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Preliminary study on the technical and legal aspects relating to the desirability of revising the 1974 Recommendation on the Status of Scientific Researchers

Revised First Draft

May 2013

A. Scope and purpose of this report[1]

1. In 1974, at its 18th session, the UNESCO General Conference adopted a Recommendation on the Status of Scientific Researchers (hereafter referred to as the "1974 Recommendation").

2. The Executive Board, having considered reports on the implementation of the 1974 Recommendation at its 189th and 190th sessions, took note of the possible desirability of revising and updating it and adopted 190 EX/Decision 24(IV), which invited the Director-General to prepare a preliminary study on the technical and legal aspects relating to the desirability of revising the 1974 Recommendation.

3. As requested by the Executive Board, the first draft of the preliminary study is conducted by an Ad Hoc Expert Group, the composition of which is specified in Appendix 1. The present document was prepared by the Ad Hoc Expert Group, working exclusively through electronic communication with the support of the UNESCO Secretariat, between January and March of 2013. It is designed to offer an initial review of the main points relevant to consideration of possible revision of the 1974 Recommendation, in order to inform consultations with relevant stakeholders, as required by 190 EX/Decision 24(IV), including consultation with the members of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) during its 8th ordinary session in May 2013.

4. This work will result in the preparation of the final version of the preliminary study on technical and legal aspects relating to the desirability of revising the 1974 Recommendation, which will be submitted to the Executive Board at its 192nd session in September 2013 in accordance with 191 EX/Decision 20 (IV).

5. At its 192nd session, the Executive Board will consider the preliminary study in order to decide whether the question of revising the 1974 Recommendation should be included in the provisional agenda of one of the next sessions of the General Conference.

B. Historical context of the 1974 Recommendation

6. The 1974 Recommendation expressed the concern to establish a "social contract" between scientific researchers, who represented a relatively small but very dynamic group, and contemporary societies, which had become increasingly aware of the need to improve their situation – both material and non-material. The elaboration and adoption of the 1974 Recommendation was the outcome of substantial work by UNESCO in the late 1960s and early 1970s aimed at elaborating principles to inform relations between science and society. One important conclusion of this work was the need for an

[1] The first draft of the preliminary study, approved by the Ad Hoc Expert Group, was revised to reflect the decision of the Executive Board of UNESCO, adopted at its 191st session, to postpone consideration of the relevant agenda item to its next 192nd session.

international instrument on account of the international nature of the work done by scientific researchers.

7. Specifically, the development of the 1974 Recommendation was guided by two earlier documents: “The Declaration on the Rights of Scientific Workers”, adopted in 1969 by the World Federation of Scientific Workers (WFSW); and the “Recommendation Concerning the Status of Teachers” adopted by the Special Intergovernmental Conference on the Status of Teachers in 1966. The general orientation of the 1974 Recommendation is shaped by this emphasis not on science as an abstract category – though general considerations at this level are included in the preamble – but on science as a concrete, institutionalized sphere of activity defined to a large extent by the professionalization of its participants.

8. The 1974 Recommendation was not designed to provide benefits to scientific researchers as a category of intellectual workers. The purpose was rather to determine the relationship between what scientific researchers can reasonably expect of society, and what society can reasonably ask from its scientific researchers, thus establishing a connection between the rights of scientific researchers and their relevant ethical and institutional obligations towards their society. Mediation between the rights and the responsibilities is ensured in the 1974 Recommendation by a general vision of science as “the enterprise whereby mankind, acting individually or in small or large groups, makes an organized attempt, by means of the objective study of observed phenomena, to discover and master the chain of causalities” (1974 Recommendation, article 1(a)(i)), which, in light of the human right “freely … to share in scientific advancement and its benefits” (Universal Declaration of Human Rights, article 27(1)), imposes certain responsibilities of an ethical nature.

9. In order to define a status for scientific researchers consistent both with scientific integrity and with such ethical responsibilities, the 1974 Recommendation determined general principles relevant to the professional conduct of scientific researchers along with specific institutional measures to which states should be committed.

10. The context in which the 1974 Recommendation was adopted was also one in which concern about misapplications of science was attaining considerable significance. While there is a clear emphasis in the 1974 Recommendation on the major positive contribution of scientific discoveries and related technological developments to an improved quality of human life for the benefit of mankind, it was also widely recognized that, at the same time, scientific achievements “may entail certain dangers which constitute a threat especially in cases where the results of scientific research are used against mankind’s vital interests in order to prepare wars involving destruction on a massive scale or for purposes of the exploitation of one nation by another, and in any event give rise to complex ethical and legal problems” (1974 Recommendation, preamble). In light of these concerns, reflection on the status of scientific researchers was designed to facilitate endorsement by the public of the aims, nature and principles of scientific research and thus to favour support for science policies for the benefit of society.

