy the benefits of scientific progress cannot be interpreted as establishing a rigid distinction between the scientist who produces science and the general

⁷ See the 2017 UNESCO Recommendation, para. 1.a.ii.

⁸ Technology, according to the 2017 UNESCO Recommendation, is scientific knowledge “as relates directly to the production or improvement of goods or services”.

population entitled only to enjoy benefits derived from research conducted by scientists. This restrictive interpretation is contrary to a systematic and teleological interpretation of this right, which takes into account the context, the object and the purpose of this provision, in accordance with article 31 of the Vienna Convention on the Law of Treaties.

10. Cultural life” is an “inclusive concept encompassing all manifestations of human existence”.⁹ Cultural life is therefore larger than science as it includes other aspects of human existence; it is however reasonable to include scientific activity in cultural life. Thus, the right of everyone to take part in cultural life includes the right of every person to take part in scientific progress and in decisions concerning its direction. This interpretation is also implied by the principles of participation and inclusiveness underlying the Covenant and by the expression, “to enjoy the benefits of scientific progress”. Such benefits are not restricted to the material benefits or products of scientific advancement, but includes the development of the critical mind and faculties associated with making science. Finally, this understanding is corroborated by the travaux préparatoires concerning the drafting of article 15 of the Covenant, which demonstrates that the latter article was intended to develop article 27 of the UDHR,¹⁰ which recognizes not only a right to benefit from the applications of science but also to participate in scientific advancement.¹¹ The UDHR is relevant to establish the scope of all the rights enshrined in the Covenant, not only because the preamble explicitly mentions the UDHR but also because both Covenants represent international endeavours to give legal force to the rights in the UDHR through the adoption of binding treaties. Thus doing science does not only concern scientific professionals but also includes “citizen science” (ordinary people doing science) and the dissemination of scientific knowledge. State Parties should not only refrain from preventing citizen participation in scientific activities but should actively facilitate it.

11. The right enshrined in article 15.1.b encompasses not only a right to receive the benefits of the applications of scientific progress but also a right to participate in scientific progress. Thus, it is the right to participate and to enjoy the benefits from scientific progress and its applications (Hereinafter: RPEBSPA).

“Benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the author”

12. The Committee has already examined this right in its General Comment 17 (2005) stressing the difference between this human right that protects creators of scientific discoveries and “most legal entitlements recognized in intellectual property systems.” It is unnecessary to repeat this analysis here. However, the specific relationship between intellectual property rights and RPEBSPA will be developed in Part V.

“The freedom indispensable for scientific research and creative activity”

13. In order to flourish and develop, science requires the robust protection of freedom of research. The Covenant establishes a specific duty for States to “respect the freedom indispensable for scientific research” (art 15.3). This freedom includes, at least, the following dimensions: protection of researchers from undue influence on their independent judgment; their possibility to set up autonomous research institutions and to define the aims and objectives of the research and the methods to be adopted; the freedom of researchers to freely and openly question the ethical value of certain projects and the right to withdraw from those projects if their conscience so dictates; the freedom of researchers to cooperate with other researchers, both nationally and internationally; the sharing of scientific data and analysis

⁹ See Committee on Economic, Social and Cultural Rights, general comment No. 21 (2009) on the right of everyone to take part in cultural life, para 11.

¹⁰ See Ben Saul (2016), *The International Covenant on Economic, Social and Cultural Rights: Travaux Préparatoires*, Volume I: Oxford Public International Law.

¹¹ The English version refers to the right to “share” but the expressions “participer”, “participar” or “участвовать”, appear respectively in the French, Spanish and Russian versions, which are also official texts of the UDHR, and which speaks about the right of all persons to “participate in scientific advancement and in the benefits derived from it”.

with policymakers, and with the public, wherever possible.¹² However, freedom of scientific research is not absolute; some limitations are possible, as dealt with below.

Take steps “for the conservation, the development and the diffusion of science”

14. State parties should not only abstain from interfering in the freedom of individuals and institutions to develop science and diffuse its results. States must take positive steps for the advancement of science (development) and for the protection and dissemination of scientific knowledge and its applications (conservation and diffusion).

III. Elements of the right and limitations

15. The RPEBSPA contains both freedoms and entitlements. Freedoms include the right to participate in scientific progress and enjoy the freedom indispensable for scientific research. Entitlements include the right to enjoy, without discrimination, the benefits of scientific progress. These freedoms and entitlements imply not only negative, but also positive obligations for States. Further, this right contains the following five interrelated and essential elements.

A. Elements of the right

16. Availability is linked with State parties’ obligation to take steps for the development, conservation and diffusion of science. Thus, availability means that scientific progress is actually taking place, and that scientific knowledge and its applications are protected and widely disseminated. State parties should direct its own resources and coordinate actions of other actors to ensure that scientific progress happens and its applications and benefits are distributed and available, especially for vulnerable and marginalised groups. This requires, *inter alia*, instruments for the diffusion of science (libraries, museums, internet networks, etc), a strong research infrastructure with adequate resources, adequate financing of scientific education, etc. In particular, States should promote open science and open source publication of research. Research findings and research data funded by States should be accessible to the public.

17. Accessibility means that scientific progress and its applications should be accessible for all persons, without discrimination. It has three dimensions: first, States Parties should ensure that everyone has equal access to the applications of science, particularly when they are instrumental for the enjoyment of other ESCRs. Second, information concerning the risks and benefits of science and technology should be accessible without discrimination. Third, everyone should have the open opportunity to participate in scientific progress, without discrimination. Thus, State parties should remove discriminatory barriers that impede persons from participating in scientific progress, for instance, by facilitating access by marginalized populations to scientific education.

18. Quality refers to the most advanced, up-to-date, and generally accepted and verifiable science available at the time, according to the generally accepted standards by the scientific community. This element applies both to the process of scientific creation and to access to the applications and benefits of science. Quality also includes regulation and certification as necessary, to ensure the responsible and ethical development and application of science. States should rely on widely accepted scientific knowledge, in dialogue with the scientific community, to regulate and certify the circulation of new scientific applications accessible to the public.

