Preface

After almost seven years since the accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi Nuclear Power Plant, areas struck by the tragedy are steadily moving forward on a path toward reconstruction and regeneration.
The level of radioactive materials has dropped since that time, and foods available on the market are now safe, thanks to the efforts of producers and all people concerned.
On the other hand, some people have concerns over the issue of “radioactivity.”
We hope this brochure will help foster your understanding of food safety and the effects of radiation and resolve questions that you may have on the subject.
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“Radiation” is similar to high-intensity light rays that have the ability to penetrate matter that are emitted when unstable nuclei change into stable nuclei. The ability to emit radiation is called “radioactivity,” and materials that have such ability are called “radioactive materials.”

Radiation includes alpha (α) rays, beta (β) rays, gamma (γ) rays, X-rays and neutron beams. The intensity of energy and ability to penetrate matter differ according to the type of radiation.

* In the example of a street lamp, the light constitutes radiation, the street lamp comprises radioactive material and the ability to emit light translates into radioactivity. As your body would not gleam after it is exposed to light, your body would not acquire radioactivity even after it is subjected to radiation. Radiation is not infectious; it is not epidemic among humans.
Food and Radiation Mini Q&A

Q.2 Will radioactive materials remain indefinitely?

Because radioactive materials turn into stable substances that do not release radiation after they have released radiation, their radioactivity levels drop over time. The amount of time required for radioactive materials to be reduced by half is called "physical half-life."

The physical half-life of radioactive materials depends on the type of material and is unaffected by cooking or other applications of heat. Freezing of food with radioactive materials does not affect the physical half-life, either.

A.2

- **Iodine-131**: Approx. 8 days
- **Cesium-134**: Approx. 2 years
- **Cesium-137**: Approx. 30 years

Q.3 What is the difference between the units for measuring radioactivity: "becquerel" and "sievert"?

"Becquerel (Bq)" is a unit that indicates the ability of radioactive materials to emit radiation contained in food, water or other substances. One "becquerel" is the amount of radiation released when one unstable nucleus of radioactive material changes into another nucleus in one second.

On the other hand, the effects of radiation differ according to the type of radiation and situation of exposure. The unit "sievert (Sv)" is a common unit used to indicate the effects of radiation on the human body. Radiation of identical sievert values will always have the same level of effect on the human body, even if conditions such as the situation of exposure and type of radiation differ.

A conversion coefficient called the effective dose coefficient is used to convert the unit becquerel, which shows the amount of radioactive materials contained in a food, into sievert, an indication of the impact of ingesting that food on the human body.
**Q.4 Was our environment radiation-free prior to the accident?**

Radioactive materials found in our soil and air have been emitting radiation ever since the earth came into being. Our foods also contain natural radioactive materials. Space is filled with a large amount of radiation, with some reaching the earth. The type of radiation that has always existed in nature, as above, is called natural radiation. We are constantly exposed to these forms of radiation.

The impact of artificial radiation and naturally occurring radiation on the human body is the same if their sievert values are identical.

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**Natural radiation to which we are exposed in one year -- Annual radiation dose per person**

<table>
<thead>
<tr>
<th>Internal exposure</th>
<th>External exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air 0.48</td>
<td>Space 0.3</td>
</tr>
<tr>
<td>Food 0.99</td>
<td>Earth 0.33</td>
</tr>
</tbody>
</table>

**Natural radiation** 2.1 mSv

**Average in Japan**
- Air: 0.48 mSv
- Food: 0.99 mSv
- Space: 0.3 mSv
- Earth: 0.33 mSv

**Average in the world**
- Air: 1.26 mSv
- Food: 0.29 mSv
- Space: 0.39 mSv
- Earth: 0.48 mSv

**Natural radiation** 2.4 mSv

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* The annual exposure dose (including internal exposure) from natural radiation in Japan was conventionally said to be 1.5 millisieverts/year. However, the figure was revised to 2.1 mSv/year after the internal exposure dose was adjusted upward following a verification of research papers in Japan and abroad, which confirmed the underestimation of polonium-210 found primarily in fish offal.

* Elements that constitute the body of plants and animals contain a certain proportion of naturally occurring radioactive materials (such as potassium-40). Our body, which intake radioactive materials through breathing or consuming plants and animals, also contains radioactive materials (approximately 7,000 becquerels in the case of a Japanese person weighing 60kg).