11. These considerations help to explain why the 1974 Recommendation combines, in one normative statement, considerations on science ethics and statements on science policies that are quite specific in institutional terms. The connection between the two domains is clearly stated in the preamble, which, expressing the concern to “encourage and assist indigenous capability to perform research and experimental development in an enhanced spirit of responsibility towards man and his environment”, is premised on the assumption that “concrete action for the introduction and pursuit of adequate science and technology policies” can “considerably assist” in the creation of conditions conducive to such desirable outcomes.

12. The Recommendation was intended to serve as a general framework at global level, leaving significant latitude for local adjustments. The development of a recommendation in this area, rather than a convention, to which consideration was also given at the time, was chosen precisely due to the flexibility in implementation that a recommendation gives to Member States. Each Member State can apply the principles and norms of a recommendation through its legal system and institutional practices, taking account of its traditions, resources, level of development, and specific development needs.

13. Finally, it is of some importance to note that the 1974 Recommendation reflects the geopolitics of the period when it was drafted. Questions of academic freedom, mobility, exchange of ideas, publication etc. were controversial in a context in which sections of the scientific community in many countries were actively engaged in political activism, often in opposition to the political agendas of their governments. The text is a compromise that reflects some of these tensions – notably in the way in which it presents the notion of “academic freedom”. The preamble thus states that “open communication of the results, hypotheses and opinions – as suggested by the phrase ‘academic freedom’ – lies at the very heart of the scientific process, and provides the strongest guarantee of accuracy and objectivity of scientific results”. The quotation marks around “academic freedom” are a clear reflection of the geopolitical tensions of the time.

14. The current geopolitical, economic and cultural context of research is in many respects different from that envisaged in 1974. Alongside the concern to promote peace, others have attained major significance as a consequence of the unprecedented pace of technological progress, particularly in the field of biomedical sciences and associated technologies. It may be considered desirable to reflect these changes and challenges in the 1974 Recommendation.

C. Overview of the content of the 1974 Recommendation

15. The preamble of the 1974 Recommendation sketches a general epistemological vision of science, and draws some conclusions as to the institutional organization of science from the ethical requirement to create the conditions conducive to realization of article 27 of the Universal Declaration of Human Rights. The postulated connection is strong in this regard. Special rights and responsibilities attach to the status of scientific researchers by the

very nature of research and experimental development activities, which provide unique opportunities both for the self-fulfilment of scientific researchers and for the fulfilment of society's needs. It is however recognized that such ethical guidelines neither can nor should be finalized for all time. On the contrary, they should evolve with, and as a function of, the changing needs of scientific researchers themselves and of society.

16. Section I of the 1974 Recommendation (Scope of application – articles 1-3) defines basic concepts and their relations. It includes, notably, definitions of the following: "science" and the scientific approach to the unknown; the output of science and "technology"; the broad concept of "scientific research" and "experimental development"; types of intellectual workers involved in research and experimental development activities who may be included in the notion of "scientific researchers" and criteria for the evaluation of research and experimental development performance.

17. For the purposes of the 1974 Recommendation, "the word 'status' as used in relation to scientific researchers signifies the standing or regard accorded them, as evidenced, first, by the level of appreciation both of the duties and responsibilities inherent in their function and of their competence in performing them, and, secondly, by the rights, working conditions, material assistance and moral support which they enjoy for the accomplishment of their task." (Article 1(e)). In specifying the professional status of scientific researchers, science policies also provide the institutional background within which ethical science is possible.

18. The 1974 Recommendation explicitly applies to all scientific researchers, irrespective of: (a) the legal status of their employer, or the type of organization or establishment in which they work; (b) their scientific or technological fields of specialization; (c) the motivation underlying the scientific research and experimental development in which they engage; (d) the kind of application to which that scientific research and experimental development relates most immediately (article 2). This point is important with respect to application of the principles enshrined in the 1974 Recommendation to researchers working in the private sector, which is in full compliance with its scope and original spirit.

19. Section II (articles 4-9) specifies the institutional basis for ethical science through a series of detailed guidelines on the role of science and scientific researchers in national policy-making. These relate to public funding of scientific and experimental development research based on the principles of public interest, accountability and transparency; science for peace, development, international cooperation, disaster prevention, etc.; participation of scientific researchers in policy-making and decision-making processes; freedom of movement; and creation of material and moral conditions beneficial for the work of scientific researchers, in particular young scientists.

20. Correctly noting that the embedding of ethical principles in scientific practice is an educational issue, Section III of the 1974 Recommendation (articles 10-12) addresses the importance in scientific education and training of the principles of respect, evaluation and formation of scientific integrity, maturity, moral and

intellectual qualities; non-discrimination in access to scientific education and training and careers; civic responsibility for possible social and ecological consequences of scientific research and experimental development activities; promotion of educational initiatives that mainstream elements of social sciences in curricula and courses concerning the natural sciences and technology; as well as scientific communication and team work.