19. Acceptability: Efforts should be made to ensure that science is explained and its applications are disseminated in such a manner as to facilitate their acceptance in different cultural and social contexts, provided that this does not affect their integrity and quality. Scientific education and the products of science should be tailored to the particularities of populations with special needs, such as persons with disabilities. Acceptability implies also

¹² See the 2017 UNESCO Recommendation, para. 16.

that scientific research have to incorporate ethical standards in order to ensure its integrity and the respect of human dignity, such as those proposed by the Universal Declaration on Bioethics and Human Rights.¹³ Some of these standards are: benefits to research participants and other affected individuals should be maximized and any possible harm minimized with reasonable protections and safeguards; autonomy and free and informed consent of participants shall be guaranteed; privacy and confidentiality should be respected; groups or persons in conditions of vulnerability shall be especially protected in order to avoid any discrimination; and cultural diversity and pluralism should be given due regard.

20. As already explained (*supra par.* 14), the protection of freedom of scientific research is also an element of the RPEBSPA.

B. Limits

21. Some limits on the RPEBSPA might be necessary, as science and its applications can, in certain contexts, affect ESCRs. However limits on the RPEBSPA must respect the requirements of article 4 of the Covenant: first, limitations have to be determined by law; second, they must promote “the general welfare in a democratic society”; third, any restriction must be compatible with the nature of the right restricted. As understood by the Committee, this implies that limitations must respect the minimum core obligations of the right, and must be proportionate to the aim pursued, which means that where there are several means reasonably capable of achieving the legitimate aim of the limitation, the one least restrictive to ESCRs must be selected¹⁴ and the burdens imposed on the enjoyment of the RPEBSPA should not outweigh the benefits of the limitation.

22. Limits on the applications of science and technology can be used to guarantee the safety and quality of products used by persons. Human rights impact assessments might be necessary to protect persons against risky applications. Limits on the research process can also be necessary, particularly when the research affects human beings, in order to protect their dignity, their integrity and their consent when involved in the research. When the research is done in countries or on populations different to those of the researchers, the State of origin must guarantee the rights and obligations of all parties involved. However, any limit on the content of scientific research implies a strict burden of justification by States, to avoid infringements on freedom of research.

IV. Obligations

A. General obligations

23. States Parties must take steps, to the maximum of their available resources, for the full realization of the RPEBSPA. While full realization of the right may be achieved progressively, steps towards it must be taken immediately or within a reasonably short period of time. Such steps should be deliberate, concrete and targeted, using all appropriate means, including the adoption of legislative and budgetary measures.

24. As with all other rights in the Covenant, there is a strong presumption that retrogressive measures taken in relation to the RPEBSPA are not permissible.¹⁵ Examples of retrogressive measures include the removal of programs or policies necessary for the conservation, the development and the diffusion of science; the imposition of barriers to education and information on science; the imposition of barriers to citizen participation in scientific activities, including misinformation, intended to erode citizen understanding and respect for science and scientific research; the adoption of legal and policy changes that reduce the extent of international collaboration on science, etc. In the exceptional circumstances under which retrogressive measures may be inevitable, States must ensure that

¹³ See UNESCO 2005 Universal Declaration on Bioethics.

¹⁴ See Committee on Economic, Social and Cultural Rights, general comment No. 21, para. 19.

¹⁵ See Committee on Economic, Social and Cultural Rights, general comment No. 14 (2000) on the right to the highest attainable standard of health, para. 32.

such measures are necessary and proportionate. They should remain in place only insofar as they are necessary; they should mitigate inequalities that can grow in times of crisis and ensure that the rights of disadvantaged and marginalized individuals and groups are not disproportionately affected; and in addition guarantee the minimum core obligations.¹⁶

25. States Parties are under an immediate obligation to eliminate all forms of discrimination against individuals and groups in their enjoyment of ESCRs. This duty is of particular importance in relation to the RPEBSPA because deep inequalities persist in the enjoyment of this right. States must adopt the measures necessary to eliminate conditions and combat attitudes that perpetuate inequality and discrimination in order to enable all individuals and groups to enjoy the RPEBSPA, without discrimination, including on the grounds of religion, national origin, sex, sexual orientation and gender identity, race and ethnic identity, disability, poverty and any other relevant status.

26. The duty to eliminate discrimination is a cross-cutting obligation that States should take into account when fulfilling all other obligations. For instance, the duty of States to take steps for the development and diffusion of science (Art 15.2) includes the obligation to make all necessary efforts to overcome persistent inequalities in scientific advancement through culturally and gender-appropriate means of education and communication, with the aim of allowing the widest participation in scientific progress of those populations who have traditionally been excluded from such progress.

27. The duty to combat discrimination on those grounds has implications for the design and implementation of all policies related to the RPEBSPA. For instance, States have to carefully design and implement quality scientific education programs in order to allow all persons equal opportunities to gain a basic level of understanding and knowledge of the science and training needed to pursue careers in science, as well as to ensure access without discrimination to available employment in scientific research fields.¹⁷

B. Special protection for specific groups

28. Without prejudice to the duty of States to eliminate all forms of discrimination, special attention should be paid to certain groups who have experienced systemic discrimination in the enjoyment of the RPEBSPA, such as women, persons with disabilities, LGBTI, indigenous peoples and persons in poverty. Temporary special measures might be necessary to achieve substantive equality and remedy current manifestations of previous patterns of exclusion of these groups. Owing to limitations of space, this General Comment focuses on women, persons with disabilities, persons in poverty and indigenous peoples.

Women

29. Women are frequently underrepresented in scientific activity. Sometimes this is due to situations of direct discrimination in access to education or professional employment and promotion. In other cases, discrimination is more subtle and based on stereotypes or professional practices, which discourage women's participation in scientific research. In particular, women's advancement in a scientific career, both in academia and in industry, is cumulatively limited as they climb the hierarchical ladder.

30. Unequal access between men and women to science implies a double discrimination: first, women have the right to participate in scientific research on an equal footing with men; thus, unequal access to scientific education or scientific careers constitutes in principle a discrimination. Second, as women are underrepresented in scientific research, it is very common that scientific research and new technologies are gender biased and not sensitive to the particularities and special needs of women.