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**Naturally occurring radioactive materials found in our body**

- **In the case of a Japanese person (weight: 60kg)**
  - Potassium-40: Approx. 4,000 (Bq/person)
  - Carbon-14: Approx. 2,500 (Bq/person)
  - Others: Approx. 520 (Bq/person)

Source: “Research on Radiation Data in Living Environment” (1983) by Nuclear Safety Research Association (public interest incorporated foundation)
What is the difference between “external exposure” and “internal exposure”?

External exposure refers to exposure to radiation emitted by radioactive materials outside the body. By contrast, internal exposure is exposure to radiation from radioactive materials inside our body, which we intake primarily through breathing, drinking, and eating.

External exposure and internal exposure have the same degree of effect on the human body, if their values shown by sievert are identical.

We are subjected to natural radiation through both “external exposure” and “internal exposure” in our daily lives.
(2) Impact on humans

Q.1 What effects does radiation have on the human body?

We are constantly exposed to a small amount of radiation, but we have always lived our life as usual without becoming particularly concerned about its effects on our health. The effects of radiation depend not on its “presence” but the “amount” of exposure.

When our body is exposed to radiation, its energy may damage some DNA (genes) in our cells. However, because our body has a mechanism to repair the DNA damage, many of the cells are restored as most unrepaired cells are replaced by healthy cells through the process of metabolism.

On the other hand, exposure to a large amount of radiation at once results in an increase in the number of dead cells if the DNA repair cannot keep up with the process, which causes health hazards such as nausea, hair loss, cataracts and skin disorders. The body will recover from temporary symptoms when the number of normal cells increases, but if the body is further exposed to a large amount of radiation and suffers from significant damage to cells in tissues and organs, its impact may be sustained.

Even when the body is exposed to radiation in amounts that would not cause immediate symptoms, the body may sometimes fail to properly repair the DNA damage. If cells with DNA that are not fully repaired are not eliminated and remain in the body and proliferate, it may lead to health hazards including cancer.

Q.2 Can a small amount of radiation affect our health?

Current scientific evidence suggests that the impact of exposure to radiation of less than 100 mSv is too small to detect any significance.

Cancer-causing factors other than radiation can be found in various areas of our life including stress and smoking. For this reason, the rate of increase in carcinogenic risks posed by a small amount of radiation is said to be so insignificant as to be masked by the carcinogenic effects posed by other factors.

- 200-500
  - Too lean (BMI < 19)
  - Obese (BMI ≥ 30)
  - Sedentary lifestyle
  - too much salty foods
  - Relative cancer risks: 1.29
  - 1.22
  - 1.15-1.19
  - 1.11-1.15

- 100-200
  - too little vegetables
  - Passive smoking (non-smoking female)
  - Relative cancer risks: 1.08
  - 1.06
  - 1.02-1.03

- Less than 100
  - Undetectable

*Figures on the carcinogenic risks of radiation are based on data analysis of instantaneous exposure following the dropping of atomic bombs on Hiroshima and Nagasaki (solid cancer only) and are not derived from observation of the long-term effects of exposure.

Source: National Cancer Center Japan
Q.3 Will the radioactive materials intaked in baby remain long?

Radioactive materials that are taken in the body through breathing, eating and drinking are remitted from the body by the processes of metabolism and excretion. The time required for radioactive materials in the body to decrease to half their original value through this elimination process is called the “biological half-life.” The physical half-life (see A2 on p2) and biological half-life proceed simultaneously. The time required for actual radioactive materials in the body to decrease to half their original value is called “effective half-life.”

* For instance, in the case of cesium-137, whose physical half-life is 30 years, the amount of cesium-137 in the body decreases to half its original value in about three months (in the case of a 50-year-old person).

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Physical half-life</th>
<th>Biological half-life</th>
<th>Effective half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesium-137</td>
<td>Up to age 1</td>
<td>Approx. 30 years</td>
<td>9 days</td>
</tr>
<tr>
<td>Up to age 9</td>
<td></td>
<td></td>
<td>38 days</td>
</tr>
<tr>
<td>Up to age 30</td>
<td></td>
<td></td>
<td>70 days</td>
</tr>
<tr>
<td>Up to age 50</td>
<td></td>
<td></td>
<td>90 days</td>
</tr>
<tr>
<td>Iodine-131</td>
<td>Infants</td>
<td>Approx. 8 days</td>
<td>11 days</td>
</tr>
<tr>
<td>Age: 5 years</td>
<td></td>
<td></td>
<td>23 days</td>
</tr>
<tr>
<td>Adults</td>
<td></td>
<td></td>
<td>80 days</td>
</tr>
</tbody>
</table>

Q.4 Will the effects of radiation be inherited?

