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## Conseil des droits de l'homme

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**Promotion et protection de tous les droits de l'homme,  
civils, politiques, économiques, sociaux et culturels,  
y compris le droit au développement**

## **Rapport du Rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible, M. Anand Grover**

### Additif

### **Mission au Japon (15-26 novembre 2012)\*, \*\***

#### *Résumé*

Le Rapporteur spécial sur le droit qu'a toute personne de jouir du meilleur état de santé physique et mentale possible s'est rendu au Japon du 15 au 26 novembre 2012. Lors de sa mission, qu'il a menée dans un esprit de dialogue et de coopération, il a constaté les efforts faits par le pays pour mettre en œuvre le droit à la santé et a examiné en particulier les questions relatives à la réalisation du droit à la santé au lendemain de l'accident de la centrale nucléaire de Fukushima Dai-ichi, survenu le 11 mars 2011, les événements qui ont précédé l'accident et les mesures d'urgence, de relèvement et d'atténuation qui ont été prises.

Dans le présent rapport, le Rapporteur spécial félicite le Japon pour les mesures qu'il a prises pour surveiller l'état de santé des populations touchées, définir les zones d'évacuation, contrôler les niveaux de radioactivité et décontaminer les zones polluées, ainsi que pour son attachement à la mise en œuvre du droit à la santé physique et mentale. Afin de favoriser la pleine réalisation de ce droit, le Rapporteur spécial encourage le Gouvernement à régler plusieurs problèmes importants et à étudier les améliorations à apporter en ce qui concerne le dispositif d'intervention d'urgence dans le domaine nucléaire, la portée et l'étendue des enquêtes générales ou détaillées sur l'état de santé de la population, les doses limites de radiations, l'accès à des informations exactes sur

\* Le résumé du présent rapport est distribué dans toutes les langues officielles. Le rapport proprement dit, qui est joint en annexe au résumé, n'est distribué que dans la langue originale.

\*\* Soumission tardive.

les radiations et leurs effets sur la santé, la transparence et la responsabilité de l'industrie nucléaire et de l'autorité de réglementation, et la participation des communautés touchées à la prise de décisions. Pour faciliter cette démarche, le Rapporteur spécial formule plusieurs recommandations à l'intention du Gouvernement japonais.

## Annexe

[Anglais seulement]

### **Report of the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health on his mission to Japan (15 – 26 November 2012)**

## Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction.....	1-3	4
II. Legal framework.....	4-5	4
III. The Fukushima Dai-ichi nuclear power plant accident.....	6-10	4
IV. The right to health and nuclear disaster management.....	11-75	7
A. Nuclear emergency response .....	14-21	7
B. Monitoring the health effects of the nuclear accident.....	22-44	10
C. Policy decisions and information on dose limits .....	45-51	16
D. Decontamination.....	52-58	18
E. Transparency and accountability .....	59-63	19
F. Compensation and relief measures .....	64-69	20
G. Participation of vulnerable groups and affected communities.....	70-75	21
V. Recommendations.....	76-82	22

## **I. Introduction**

1. The Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health undertook a visit to Japan, at the invitation of the Government, from 15 to 26 November 2012. The purpose of the mission was to ascertain, in a spirit of dialogue and cooperation, the measures taken by the Government of Japan for the successful realization of the right to health.

2. During his mission, the Special Rapporteur considered issues relating to the realization of the right to health in the wake of the nuclear accident at the Fukushima Dai-ichi nuclear power plant on 11 March 2011, the events leading up to it and emergency response, recovery and mitigation. The Special Rapporteur visited Tokyo and Sendai, as well as numerous communities and cities in Fukushima prefecture.

3. The Special Rapporteur held meetings with senior government officials from the Ministry of Foreign Affairs, the Ministry of Health, the Ministry of Labour and Welfare, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of the Environment, as well as with senior officials from the Reconstruction Agency and Nuclear Regulatory Authority. He met with the representatives of United Nations agencies, health professionals, academics, representatives of civil society organizations and community members. He also met with senior Government officials in Fukushima and Miyagi Prefectures. The Special Rapporteur is grateful to the Government of Japan for its invitation and full cooperation during his visit. He also thanks all those who met with him, gave their time and extended cooperation to him during the mission.

## **II. Legal framework**

4. Japan has ratified a number of international human rights treaties recognizing the right to health, including the International Covenant on Economic, Social and Cultural Rights, the International Convention on the Elimination of All Forms of Racial Discrimination, the Convention on the Elimination of All Forms of Discrimination against Women, the Convention on the Rights of the Child and the first two Optional Protocols thereto, and the International Convention for the Protection of All Persons from Enforced Disappearance. Japan signed but has not yet ratified the Convention on the Rights of Persons with Disabilities. Even though the Constitution of Japan of 1946 does not explicitly guarantee the right to health, article 25 thereto requires the State to promote public health.

5. The Act on Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors, the Act on Basic Act on Disaster Control Measures and the Act on Special Measures concerning Nuclear Emergency Preparedness provide the basic legal framework for nuclear disaster countermeasures and the emergency response of Japan after the nuclear accident.

## **III. The Fukushima Dai-ichi nuclear power plant accident**

6. The nuclear accident occurred soon after the earthquake and tsunami hit Japan on 11 March 2011. The earthquake, with a magnitude of 9.0, occurred off the east coast of Japan in the Pacific Ocean. It gave rise to a tsunami with waves of up to 40 metres high. The

earthquake and tsunami resulted in 15,879 deaths and 6,126 injured people.<sup>1</sup> Nuclear power reactors at Tokai Daini, Higashi-Dori, Onagawa and the Fukushima Daiichi plant were also affected, although no major damage was caused to any of them.<sup>2</sup>

7. At the time of the earthquake, the operation of reactors 4, 5 and 6 six of the Fukushima Dai-ichi nuclear power plant, owned by the Tokyo Electric Power Company (TEPCO), had been suspended for a routine inspection. Though units 1, 2 and 3 went into automatic shut-down mode as soon as the earthquake struck, the electricity supply to the power plant was lost. Tsunami waves as high as 14 metres hit the plant approximately 50 minutes after the earthquake, overwhelming its walls. Designed to withstand waves of a maximum height of 5.7 metres, the walls failed to contain the impact of the tsunami, causing a complete power blackout in units 1 to 5. Communication systems within and outside the plant site were also compromised.<sup>3</sup> Owing to complete power outage, units 1 to 3 at the Dai-ichi plant lost the ability to maintain proper reactor cooling and suffered a meltdown; consequently, the fuel contained in the reactors was exposed and damaged, and a series of explosions occurred. Unit 4 suffered a hydrogen explosion on 15 March 2011.<sup>4</sup> Since the nuclear accident, reactors 1 to 4 have been decommissioned.<sup>5</sup>

8. The amount of radioactive caesium ( $^{137}\text{C}$ ) released by the accident at the Dai-ichi Plant is estimated to be 168 times higher than that released by the atomic bomb in Hiroshima.<sup>6</sup> According to TEPCO, the accident released 900 petabecquerels of radioactive iodine and caesium (iodine conversion).<sup>7</sup> Other radioactive materials released in the wake of the accident included radioactive Tellurium ( $^{129\text{m}}\text{Te}$ ,  $^{129}\text{Te}$ ), Silver ( $^{110\text{m}}\text{Ag}$ ), Lanthanum ( $^{140}\text{La}$ ) and Barium ( $^{140}\text{Ba}$ ).<sup>8</sup>

9. Owing to the similarities between the accidents in Chernobyl, Three Mile Island and Fukushima,<sup>9</sup> it is understandable that lessons from the first two were drawn when

<sup>1</sup> National Police Agency of Japan, Emergency Disaster Countermeasures Headquarters, *Damage Situation and Police Countermeasures associated with 2011 Tohoku District – off the Pacific Ocean Earthquake* (10 April 2013). Available from [www.npa.go.jp/archive/keibi/biki/higaijokyo\\_e.pdf](http://www.npa.go.jp/archive/keibi/biki/higaijokyo_e.pdf).

<sup>2</sup> International Atomic Energy Agency (IAEA), *The Great East Japan Earthquake Expert Mission: International Fact Finding Expert Mission on the Fukushima Dai-ichi NPP Accident Following the Great East Japan Earthquake and Tsunami* (16 June 2011) (available from [www-pub.iaea.org/mtcd/meetings/pdfplus/2011/cn200/documentation/cn200\\_final-fukushima-mission\\_report.pdf](http://www-pub.iaea.org/mtcd/meetings/pdfplus/2011/cn200/documentation/cn200_final-fukushima-mission_report.pdf)), p. 11.

<sup>3</sup> *Ibid.*, p. 12.

<sup>4</sup> National Diet of Japan, Official Report of the Fukushima Nuclear Accident Independent Investigation Commission, 2012 (available from [www.nirs.org/fukushima/naiic\\_report.pdf](http://www.nirs.org/fukushima/naiic_report.pdf)), p. 13.

<sup>5</sup> Mid-and-long-Term Roadmap towards the Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1-4, TEPCO, 21 December 2011, available from [www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/111221\\_02.pdf](http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/111221_02.pdf).