21. Section IV (articles 13-19) considers the professional rights and responsibilities of scientific researchers and specifies measures to be taken by Member States to ensure that scientific researchers have the responsibility and the right to work in a spirit of intellectual freedom; to participate in the determination of the aims, content and methods of research, which should be compatible with respect for universal human rights and fundamental freedoms, as well as ecological and social responsibility; to creativity, occupational mobility, international cooperation for furtherance of international peace, cooperation and understanding, etc.

22. Emphasizing that realization of the principles stated in the 1974 Recommendation depends on detailed institutional considerations, and reflecting its scope as applicable to persons professionally engaged in science, Section V (articles 20-42) sketches a comprehensive framework for the employment and career development of scientific researchers, including provision by Member States and all other employers of scientific researchers of satisfactory working conditions, including material and economic position, health and social security protection, multidisciplinary working approach, professional and career development, facilities for permanent self re-education; criteria for the appraisal of the creativity of scientific research and publication of research results; moral support and material compensation, author's rights and freedom of association.

23. However, while comprehensive, the framework sketched in Section V of the 1974 Recommendation is deliberately very general. Technical and concrete aspects of employment and career development of scientific researchers are regulated by ILO instruments, which are enumerated in the Annex (which could helpfully be updated). An important issue in considering possible revision of the Recommendation will be how detailed, comprehensive and prescriptive its institutional content should be. A more analytical approach to the framework adopted in 1974 may be recommended at this stage.

24. Finally, Section VI ("Utilization and exploitation of the present recommendation" – articles 43-45) and Section VII ("Final Provision" – article 47) determine the basis for the implementation of the 1974 Recommendation by UNESCO Member States in co-operation with other actors of society, in particular National Commissions for UNESCO; international organizations; organizations representing science and technology educators; employers generally; learned societies, professional associations and trade unions of scientific researchers; associations of science writers; and youth organizations.

25. The Annex of the Recommendation contains a list of international instruments and other texts concerning workers in general or scientific researchers. The list is inevitably out of date and its significance might deserve consideration.

D. Implications of the Process to Monitor the Implementation of the 1974 Recommendation

26. Since its adoption, the implementation of the 1974 Recommendation has been monitored on an ad hoc basis. The Director-General's first report to the Executive Board on the subject, in 2012 (document 189 EX/13 Part III), therefore responded to the new procedures adopted in 2007 for the monitoring of the implementation of UNESCO conventions and recommendations for which no specific institutional mechanism is provided (177 EX/Decision 35 (I) and 187 EX/Decision 20 (I)).

27. Issues relating to the role of science in policy-making, scientific education and training, and the professional rights and responsibilities of scientists, have further been addressed in the Declaration on Science and the Use of Scientific Knowledge, adopted as an outcome of the 1999 World Conference on Science and subsequently endorsed by the General Conference (30 C/Resolution 20).

28. With respect to science ethics, the Executive Board specifically invited the Director-General in 2007 "to analyse the ethical principles of the Recommendation on the Status of Scientific Researchers as well as of the ethical aspects of the Declaration on Science and the Use of Scientific Knowledge, in order to encourage their use by Member States" (175 EX/Decision 13). In considering these issues at its 6th Ordinary Session (Kuala Lumpur, Malaysia, June 2009), the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) reached the conclusion that, while still valuable, the 1974 Recommendation fails to deal with certain major issues of contemporary concern and does not, by itself, provide a fully adequate framework for the adoption by Member States of appropriate policies. On this basis, COMEST adopted the following recommendations:

    - The monitoring process should be designed so as to ensure integration of science ethics and science policy issues. It should also give Member States the opportunity to comment on the limitations of the 1974 Recommendation and the practical steps that might be taken to supplement it, inter alia through enhanced articulation with the 1999 Declaration on Science and the Use of Scientific Knowledge.

    - In addition to monitoring of national policies, consideration should be given to the impact of globalization, with particular reference to fair employment and non-employment conditions across and within national research systems.

- Particular attention should be given in analysis and follow-up of the monitoring process to global inequalities including brain drain and inequitable distribution of research funds.

- The role of public investment in research leading to public benefit should be promoted. Public-private partnerships, where relevant, should be equitable with regard to sharing of costs and benefits.

- In monitoring the 1974 Recommendation, taking account of the economic importance of the knowledge society, UNESCO should consult Member States on the need for new ethical thinking on private-sector research and on intellectual property rights.

29. In the monitoring exercise conducted in 2011-12, taking account of the absence of systematic monitoring over a lengthy period, Member States were invited to answer the following three questions, while also taking note of the COMEST recommendations quoted in the previous paragraph:

    - "To what extent do you judge national legislation in the areas covered by the Recommendation to conform to the principles that it lays down?

    - To what extent do you judge institutional practices in the areas covered by the Recommendation to conform to the principles it lays down? Indications on the views of national scientific communities in this respect would be particularly welcome.

    - To what extent do you regard the Recommendation as an adequate and currently applicable framework for the science ethics and science policy issues that it is designed to address? On the basis of the answer to this question, you may wish further to indicate whether you believe that the General Conference should in due course determine a timeframe and a procedure for regular future monitoring of the Recommendation. You may also wish to indicate whether you believe that the Recommendation should be updated, revised or otherwise refined, possibly by reference to the 1999 Declaration on Science and the Use of Scientific Knowledge, as suggested by the Executive Board in 175 EX/Decision 13."

