

SOURCES AND EFFECTS OF IONIZING RADIATION

United Nations Scientific Committee on the Effects
of Atomic Radiation

UNSCEAR 1996 Report to the General Assembly,
with Scientific Annex



UNITED NATIONS
New York, 1996

NOTE

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Report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly

1. During the last few years the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)¹ has undertaken a broad review of the sources and effects of ionizing radiation. The results of this work have been issued in a series of publications: the UNSCEAR 1993 Report with nine scientific annexes, the UNSCEAR 1994 Report with two scientific annexes and the present UNSCEAR 1996 Report with one scientific annex, "Effects of radiation on the environment". These three publications form a series of reports entitled *Sources and Effects of Ionizing Radiation*, which together inform the General Assembly and the scientific and world community of the Committee's latest findings and evaluations.

2. The scientific annex of this report was developed over several annual sessions and completed at the forty-fifth session of the Committee, at which L. Pinillos Ashton (Peru), A. Kaul (Germany) and L.-E. Holm (Sweden) served as Chairman, Vice-Chairman and Rapporteur, respectively. The names of members of delegations who attended the sessions during which this report was considered are listed in the Appendix. The Committee wishes to acknowledge the assistance of a small group of scientists in the preparation of the scientific annex: D. Woodhead, (principal consultant) R.M. Alexakhin, B.G. Bennett and A. Bouville, who conducted the reviews of the scientific literature and who made the preliminary evaluations on which the final assessment of the Committee is based.

3. The Committee considers in this report the effects of ionizing radiation on plants and animals in the environment. These effects have not previously been addressed directly by the Committee. The emphasis of past assessments has been on determining the effects of radiation on human health. With the increasing interest around the world in nurturing the environment and concerns about possible detrimental effects of radiation, the time is appropriate for the Committee to provide a summary of the effects of radiation on the environment. The information for this summary has been drawn from reported observations in natural and contaminated environments, from experimental studies and from the Committee's own assessments of radiobiological effects. The intention is to provide countries, national and international organizations and the scientific community

^{1/} The United Nations Scientific Committee on the Effects of Atomic Radiation was established by the General Assembly at its tenth session, in 1955. Its terms of reference are set out in resolution 913 (X) of 3 December 1955. The Committee was originally composed of the following Member States: Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, Egypt, France, India, Japan, Mexico, Sweden, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America. The membership was subsequently enlarged by the General Assembly in its resolution 3154 C (XXVIII) of 14 December 1973 to include the Federal Republic of Germany, Indonesia, Peru, Poland and the Sudan. By resolution 41/62 B of 3 December 1986, the General Assembly increased the membership of the Committee to a maximum of 21 members and invited China to become a member.

with a reference text on the effects of radiation on plants and animals in all sectors of the environment.

4. All living organisms have developed and survive in environments subject to a natural radiation background. Global fallout from nuclear weapons tests in the second half of this century has made minor additions to this background. Also, increments in radiation exposures of a more local or regional nature have arisen because of emissions to the atmosphere, water bodies and the ground from the operation of nuclear power facilities, from industrial, medical and defence-related operations and from some accidents. Generally, there have been no apparent effects in plants and animals from these radiation exposures. Following severe accidents, however, damage has been observed in individual organisms and populations.

5. There is a wide range of sensitivities of plants and animals to ionizing radiation. In general, mammals are the most sensitive of the animal species, followed by birds, fish, reptiles and insects. The range of sensitivities of plants overlaps that of animals. Reproductive capacity, which is particularly important for the maintenance of the population, appears to be the most radiosensitive population attribute. For natural plant and animal communities, there is little evidence that dose rates of 0.1 milligray per hour (i.e. about 1,000 times greater than the natural background) to a small proportion of the individuals (and therefore, lower

average dose rate to the remaining organisms) would have any detrimental effects at the population level.

6. The Committee is proceeding with a new programme of work to evaluate further the sources and effects of ionizing radiation. Recent data on radiation exposures in countries worldwide are being collected in order to determine representative values and ranges of such exposures in human population groups. New information from radiobiological and epidemiological studies is being reviewed, which should improve understanding of the effects of radiation and the underlying risks. During the 41 years of work of the Committee, considerable knowledge has been acquired of radiation sources and of the inevitable and circumstantial exposures that are a part of human life. An understanding of the underlying mechanisms of radiation interactions will improve the assessments of radiation risks. The Committee will continue to direct its efforts towards a broader understanding of ionizing radiation sources and effects.

7. Following established practice, the Report to the General Assembly does not include the scientific annex. The UNSCEAR 1996 Report, *Sources and Effects of Ionizing Radiation*, with the scientific annex "Effects of radiation on the environment", will be issued as a United Nations sales publication in order to achieve wide distribution of the findings for the benefit of the international scientific community.