<sup>6</sup> “Fukushima caesium leaks ‘equal 168 Hiroshimas’”, *Telegraph*, 25 August 2011. Available from <http://www.telegraph.co.uk/news/worldnews/asia/japan/8722400/Fukushima-caesium-leaks-equal-168-Hiroshimas.html>.

<sup>7</sup> TEPCO, Estimation of the released amount of radioactive materials into the atmosphere as a result of the accident in the Fukushima Daiichi Nuclear Power Station, 24 May 2012. Available from [www.tepco.co.jp/en/press/corp-com/release/betu12\\_e/images/120524e0201.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120524e0201.pdf).

<sup>8</sup> See P. D. McLaughlin et al., “An update on radioactive release and exposures after the Fukushima Dai-ichi nuclear disaster”, *The British Journal of Radiology*, vol. 85, No. 1017 (September 2012), pp.1222–1225. TEPCO also detected Strontium ( $^{90}\text{Sr}$ ) in the soil; see Fukushima Daiichi Nuclear Power Station: Strontium analysis result in the soil, available from [www.tepco.co.jp/en/press/corp-com/release/betu11\\_e/images/110508e7.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110508e7.pdf).

<sup>9</sup> The nuclear accidents in Chernobyl and Fukushima are the only two accidents to have been designated a rating of level 7 (major accident) on the International Nuclear and Radiological Event Scale. The Three Mile Island incident was designated level 5 (accident with wider consequences) on the scale.

devising strategies for Fukushima. The Special Rapporteur draws attention to the fact, however, that crucial and complete information regarding the Chernobyl accident was not made public until 1990;<sup>10</sup> studies on Chernobyl may therefore not take fully into account the effects of contamination and radiation exposure.<sup>11</sup> In that context, it is of concern that only the increased prevalence of thyroid cancer following the Chernobyl accident is acknowledged and applied to the accident in Fukushima. Reports on the impact on health of radiation exposure after the Chernobyl accident have characterized evidence of other health anomalies as “inconclusive”.<sup>12</sup> This regrettably neglects other effects on health of radiation exposure, such as chromosomal aberrations,<sup>13</sup> increased childhood and adult morbidity, impairment<sup>14</sup> and leukaemia,<sup>15</sup> which may require monitoring.<sup>16</sup>

10. The Government has relied on recommendations from the International Commission on Radiological Protection, which provide a reference level for radiation dose of 1 mSv/year to 20 mSv/year for resettling people in contaminated areas.<sup>17</sup> Life span epidemiological studies of survivors of the bombing of Hiroshima and of Nagasaki point, however, to causal links between long-term exposure to low doses of radiation and the increased incidence of cancer.<sup>18</sup> The Special Rapporteur considers that disregarding these findings will diminish the understanding of and increase vulnerability to the health effects of long-term exposure to low-dose ionizing radiation.

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- <sup>10</sup> International Physicians for the Prevention of Nuclear War, *Health effects of Chernobyl: 25 years after the reactor catastrophe* (Berlin, April 2011) (available from [www.ratical.org/radiation/Chernobyl/HEofC25yrsAC.html](http://www.ratical.org/radiation/Chernobyl/HEofC25yrsAC.html)), p. 13. See also A/45/342 – E/1990/102.
- <sup>11</sup> Alexey V. Yablokov et al, *Chernobyl: Consequences of the Catastrophe for People and the Environment*, *Annals of the New York Academy of Sciences*, vol. 1181, Boston, 2009. Available from [www.strahlentelex.de/Yablokov%20Chernobyl%20book.pdf](http://www.strahlentelex.de/Yablokov%20Chernobyl%20book.pdf).
- <sup>12</sup> United Nations Scientific Committee on the Effects of Atomic Radiation, *Sources and Effects of Ionizing Radiation*, vol. II, annex D (United Nations publication, Sales No. E.11.IX.3), para.110; UNDP, WHO, “The Human Consequences of the Chernobyl Nuclear Accident: A Strategy for Recovery”, 2002 (available from [www.who.int/ionizing\\_radiation/chernobyl/UN%20Report%20Strategy%20for%20Recovery%20Jan%202002.pdf](http://www.who.int/ionizing_radiation/chernobyl/UN%20Report%20Strategy%20for%20Recovery%20Jan%202002.pdf)), p. 7.
- <sup>13</sup> Rudi H. Nussbaum and Wolfgang Kohnlein, “Inconsistencies and open questions regarding low-dose health effects of ionizing radiation”, *Environmental Health Perspectives*, vol. 102, No. 8 (August 1994), pp.656–667.
- <sup>14</sup> Yablokov et al, *Chernobyl : Consequences of the Catastrophe* (see footnote 11),pp. 42-54.
- <sup>15</sup> Steven Wing et al, “A reevaluation of cancer incidence near the Three Mile Island nuclear plant: the collision of evidence and assumptions”, *Environmental Health Perspectives*, vol.105, No. 1 (January 1997), pp. 52-57.
- <sup>16</sup> Elisabeth Cardis and Maureen Hatch, “The Chernobyl accident – an epidemiological perspective”, *Clinical Oncology*, vol. 23, No. 4 (May 2011), pp. 251–260.
- <sup>17</sup> See International Commission on Radiological Protection, *Fukushima Nuclear Power Plant Accident*, 21 March 2011 (available from [www.icrp.org/docs/fukushima%20nuclear%20power%20plant%20accident.pdf](http://www.icrp.org/docs/fukushima%20nuclear%20power%20plant%20accident.pdf)).
- <sup>18</sup> National Research Council, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (Washington, D.C., The National Academies Press, 2006), p. 30; Kotaro Ozasa et al, “Studies of the mortality of atomic bomb survivors, Report 14, 1950-2003: An Overview of Cancer and Non-cancer Diseases”, *Radiation Research*, vol. 177, No. 3 (March 2012), pp. 229-243; David J. Brenner et al, “Cancer risks attributable to low doses of ionizing radiation: assessing what we really know”, *PNAS*, vol. 100, No.24 (November 2003), pp.13761-13766; Donald A. Pierce and Dale L. Preston, “Radiation-related cancer risks at low doses among atomic bomb survivors”, *Radiation Research*, vol. 154 (2000), pp.178-186.

## IV. The right to health and nuclear disaster management

11. The nuclear accident in Japan has affected the right to health of evacuees and residents alike, and has had an impact on physical and mental health, particularly of pregnant women, older persons and children. The precise health implications of radiation exposure are still not clear, given that the long-term health effects of low-dose ionizing radiation are still being studied. The evacuation has caused the breakdown of families and communities, giving rise to mental health concerns, especially among first responders, older persons, mothers and children.

12. The enjoyment of the right to health is dependent on underlying determinants, such as safe and nutritious food, and access to safe and potable water, a healthy environment and housing.<sup>19</sup> The accident caused widespread contamination of soil, water, food and the environment. Authorities in Tokyo, Fukushima, Ibaraki, Chiba and Tochigi therefore imposed restrictions on the consumption of tap water when radioactive iodine and caesium higher than the permissible limit were detected in it.<sup>20</sup>

13. The right to health requires the State to ensure availability and accessibility of quality health facilities, goods and services.<sup>21</sup> This includes information that allows individuals to make informed decisions regarding their health. Furthermore, monitoring the health of people for adverse effects of radiation and providing timely health care are an important aspect of the fulfilment of the right to health. The State is also required to have in place evidence-based policies for the decontamination of affected areas to restore the life and health of people as soon as possible. Lastly, transparency and accountability in governance,<sup>22</sup> access to remedies<sup>23</sup> and participation of the affected population<sup>24</sup> in decision-making processes are necessary to the enjoyment of the right to health.

### A. Nuclear emergency response

14. Soon after the earthquake and the tsunami hit the Dai-ichi plant, the Government of Japan announced a “nuclear emergency situation” pursuant to article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.<sup>25</sup> This was the first step in initiating the emergency response system<sup>26</sup> aimed at containing the accident and protecting

<sup>19</sup> E/C.12/2000/4, para. 11.

<sup>20</sup> See press release of the Ministry of Health, Labour and Welfare on the detection of radioactive materials in tap water, 23 March 2011 (available from [www.mhlw.go.jp/english/topics/2011eq/dl/march\\_23\\_02.pdf](http://www.mhlw.go.jp/english/topics/2011eq/dl/march_23_02.pdf)); and Health Services Council, The Survey Results of Radioactive Materials in Tap Water, 19 April 2011 (available from [www.mhlw.go.jp/english/topics/2011eq/dl/Document2.pdf](http://www.mhlw.go.jp/english/topics/2011eq/dl/Document2.pdf)).

<sup>21</sup> E/C.12/2000/4, para.12.

<sup>22</sup> Ibid., para. 55.

<sup>23</sup> Ibid., para. 59.

<sup>24</sup> Ibid., para. 11.

<sup>25</sup> Tessa Morris-Suzuki et al, *Lessons from Fukushima* (Greenpeace International, February 2012) (available from [www.greenpeace.org/international/Global/international/publications/nuclear/2012/Fukushima/Lessons-from-Fukushima.pdf](http://www.greenpeace.org/international/Global/international/publications/nuclear/2012/Fukushima/Lessons-from-Fukushima.pdf)), p. 16.