31. States must therefore immediately eliminate barriers, which affect girls and women's access to quality scientific education and careers. Further, States must take steps to ensure

¹⁶ See Committee on Economic, Social and Cultural Rights, statement on public debt, austerity measures and the International Covenant on Economic, Social and Cultural Rights (E/C.12/2016/1).

¹⁷ The 2017 UNESCO Recommendation, para. 13 (b).

women's substantive equality in access to scientific education and careers, through different policies, such as education of the public to eliminate stereotypes that exclude women from science or the adoption of policies for both men and women to balance domestic life with scientific careers. Special temporary measures, such as the establishment of quotas reserved for women in scientific education, might be necessary in order to speed up the attainment of substantive equality in the enjoyment of REBSPA. The availability of kindergartens and other caring institutions for children is also key for the advancement of equality.

32. A gender-sensitive approach is not a luxury for scientific research but a crucial tool in order that scientific progress and new technologies adequately take into account the special characteristics and needs of women and girls. This approach should not be relegated to the last stages of research but should be incorporated from the first stage of research, such as the choice of the subject and the design of methodologies, and must be present throughout all steps of scientific research and its applications, including during the evaluation of its impacts. Decisions concerning funding or general policies must also be gender-sensitive.

33. This gender-sensitive approach is of particular relevance to the right to sexual and reproductive health. States parties must ensure access to up-to-date scientific technologies necessary for women in relation to this right. In particular, States parties should ensure access to modern and safe forms of contraception, including emergency contraception, medication for abortion, assisted reproductive technologies, and other sexual and reproductive goods and services, on the basis of non-discrimination and equality, as outlined in General Comment No. 22 on the right to sexual and reproductive health. Special attention should be given to the protection of women's free prior, and informed consent in treatments or scientific research on sexual and reproductive health.

Persons with disabilities

34. Persons with disabilities have suffered deep discrimination in the enjoyment of the RPEBSPA, either because of severe physical, communication and information obstacles to access basic and higher scientific education and careers, or because the products of scientific progress do not take into account their peculiarities and special needs. Persons with disabilities bring their unique perspectives and experiences into the scientific landscape, thus specifically contributing to the promotion of the RPEBSPA.

35. States Parties should, at least, adopt the following measures and policies to overcome discrimination against persons with disabilities in the enjoyment of the RPEBSPA: i) promotion of the participation and contributions of persons with disabilities, including women with disabilities who face multiple discrimination, in decision-making procedures concerning science; ii) development of statistics on access to science and its benefits disaggregated by disability; iii) implementation of universal design; iv) promotion of technologies that facilitate access to scientific education and employment for persons with disabilities; v) ensure that reasonable accommodation is provided for persons with disabilities to enable them to have access to scientific education and employment and to ensure that they benefit from the products of scientific development including diffusion and dissemination in adapted formats; vi) adoption of appropriate measures to raise awareness of the capabilities and contributions of persons with disabilities and to combat stereotypes and harmful practices relating to these persons;¹⁸ vii) ensuring free, prior and informed consent when they are subjects of research.

Persons in poverty, inequality and science

36. In the last decades, the growth of inequalities has undermined the Rule of Law and has had negative effects on the enjoyment of ESCRs.¹⁹ Economic inequality hinders equal access to scientific education and to the benefits of scientific progress for low-income households and especially for persons in poverty. This in turn reinforces economic inequalities because upper-income households can enjoy better scientific education and can

¹⁸ See Convention on the Rights of Persons with Disabilities, in particular articles 1 to 9.

¹⁹ See Special rapporteur on extreme poverty and human rights, report to the Human Rights Council (2015), (A/HRC/29/31).

access the latest and most expensive scientific innovations, allowing these affluent persons to become more technologically productive than poor people, perpetuating inequalities and providing an apparent justification for them.

37. As equality is at the core of human rights, States must make all efforts to break this vicious circle between substantive inequality and unequal access to the RPEBSPA. This implies a threefold strategy: first, States Parties should adopt policies to reduce inequalities, a subject that goes beyond the scope of this General Comment but is at the center of current discussions on democracy and human rights, Second, States Parties need a specific strategy to strengthen access to good scientific education for persons in poverty. Third, States should prioritize scientific and technological innovations that serves especially the needs of persons in poverty and ensure them access to the technological innovations.

38. State should adopt measures to ensure that children in poverty, particularly those with disabilities, have full access to the enjoyment of RPEBSPA, as they are “entitled to special care and assistance”, especially through pedagogical tools and quality scientific education that allow “the development of the child's personality, talents and mental and physical abilities to their fullest potential”.²⁰

Traditional Knowledge and indigenous peoples

39. Local, traditional and indigenous knowledge, especially regarding nature, species (flora, fauna, seeds) and their properties, are precious and has an important role to play in the global scientific dialogue. State must take measures to protect such knowledge, through different means, including special regimes of intellectual property, and measures to secure the ownership and control of this traditional knowledge by local and traditional communities and indigenous peoples.

40. Indigenous peoples and local communities all over the globe should participate in a global intercultural dialogue for scientific progress, as their inputs are precious and science should not be used as an instrument of cultural imposition. States Parties must provide indigenous peoples, with due respect for their self-determination, the means (both educational and technological) to participate in this dialogue. They must also take all measures to respect and protect the rights of indigenous peoples, in particular their land, their identity, and the protection of the moral and material interests resulting from their knowledge of which they are authors, individually or collectively. Genuine consultation in order to obtain free, prior and informed consent is necessary, whenever the State party or non-state actors make researches, take decisions or create policies related to science that have an impact on indigenous peoples or when using their knowledge .

C. Specific obligations

41. States Parties have an obligation to respect, protect and fulfil the RPEBSPA.

Obligation to respect.