30. Subsequently, following initial consideration by the Executive Board at its 189th session, Member States were further invited to state their views on the process that might be adopted in due course to assess the desirability of reviewing and updating of the 1974 Recommendation. In total, 40 Member States made written submissions on the implementation of the 1974 Recommendation. In some cases, national submissions were prepared in consultation with national scientific communities, including national academies of sciences and ministries entrusted with scientific research.

31. In addition, in line with 189 EX/Decision 13 (III), COMEST was invited to provide further input for the consideration of the Executive Board. The Extraordinary Session of COMEST (Paris, France, 2-4 July 2012) considered the issue of ethics of science and the implementation of the 1974

Recommendation and, in conclusion, adopted a “Recommendation on the desirability of reviewing and updating the 1974 Recommendation on the Status of Scientific Researchers”. This statement confirmed the view previously expressed by COMEST that the 1974 Recommendation would be enhanced and made more relevant to contemporary ethical and science policy challenges if it were updated in certain respects, corresponding to major changes in the institutional and social organization of science since 1974.

32. In their submissions, the majority of Member States indicated that their national legislation conforms to the major principles laid down in the 1974 Recommendation, such as non-discrimination, freedom and autonomy of scientific researchers, respect for their human rights and fundamental freedoms. However, several Member States underlined that the status of scientific researches varies greatly in most developing countries due to the different scientific, educational, cultural, economic, social and political context. In some cases, it was suggested that national laws relevant to the 1974 Recommendation tend to concentrate on the promotion of science and technology as a means of attaining economic growth and pay less attention to support for creative scientific research for the enhancement of the cultural and material well-being of citizens or scientific research contributing to the solution of global challenges. In line with the spirit of the 1974 Recommendation, it was suggested in some submissions that the social role of scientific researchers often needs to be better recognized.

33. In so far as the 1974 Recommendation explicitly applies to all scientific researchers, and not only those employed in public institutions, it was important that the monitoring exercise elicit input on institutional practices in relevant areas. The majority of submissions indicated that institutional practices do indeed conform to the principles laid down in the 1974 Recommendation. However several developing countries indicated that their current economic situation may present obstacles to implementation of such principles of the 1974 Recommendation as provision of public funding for scientific research; and promotion of scientific careers, in particular those of young researchers, in State institutions with payment of benefits, provision of appropriate working schedules, education and training opportunities, and incentives to work in the service of their countries, etc. It was specifically suggested that emphasis be placed in implementing the 1974 Recommendation on the requirements and special needs of scientific research and researchers in developing countries in Africa.

34. The majority of submissions expressed the view that the 1974 Recommendation, as a component of an overarching and broad ethical framework to guide scientific activity, is adequate and applicable for the science ethics and science policy issues that it is designed to address. At the same time the majority of submissions judged that the revision of the 1974 Recommendation would be desirable in light of major changes in the institutional and social organization of science, as well as certain defects in its text that assume greater significance with hindsight and with reference to subsequently adopted instruments. Furthermore, certain important issues of contemporary concern were inadequately recognized in 1974, including but

not limited to gender, the role of the private sector and of military research, the globalization of science and technology, the impact of new information technologies, and environmental sustainability.

35. However, while submissions generally judged that revision of the 1974 Recommendation would be desirable, the view was expressed that no steps taken to review or update it, including consultation thereon, should have the effect of qualifying or limiting the validity or applicability of the existing text. On the contrary, consistently with the decision taken by the Executive Board at its 189th session, UNESCO Member States should continue to be urged to give due consideration, in their national science policies, to the general principles propounded in the existing 1974 Recommendation. This approach was explicitly endorsed by the Executive Board (190 EX/Decision 24(IV)), which welcomed "the opinions expressed by Member States that the 1974 Recommendation on the Status of Scientific Researchers represents an important element of an overarching and broad ethical framework to guide scientific activity, and remains adequate and applicable for science ethics and science policy".

36. Member States were also invited to comment on the procedure to be followed to assess the technical and legal aspects of the desirability of revising the 1974 Recommendation. The Ad Hoc Expert Group responsible for the present study has been constituted consistently with the views expressed, as endorsed by the Executive Board in 190 EX/Decision 24(IV). In finalizing the study, submissions suggested, and the Executive Board confirmed, that alongside reference to the 1999 Declaration on Science and the Use of Scientific Knowledge (hereafter referred to as the 1999 Declaration) and to the 2005 Universal Declaration on Bioethics and Human Rights (hereafter referred to as the 2005 Declaration), efforts should be made to build on the statements of ethical principles for science developed by relevant intergovernmental bodies, including at regional level, and by science communities through their academies and professional associations. To this end, the Ad Hoc Expert Group will base revision of the first draft of the present study on broad public consultation.