<sup>26</sup> IAEA, *Preparedness and Response for a Nuclear or Radiological Emergency: Safety Requirements*, IAEA Safety Standards Series GS-R-2 (Vienna, 2002), p. 14.

individuals from adverse health effects arising from radiological and non-radiological causes.<sup>27</sup>

## 1. Information on the nuclear accident and evacuation

15. Access to information is an essential component of the right to health, as it allows individuals to make informed decisions about their health. Information about the nuclear accident, including on contaminated and potentially contaminated areas, should be made public immediately and in a coordinated manner. In addition, an effective emergency response system requires the public to be provided with useful, timely, truthful, consistent and appropriate information promptly throughout a nuclear or radiological emergency.<sup>28</sup>

16. According to the independent investigation committee, the System for Prediction of Environment Emergency Dose Information (SPEEDI), a computer-based system for estimating potential radiation contamination based on real-time information, was not utilized by the Government in a timely and efficient manner.<sup>29</sup> Consequently and contrary to the requirements of the International Atomic Energy Agency (IAEA) for a nuclear emergency response,<sup>30</sup> on 11 March 2011, only 20 per cent of Fukushima residents near the plant came to know of the accident.<sup>31</sup> Most people within a radius of 10 km were informed of the accident only when evacuation orders were given on 12 March 2011.<sup>32</sup>

17. The evacuation zones designated by the Government on the basis of their proximity to the nuclear plant, rather than on scientific data indicating areas likely to be contaminated by the radioactive plume. Mandatory evacuation zones were periodically extended from an initial radius of three km from the Dai-ichi plant to 10, then later to 20.<sup>33</sup> Voluntary evacuation was eventually endorsed within a radius of 20 to 20 km.<sup>34</sup> Evacuation orders for some areas with high radiation doses were not issued until one month later. On 22 April 2011, the Government issued evacuation orders for areas up to 50 km north-west of the plant, including Katsurao, Iitate, Namie and parts of Minami-soma and Kawamata, owing to the high-dose radiation detected in the area<sup>35</sup> caused by winds carrying radioactive material from the plant. People in these areas thus remained exposed to high-dose radiation for a significant period. Even after SPEEDI was used, the resulting data were not made immediately available to the public.<sup>36</sup>

18. A coordinated and effective response at the local and national levels is a key goal of emergency preparedness.<sup>37</sup> Japan's emergency response did not meet up to the requirements of such an outcome. Poor coordination between the authorities was evident when the Fukushima authorities initially ordered evacuation from the 2 km area, after which the Government ordered a 3 km evacuation area.<sup>38</sup> Owing to insufficient training in the

<sup>27</sup> Ibid., pp. 4-5.

<sup>28</sup> IAEA, *Safety Standards* (see footnote 26), p. 31.

<sup>29</sup> Investigation Committee of the Accident at Fukushima Nuclear Power Stations of Tokyo Electric Power Company, Final Report (23 July 2012), p. 11.

<sup>30</sup> IAEA, *Safety Standards* (see footnote 26), p. 25.

<sup>31</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4), p. 19.

<sup>32</sup> Ibid.

<sup>33</sup> Ibid., p. 38.

<sup>34</sup> Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), p. 16.

<sup>35</sup> Ibid.

<sup>36</sup> Ibid, p. 18.

<sup>37</sup> IAEA, *Safety Standards*, p. 6.

<sup>38</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4), p. 62.



response system, including inefficient use of SPEEDI, 573 deaths were certified by the Government as “nuclear disaster-related deaths”.<sup>39</sup>

## 2. Distribution of iodine prophylaxis

19. The obligation to fulfil the right to health requires the State to take measures that assist individuals in realizing their right to health when they are unable to do so themselves.<sup>40</sup> This is especially significant in cases of nuclear emergency, where the ill effects of radiological contamination, such as thyroid cancer, on the health of people are immense and long-term. In the aftermath of the nuclear accident in Chernobyl, more than 4,000 cases of thyroid cancer were documented in Belarus, the Russian Federation and Ukraine from 1992 to 2002 among those who were children or adolescents at the time of the accident.<sup>41</sup> In such circumstances, the State should make every effort to ensure that such goods as stable iodine tablets are made available and accessible, in a timely manner, to mitigate the effect of radioactive iodine on the health of the exposed population.

20. The Government, in its interim report to IAEA, estimated that was approximately  $1.6 \times 10^{17}$  Bq of radioactive iodine ( $^{131}\text{I}$ ) was released into the environment.<sup>42</sup> Exposure to radioactive iodine increases the risk of thyroid cancer, especially in children, infants and newborns.<sup>43</sup> To block or reduce the accumulation of radioactive iodine in the thyroid gland, stable iodine is administered before or soon after the supposed intake of radioactive iodine.<sup>44</sup> Although the optimal time for ingesting stable iodine is before a nuclear accident, it can reduce the intake of radioactive iodine by 50 per cent if administered a few hours after the accident.<sup>45</sup>

21. Regrettably, the Government did not give prompt orders for the administration of stable iodine after the nuclear accident. Even though some municipal authorities had stocks of stable iodine, they were not distributed. Some municipalities, such as Futaba and Tomioka, distributed stable iodine without orders from the Government.<sup>46</sup> During the meeting with officials of the Fukushima Medical University, the Special Rapporteur learned that the decision to administer stable iodine had been delayed owing to apprehensions about the potential harmful side effects of iodine prophylaxis (it is an accepted position in radiological medicine, however, that even where the absorbed dose is less than 100mGy, stable iodine should be administered, as it does not entail any significant health hazards).<sup>47</sup>

<sup>39</sup> Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), p. 19.

<sup>40</sup> E/C.12/2000/4, para. 37.

<sup>41</sup> IAEA, Chernobyl's Legacy: Health, Environmental and Socio-economic Impacts and Recommendations to the Governments of Belarus, the Russian Federation and Ukraine (Second revised version), The Chernobyl Forum: 2003-2005 (Austria, April 2006) (available from [www.iaea.org/Publications/Booklets/Chernobyl/chernobyl.pdf](http://www.iaea.org/Publications/Booklets/Chernobyl/chernobyl.pdf)), p. 7.

<sup>42</sup> Report of Japanese Government to IAEA Ministerial Conference on Nuclear Safety, Accident at TEPCO's Fukushima Nuclear Power Stations (see [www.iaea.org/newscenter/focus/fukushima/japan-report/chapter-6.pdf](http://www.iaea.org/newscenter/focus/fukushima/japan-report/chapter-6.pdf)), p. VII.

<sup>43</sup> WHO, Guidelines for Iodine Prophylaxis following Nuclear Accidents: Update 1999 (available from [www.who.int/ionizing\\_radiation/pub\\_meet/Iodine\\_Prophylaxis\\_guide.pdf](http://www.who.int/ionizing_radiation/pub_meet/Iodine_Prophylaxis_guide.pdf)), p. 8.

<sup>44</sup> Ibid., p. 7.

<sup>45</sup> Ibid., p. 19.

<sup>46</sup> Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), p. 20.

<sup>47</sup> WHO, Guidelines for Iodine Prophylaxis (see footnote 43), p. 14; IAEA, *Safety Standards* (see footnote 26), p. 52.

## B. Monitoring the health effects of the nuclear accident

22. In the immediate and long-term aftermath of a nuclear accident, the right to health necessitates rigorous and prolonged monitoring of individual health, as the health effects of radiation exposure are not always immediately known or treatable. Though the experiences of the Three Mile Island and Chernobyl accidents provided invaluable guidance, a narrow assessment of those accidents would not provide proper guidance for other nuclear accidents. The Special Rapporteur encourages the Government to monitor any increase in morbidity and leukaemia, since they have been detected among the survivors of Chernobyl and Three Mile Island.<sup>48</sup> Owing to the limited knowledge about the health effects of long-term exposure to low-dose ionizing radiation, the Government's orders for the resettlement of residents in areas with accumulated dosage of 20 mSv/year and lower should be followed by long-term health monitoring of affected people.

23. The health management survey in Fukushima is conducted by the prefecture authorities, which reportedly received 78.2 billion Yen from the Government, in coordination with the Fukushima Medical University. It comprises a basic survey and four detailed surveys. The basic survey estimates levels of external irradiation among residents. The detailed surveys include a thyroid ultrasound examination for all children in Fukushima aged up to 18 years, a comprehensive health check for all residents from the evacuation zones, an assessment of mental health and lifestyles of all residents from the evacuation zones, and a recording of all pregnancies and births among all women in the prefecture who were pregnant on 11 March 2011.<sup>49</sup>

24. Despite the funding reportedly given by the Government mentioned above, during his mission the Special Rapporteur heard concerns about the slow progress of survey implementation owing to a lack of capacity of the Fukushima authorities. He urges the Government to take the central role in the implementation of the survey and to make more financial and human resources available for its implementation.