42. The obligation to respect requires that States Parties refrain from interfering directly or indirectly in the enjoyment of this right. Examples of the obligation to respect are: eliminating barriers to accessing quality science education, and to the pursuit of scientific careers; refraining from disinformation, disparagement, or deliberate misinformation intended to erode citizen understanding and respect for science and scientific research; elimination of censorship or arbitrary limitations on access to the Internet which undermines access to and dissemination of scientific knowledge; imposing, or refraining from eliminating, obstacles to international collaboration among scientists, unless such restrictions may be justified, in accordance with article 4 of the Covenant.

²⁰ See Convention on the Rights of the Child, in particular articles 24 and 29.

Obligation to protect

43. The obligation to protect requires States Parties to adopt measures to prevent other actors from interfering with the RPEBSPA when these actors commit acts such as preventing access to knowledge or discriminating on the grounds of gender, sexual orientation or gender identity or other circumstances, etc. These actors may include universities, schools, laboratories, cultural or scientific associations, patients in hospitals as well as volunteers participating in scientific experiments, etc. Examples of this duty to protect are: ensuring that scientific associations, universities, laboratories or other non-state actors do not apply discriminatory criteria; protecting people from research or tests which contravene the applicable ethical standards for responsible research and guaranteeing their free, prior and informed consent; ensuring that private actors do not disseminate false or misleading scientific information; ensuring that private investment in scientific institutions is not used to unduly influence the orientation of research or to restrict the scientific freedom of researchers.

44. Sometimes State Parties may have to protect people within their own familial, social or cultural context when their RPEBSPA is affected. Persons who, due to their age or capacity, cannot choose for themselves, must receive special protection. For instance, when parents decide not to vaccinate their children on grounds the scientific community considers false, such refusal entails risks for the child and sometimes even for society, because of the possible resurgence of infectious diseases that were previously under control. In these cases, the best interests of the child must be a primary consideration. In some contexts, people may be subject to great pressure from their social environment to undergo traditional treatment instead of benefitting from the best available medical attention. State Parties must guarantee everyone the right to choose or refuse the treatment they want with the full knowledge of the risks and benefits of the relevant treatment, subject to any limitations that meet the criteria of article 4 of the Covenant. States must also establish protective measures in relation to messages from pseudoscience, which creates ignorance and false expectations among the most vulnerable parts of the population.

Obligation to fulfil

45. The duty to fulfil requires that States adopt measures, including legislative, administrative, budgetary, and the establishment of effective remedies, aimed at the full enjoyment of the RPEBSPA, which includes education policies, grants, participation tools, dissemination, providing access to the Internet and other sources of knowledge, participation in international cooperation programs, and ensuring appropriate financing.

46. The duty to fulfil is reinforced and specified by article 15.2 of the Covenant, which establishes that State parties must take steps “for the conservation, the development and the diffusion of science”. States Parties not only have a duty to allow persons to participate in scientific progress but also have a positive duty to actively promote the advancement of science through, *inter alia*, education and investment in science and technology. This includes approving policies and regulations which foster scientific research, allocating appropriate resources in the budgets and, in general, creating an enabling and participatory environment for the conservation, development and diffusion of science and technology. This implies *inter alia* protection and promotion of academic and scientific freedom, including freedoms of expression and to seek, receive and impart scientific information, freedom of association and movement; guarantees for equal access and participation of all public and private actors; and capacity-building and education.²¹

47. The obligation to fulfill is particularly important in creating and guaranteeing access to the benefits of the applications of scientific progress. States should use the maximum of available resources to overcome hurdles that any person may face to benefit from new technologies or other forms of applications of scientific advancements. This is particular relevant for disadvantaged and marginalized groups. Scientific progress and its applications should be, as far as possible, accessible and affordable to persons in specific need of certain goods or services. Public institutions in different sectors should be provided with a clear mandate to actively overcome exclusion from such progress and applications, especially in

²¹ See Venice Statement, para. 13.

the health sectors and education. Knowledge about scientific progress and its applications should be made broadly available and accessible to the general public through schools, universities, technical colleges, libraries, museums, print and electronic media and other channels. Specific programmes are needed to overcome problems of access to scientific knowledge and its applications related to age, language or other aspects of cultural diversity

48. All countries must contribute, to the maximum of its available resources, towards this common task of developing science. Recommending that the poor countries focus exclusively on applied science actually increases the gap and unfair distribution of knowledge and power between States.

49. The importance of the duty of States to disseminate science and to foster citizen participation cannot be underestimated. Basic knowledge of science, its methods and results, has become an essential element for being an empowered citizen and for the exercise of other rights, such as access to decent work. States must exert all efforts to ensure equitable and open access to scientific literature, data and contents including by removing barriers to publishing, sharing and archiving scientific outputs.²² However, open science cannot be achieved by the State alone. It is a common endeavor to which all other stakeholders should contribute, nationally and internationally: scientists, universities, publishers, scientific associations, funding agencies, libraries, the media, non-governmental institutions etc. All these actors play a decisive role in the dissemination of knowledge, especially when it comes to outcomes of research financed with public funds.

50. As a consequence of the right to freedom of research and the duty of States to disseminate science, scientists have, in principle, the right to publish the results of their research. Any restriction on this right should be compatible with article 4 of the Covenant. In particular, States should ensure that any contractual restriction on this right is consistent with the public interest, reasonable and proportionate, and that it provides for the appropriate crediting and acknowledging of the contributions of scientific researchers to the research outcomes.

D. Core obligations

51. States parties have to implement, as a matter of priority, core obligations. If a State party fails to satisfy these core obligations, it must demonstrate that it has made all reasonable efforts to comply with them, taking into account the totality of the rights of the Covenant, and in the context of the maximum of its available resources, individually and through international assistance and co-operation.

52. Core obligations related to the RPEBSP requires State parties to:

- Eliminate laws, policies and practices that unjustifiably limit access by individuals or particular groups to facilities, services, goods and information related to science, scientific knowledge and its applications;
- Identify and eliminate any law, policy, practice, prejudice or stereotype that undermines women's and girls' participation in scientific and technological areas;
- Remove limitations to the freedom for scientific research incompatible with article 4 of the Covenant;
- Develop a participatory national framework law on the RPEBSPA, which includes legal remedies in case of violations, and adopt and implement a participatory national strategy or an action plan for the realization of the RPEBSPA, which includes a strategy for the conservation, the development and diffusion of science;
- Ensure that people have access to basic education and skills necessary for the comprehension and application of scientific knowledge and that scientific education in both public and private schools respect the best available scientific knowledge;

²² The 2017 UNESCO Recommendation, paras. 13(c) and 36.