Appendix

MEMBERS OF NATIONAL DELEGATIONS ATTENDING THE THIRTY-EIGHTH TO FORTY-FIFTH SESSIONS

ARGENTINA	D. Beninson (Representative), E. d'Amato, C. Arias, D. Cancio, A. Curti, E. Palacios
AUSTRALIA	K.H. Lokan (Representative), Dr. J. Bonnyman
BELGIUM	J. Maisin (Representative), P. Govaerts, R. Kirchmann, H.P. Leenhouts, P.H.M. Lohman, K. Sankaranarayanan, D. Smeesters, H. Vanmarke, A. Wambersie
BRAZIL	J. Lipsztein (Representative), E. Penna Franca (Representative), A.R. Oliveira, A. Ramalho
CANADA	R.V. Osborne (Representative), R.M. Chatterjee (Representative), E.G. Létourneau (Representative), A. Arsenault, D.R. Champ, P.J. Duport, V. Elaguppilai, N.E. Gentner, K.L. Gordon, B.C. Lentle, D.K. Myers, S. Vlahovich

CHINA	Pan Ziqiang (Representative), Wei Kedao (Representative), Li Deping (Representative), Liu Hongxiang (Representative), Wei Lüxin (Representative), Guo Jidong, Leng Ruiping, Tao Zufan, Wu Dechang, Wei Kang
EGYPT	F.H. Hammad (Representative), M.F. Ahmed (Representative), F. Mohamed (Representative), H.M. Roushdy (Representative), S.E. Hashish
FRANCE	R.Masse (Representative), P.Pellerin (Representative), N. Arannou, S. Boiteux, E.Cardis, R.Coulon, H.Dutrillaux, A.Flury-Hérard, H.Jammet†, J.Lafuma, J. Lallemand, G. Lemaire, C. Luccioni, J. Piéchowski, A. Rannou
GERMANY ^a	A.Kaul (Representative), W. Burkart, U.H. Ehling, W. Jacobi, A.M.Kellerer, F.E.Stieve, C.Streffler
INDIA	P.C. Kesavan (Representative), D.V. Gopinath (Representative), U. Madhvanath (Representative), N.K.Notani (Representative)
INDONESIA	A. Razak (Representative), S.Soekarno (Representative), S.Wiryosimin (Representative), S. Zahir (Representative), T. Suprihadi, K.Wiharto
JAPAN	Y. Hirao (Representative), H.Matsudaira (Representative), T. Asano, Y. Hosoda, T. Iwasaki, A. Kasai, S. Kumazawa, K. Mabuchi, T. Matsuzaki, K. Morita, K. Nishizawa, H. Noguchi, K. Sato, K. Shinohara, N. Shiomitsu, K. Tatsumi, S. Yano
MEXICO	E. AraicoSalazar (Representative), S. Ajuria
PERU	L.V. Pinillos Ashton (Representative)
POLAND	Z. Jaworowski (Representative), H. Dzikiewicz-Sapiecha, J. Jankowski, J. Liniecki, M. Waligórski, O. Rosiek, S. Sterlinski, I. Szumiel
RUSSIAN FEDERATION ^b	L.A. Ilyin (Representative), R. Alexakhin, A. Bakunijev, R.M. Barhoudarov, Y. Buldakov, V. Bebeshko, N.A. Dolgova, K.I. Gordeev, A. Guskowa, D.F. Khokhlova, Y. Kholina, E. Komarov, I.S. Koshkin, O. Pavlovski, V.V. Redkin, G.N. Romanov, M. Savkin
SLOVAKIA ^c	M. Klímek (Representative), D. Viktorý (Representative), I. Bučina
SUDAN	O.I.Elamin (Representative), A. Hidayatalla (Representative)
SWEDEN	L.E. Holm (Representative), G. Bengtsson (Representative), J.O. Snihs, L. Sjöberg, J. Valentin
UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND	R.H. Clarke (Representative), J. Dunster (Representative), J. Denekamp, Sir Richard Doll, J.W. Stather
UNITED STATES OF AMERICA	F.A. Mettler (Representative), L.R. Anspaugh, J.D. Boice, C.W. Edington, J.H.Harley†, N.H. Harley, C. Meinhold, P.B. Selby, W.K. Sinclair, E.W. Webster, H.O. Wyckoff

^a At the thirty-eighth and thirty-ninth sessions: Federal Republic of Germany.

^b At the thirty-eighth, thirty-ninth and fortieth sessions: Union of Soviet Socialist Republics.

^c At the thirty-eighth, thirty-ninth, fortieth and forty-first sessions: Czechoslovakia.