37. Views expressed by Member States during the monitoring exercise differed as to the scope of possible revision of the 1974 Recommendation. Whereas some submissions favoured revision of specific aspects of the text that might be improved, others emphasized consideration of the general issues to which a currently relevant normative instrument on science ethics and science policy should respond. In particular, some Member States proposed a total revision of the 1974 Recommendation with focus on the social responsibility of scientists and research ethics as the two main issues of greatest concern at the present stage of scientific development. In view of the absence of background consensus on this point, the Ad Hoc Expert Group has given particular attention to the appropriate scope of revision of the 1974 Recommendation.

E. Relevance of the Subject Matter and General Approach of the 1974 Recommendation

38. With respect to the overall scope and purpose of the 1974 Recommendation, the view of the Ad Hoc Expert Group is fully consistent with the earlier submissions made by Member States. The major ethical principles of non-discrimination, integrity, freedom and autonomy of scientific researchers, and respect for their human rights and fundamental freedoms, are both unobjectionable and highly relevant. Today, as in 1974, it is necessary to assert and to take seriously the right, enshrined in article 27(1) of the Universal Declaration of Human Rights, "freely … to share in scientific advancement and its benefits". Furthermore, there remain strong reasons to endorse the rationale of the 1974 Recommendation, which is that the general ethical principles that apply to science need to be embedded in concrete institutional arrangements.

39. To illustrate the current relevance of the 1974 Recommendation in this regard, a more recent statement of the essence of scientific activity may be helpful: "The research process includes the construction of hypotheses; the development of experimental and theoretical paradigms; the collection, analysis, and handling of data; generation of new ideas, findings, and theories through experimentation and analysis; timely communication and publication; refinement of results through replication and extension of the original work; peer review; and the training and supervision of associates and students. The traditions of skepticism, openness, sharing and disclosure that are associated with the research process not only provide a means of identifying theoretical or experimental errors that occur inevitably in science, but also imply an obligation to maintain the integrity of the research process".[2] The core of the scientific research ethos has thus not changed since 1974: it is grounded on such values as integrity, honesty, trust, curiosity, and respect for intellectual achievement,

40. However, whether the details of the institutional template assumed in the 1974 Recommendation remain relevant is open to question. Scientific activity as defined above in terms of its values is challenged by the general social context, especially the globalization of the economy, which relies on market-driven scientific advances that lead to privatization, deregulation, and commercialization of science. Such processes influence science policies and the institutional organization of science and give rise to new ethical issues for scientific researchers. Among these are an undervaluing of basic research; possible subjection of science to non-scientific agendas (which, like economic growth and human welfare, may be unobjectionable in themselves); increased risk of scientific fraud or misconduct; and institutional pressure to convert scientific knowledge into intellectual property. In addition, more generally, ethical issues arise in the relation between science and society, as shown by heated debates on the risks associated with innovative technologies, which are assessed in different and often incompatible ways by competing groups of scientists and laypersons.

[2] *Responsible Science: Ensuring the Integrity of the Research Process*, vol. 1, 1992, National Academy Press, Washington, DC.

41. This situation raises concerns because it puts in light the relative fragility of this complex social activity. It becomes obvious that in current circumstances, science and technology may be promoted mainly as a means of attaining economic growth, to the detriment of scientific research to enhance knowledge and understanding. This implies a different mode of scientific organization, and subjects researchers to different kinds of pressures than were envisaged in 1974. The status of scientific researchers in both developed and, in particular, developing countries requires specific attention in this regard.

42. Despite its enduring value, the 1974 Recommendation suffers in certain important respects not just from out-dated language but also from an excessively narrow framing that excludes or underplays important issues of contemporary concern, including but not limited to gender, limited access to scientific education for people with low income, the role of the private sector and of military research, the globalization of science and technology, new approaches to research such as interdisciplinarity and "big science" based on the organization of research groups into bigger consortia, and the impact of new information technologies. The 1974 Recommendation also predates the notion of sustainability as currently emphasized in international thinking on environmental issues and, while it mentions environmental problems, is not free from anthropocentrism. General principles with respect to many of these issues are available in more recent normative documents, such as the 1999 Declaration and the 2005 Declaration.

43. The scope of the 1974 Recommendation is defined by the notion of a "status" attaching to professional engagement in scientific research. The Ad Hoc Expert Group has taken note of the view, expressed in one submission to the aforementioned monitoring, that this scope is unnecessarily restrictive and that an updated recommendation might deal more explicitly with ethical issues, perhaps under a title such as "Recommendation on the Status and Social Responsibilities of Scientific Researchers". On the other hand, in light of the points made in section H below, it should also be kept in mind that any process implying the elaboration of an entirely new text – whether or not under the guise of "revision" – might be counterproductive with respect to the standing of the currently applicable recommendation. Furthermore, given the existence of other relevant declaratory instruments, as discussed in Section G below, the added value of a recommendation with respect to general principles may be less than with respect to specific institutional arrangements.