- Ensure access to those applications of scientific progress that are critical to the enjoyment of the right to health and other ESCRs;
- Ensure that public resources prioritize research that is directed to areas with the greatest need for scientific progress in health, food and other basic needs related to ESCRs and the wellbeing of the population, especially vulnerable and marginalized groups;
- Adopt mechanisms aimed at aligning government policies and programs to the best available, generally accepted scientific evidence;
- Ensure adequate training for health professionals in using and applying modern technologies and medicines resulting from scientific progress;
- Promote accurate scientific information and refrain from disinformation, disparagement, or deliberate misinforming of the public, so as to erode citizen understanding and respect for science and scientific research;
- Adopt mechanisms to protect people from the harmful consequences of false, misleading and pseudoscience-based practices, especially when other ESCRs are at risk;
- Foster the development of international contacts and co-operation in the scientific field, without imposing restrictions on the movements of persons, goods and knowledge beyond those which are justifiable in accordance with article 4 of the Covenant.

V. Special topics of broad application

A. Participation and transparency

53. The principles of transparency and participation are essential to make science objective and reliable, and not subject to interests that are not scientific or are against human rights and the welfare of society.²³ Secrecy and collusion are in principle contrary to the integrity of science at the service of humanity. Thus, States should take measures to avoid the risks associated with the existence of conflicts of interest by creating an environment in which actual or perceived conflicts of interest are adequately disclosed and regulated, especially those involving scientific researchers who give policy advice to policymakers and other public officials.²⁴

54. A clear benefit of scientific progress is that scientific knowledge is used in decision-making and policies, which should, as far as possible, be based on the best available scientific evidence. States should endeavor to align their policies to the best scientific evidence available. They should, furthermore, promote public trust and support for sciences throughout society and a culture of active citizen engagement with science, in particular through a vigorous and informed democratic debate on the production and use of scientific knowledge, and a dialogue between the scientific community and society.²⁵

55. With due respect to scientific freedom, some decisions concerning the orientation of scientific research or the adoption of certain technical advancements, should be subjected to public scrutiny and citizen participation. As far as possible, scientific or technological policies should be established through participatory and transparent processes and should be implemented with accompanying transparency and accountability mechanisms.

²³ See Venice Statement, para. 12.

²⁴ The 2017 UNESCO Recommendation, paras. 9 y 14.

²⁵ The 2017 UNESCO Recommendation, paras. 5c and g.

B. Participation and the precautionary principle

56. Participation also includes the right to information and participation in controlling the risks involved in particular scientific processes and its applications. In this context, the precautionary principle plays an important role. This principle demands that, in the absence of full scientific certainty, when an action or policy may lead to unacceptable harm to the public or the environment, actions shall be taken to avoid or diminish that harm. Unacceptable harm includes “harm to humans or the environment that is (a) threatening to human life or health, (b) serious and effectively irreversible, or (c) inequitable to present or future generations, or (d) imposed without adequate consideration of the human rights of those affected”.²⁶ Technological and human rights impacts assessments are tools that shall help to identify potential risks early in the process and the use of scientific applications.

57. The application of the precautionary principle is sometimes controversial, particularly in relation to the scientific research itself, as limits on the freedom of scientific research are compatible with the Covenant only in the circumstances set out in article 4 of the Covenant. On the contrary, this principle is more broadly applied for the use and application of scientific outcomes. The precautionary principle should not hinder and prevent scientific progress, which is beneficial for humanity. On the other hand it should be able to address available risks for human health, the environment etc. Thus, in controversial cases, participation and transparency become crucial because the risks and potentials of some technical advances or some scientific research should be made public in order that society, through an informed, transparent and participatory public deliberation, can decide whether or not the risks are acceptable.

C. Private scientific research and Intellectual Property (Hereinafter IP)

58. In the contemporary world, an important part of scientific research is carried out by business enterprises and non-State actors. This is not only compatible with the Covenant, but can also be instrumental to the enjoyment of the RPEBSPA. However, the large privatization of scientific research without any other consideration might sometimes have negative effects on the enjoyment of the REBSPA.

59. In some cases, scientific research made or financed by private actors can create conflicts of interests, for instance, when business corporations support research related to the type of economic activities in which they are involved, as happened in the past with some tobacco companies. Mechanisms should be established for the disclosure of these actual or perceived conflicts of interest.

60. Private scientific research has been associated with the development of international and national IP legal regimes, which have complex relationships with the REBSPA. On one hand, IP enhances development of science and technology through economic incentives for innovation, such as patents for inventors, which stimulates involvement of these private actors in scientific research. On the other hand, IP can negatively affect the advancement of science and access to its benefits, in at least in three ways. It is necessary to tackle these three problems in order to ensure that IP promotes research and innovation crucial to the full enjoyment of ESCRs without undermining these rights.

61. First, IP can sometimes create distortions in the funding of scientific research as private financial support might go only to research projects that are profitable, while funding for addressing issues which are crucial for ESCRs might not receive adequate support, as they do not seem financially attractive for business. This has happened with the so-called “neglected diseases”. Second, some IP regulations limit for a certain period the sharing of information of scientific research, as it happens with data exclusivity for patent holders

²⁶ UNESCO World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) (2005), *The Precautionary Principle*, available at <https://unesdoc.unesco.org/ark:/48223/pf0000139578>, accessed 5 November 2019, p. 14.

included in some of the so-called “Trip-plus treaties”.²⁷ Further, the excessive price of some scientific publications is an obstacle for low-income researchers, especially in developing countries. All those restrictions hinder the advancement of science. Third, although IP provides positive incentives for new research activities and thus plays an important role in contributing to innovation and the development of science, it may, in some cases, pose very serious obstacles for persons wishing to access the benefits of scientific progress, which may be crucial for the enjoyment of other ESCRs, such as the right to health. Patents give patent holders a temporary exclusive right to exploit the product or service they have invented. Thus, they can determine a price for these products and services. If prices are fixed very high, access to these products and services become impossible for low-income persons or developing countries, as has happened with new medicines that are essential for the health and life of persons with certain diseases.