The hereditary effects of radiation exposure in humans have not been reported in past case studies and surveys. Also, hereditary effects in children showed no significant difference among those exposed to radiation as compared with those who are not.
(3) Food safety

What is the recent condition of radioactive materials contained in food?

The amount of radioactive materials contained in agricultural and animal products whose cultivation and breeding conditions are managed by producers has decreased yearly and values exceeding the limits are found in very few products at present. By contrast, the levels in some wild products exceed the limit in some regions.

None of the agricultural products including vegetables and tea (see p9) were found to have exceeded the limit in inspection results after FY2013. Figures for all animal products were also below the limit. Also, none of the items in the rice and legume was found to have exceeded the limit for those produced after 2015 (as of December 26, 2017).

Stringent inspections are being conducted on wild mushrooms, wild plants, wild animal meat, etc., since their values may exceed the limit in some regions and items due to difficulties concerning the management of producers.

[Inspection Results until FY2011][1]

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of inspected items</th>
<th>Number of items that exceeded the limit 1</th>
<th>Ratio of items that exceeded the limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>26,464</td>
<td>592</td>
<td>2.2%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>12,671</td>
<td>385</td>
<td>3.0%</td>
</tr>
<tr>
<td>Fruits</td>
<td>2,732</td>
<td>210</td>
<td>7.7%</td>
</tr>
<tr>
<td>Legume</td>
<td>689</td>
<td>16</td>
<td>2.3%</td>
</tr>
<tr>
<td>Tea</td>
<td>2,233</td>
<td>192</td>
<td>8.6%</td>
</tr>
<tr>
<td>Raw milk</td>
<td>1,919</td>
<td>8</td>
<td>0.4%</td>
</tr>
<tr>
<td>Beef</td>
<td>78,095</td>
<td>1,052</td>
<td>1.3%</td>
</tr>
<tr>
<td>Pork, poultry and eggs</td>
<td>867</td>
<td>6</td>
<td>0.7%</td>
</tr>
<tr>
<td>Mushrooms/ wild plants</td>
<td>3,856</td>
<td>779</td>
<td>20.2%</td>
</tr>
<tr>
<td>Fishery products</td>
<td>8,576</td>
<td>1,476</td>
<td>17.2%</td>
</tr>
<tr>
<td>Wild bird and animal meat</td>
<td>631</td>
<td>394</td>
<td>62.4%</td>
</tr>
</tbody>
</table>

[Inspection Results in FY2016][1]

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of inspected items</th>
<th>Number of items that exceeded the limit 1</th>
<th>Ratio of items that exceeded the limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>Approx. 10.26 million</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>10,610</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Fruits</td>
<td>2,155</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Legume</td>
<td>957</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Tea</td>
<td>102</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Raw milk</td>
<td>1,420</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Beef</td>
<td>211,288</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Pork, poultry and eggs</td>
<td>752</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Mushrooms/ wild plants</td>
<td>9,241</td>
<td>69</td>
<td>0.7%</td>
</tr>
<tr>
<td>Fishery products</td>
<td>18,166</td>
<td>11</td>
<td>0.1%</td>
</tr>
<tr>
<td>Wild bird and animal meat</td>
<td>1,711</td>
<td>378</td>
<td>22.1%</td>
</tr>
</tbody>
</table>

*1 Result of inspections conducted by 17 prefectures subject to inspections under the “Concepts of Inspection Planning and the Establishment and Cancellation of Items and Areas to which Restriction of Distribution and/or Consumption of Foods Concerned Applies” (decision by the Nuclear Emergency Response Headquarters) based on data released by the Ministry of Health, Labour and Welfare, local governments and other institutions before December 26, 2017. Figures for cereals (rice and pulses) were aggregated by the Ministry of Agriculture, Forestry and Fisheries according to the fiscal year of production.

*2 Number of items that exceeded the limits established in April 2012 (provisional regulation limits were applied in FY2011; the current limits were used in aggregation for comparison purposes)
What actions have been taken on radioactive materials in food?

Restrictions on distribution are enforced based on systematic monitoring inspections and their results to prevent foods that exceed the limit from entering the market.

To ensure food safety, health effects (risks) of radioactive materials in food are evaluated (see p10), limits are established (see p9) and inspection plans are formulated by the respective prefectural governments based on the guideline set by the Nuclear Emergency Response Headquarters. Food items are put through monitoring inspections prior to shipping according to the guideline. Food items whose values were found to exceed the limits in inspections are collected and discarded.