F. Significance for the 1974 Recommendation of Major Developments since 1974

44. There have been major developments in science ethics and general ethical frameworks for science policies since 1974, which call both for revision of the preamble of the 1974 Recommendation and for a more comprehensive approach to its specific provisions. Taking account in particular of the 1999 Declaration and of the 2005 Declaration, as well as of instruments in the same area adopted at regional and national level, or by professional associations and research bodies, the responsibilities of scientific researchers for the uses made of their knowledge and towards the environment, as well the

requirements of professional integrity, could be better stated and operationalized. Areas of science that have potential “dual use” – i.e. leading to new technologies or information with potential for both benevolent and malevolent applications – have gained considerably in significance since 1974, raising more intensely the issue of how researchers approach these problems. Furthermore, issues such as gender and social equity in science, public participation, and risk, uncertainty and precaution, are either absent from or inadequately reflected in the 1974 Recommendation.

45. Alongside such developments in ethical reflection on science, technology and innovation, major changes have also occurred in social contexts and institutional settings.

46. A major concern in the 1950s and 60s, was the need to ensure the status of scientific researchers to guarantee their rights and freedoms and to prevent the mobilization of science for purposes incompatible with universal human values and the survival of humankind, as well as to prevent the involuntary side-effects of technology, in particular with regard to its negative impact on the environment. Today, the role of science in human life has grown substantially, and researchers are expected to act, in support of economic development in particular, as much as to understand the world. At the same time, scientific advances sometimes provoke fears and anxiety, in particular with regard to possible negative impacts and consequences of scientific research and technological developments for human beings and society. The emergence of unpredictable and uncertain, but possibly catastrophic, risks has stimulated the development of precautionary approaches that were little recognized in 1974.

47. Research activities have become internationalized and more complex and require greater investments, at the same time as being reshaped in complex ways by digital technologies. Among the current challenges facing scientific communities are new modes of circulation of scientific information, which facilitate new, and in some ways problematic, forms of scientific behaviour, while also changing the conditions of access to scientific information, abolishing certain barriers while creating others. In addition, expansion and globalization have coincided with growing commercial and security pressures on science and scientific researchers, as well as new and sharper forms of competition between institutions. Mechanisms for implementation of ethical principles applied to research conducted in whole or in part within the public sector – which was the implicit frame of reference for the 1974 Recommendation – may need to be re-examined in the context of privately funded and executed research.

48. It is also important that progress in science and technology, including the discovery of “laws of nature” and “basic new knowledge”, which are public goods, as recognized by the Universal Declaration on Bioethics and Human Rights, should belong to humanity as a whole, independently of the source of the funds that supported it. The current trend towards privatization of knowledge, in particular through patenting, may restrict developing countries’ access to scientific and technological advances, thus exacerbating the

scientific and technological divide and increasing global inequities, rather than contributing to the progress of humanity as a whole.

49. It is hard to overestimate the role of science, research and innovation in the progress already achieved in implementing the Millennium Development Goals (MDG), first established in 2000. However much remains to be done to attain the MDGs by 2015 and to ensure sustained progress in reducing poverty and related issues identified by the MDGs beyond 2015. Stronger worldwide capacities in science and technology and comprehensive science, research and development policies (priority setting and programming, funding, higher education, institutional design in research systems, etc.) are necessary to address effectively key social needs and contribute to ameliorating human well-being in all its multiple dimensions. The revision of the 1974 Recommendation would contribute to this aim by providing a framework for strengthened institutions for science, technology and innovation throughout the world, in particular in developing countries.

G. Added Value of the 1974 Recommendation in Light of More Recent Normative Instruments Bearing on the Same Issues

50. It appears therefore that none of the instruments on science ethics and science policies adopted since 1974 renders the 1974 Recommendation redundant or obsolete. Declarations have a different and complementary purpose, and instruments developed at regional or national level, or by professional bodies, differ in scope. A recommendation by the General Conference to all UNESCO member states appears to have enduring value as a universal framework for ethically informed science policies.

51. In addition, recommendations, compared to alternative instruments such as declarations, codes of conduct, binding instruments adopted through national or supranational legislation etc., are well suited, taking into consideration a rapidly changing world and the progress of science and technology, to matching the normative, non-time-bound claim of a standard-setting document promoted within the United Nations institutional framework, with the flexibility which is required looking at the different contexts as well as the pace of scientific development.

52. The Executive Board specifically requested that, when reflecting on possible revision of the 1974 Recommendation, consideration be given to the significance of the 1999 Declaration and of the 2005 Declaration. It may be noted in this regard that that the focus of the 1974 Recommendation is on scientific researchers rather than on the use of scientific knowledge. To this extent, the documents are complementary.

H. Desirability and Feasibility of Revision of the 1974 Recommendation

53. In light of the arguments made in sections E, F and G above, it appears that revision of the 1974 Recommendation would be desirable. If successfully

completed, a revised Recommendation would provide a powerful and relevant statement of science ethics as the basis for science policies that would favour the creation of an institutional order conducive to the realization of article 27(1) of the Universal Declaration of Human Rights.