62. States should take appropriate measures to foster the positive effects of IP on the REBSPA, while at the same time avoiding its possible negative effects. First, to counter distortions of funding associated with IP, States should provide adequate financial support for research that is important for the enjoyment of ESCR, either by national effort or, if necessary, by resorting to international and technical cooperation. States could also resort to other incentives, such as the so called “market entry rewards”, that delink remuneration of successful research from future sales, stimulating in that way research by private actors in these otherwise neglected fields. Second, States should make all efforts, in their national regulations and in international agreements on IP to guarantee the social dimensions of intellectual property, in accordance with international human rights obligations to which they have committed themselves”.²⁸ A balance must be reached between IP and the open access and sharing of scientific knowledge and its applications, especially those linked with the realization of other ESCRs, such as the right to health, right to education and right to food. The Committee reiterates that “ultimately, intellectual property is a social product and has a social function” and consequently States Parties “have a duty to prevent unreasonably high costs for access to essential medicines, plant seeds or other means of food production, or for schoolbooks and learning materials, from undermining the rights of large segments of the population to health, food and education”.²⁹

D. Interdependence with other rights

63. The REBSP is a human right with an intrinsic value, but it also has an instrumental value, as it constitutes an essential tool for the realization of other ESCRs, in particular for the right to food and the right to health.

Right to food

64. Scientific and technological advancements have increased agricultural productivity contributing to higher availability of food per person and reduction of famine. However the environmental impacts of certain technologies associated with the “Green Revolution“, as well as the risks associated with an increased dependency on technology providers, has led, *inter alia*, the General Assembly to acknowledge that “Peasants and other people working in rural areas have the right to determine their own food and agriculture systems, recognized by many States and regions as the right to food sovereignty”.³⁰ Thus, the RPEBSP in agriculture should preserve, not close down, the right of peasants and other people working in rural areas to choose which technologies suit them best. Low-input eco-agronomic techniques, that

²⁷ WHO. UHC Technical Brief for SEA Region (2017) Data exclusivity and other UHC Technical brief “trips-plus” measures.

²⁸ See Committee on Economic, Social and Cultural Rights, statement on human rights and intellectual property (E/C.12/2001/15), para. 18.

²⁹ See Committee on Economic, Social and Cultural Rights, general comment No. 17 (2005) on the right of everyone to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the author, para. 35.

³⁰ United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas, adopted by UN General Assembly Res. 73/165 of 17 Dec. 2018, art. 15(4) (emphasis added).

increase soil organic matter content and carbon sequestration, and protect biodiversity, should also be supported.

65. In addition, States parties should take appropriate measures to ensure that agricultural research and development integrates the needs of peasants and other people working in rural areas and to ensure their active participation in the determination of priorities and the undertaking of research and development, taking into account their experience and respecting their cultures. Every policy or action taken on biofuels and pesticides should consider all their interconnected complexities and the best available scientific knowledge.

66. Inadequate diets have become a major contributing factor to the increase of non-communicable diseases in all regions. Given the proven long-term impacts of adequate nutrition during pregnancy and before the second birthday of the child, States should do more to regulate marketing of breast milk substitutes, to disseminate information about the benefits of adequate feeding practices, and to create an enabling environment for breast-feeding. They should also redirect investments in agricultural development away from the exclusive focus on boosting the production of cereal crops – rice, wheat and maize – towards support for healthy diets, including adequate measures to reduce the over intake of sugar. Cereal crops are mainly a source of carbohydrates and contain relatively few proteins and other nutrients essential for adequate diets.³¹

Right to health

67. The links of the RPEBSPA to the right to health are clear and diverse. First, scientific progress creates medical applications that prevent diseases (for instance, vaccination), or that enable them to be more effectively treated. The RPEBSPA is therefore instrumental for realising the right to health. States should promote scientific research, through financial support or other incentives, to create new medical applications and make them accessible and affordable to everyone, especially the most vulnerable. In particular, States parties should prioritize the promotion of scientific progress that can result in better and more accessible ways for the prevention, control or treatment of epidemic, endemic, occupational and other diseases (art 12,2,e).

68. In this respect, scientific research is impaired for some substances under the international conventions on drug control,³² as these substances are classified as harmful for health and with no scientific or medical value. However, some of these classifications were made with insufficient scientific support to substantiate the decision, as credible evidence exists regarding the medical uses of a number of them, such as cannabis for the treatment of certain epilepsies. Thus, States Parties should harmonize the fulfilment of their obligations under the international drug control regime with their obligations to respect, protect and fulfil the RPEBSPA, through a regular revision of its policies in relation to controlled substances. Prohibition of research in those substances are in principle limitations of the RPEBSPA and should meet the requirements of article 4 of the Covenant. Besides, because of the potential benefits for health of these controlled substances, these restrictions should also be weighed in relation to State Parties' obligations under article 12 of the Covenant.

69. Second, some applications of scientific progress are protected through IP. The REBSPA assists States in making sure that these property rights are not realised at the expense of the right to health. The REBSPA becomes a significant mediator between a human right (the right to health) and a property right (IP). As stated in the "Doha Declaration on the Trips Agreement and Public Health" of the WTO Ministerial Conference of 2001, the IP regime should be interpreted and implemented in a manner supportive of the duty of States "to protect public health and, in particular, to promote access to medicines for all". Thus, State parties should use, when necessary, all the flexibilities of the TRIPS Agreement, such as compulsory licences, to ensure access to essential medicines, especially for the most disadvantaged groups. State parties should also refrain from granting disproportionately

³¹ Frison E et al. (2006). Agricultural biodiversity, nutrition and health: Making a difference to hunger and nutrition in the developing world. *Food and Nutrition Bulletin*, 27(2): 167–179.