Inspection plans are formulated by examining the analysis of past inspection results and other data so that proper inspections can be conducted on food items and regions in which the level of radioactive materials is likely to exceed the limit.

The inspection results are published on the website, etc., of the Ministry of Health, Labour and Welfare and local public organizations.

When radioactive materials levels that exceed the limit are detected widely in region following monitoring inspections, “distribution restrictions” are designated in specific regions and items. Also, instructions on “consumption restrictions,” in addition to “distribution restrictions,” are issued when significantly high concentrations of radioactive materials are detected, which require farmers to refrain from consuming home-grown agricultural products.

Distribution and consumption restrictions are lifted in response to applications by the prefectural government when the safety of the food in question is confirmed and the conditions set out in the government’s guideline are fulfilled.
Q.3 What are the standards for radioactive materials in food?

A.3

The limits are established so that the radiation levels would be lower than the level considered safe internationally (additional radiation dose derived from food is less than 1 millisievert/year) for both sexes and all age groups.

The limits are classified according to four categories of drinking water, milk, infant foods and general foods. The limit for drinking water was established at “10 Bq/kg” based on the guidance level indicated by the World Health Organization (WHO).

The limits for general foods were established after considering the differences in the amount of food consumed according to sex and age groups and the impact of radioactive materials on health. The calculation is based on the annual additional radiation dose that would not exceed approximately 0.9 mSv (assuming approximately 0.1 mSv of radiation dose comes from drinking water) even if 50% of the foods contained a certain level of radioactive materials and if such foods are ingested continuously (limits for radioactive materials in food). The value of “100 becquerels/kg” was consequently determined based on the most conservative limit (meaning lower limits) established for males aged 13-18. Accordingly, this is considered the safe limit for people of both sexes and all age groups.

Furthermore, the value for infant foods consumed by infants under a year old and milk, whose intake by children is extremely high, is “50 Bq/kg,” which is one half (meaning twice as rigorous as) the limit for general foods out of consideration for children.

The limits are designed to reduce the radiation doses from food and drinking water to below the specified level. The limit values are lower in Japan than in other countries, as represented by the view of Codex Alimentarius Commission (1,000Bq/kg), in consideration of the amount of food ingested in a year and the effects of radioactive materials other than cesium as well as the nuclear accident that occurred in the country.

<table>
<thead>
<tr>
<th>Food group</th>
<th>Limit (Bq/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking water</td>
<td>10</td>
</tr>
<tr>
<td>Milk</td>
<td>50</td>
</tr>
<tr>
<td>Infant foods</td>
<td>50</td>
</tr>
<tr>
<td>General foods</td>
<td>100</td>
</tr>
</tbody>
</table>

The limits are calculated by considering the intake and effects of radioactive materials on health according to age category.

<table>
<thead>
<tr>
<th>Age category</th>
<th>Limits (Bq/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1</td>
<td>460</td>
</tr>
<tr>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>310</td>
</tr>
<tr>
<td>Female</td>
<td>320</td>
</tr>
<tr>
<td>7-12</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>190</td>
</tr>
<tr>
<td>Female</td>
<td>210</td>
</tr>
<tr>
<td>13-18</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>120</td>
</tr>
<tr>
<td>Female</td>
<td>150</td>
</tr>
<tr>
<td>19 and older</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>130</td>
</tr>
<tr>
<td>Female</td>
<td>160</td>
</tr>
<tr>
<td>Pregnant</td>
<td>160</td>
</tr>
</tbody>
</table>

* The limits are calculated by considering the intake and effects of radioactive materials on health according to age category.
In the process of setting the limits, the Food Safety Commission of Japan evaluated the risk of additional exposure from radiation in food on human health based on the current scientific evidence at home and abroad as follows:

(1) The effect of radiation on health can be observed when the lifelong additional accumulation of effective radiation dose is approximately 100 mSv or larger, which excludes exposure that occurs in the normal course of life, such as natural radiation (2.1 mSv/year in Japan) and medical exposure.

(2) It has been concluded that the health effects of exposure to radiation of 100 mSv or less are difficult to identify because they may not be clearly distinguishable from effects attributable to factors other than radiation.

Radiation levels of approximately 100 mSv do not constitute the boundary between safe and hazardous ranges but a rough indication presented to enable appropriate risk management of food.

Consequently, the Ministry of Health, Labour and Welfare set the upper limit of additional radiation dose from foods at 1 mSv/year for reasons outlined below:

(1) The Codex Alimentarius Commission (a joint organization of the World Health Organization [WHO] and the Food and Agriculture Organization of the United Nations [FAO]), which establishes international specifications and standards on food, has adopted 1 mSv/year as an intervention exemption level in its guideline.