54. While the development since 1974 of science and technology and their related institutions and practices, including those shaped by contemporary patterns of globalization, gives rise to specific challenges in building consensus around specific institutional recommendations, it also establishes a clear shared interest in developing a common vision for the governance of science to contribute to the benefit of humankind as a whole. There is therefore no *prima facie* reason to consider that revision of the 1974 Recommendation would encounter insuperable practical obstacles.

55. While the elaboration of an entirely new recommendation covering the subject matter of the 1974 Recommendation, on some variation on it, taking account of the full range of contemporary concerns, could be envisaged, such a process would have significant drawbacks. In light of the decision taken by the Executive Board, at its 189th session, that UNESCO Member States should be urged to give due consideration, in their national science policies, to the general principles propounded in the existing 1974 Recommendation (189 EX/Decision 13, Part III), it would appear undesirable that any steps taken to review or update the 1974 Recommendation should have the effect of qualifying or limiting the validity or applicability of the existing text. While revision of the 1974 Recommendation would necessarily remain within its general orientation and structure, and might therefore not necessarily update the text in all the respects that might otherwise be desirable, it would nonetheless be valuable in updating its language, including making it more gender-neutral, and sharpening its focus on major issues of contemporary concern such as the social responsibilities of scientists and research ethics.

56. It is the understanding of the Ad Hoc Expert Group, based on the information provided by the UNESCO Secretariat, that no obstacle of a procedural nature impedes revision of the 1974 Recommendation on the basis of the existing Rules of Procedure of the General Conference. No other legal issue has hitherto been identified in the course of this preliminary study that might bear on the technical feasibility of revision of the 1974 Recommendation.

I. Possible Scope of Revision of the 1974 Recommendation

57. The Preamble of the 1974 Recommendation could be revised to give a more up-to-date overview of the challenges with which the development of science and society is confronted at the present stage of their development, given the changes since 1974 as summarized in Section F above.

58. While the Preamble refers to the human right freely to enjoy the benefits of scientific progress and its application, it does not reference Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights (ICESCR), which gives enhanced legal force to the same principle.

59. Taking into consideration the request by the Executive Board that the Director-General consider the possibility of revising the 1974 Recommendation in light of the outcomes of the 2006 consultations on the desirability of elaborating a universal code of conduct for scientists (document 175 EX/14) and of the 2009 recommendations of COMEST, while also referring to the principles enshrined in the 1999 Declaration and in the 2005 Declaration, a series of additional elements could also be considered for insertion in revisions to the 1974 Recommendation.

60. The challenge of ecological degradation, including but not limited to the negative effects of anthropogenic climate change, could be spelled out in the Preamble of the Recommendation, as in the 1999 Declaration, which states in its article 27 the need for "a new relationship between science and society" to cope with "such pressing global problems as poverty, environmental degradation, inadequate public health, and food, water and energy security, in particular those associated with population growth".

61. Furthermore, the Preamble of the Recommendation could also reflect the need, expressed in Paragraphs 4, 20 and 22 of the 1999 Declaration, for "a vigorous and informed democratic debate on the production and use of scientific knowledge" to avoid situations when "some applications of science can be detrimental to individuals and society, the environment and human health, possibly even threatening the continuing existence of the human species". Consistently with the 1974 Recommendation, but without explicit reference to it, the 1999 Declaration states that "the contribution of science is indispensable to the cause of peace and development, and to global safety and security" and that scientific research should be carried out consistently with the precautionary principle according to which, in the absence of scientific consensus, caution is required with respect to actions or policies that might cause severe or irreversible harm to the public or the environment. Noting the increased problem of the potential dual use of applications of scientific research resulting from scientific advances in recent years, specific responsibilities corresponding to these concerns could also be included in the body of the 1974 Recommendation, as well as rights, such as those relating to protection of whistleblowers, reflecting the desirable orientation of science towards the well-being of humankind as a whole.

62. Consistently with the thrust of article 27 of the Universal Declaration of Human Rights, explicit reference could be made to the principle of non-discrimination, with regard to the historical imbalance in the participation of men and women in science-related activities, as well as to the barriers that have precluded the full participation of other disadvantaged groups, of both sexes, including disabled people, indigenous peoples, ethnic minorities and low-income or marginalised groups. These issues are addressed in articles 24 and 25 of the 1999 Declaration.

63. The 1974 Recommendation could better reflect the need to strengthen scientific co-operation given uneven distribution of the benefits of science, including technology transfer and capacity-building, as per Paragraphs 5, 11 and 14 of the 1999 Declaration. In addition to general preambular statements,

consideration could also be given to specific institutional responsibilities corresponding to them.