### 1. Basic health management survey

25. Three months after the nuclear accident, Fukushima authorities sent the health management survey to people who were residing in the prefecture on 11 March 2011.<sup>50</sup> The objective was to evaluate individual radiation exposure from March to July 2011.<sup>51</sup> Basic data collected will be used in health examinations of the target population and in their future long-term health care.<sup>52</sup>

26. The basic survey was designed to gather information about the whereabouts of individuals during various periods between 11 March and 11 July 2011, and the consumption of food, dairy products and water between 11 March and 31 March 2011.<sup>53</sup> The survey did not inquire into the health status of survey respondents at the time of the accident or in the period following the accident. A standard medical question regarding injuries (conventional, radiation-induced or both) around the time of the accident was

<sup>48</sup> Nussbaum and Kohnlein (see footnote 13); Wing et al "A reevaluation of cancer incidence" (see footnote 15).

<sup>49</sup> Seiji Yasumura et al, "Study Protocol for the Fukushima Health Management Survey", *Journal of Epidemiology* (August 2012), vol. 22, p. 376.

<sup>50</sup> Ibid., p. 377.

<sup>51</sup> Fukushima Medical University, Information about the Fukushima Health Management Survey (available from [www.fmu.ac.jp/univ/chiiki/health\\_survey/pdf/en/en\\_zip.pdf](http://www.fmu.ac.jp/univ/chiiki/health_survey/pdf/en/en_zip.pdf)).

<sup>52</sup> Ibid.

<sup>53</sup> Ibid.

missing from the survey.<sup>54</sup> Unlike other similar surveys, it did not incorporate questions about the cancer history of respondents, such as cancer diagnosis, thyroid disorders, radiation treatment, prior exposure to ionizing radiation at work, or risk factors such as smoking.<sup>55</sup>

27. Early capture of information is crucial to the effective monitoring of the human health impact of radiation exposure.<sup>56</sup> The above-mentioned basic survey was, however, sent out only three months after the nuclear accident and relied solely on the memory of respondents about their activities around the time of the accident. Additionally, the size of the cohort is a significant factor in the analysis of the health effects of radiation exposure. For instance, in a survey conducted following the Three Mile Island incident, data from 92 to 93 per cent of the affected population was captured within six weeks.<sup>57</sup> The Fukushima authorities informed the Special Rapporteur that the response rate to their survey was as low as 23 per cent as at October 2012. The low response rate and the ambiguous nature of replies due to a three-month delay does not ensure the accurate capture and evaluation of the health effects of the nuclear accident. The Special Rapporteur therefore encourages the Government to take additional measures to ensure adequate health monitoring of affected residents. Moreover, given that the fallout from the accident seems to have reached prefectures other than Fukushima,<sup>58</sup> he also urges the Government to expand the health monitoring to other affected prefectures where radiation exposure is higher than an additional 1 mSv/year in the effective dose.

## 2. Thyroid screening of children

28. The right to health requires the State to pay special attention to vulnerable groups, such as children. As children are most vulnerable to thyroid cancer caused by radioactive iodine intake, the Fukushima authorities initiated thyroid check-ups of all children who were up to 18 years of age at 11 March 2011. The Special Rapporteur commends the Government for this effort, and encourages it to explore other health effects of radiation on children, such as leukaemia, given that epidemiological studies have not ruled out the possibility of leukaemia in children who were exposed to radiation following the Chernobyl accident.<sup>59</sup>

29. The thyroid check-ups commenced in October 2011 and were scheduled to continue until March 2014, after which they will continue every two years until the individual is 20 years of age; thereafter they will continue every five years.<sup>60</sup> The results of the thyroid

<sup>54</sup> See IAEA, *Generic Procedures for Medical Response During a Nuclear or Radiological Emergency, Emergency Preparedness and Response* (Vienna 2005), p. 138.

<sup>55</sup> Marilyn Goldhaber et al, The Three Mile Island Population Registry, *Public Health Reports* (November-December 1983), vol. 98, No. 6, pp. 603-609.

<sup>56</sup> IAEA, *Generic Procedures* (see footnote 54).

<sup>57</sup> Goldhaber et al, The Three Mile Island Population Registry (see footnote 54), p. 605.

<sup>58</sup> See Tomoka Ohta et al, "Prediction of groundwater contamination with <sup>137</sup>Cs and <sup>131</sup>I from the Fukushima nuclear accident in the Kanto district", *Journal of Environmental Radioactivity* (September 2012), vol. 111, pp. 38-41; and Hikaru Amano et al, "Radiation measurements in the Chiba Metropolitan Area and radiological aspects of fallout from the Fukushima Dai-ichi Nuclear Power Plants accident", *ibid.*, pp. 42-52.

<sup>59</sup> See Andrey G. Noshchenko et al, "Patterns of acute leukaemia occurrence among children in the Chernobyl region", *International Journal of Epidemiology* (February 2001), vol. 30, No.1, pp.125-129; and S. Davis et al, Childhood leukaemia in Belarus, Russia and Ukraine following the Chernobyl power station accident: results from an international collaborative population-based case-control study, *ibid.* (April 2006), vol. 35, No. 2, pp. 386-396.

<sup>60</sup> Yasumura et al, "Study Protocol" (see footnote 49), p. 378.

check-up are divided into four categories. An A1 outcome denotes no detection of any nodule or cyst; A2, that the size of the nodule present is less than 5 mm and/or the cyst is less than 20 mm. Children with A1 and A2 results are not eligible for a secondary examination. Result B indicates that the nodules and cysts are larger than 5.1 mm and/or 20.1 mm respectively, and qualifies the child for secondary examination. C denotes urgent need for a secondary examination.<sup>61</sup>

30. Nodule size does not always reflect the degree of malignancy; the likelihood that a nodule is malignant is independent of the number of nodules and the size of the nodule.<sup>62</sup> Moreover, follow-up treatment for children in A2 categories will commence after two years. This may be too long a period to check the rate of growth of a tumour, which is an indicator of increased risk of malignancy.<sup>63</sup> According to the latest official information, 186 of 38,114 children examined (0.5 per cent) in 2011 were in category B while, in 2012, there were 548 children out of 94,975 (0.6 per cent) in that category.<sup>64</sup>

31. During his visit, the Special Rapporteur was informed that the Japan Thyroid Association had been instructed against providing secondary examinations to children in the A2 category; parents and children would therefore have to wait for the second round of check-ups after March 2014 before being able to take any mitigating action against possible thyroid cancer. The Special Rapporteur calls on the Government to remove such barriers, which prevent people from exercising their right to health, and to ensure that children and parents are given access to second opinions and secondary health examinations, as required under the right to health.

32. The Special Rapporteur was also informed that parents found it difficult to obtain access to the results of their children's thyroid check-ups owing to bureaucracy and the cumbersome Freedom of Information Act procedure that Fukushima authorities insist on applying to parents' requests. Though confidentiality of information is an important aspect of the right to health, it should not become a barrier to information regarding one's own health. In accordance with the right to health, the State is required to ensure an individual's right to informed decisions regarding his/her health by giving them access to information relating to their health, which will have a bearing on their ability to make a decision.

### 3. Comprehensive health management survey

33. The comprehensive survey seeks to review health information, assess the incidence of various diseases and improve the health status of respondents. The target population is restricted to residents of the evacuation zone specified by the Government and residents of Yamakiya in Kawamata-machi, Namie-mach and Iitate-mura.<sup>65</sup> Owing to the high levels of contamination in the soil, water and foodstuffs, including marine life, there is a possibility of internal irradiation.<sup>66</sup> Following the Chernobyl accident, increased morbidity due to

<sup>61</sup> Data from the Fukushima prefecture, at: <http://www.cms.pref.fukushima.jp/>

<sup>62</sup> Dan Mihailescu and Arthur Schneider, Size, number and distribution of thyroid nodules and their risk of malignancy in radiation-exposed patients who underwent surgery, *The Journal of Clinical Endocrinology and Metabolism* (June 2008), vol. 93, No.6, pp. 2188-2193; Mary Frates et al, Management of thyroid nodules detected at US: Society of Radiologists in Ultrasound consensus conference statement, *Radiology* (December 2005), vol. 237, No. 3, pp. 794-800.

<sup>63</sup> Frates et al, *ibid*, p. 799.

<sup>64</sup> Thyroid Ultrasound Examination (Thyroid Screening) in 2012/2013, at [www.fmu.ac.jp/radiationhealth/results/media/10-2\\_ThyroidUE.pdf](http://www.fmu.ac.jp/radiationhealth/results/media/10-2_ThyroidUE.pdf).

<sup>65</sup> Yasumura et al, "Study Protocol" (see footnote 49), p. 378.

<sup>66</sup> Teppei J. Yasunari et al, Cesium-137 deposition and contamination of Japanese soils due to the Fukushima nuclear accident, *PNAS* (December 2011), vol. 108, no. 49, pp.19530-19534.

diseases of the endocrine, haematopoietic, circulatory and digestive systems were found among those affected.<sup>67</sup> The comprehensive health management survey should therefore include check-ups for internal radiation exposure. Radioactive caesium has already been found in urine samples of people as young as 8 years in Japan.<sup>68</sup> The survey does not, however, include urine tests for people under the age of 16.<sup>69</sup> Tests<sup>70</sup> should also be conducted to check for radioactive strontium,<sup>71</sup> given that it presents a large risk for internal radiation exposure via ingestion of contaminated agricultural crops and may cause leukaemia.<sup>72</sup>

34. The Special Rapporteur was informed that whole-body counters, used for measuring internal exposure to gamma radiation, were not available in health-care facilities throughout Fukushima prefecture, as would be required.