³² See 1961 Single Convention on Narcotic Drugs, 1971 Convention on Psychotropic Substances and 1988 Vienna Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.

lengthy terms of patent protection for new medicines in order to allow, within a reasonable time, the production of safe and effective generic medicines for the same diseases.

70. Third, State parties have a duty to make available and accessible to all persons, without discrimination, especially to the most vulnerable, all the best available applications of scientific progress necessary to enjoy the highest attainable standard of health. State parties should fulfil this duty to the maximum of their available resources, including those available through international assistance and co-operation, and taking into account the full range of ESCRs. Safe and effective generic medicines should be prioritized over brand-named medicines in national health plans for a better use of the available resources for the fulfilment of ESCRs.

71. Fourth, some scientific research can carry health-related risks for the participants in the research, or because of the impact of the applications of the relevant research. States Parties should prevent or mitigate these risks with a careful application of the precautionary principle and the protection of participants in scientific research. In particular, States should make all efforts to ensure that medicines and medical treatments, including in the field of drug dependency, are evidence-based, that their risks have been properly evaluated, and communicated in a clear and transparent manner, so that patients can provide properly informed consent.

E. Risks and promises of new emerging technologies

72. Technological change is now so intense and rapid that is blurring the boundaries between the physical, digital and biological worlds, because of the growing fusion of scientific and technological advancements in areas such as artificial intelligence (AI), robotics, 3D printing, biotechnology, genetic engineering, quantum computers, and management of big data. These innovations might change not only society and human behavior, but even human beings themselves, through genetic engineering or the incorporation in human bodies of technological devices that transform some biological functions.

73. These emerging technologies might enhance the enjoyment of ESCRs. For instance, applications of AI in industry or services can lead to enormous gains in productivity and efficiency; biotechnology can allow the cure or the treatment of many diseases, etc. On the other hand, these changes might intensify social inequalities by increasing unemployment and segregation in the labor market; algorithms incorporated in AI can reinforce discrimination, and so forth.

74. States Parties have to adopt policies and measures that expand the benefits of these new technologies while at the same time reducing their risks. However, there are no easy solutions given the varied nature of these new technologies and their complex effects. The Committee will therefore monitor constantly the impact of these new technologies in the enjoyment of ESCRs. Nevertheless, for the Committee, three elements remain very important: first, international cooperation should be enhanced in this field as these technologies need global regulations to be effectively managed. Fragmented national responses to these transnational technologies would create governance gaps detrimental to the enjoyment of ESCRs and would perpetuate technological divides and economic disparities.

75. Second, decisions concerning the development and use of these technologies should be adopted within a human rights framework and with a holistic and inclusive view.³³ All crosscutting human rights principles, such as transparency, non-discrimination, accountability and respect for human dignity, become crucial in this field. For instance, State Parties should develop mechanisms in order that autonomous intelligent systems are designed in ways that avoid discrimination, enable their decisions to be explained, and allow accountability for their use. Additionally, States Parties should establish a legal framework

³³ See Report of the UN Secretary-General's High-level Panel on Digital Cooperation, available at <https://digitalcooperation.org/wp-content/uploads/2019/06/DigitalCooperation-report-web-FINAL-1.pdf>.

that imposes on non-State actors, a duty of human rights due diligence³⁴ especially in the case of Big-Tech companies.³⁵ This legal framework should include measures that require companies to prevent discrimination at both the input and output levels of AI systems and other technologies.

76. Third, some aspects related to these new technological deserve a special attention because of their particular impact for the enjoyment of ESCRs. For instance, State parties should adopt policies to ensure that those vulnerable to temporary and long-term job loss as a result of scientific and technological advances are provided and encouraged to pursue vocational job training and other job placement opportunities. Besides, taking into account that many of the emerging inequalities are strongly linked to the capacity of some business entities to access, store and exploit massive data, it is crucial to regulate, according to human rights principles, the ownership and control of data.

VI. International cooperation

77. The duty to cooperate internationally towards the fulfilment of all ESCRs, established in article 2 of the Covenant and in articles 55 and 56 of the United Nations Charter, is reinforced in relation to the RPESPA, as article 15.4 of the Covenant specifically provides that States shall recognize the benefits “derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields”. States need to take steps through legislation and policies, including diplomatic and foreign relations, to promote a global environment favorable for the advancement of science and the enjoyment of benefits from its applications.

78. This reinforced duty of international cooperation has several important justifications and dimensions. First, as certain fields of science necessitate a universal endeavour, international cooperation among scientists should be encouraged to foster scientific progress. Thus, States should take steps to promote and enable scientific researchers to participate in the “international scientific and technological community”,³⁶ especially through facilitating their travel in and out of their territory and implementing policies that enable scientific researchers to freely share data and educational resources internationally, for example, by means of virtual universities.³⁷

79. Second, this international cooperation is also essential because of the existence of deep international disparities among countries in science and technology. Developing States, if necessary because of financial or technological constraints, should resort to international assistance and cooperation, with a view to complying with their obligations under the Covenant. Developed States should contribute to the development of science and technology in developing countries, adopting measures to achieve this purpose, such as allocating development aid and funding towards building and improving scientific education, research and training in developing countries, promoting collaboration between scientific communities of developed and developing countries to meet the needs of all countries and facilitate their progress while respecting national regulations. The access to research results and their applications should be regulated in a form that allows developing countries and its citizens adequate access to these products in an affordable manner, such as the access to essential medicines. While respecting the right of scientists to decide on their own careers, developed States should also implement reasonable policies for identifying, not fostering and countering the effects of brain drain.³⁸

80. Third, the benefits and applications resulting from scientific progress should be shared, with due incentives and regulations, with the international community, in particular

³⁴ See Committee on Economic, Social and Cultural Rights, general comment No 24 (2017) on State obligations under the International Covenant on Economic, Social and Cultural Rights in the context of business activities, para. 16.

³⁵ See Special rapporteur on extreme poverty and human rights, report to the General Assembly (A/74/493).

³⁶ The 2017 UNESCO Recommendation, para. 31.

³⁷ The 2017 UNESCO Recommendation, para. 18.