64. Certain ethical principles implicit or explicit in the 1974 Recommendation have been given a more precise and more up-to-date formulation in the 1999 Declaration and the 2005 Declaration, as well as in instruments such as the Universal Declaration on the Human Genome and Human Rights (1997) and the International Declaration on Human Genetic Data (2003), adopted by UNESCO in response to the challenges to the right to enjoy the benefits of scientific progress and its applications posed by bioethics and biotechnology. Among the ethical principles enshrined in the 1999 Declaration that could be better stated in a revised 1974 Recommendation are the special responsibility to seek to avert applications of science which are ethically wrong or have an adverse impact or dual-use potential (article 21); the need to practise and apply the sciences in line with appropriate ethical requirements developed on the basis of an enhanced public debate (article 22); respect for and maintenance of life in all its diversity, as well as the life-support systems of our planet (article 23); and the need to preserve, protect, research and promote traditional and local knowledge systems, as dynamic expressions of perceiving and understanding the world, which can make, and historically have made, a valuable contribution to science and technology, and empirical knowledge (article 26). The Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications, adopted by a joint UNESCO/EIUC expert meeting held in Venice, Italy, in 2009, may also be referred to as a persuasive source of statements in the same spirit.

65. The role of the private sector in scientific research needs to be better reflected throughout the text of the 1974 Recommendation. The ultimate goal of scientific progress cannot be profit alone. Vulnerability as a human condition calls on each of us, especially those who have the responsibility to advance knowledge and to decide how to use it, to fulfil the fundamental obligations we have one to another and to ensure respect for human rights for all.

66. The establishment of a specific monitoring mechanism will be a requirement of any revision of the 1974 Recommendation. With this in mind, and in line with the recommendations of COMEST as quoted above (see paragraph 28 above), consideration could be given to an explicit linkage between monitoring of the implementation of the 1974 Recommendation and UNESCO's inputs to the Universal Periodic Review, under the aegis of the Human Rights Council, as well as cooperation with the Committee on Economic, Social and Cultural Rights, which monitors implementation of the ICESCR and its Article 15(1)(b) on the right to benefit from scientific progress and its applications.

67. It is also necessary to revise and update the Annex of the Recommendation to include major instruments adopted since 1974.

68. The discrepancies that have emerged over time between the text of the 1974 Recommendation and the context of its implementation serve as a reminder of the inherently time-bound nature of specific institutional recommendations, as distinct from general statements of principles. Consideration might be given to the modalities by which an appropriate monitoring mechanism could serve as

a tool to overcome the alternative between a list of general principles and a list of time-bound recommendations destined to become rapidly otiose. In this regard, the recommendations formulated by COMEST in 2009, quoted in paragraph 28 above, should guide reflection about the monitoring mechanism appropriate for the revised 1974 Recommendation.

Appendix 1

Composition of the Ad Hoc Expert Group

Mr Khalid Abdullah al-Ali (Qatar), Associate Professor of Human Genetics in the Department of Biological Science and Director of the Foundation Programme of Qatar University; member of the Arab Ethics Committee for Science and Technology; President of COMEST.

Ms Ashima Anand (India), researcher at the V. P. Chest Institute, Delhi University; member of the ICSU Committee on Freedom & Responsibility.

Mr Jean Audouze (France), Directeur de recherche au CNRS, Institut d'Astrophysique de Paris; President, French National Commission for UNESCO.

Mr Philippe Busquin (Belgium), President, Belgian Francophone and Germanophone Commission for UNESCO; member of COMEST.

Mr Nigel Cameron (United States of America), President and CEO, Center for Policy on Emerging Technologies (C-PET); member of the US National Commission for UNESCO**.**

Mr John Finney (United Kingdom), Emeritus Professor of Physics, at University College London and the London Centre for Nanotechnology; representative on COMEST of the Pugwash Conferences on Science and World Affairs.

Ms Karen Hallberg (Argentina), Professor of Physics, Instituto Balseiro; member of the Argentine National Committee for Ethics in Science and Technology (CECTE).

Ms Tafeeda Jarbawi (Palestine), Dean of the Women's Community College and Director of Ramallah Women's College; member of COMEST.

Mr Isidoros Karatzas (Greece), Head of Ethics Review Sector, European Commission.

Ms Linda Nielsen (Denmark), Professor of Law, University of Copenhagen; Vice-President, European Group on Ethics in Science and New Technology; President, Danish National Commission for UNESCO.

Ms Marie-Hélène Parizeau (Canada), Professeur titulaire, Faculté de philosophie, Université Laval; member of COMEST.

Mr Stefano Semplici (Italy), Professor of Social Ethics, Tor Vergata University (Rome); President, International Bioethics Committee.

Mr Abdoulaye Sène (Senegal), Director, Environmental Sciences Institute, Cheikh Antar Diop University; member of COMEST.

Ms Hebe Vessuri (Venezuela), emeritus researcher at the Center for Science Studies, Venezuelan Institute of Scientific Research; Vice-President of COMEST.

Ms Irene Villaseñor (Philippines), Professor of the Institute of Chemistry, University of the Philippines (UP) Diliman; member of the ICSU Committee on Freedom & Responsibility.