35. The Special Rapporteur commends the Government for having lowered the permissible limit of radionuclides in food for consumption.<sup>73</sup> Careful scientific sampling is important to measure radioactivity in food. He however noted dissatisfaction among people about government sampling and preferred community measurement centres. It is important that the Government take steps to bridge the trust deficit with the people of Japan.

#### 4. Mental health survey

36. The right to health extends not only to provision of medical health facilities, goods and services, but also to facilitating an environment within which the affected population is able to enjoy the right. The State is therefore under an obligation to mitigate the effect of the accident on the mental health of people by, inter alia, alleviating stress and anxiety related to radiation exposure and separation from families.

37. The effect of nuclear disasters on mental health was documented for the accidents in Three Mile Island and in Chernobyl.<sup>74</sup> A year after the Three Mile Island accident, mothers were found to be at a high risk of experiencing clinical episodes of anxiety and depression.<sup>75</sup> After the Chernobyl accident, women with young children were found to be

<sup>67</sup> WHO, *Health Effects of the Chernobyl Accident and Special Health Care Programmes* (Geneva, 2006), p. 74.

<sup>68</sup> Results of ACRO monitoring in Japan (12 July 2012); see [www.acro.eu.org/OCJ\\_en.html#33](http://www.acro.eu.org/OCJ_en.html#33).

<sup>69</sup> Yasumura et al, "Study Protocol" (see footnote 49), p. 379.

<sup>70</sup> Patrick C. D'Haese et al, "Measurement of strontium in serum, urine, bone, and soft tissues by Zeeman atomic absorption spectrometry", *Clinical Chemistry* (January 1997), vol. 43, No. 1, pp. 121-128.

<sup>71</sup> IAEA, Fukushima Update Log, available from [www.iaea.org/newscenter/news/2011/fukushima130411.html](http://www.iaea.org/newscenter/news/2011/fukushima130411.html).

<sup>72</sup> Norikazu Kinoshita et al, "Assessment of individual radionuclide distributions from the Fukushima nuclear accident covering central-east Japan", *PNAS* (December 2011), vol. 108, No.49, pp. 19526-19529.

<sup>73</sup> Ministry of Health, Labour and Welfare, "New standard limits for radionuclides in foods"; see [www.mhlw.go.jp/english/topics/2011eq/dl/new\\_standard.pdf](http://www.mhlw.go.jp/english/topics/2011eq/dl/new_standard.pdf).

<sup>74</sup> Evelyn Bromet, "Lessons learned from radiation disasters", *World Psychiatry* (June 2011), vol. 10, No. 2, pp. 83-84; Evelyn Bromet and John Havenaar, "Psychological and perceived health effects of the Chernobyl disaster: a 20-year review", *Health Physics* (November 2007), vol. 93, No. 5, pp. 516-521.

<sup>75</sup> Evelyn Bromet et al, "Mental health of residents near the Three Mile Island reactor: A comparative study of selected groups", *Journal of Preventive Psychiatry* (October 1982), vol. 1, No.3, pp. 225-276.

most vulnerable to the mental health effects of the nuclear accident,<sup>76</sup> and its continued impact on mental health was visible even six years after the accident.<sup>77</sup> In a study conducted by IAEA, a significant amount of stress and anxiety was found to be related to the Chernobyl accident.<sup>78</sup> Moreover, the rate of prevalence of post-traumatic stress disorder is reportedly high among survivors of man-made disasters.<sup>79</sup>

38. The Fukushima nuclear accident resulted in a breakdown in families and communities and feelings of isolation. The Special Rapporteur personally observed the anxiety and stress of evacuees, residents and their families that were related to the effect of radiation leakage on health, especially of children, the cost of evacuation and the loss of livelihoods, as well as the uncertainty of the future and the delays in receiving compensation, which hindered the rebuilding of their lives.

39. The Special Rapporteur notes with concern that the mental and physical health of children has been especially affected by the lack of outdoor activities, safe areas to play and restrictions on activities in school. He calls on the Government to make quality mental health facilities, goods and services available and accessible to the residents of Fukushima, the evacuees and their families, with a focus on vulnerable groups, such as first responders and children. The Government should also provide and support programmes, such as the recuperation camps organized by non-governmental organizations to reduce stress and anxiety in the affected communities.

40. Even though the Government developed a detailed mental health survey for residents of the evacuation zone, the target population does not include all those affected by the accident. As in the case of the comprehensive health survey, the survey should at least include residents of the voluntary evacuation zone. Furthermore, the response rate to the survey was less than 50 per cent.<sup>80</sup> The Special Rapporteur welcomes the Government's effort to provide direct care to those who require it, as revealed by the survey. Efforts are nonetheless still required to ascertain the need for and deliver services to the rest of the target population. Although the survey enquires about the responder's experience during the earthquake, tsunami and nuclear accident, it is important to record also any past experiences with radiation exposure, which may be an aggravating factor.

## 5. Pregnancy and birth survey

41. The obligation to respect, protect and fulfil the right to health is a continuous obligation and extends to progeny. The pregnancy and birth survey, however, is based on the assumption that the Chernobyl accident did not significantly increase child anomalies or foetal deaths.<sup>81</sup> The survey covers antenatal health, delivery records and the mental health of women.<sup>82</sup> It does not include a provision for monitoring the health of either the foetus or the child after birth. With a view to ensuring the highest standard of physical and mental

<sup>76</sup> John Havenaar et al, "Long-term mental health effects of the Chernobyl disaster: an epidemiologic survey in two former Soviet regions", *American Journal of Psychiatry* (November 1997), vol. 154, No. 11, p. 1606.

<sup>77</sup> Ibid, p. 1607.

<sup>78</sup> Harold Ginzburg, "The psychological consequences of the Chernobyl accident: findings from the International Atomic Energy Agency Study", *Public Health Reports* (March-April 1993), vol. 108, No. 2, p.188.

<sup>79</sup> Y. Neria et al, "Post-traumatic stress disorder following disasters: a systematic review", *Psychological Medicine* (2008), vol. 38, pp.467-480.

<sup>80</sup> Yasumura et al, "Study Protocol" (see footnote 49), p. 380.

<sup>81</sup> Ibid., p. 379

<sup>82</sup> Ibid., p. 380.

health, the Special Rapporteur encourages the Government to revise the survey and to take into account studies that have established a link between utero radiation exposure and mental disability.<sup>83</sup> Further, the Government should explore the still unclear relation between in utero exposure and leukaemia.<sup>84</sup>

## 6. Health of nuclear power plant workers

42. In the aftermath of Chernobyl, workers involved in the cleaning operations and first responders were exposed to the highest doses of radiation.<sup>85</sup> During the Fukushima accident, an estimated 167 workers were exposed to more than 100mSv of radiation, a dose level recognized unequivocally to increase the risk of cancer.<sup>86</sup> Two operators received doses above 600mSv.<sup>87</sup> In addition, first responders face a high prevalence of post-traumatic stress disorder in man-made disasters.<sup>88</sup>

43. The law requires a medical check-up for all workers who have worked in controlled areas every six months,<sup>89</sup> while guidelines provide for additional medical check-ups of workers exposed to 50 mSv/year of radiation.<sup>90</sup> The Special Rapporteur was nonetheless concerned to learn that the results are not always reported to the Government. To protect the right to health of workers, health check-ups need to be conducted regularly and their results reported. While acknowledging the Government's reiteration that the health monitoring of nuclear workers is carried out under relevant laws and regulations, the Special Rapporteur notes concerns by nuclear power plant workers that such health monitoring is not conducted.

44. The Special Rapporteur was informed that many workers employed in the nuclear power industry were poor and some even homeless, increasing their vulnerability. Even though the law<sup>91</sup> requires compulsory medical check-ups for workers when they are hired, a significant number of workers, employed through layers of sub-contractors for short periods of time, are not provided with proper and effective monitoring of their health.<sup>92</sup>

<sup>83</sup> Masanori Otake and William J. Schull, "In utero exposure to A-bomb radiation and mental retardation: a reassessment", *The British Journal of Radiology* (May 1984), vol. 57, pp. 409-414; European Commission, *Effects of in utero exposure to ionizing radiation during the early phases of pregnancy* (Luxembourg, 2002) (available from [http://ec.europa.eu/energy/nuclear/radiation\\_protection/doc/publication/131.pdf](http://ec.europa.eu/energy/nuclear/radiation_protection/doc/publication/131.pdf)).

<sup>84</sup> E. Cardis et al, "Cancer consequences of the Chernobyl accident: 20 years on", *Journal of Radiological Protection* (2006), vol. 26, p. 135; Richard Wakeford, "Childhood leukaemia following medical diagnostic exposure to ionizing radiation in utero or after birth", *Radiation Protection Dosimetry* (October 2008), vol. 32, No. 2, pp. 166-174.