³⁸ The 2017 UNESCO Recommendation, para. 18.

with developing countries, as well as communities living in poverty, and groups with special needs and vulnerabilities, especially when these benefits are closely related to the enjoyment of ESCRs.

81. Fourth, international cooperation is essential because the most acute risks of the world related to science and technology, such as climate change, the rapid loss of biodiversity, the development of dangerous technologies, such as autonomous weapons based on AI or the threat of weapons of mass destruction, especially nuclear weapons, are transnational and cannot be adequately addressed without robust international cooperation. States should promote multilateral agreements to prevent these risks from materializing or to mitigate their effects. States should also take measures in cooperation with other States against bio-piracy; illicit trafficking of organs, tissues, samples, genetic resources and genetic-related materials.³⁹

82. Pandemics are a crucial example of the need of scientific international cooperation to face transnational threats. Virus and other pathogens do not respect borders. If adequate measures are not taken, a local epidemic can become very quickly a pandemic with devastating consequences. WHO's role in this field remains fundamental and should be supported. Combating pandemics effectively requires stronger commitments from States to scientific international cooperation as national solutions are insufficient. An enhanced international cooperation could increase preparedness of States and of international organizations to face upcoming pandemics, for instance through sharing of scientific information of potential pathogens. It should also improve early warning mechanisms, based on timely and transparent information provided by States on emerging epidemics that have the potential of transforming in a pandemics, that would allow early interventions, based on the best scientific evidence, aimed at controlling this epidemics and preventing them from becoming a pandemic. If a pandemic develops, sharing of the best scientific knowledge and its applications, especially in the medical field, becomes crucial to mitigate the impact of the disease and to expedite the discovery of effective treatments and vaccines. Finally, after the pandemic, scientific research should be promoted to learn lessons and increase preparedness for possible pandemics in the future.

83. States also have extraterritorial obligations for the full realization of the RPESPA. In particular, States Parties, when negotiating international agreements or adopting their domestic IP regime, should ensure that traditional knowledge is protected, contributions to scientific knowledge are appropriately credited and that IP regimes foster the enjoyment of the RPEBSPA.⁴⁰ These bilateral and multilateral agreements should enable developing countries to build up their capacity to participate in generating and sharing scientific knowledge and benefiting from its applications. The Committee recalls that States parties participating in decisions as members of international organizations cannot ignore their human rights obligations.⁴¹ Thus, States Parties should direct their efforts and exercise their voting powers in these organizations towards ensuring respect, protection and fulfilment of RPEBSPA.

84. State Parties also have an extraterritorial obligation to regulate and monitor the conduct of multinational companies over which they can exercise control in order that these companies exercise due diligence to respect RPEBSPA, also when acting abroad.⁴² State parties should provide remedies, including judicial remedies, for victims of these companies.

³⁹ The 2017 UNESCO Recommendation, para. 18.

⁴⁰ The 2017 UNESCO Recommendation, para. 18.

⁴¹ See Committee on Economic, Social and Cultural Rights, statement on public debt, austerity measures and the International Covenant on Economic, Social and Cultural Rights (E/C.12/2016/1).

⁴² See Committee on Economic, Social and Cultural Rights, general comment No 24 (2017) on State obligations under the International Covenant on Economic, Social and Cultural Rights in the context of business activities, paras. 31-33.

VII. National implementation

85. While States Parties have a wide margin of discretion in selecting the steps and policies to achieve the full realization of all ESCRs,⁴³ including the RPEBSPA, at least four types of measures should be implemented.

86. First, States should put in place a normative framework that ensures the full enjoyment of the RPEBSPA without discrimination and that creates an enabling and participatory environment for the conservation, development and diffusion of science and technology. This framework should include, *inter alia*, the protection of access, without discrimination, to the benefits of scientific progress, especially when other ESCRs are in stake for those most in need; the protection of freedom of research with limits compatible with article 4 of the Covenant; measures to ensure that ethics and human rights are respected in scientific research, including the establishment of committees on ethics when necessary; measures to harmonize intellectual property with the RPEBSPA; and adequate protection against all forms of discrimination.

87. Second, States Parties should develop a national plan of action to promote scientific progress and to disseminate its results and products to all persons without discrimination. Such a plan will help ensure that various scientific endeavors are not carried out in a fragmented and uncoordinated manner, but are part of an integrated effort for the promotion, conservation and diffusion of science. This plan of action should include, *inter alia*: measures to facilitate access without discrimination to the applications of scientific progress, especially when these applications are needed for the enjoyment of ESCRs; measures to strengthen human and institutional scientific capacities in the State; adequate public funding, especially for research which is relevant for the needs of the population and for the promotion of access to scientific education, especially for groups traditionally discriminated in this field; mechanisms to promote a culture of scientific inquiry, public trust and support for sciences in society, in particular through a vigorous and informed democratic debate on the production and use of scientific knowledge, and a dialogue between the scientific community and society; mechanisms to protect the population from false, misleading and pseudoscience-based practices, especially when other ESCR are at risk; measures to ensure ethics in science, such as the establishment or promotion of independent, multidisciplinary and pluralist ethics committees to assess the relevant ethical, legal, scientific and social issues related to research projects; and measures to enhance the professional and material conditions of scientific researchers.⁴⁴

88. Third, States Parties should identify appropriate indicators and benchmarks, including disaggregated statistics and time frames, which allow them to monitor effectively the implementation of the RPEBSPA.

89. Fourth, like all other rights, the RPEBSPA is enforceable and therefore also justiciable.⁴⁵ States Parties should establish effective mechanisms and institutions, where these do not exist, to prevent violations of the right and to ensure effective judicial, administrative and other remedies for victims if such violations occur. As this right can be threatened or violated not only by actions of the State but also through omissions, remedies must be effective in both cases.

⁴³ See Committee on Economic, Social and Cultural Rights, general comment No. 21(2009) on the right of everyone to take part in cultural life, para. 66.

⁴⁴ The 2017 UNESCO Recommendation, paras. 4, 5, and 6.

⁴⁵ See Committee on Economic, Social and Cultural Rights, general comment No. 9 (1998) on the domestic application of the Covenant.