<sup>85</sup> United Nations Scientific Committee on the Effects of Atomic Radiation, *Sources and Effects of Ionizing Radiation* (see footnote 12); WHO, *Health Effects of the Chernobyl Accident* (see footnote 67).

<sup>86</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4), p. 9.

<sup>87</sup> Geoff Brumfiel, "Fukushima's doses tallied", *Nature*, 23 May 2012, available from [www.nature.com/news/fukushima-s-doses-tallied-1.10686](http://www.nature.com/news/fukushima-s-doses-tallied-1.10686).

<sup>88</sup> Y. Neria et al, "Post-traumatic stress disorder" (see footnote 79); Jun Shigemura et al, "Psychological Distress in Workers at the Fukushima Nuclear Power Plants", *Journal of the American Medical Association* (August 2012), vol. 308, No. 7.

<sup>89</sup> Ordinance on Prevention of Ionizing Radiation Hazard, art. 56.

<sup>90</sup> Guidelines on Health Promotion for Emergency Workers in TEPCO Fukushima Daiichi APP.

<sup>91</sup> Ordinance on Prevention of Ionizing Radiation Hazard, art. 56(1).

<sup>92</sup> Gabrielle Hecht, "Nuclear nomads: A look at the subcontracted heroes", *Bulletin of the Atomic Scientists*, 9 January 2012 (available from [www.thebulletin.org/web-edition/features/nuclear-nomads-look-the-subcontracted-heroes](http://www.thebulletin.org/web-edition/features/nuclear-nomads-look-the-subcontracted-heroes)); "Nuclear power plants: A hidden world of untruths, unethical

The Government should take all measures to provide an environment that does not exacerbate their vulnerability and provide access to affordable and quality health facilities, goods and services at all times to all workers.

## C. Policy decisions and information on dose limits

### 1. Evacuation zones

45. In December 2011, the Government categorized evacuation zones in areas affected by the nuclear accident. Areas with radiation dose exceeding 50mSv/year were designated restricted areas; entry in such areas is prohibited for five years. Entry has been restricted to areas with radiation dose between 20mSv/year to 50mSv/year, and residents are allowed to return for short periods, although staying overnight is prohibited. In areas where radiation exposure is lower than 20mSv/year, people are returning.

46. The Ordinance on the Prevention of Ionizing Radiation Hazards in Japan (art. 3) requires that areas where radiation dose exceeds 1.3mSv/quarterly be designated as controlled zones. The recommended limit of radiation exposure for the general public is 1mSv/year.<sup>93</sup> In Ukraine, the 1991 law on the status and social protection of citizens who suffered as a result of the Chernobyl catastrophe limited radiation dose for living and working without limitations to 1mSv/year.

47. The dose limit of 20mSv/year is being applied by the Government because of the nuclear emergency. In this regard, the Government seeks support from the letter received from the International Commission on Radiological Protection, in which it recommended a reference level of 1mSv/year to 20mSv/year for determining areas inhabitable after the accident.<sup>94</sup> The recommendations made by the Commission were based on the principles of optimization and justification, according to which all actions of the Government should be based on maximizing good over harm.<sup>95</sup> Such a risk-benefit analysis is not in consonance with the right to health framework, as it gives precedence to collective interests over individual rights. Under the right to health, the right of every individual has to be protected. Moreover, such decisions, which have a long-term impact on the physical and mental health of people, should be taken with their active, direct and effective participation.

48. The Government assured the Special Rapporteur that it was safe to inhabit areas where the radiation dose was up to 20mSv/year, as there was no excessive risk of cancer below 100mSv. Nonetheless, even the International Commission on Radiological Protection acknowledges the scientific possibility that the incidence of cancer or hereditary disorders will increase in direct proportion to an increase in radiation doses below 100mSv.<sup>96</sup> Furthermore, epidemiological studies monitoring the health effects of long-term exposure to low-ionizing radiation conclude that there is no low-threshold limit for excess

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behavior", *Asahi Shimbun*, 6 August 2012 (available from <http://ajw.asahi.com/article/0311disaster/fukushima/AJ201208060093>).

<sup>93</sup> See IAEA, *Radiation protection and safety of radiation sources: International Basic Safety Standards – Interim Edition*, General Safety Requirements, No. GSR Part 3(Interim), Vienna, 2011, p. 90; ICRP, *1990 Recommendations of the International Commission on Radiological Protection*, ICRP Publication 60, Ann. ICRP 21 (1-3); and ICRP, *2007 Recommendations of the International Commission on Radiological Protection*, ICRP Publication 103, Ann. ICRP 37 (2-4).

<sup>94</sup> ICRP, *IBID.*, no. 17; ICRP, *2009b Application of the Commission's Recommendations to the Protection of People Living in Long-Term Contaminated Areas after a Nuclear Accident or a Radiation Emergency*, ICRP Publication 111, Ann ICRP 39(3), 2009, para.48-50.

<sup>95</sup> ICRP, *2009b Recommendations*, *ibid.*, p. 26; ICRP, *2007 Recommendations* (see footnote 93).

<sup>96</sup> ICRP, *ibid.*, (in Spanish), p. 46; A.D., Wrixon, *New ICRP Recommendations*, *Journal of Radiological Protection* (2008), vol. 28, p. 162.



radiation risk to non-solid cancers, such as leukaemia.<sup>97</sup> The additive radiation risk for solid cancers continues to increase throughout life with a linear dose-response relationship.<sup>98</sup>

49. Health policies put in place by the State should be grounded in scientific evidence. Policies should be formulated so as to minimize the interference with the enjoyment of the right to health. In setting radiation dose limits, the right to health dictates limits that have the least impact on the right to health of people, taking into account the greater vulnerability of such groups as pregnant women and children. As the possibility of adverse health effects exists in low-dose radiation, evacuees should be advised to return only when the radiation dose has been reduced as far as possible and to levels below 1 mSv/year. In the meantime, the Government should continue to provide financial support and subsidies to all evacuees so that they may make a voluntary decision to return to their homes or remain evacuated.

## **2. Government monitoring stations**

50. The State should facilitate access to information about radiation levels in the affected areas to allow people to make informed decisions that will have a bearing on their health. The Special Rapporteur was pleased to observe that the Government had set up stations to monitor the ambient air dose in Fukushima prefecture. The Government informed the Special Rapporteur that around 3,200 monitoring stations had been installed in the prefecture. The air dose measured by these fixed stations only reflects, however, the radiation dose in the immediate vicinity of the instrument. Readings by fixed monitoring stations do not reflect the actual and varied dosage levels in nearby areas, which may be higher than in the immediate vicinity of the station. Reliance on unrepresentative information may expose people, especially such vulnerable groups as children, to higher radiation levels. During his visit, the Special Rapporteur observed substantial variance, including in schools and public areas used by children, as well as radiation “hot spots” close to monitoring stations that were not reflected. Such incidents have regrettably led many people to doubt the reliability of Government monitoring stations.

## **3. Information in school textbooks**

51. The State should ensure that accurate and scientifically sound information on radiation and radioactivity is provided to children and, where appropriate, their parents to facilitate informed decision-making regarding health. Additionally, respecting the right to health requires the State to refrain from misrepresenting information in health-related matters. The Special Rapporteur was informed about the Fukushima official curriculum for compulsory radiation education in public schools. The supplementary reading and presentation materials mentioned that there was no clear evidence of high risk of disease, including cancer, when exposed for a short time to radiation levels of 100mSv and below, thus giving the impression that doses below 100mSv are safe. As noted above, this is not consistent with the law in Japan, international standards or epidemiological research. In addition, the Special Rapporteur notes that the textbooks do not mention the increased vulnerability of children to the health effects of radiation. Such information may give children and parents a false sense of security, which may result in the exposure of children

<sup>97</sup> David Richardson et al, “Ionizing radiation and leukaemia mortality among Japanese atomic bomb survivors, 1950-2000”, *Radiation Research* (September 2009), vol. 172, No.3, pp. 368-382.

<sup>98</sup> National Research Council, *Health Risks from Exposure*; Kotaro Ozasa et al, “Studies of the mortality of atomic bomb survivors”; David J. Brenner et al, “Cancer risks attributable to low doses of ionizing radiation”; Pierce and Preston, “Radiation-related cancer risks” (see footnote 18).

to high levels of radiation. The Special Rapporteur urges the Government to ensure accurate representation of the health effects associated with the nuclear accident and to include methods of preventing and controlling health problems in a manner that is effective, age-appropriate and easy to understand.

## D. Decontamination

### 1. Decontamination policy

52. The Act on Special Measures concerning the Handling of Radioactive Pollution was promulgated in August 2011 to create a legal framework for decontamination activities; the basic principles and fundamentally important regulations of the Act did not come into force, however, until January 2012. The Act covers the planning and implementation of decontamination work, including the collection, transfer, temporary storage and final disposal of contaminated material.<sup>99</sup> The Special Rapporteur notes with appreciation the Government's decontamination efforts and those of municipalities under the basic policy for emergency response on decontamination Work. Decontamination policies should have, however, already been a part of the regulatory framework for the nuclear power industry.<sup>100</sup> This would have enabled the Government to undertake decontamination activities earlier than November 2011.

53. Areas for decontamination extend beyond Fukushima prefecture and are prioritized by radiation levels, with a focus on living environments for children.<sup>101</sup> The aim is to halve exposure in areas with radiation levels of less than 20mSv/year for the general public, and to reduce it by 60 per cent for children, by August 2013. Exposure is to be reduced to less than 20mSv/year by March 2014 in areas with radiation between 20mSv/year and 50mSv/year. Demonstration projects were established to secure the safety of workers in areas with radiation above 50mSv/year. The long-term goal is to reduce radiation levels to below 1mSv/year.<sup>102</sup>

54. Although the right to health is subject to progressive realization, the obligation to formulate and take deliberate, concrete and targeted steps is an immediate obligation of the State. It is regrettable that there are neither specific measures nor a timeline for decontamination beyond 2013 and to levels less than 1mSv/year. The Special Rapporteur urges the Government to urgently formulate a long-term decontamination policy with the aim of reducing radiation to less than 1mSv/year at the earliest.

55. The Special Rapporteur notes the special attention paid by the Government to such vulnerable groups as children when conducting decontamination work by prioritizing the decontamination of schools and playgrounds. Isolated decontamination of schools and playgrounds is, however, not sufficient, given that winds can deposit radiation from surrounding areas on sites that have already been decontaminated. The decontamination of schools and playgrounds should therefore include surrounding areas, such as roads, ditches

<sup>99</sup> Takeshi Sekiya, Progress on Offsite Cleanup Efforts in Japan, December 2012 (available from [http://josen.env.go.jp/en/documents/pdf/documents\\_01.pdf](http://josen.env.go.jp/en/documents/pdf/documents_01.pdf)), p. 4.

<sup>100</sup> See IAEA, *Planning for Cleanup of Large Areas Contaminated as a Result of a Nuclear Accident*, Technical Report Series No. 347 (Vienna, 1991) (available from [www-pub.iaea.org/MTCD/Publications/PDF/trs327\\_web.pdf](http://www-pub.iaea.org/MTCD/Publications/PDF/trs327_web.pdf)), p. 8.

<sup>101</sup> Priority-setting measures are also recommended by IAEA; see *International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources*, Safety Series No. 115 (Vienna 1996) (available from [www.ilo.org/wcmsp5/groups/public/---ed\\_protect/---protrav/---safework/documents/publication/wcms\\_152685.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_152685.pdf)), p. 24.

<sup>102</sup> Sekiya, Progress on Offsite Cleanup Efforts (see footnote 99), p. 9.

and fields, which can be radiation hot spots. The decontamination policy should in fact address radiation hot spots as a priority, because they can exist even within areas where the radiation level is lower than 20 mSv/y.

56. While the Special Rapporteur notes that the Government is encouraging participation of the community in decontamination work, he recalls, however, that the State is mandated to fulfil the right to health by giving necessary information and protective equipment to individuals engaged in hazardous activities.<sup>103</sup> While the Act on Special Measures requires provision of appropriate information or equipment for individuals engaging in decontamination activities, the Special Rapporteur is concerned that, in some areas, these requirements were not strictly followed. He therefore calls on the Government to provide information, safety equipment and appropriate protective gear to residents who voluntarily undertake decontamination activities.

## **2. Storage of contaminated materials**

57. Decontamination activities involving the removal of 5 to 10 cm of topsoil<sup>104</sup> pose challenges for the Government, in particular with regard to the safe storage of contaminated soil. Authorities currently store radioactive debris in residential areas in sandbags covered with plastic or bury it, including under playgrounds, in protective containers. During his visit, the Special Rapporteur did not find any signs informing people of the presence of radioactive materials in these areas, contrary to the right to health.

58. The Special Rapporteur was informed that temporary and definitive storage and disposal facilities would be prepared to deal with contaminated waste, estimated to be 2.3 million tonnes;<sup>105</sup> there were no concrete plans, however, for the storage of the radioactive debris. As contaminated waste is currently stored in residential areas and under playgrounds, thereby posing a health hazard to residents, establishing temporary storage facilities away from residential areas is urgently required. The Government should formulate a timeline and take urgent measures to establish temporary and definitive waste storage and disposal facilities, with the active participation of the local community in the decision-making process.

## **E. Transparency and accountability**

### **1. Transparency and independence in the regulatory framework**

59. In their reports, both the Nuclear Accident Independent Investigation Commission and the Investigation Committee on the Accident at the TEPCO Fukushima Nuclear Power Stations, set up by the Parliament and the Government respectively, criticise the close association between the regulatory bodies and the Federation of Electric Power Companies in Japan, which greatly reduced the independence of the regulatory bodies.<sup>106</sup> As a result,

<sup>103</sup> See also IAEA, Planning for Cleanup of Large Areas (see footnote 100), p. 42.

<sup>104</sup> See IAEA, Decontamination of Settlements, available from [www-ns.iaea.org/downloads/rw/projects/emras-urban-decontamination-of-settlements-golikov.pdf](http://www-ns.iaea.org/downloads/rw/projects/emras-urban-decontamination-of-settlements-golikov.pdf).

<sup>105</sup> IAEA, Final Report of the International Mission on Remediation of Large Contaminated Areas Off-site the Fukushima Dai-ichi NPP, October 2011 (available from [www.iaea.org/newscenter/focus/fukushima/final\\_report151111.pdf](http://www.iaea.org/newscenter/focus/fukushima/final_report151111.pdf)), p. 61.

<sup>106</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4); Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), pp. 37-45.

the regulatory bodies failed to hold TEPCO accountable for non-compliance with domestic and international safety standards, thus compromising the safety of the Dai-ichi plant.<sup>107</sup>

60. Transparency in governance and in implementing national policies and regulatory frameworks is a key factor in the right to health. Effective transparency and independence of governing and regulatory authorities also ensure accountability. The Special Rapporteur notes that the Government, having recognized the need for independence and transparency, created the Nuclear Regulation Authority.

61. The Special Rapporteur stresses that information and data collected by the Nuclear Regulation Authority regarding domestic regulations and compliance of nuclear operators with domestic and international safety standards should be made publicly available to facilitate independent monitoring and accountability within the Authority and the nuclear power industry as a whole.

## 2. Accountability of TEPCO

62. The Special Rapporteur is pleased to note that, in Japan, nuclear operators are strictly and absolutely liable for any injury resulting from nuclear operations.<sup>108</sup> This renders private non-State actors liable for violating the right to health of individuals and is consistent with the State's obligation to protect the right to health.

63. The acquisition by the Government of a majority of shares in TEPCO in June 2012 has, however, arguably helped TEPCO to effectively avoid any accountability and liability for damages. Payment of compensation is made from government funds, funded by taxpayers. The Special Rapporteur was informed that TEPCO would have to repay the Government eventually. Nevertheless, under the current arrangement, the taxpayers may have to continue to bear the burden of nuclear damage, for which TEPCO alone should be liable.

## F. Compensation and relief measures

64. Where the right to health has been violated, victims should have access to effective remedies, including adequate reparation and compensation. The provision of compensation and other forms of relief are also essential to the recovery of individuals affected by the nuclear accident.

65. After the nuclear accident, TEPCO provided 120 billion Yen in financial security for claims,<sup>109</sup> even though the compensation costs estimated by TEPCO itself at around 4,500 billion Yen. The Government therefore established the public-private Nuclear Damage Liability Facilitation Fund in September 2011.<sup>110</sup>

66. The Dispute Reconciliation Committee for Nuclear Damage Compensation was created to formulate guidelines for payment of compensation owing to the lack of guidelines in the existing Compensation Act.<sup>111</sup> The Special Rapporteur notes that the original compensation application forms comprised around 60 pages and 2,215 sections,

<sup>107</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4); Investigation Committee, Final Report (see footnote 29), p. 22.

<sup>108</sup> Act on Compensation for Nuclear Damage, 1961, sects. 3 and 4.

<sup>109</sup> Eri Osaka, "Corporate Liability, Government Liability, and the Fukushima Nuclear Disaster", *Pacific Rim Law & Policy Journal* (June 2012), vol. 21, No. 3, p. 437.

<sup>110</sup> Nuclear Damage Liability Facilitation Fund Act, Law No. 94, 2011, as cited in Osaka, *ibid.*, p. 443.

<sup>111</sup> Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), p. 30.

and came with a 158-page instruction manual.<sup>112</sup> He was also informed of the delays caused at the Dispute Settlement Centre, which hindered the availability of compensation. While the application forms have since been streamlined, the Government should now address the concerns frequently raised by affected persons regarding attempts by TEPCO to reduce compensation levels and delay settlement.

67. The Special Rapporteur commends the passing of the Statute on Protection and Support for the Children and other Victims of Tokyo Electric Power Company Nuclear Power Plant Disaster (Victims Protection Law), which recognizes the right of victims to choose whether to evacuate. It includes persons voluntarily evacuating or living in areas outside Government-designated zones, whose relief needs were reportedly neglected. The law also contains provisions relating to the long-term impact of exposure to radiation on health.

68. The Special Rapporteur is concerned that, despite the adoption of the Victims Protection Law in June 2012, implementing instruments have not yet been adopted. In implementing the law, clarification is required with regard to “covered areas” under article 8. The Special Rapporteur believes that such areas should include those where radiation levels exceed 1mSv/year. As the exact impact of long-term exposure to low-dose ionizing radiation on health cannot be accurately predicted, the implementing measures should also expressly provide for free, life-long health screening and medical treatment relating to radiation exposure for all affected persons. The 20-year time limit contained in the Civil Code should not apply to financial assistance for medical care consequent to the nuclear accident.

69. The obligation to fulfil the right to health requires the State to ensure the provision of the underlying determinants of health by, inter alia, taking positive measures that facilitate the enjoyment of the right. The Special Rapporteur urges the Government to take such measures to implement the Victims Protection Law, and to provide funding for relocation, housing, employment, education and other essential support needed by those who chose to evacuate, stay or return to any area where radiation exceeds 1mSv/year. These measures should include relief packages reflecting the cost of rebuilding lives.

## G. Participation of vulnerable groups and affected communities

70. The right to health requires the State to pay special attention to the needs of vulnerable groups. The State is also under an immediate obligation to prevent discrimination, especially against vulnerable groups in its policies or practice, even during times of resource constraint.

71. As at August 2011, 146,520 people had evacuated from Fukushima prefecture.<sup>113</sup> Owing to frequent changes in evacuation orders, more than 10,000 people had to change evacuation centres three or more times, with some people having to move as many as 10 times.<sup>114</sup> Even after evacuation orders were given on 12 March 2011 for areas within a 20 km radius of the Dai-ichi plant, approximately 840 hospital and nursing home patients

<sup>112</sup> Osaka, “Corporate Liability” (see footnote 109), p. 441; Morris-Suzuki et al, *Lessons from Fukushima* (see footnote 25), p. 29.

<sup>113</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4), p. 38.

<sup>114</sup> Toshiaki Keicho, Evacuation Centre Management, Knowledge Note 3-5, Cluster 3: Emergency Response, World Bank (available from [http://wbi.worldbank.org/wbi/Data/wbi/wbicms/files/drupal-acquia/wbi/drm\\_kn3-5.pdf](http://wbi.worldbank.org/wbi/Data/wbi/wbicms/files/drupal-acquia/wbi/drm_kn3-5.pdf)), p. 3.

remained until 13 March 2011.<sup>115</sup> In addition, 60 hospital patients died during evacuation.<sup>116</sup> The stress, ill-health and deaths could have been prevented had coordinated evacuation orders been taken and plans been in place. In this context, mapping vulnerable groups and encouraging broad community engagement may help to create more appropriate emergency responses with respect to vulnerable communities.<sup>117</sup>

72. Older persons, children, women and persons with disabilities are more susceptible to the ill effects of disasters.<sup>118</sup> During the visit, members of such groups shared their grievances with the Special Rapporteur, mainly that they had had no say in decisions affecting them. He was also pained to learn that evacuation centres often did not have an accessible environment for persons with disabilities and women, including women with young children. Despite the existence of the Third Basic Plan for Gender Equality 2010, which promotes gender equality in disaster prevention and response, women faced greater disadvantage in evacuation centres because Plan regulations had not been fully implemented.<sup>119</sup>

73. Participation of the population at all stages of decision-making processes at the national and community levels is a critical feature of the right to health framework. Health-related laws and policies should be instituted only with the direct, active and effective involvement of communities, given that they are the most affected by these decisions. The Special Rapporteur urges the Government to take this opportunity to ensure the effective involvement of communities in the health management survey. Community participation would also help the Government to address the concerns of the people more effectively, thereby creating a more efficient health system.

74. The Special Rapporteur commends the Government for having ensured community participation in the Victims Protection Law. The Government should continue to facilitate broad-based participation and effective engagement of affected communities with a view to addressing their concerns. The participation of affected communities also encourages community-led awareness raising and initiatives. Community participation should include the participation of vulnerable groups, as it is crucial for their empowerment and the creation of an inclusive society.

75. The Special Rapporteur urges the Government to involve individuals and community organizations in current and future nuclear and health policies, including in data collection and radiation monitoring, planning evacuation centres, designing health management surveys, decisions regarding radiation levels and evacuation zones, and in setting compensation amounts.

## V. Recommendations

**76. The Special Rapporteur urges the Government of Japan, in the formulation and implementation of its nuclear emergency response system:**

<sup>115</sup> Koichi Tanigawa et al, "Loss of life after evacuation: lessons learned from the Fukushima accident", *Lancet* (March 2012), vol. 379, no. 9819, p. 890.

<sup>116</sup> Official Report of the Fukushima Nuclear Accident Independent Investigation Commission (see footnote 4), p. 6.

<sup>117</sup> Louise Lemyre et al, "Emergency Preparedness for Higher Risk Populations: Psychological Considerations", *Radiation Protection Dosimetry* (2009), vol. 134, No. 3–4, p. 211.

<sup>118</sup> Ibid.

<sup>119</sup> Fumie Saito, "Women and the 2011 East Japan Disaster", *Gender & Development* (June 2012), vol. 20, No. 2, p. 268.

(a) To establish regularly updated emergency response plans that clearly demarcate command structures and specify evacuation zones and evacuation centres, and provide guidelines for assisting vulnerable groups;

(b) To convey disaster management plans, including response and evacuation measures, to residents of areas likely to be affected by a nuclear accident;

(c) To release disaster-related information to the public as soon as a nuclear accident occurs;

(d) To distribute promptly iodine prophylaxis before or as soon as an accident occurs;

(e) To provide for prompt and effective usage of such technology as SPEEDI in gathering and disseminating information on affected areas.

77. With regard to health monitoring of the affected population, the Special Rapporteur urges the Government:

(a) To continue to monitor the impact of radiation on the health of affected persons through holistic and comprehensive screening for a considerable length of time, and to make appropriate treatment available to those in need;

(b) To provide persons residing in all affected areas with radiation exposure higher than 1 mSv/year with the health management survey;

(c) To ensure greater participation and higher response rates in all health surveys;

(d) To ensure that the basic health management survey includes information on the specific health condition of individuals and other factors that may exacerbate the effect of radiation exposure on their health;

(e) To avoid limiting health check-ups on children to thyroid checks, and to extend check-ups for all possible health effects, including urine and blood tests;

(f) To make follow-up and secondary examinations on children's thyroid check-ups available to all requesting children and parents;

(g) To simplify the access of children and their parents to information regarding their test results, while ensuring the protection of private information;

(h) To refrain from restricting examination for internal exposure to whole-body counters and to provide it to all affected population, including residents, evacuees and persons outside Fukushima prefecture;

(i) To ensure that mental health facilities, goods and services are available to all evacuees and residents, especially vulnerable groups, such as older persons, children and pregnant women;

(j) To monitor the health effects of radiation on nuclear plant workers and to provide treatment, where necessary.

78. With regard to policies and information on radiation doses, the Special Rapporteur urges the Government:

(a) To formulate a national plan on evacuation zones and dose limits of radiation by referring to current scientific evidence, based on human rights rather than on a risk-benefit analysis, and to reduce the radiation dose to less than 1mSv/year;

(b) To provide, in schoolbooks and materials, accurate information about the risk of radiation exposure and the greater vulnerability of children to radiation exposure;

(c) To incorporate validated independent data, including those from communities, to monitor radiation levels.

79. With regard to decontamination, the Special Rapporteur urges the Government:

(a) To formulate urgently a clear, time-bound plan to reduce radiation levels to less than 1mSv/year;

(b) To clearly mark sites where radioactive debris is stored;

(c) To provide, with the participation of the community, safe and appropriate temporary and definitive storage facilities for radioactive debris.

80. With regard to transparency and accountability within the regulatory framework, the Special Rapporteur urges the Government:

(a) To require the regulatory authority and nuclear power plant operators to comply with internationally agreed safety standards and guidelines;

(b) To ensure disclosure by members of the Nuclear Regulation Authority of their association with the nuclear power industry;

(c) To make information collected by the Nuclear Regulation Authority, including regulations and compliance of nuclear power plant operators with domestic and international safety standards and guidelines, publicly available for independent monitoring;

(d) To ensure that TEPCO and other third parties are held accountable for the nuclear accident, and that their liability to pay compensation or reconstruction efforts is not shifted to taxpayers.

81. In relation to compensation and relief, the Special Rapporteur urges the Government:

(a) To formulate, with the participation of the communities affected, the implementing framework under the Victims Protection Law;

(b) To include cost of reconstruction and restoration of lives in the relief package;

(c) To provide free health check-ups and any treatment required due to health effects from the nuclear accident and radiation exposure;

(d) To ensure that compensation claims by affected persons against TEPCO are settled without further delay.

82. The Special Rapporteur urges the Government to ensure effective community participation, especially participation of vulnerable groups, in all aspects of the decision-making processes relating to nuclear energy policy and the nuclear regulatory framework, including decisions regarding nuclear power plant operations, evacuation zones, radiation limits, health monitoring and compensation amounts.