* In addition, 1 millisievert/year is the value at which the International Commission on Radiological Protection (ICRP) says significant dose reductions cannot be achieved through further radiation protection measures.

(2) The concentration levels detected in many food items have dropped with the passage of time after the accident according to the results of monitoring inspections.
In some regions where countermeasures are deemed necessary from past inspection results, steps to produce foods that do not exceed the limit, including reducing the absorption of radioactive materials, are taken.

Much of the radioactive cesium that has fallen on farmland is absorbed by soil and remains on the soil surface. Consequently, measures such as stripping the top soil and mixing soil on the surface with soil in deeper layers (see illustration) are carried out to prevent farm crops from absorbing radioactive materials.

Potassium-based fertilizers are applied in the production of rice and other crops because the shortage of potassium in soil nutrients may lead to higher concentration of radioactive cesium in crops.

As for fruit trees, various steps were taken in the immediate aftermath of the nuclear accident to reduce the amount of radioactive materials that adhered to the surface of fruit trees including the removal of the coarse bark on the surface of the trunk and washing of the trunk with high-pressure water.

Also, provisional tolerable levels for radioactive cesium are set and managed for fertilizers, soil conditioners, culture media and other materials used in the production of agricultural products as well as grass forage, rice straw and other feeds given to animals in livestock farming.

In mushroom cultivation, guidance values for radioactive cesium are set for logs and beds for planting the spores.
Monitoring inspections, which consider the nature and habitat of marine fish and freshwater fish, are being conducted.

Monitoring inspections are being conducted by the prefectural governments subject to inspection with an eye on the fact that there are various types of fish including those that migrate according to their growth stage and season and those that live near the surface layers or near the seabed. When fishery products with radiation levels that exceed the limit (100 Bq/kg) are found, measures including restrictions or voluntary restraint on distribution are adopted.

In surveys conducted in Fukushima Prefecture, the proportion of products with levels that exceed the limit dropped to as low as 0.3% in October-December FY2017 from approximately 53% in April-June FY2011.

The effects of radioactive materials depend on the types of fish. None of the seawater fish that migrate long distances according to their growth stage, such as skipjack, tuna, salmon and saury, was found to have levels that exceed the limit. Also, levels that exceed the limit have not been detected among fish that live near the surface layer, such as whitebait and launce, since the autumn of 2011. Levels that exceed the limit were detected among some of the fish that live near the seabed, such as righteye flounder and rockfish, but their proportion has been decreasing gradually. None of the items in the fisheries category was found to have exceeded the limit after April 2015 (as of December 2017). On the other hand, levels exceeding the limit were detected in some species in the freshwater fish category, but their proportion has been dropping. Also, as of now, levels that exceed the limit have not been detected in shellfish, squid, octopus, shrimp, crab or seaweed including wakame.

Since the nuclear accident, voluntary restraint has been in place on the operation of all coastal fishing and bottom trawling off the coast of Fukushima. Fishing is now limited to small-scale, experimental operations in ocean areas with low radioactive material values while shipment is confined to fish species whose safety has been confirmed by inspection among the types of fish that have not been subjected to distribution restrictions.
What is the present condition of wild mushrooms, wild plants, and wild bird/wild animal meat?

In FY2017, values that exceeded the limit were detected in some wild mushrooms, wild plants and wild animal meat, which are products in which measures to reduce the level of radioactive materials are difficult to employ. Continued caution is therefore required in this field.

In regions where there is a possibility that products with radiation levels exceeding the limit (100 Bq/kg) may be detected, voluntary restraint on distribution, distribution restrictions and/or consumption restrictions are enforced based on inspection results to prevent wild mushrooms, wild plants, and wild bird and wild animal meat whose radiation levels exceed the limit from entering the market. Information on restrictions are announced on the website of the Forestry Agency and prefectural governments.

Even in regions where distribution restrictions are issued, there are cases in which the distribution of some products are allowed including wild mushrooms, wild plants and wild animal meat that are managed according to the shipping and inspection policy of the prefecture in question and are considered safe.

How is tap water monitored?

According to the results of monitoring inspections, radioactive cesium levels exceeding 10 Bq/kg have not been detected in tap water (purified water) since June 2011.
What is the impact of radioactive cesium on the dietary life of average households?

Survey of actual foods on the market and meals consumed at home revealed that the annual radiation doses from the radioactive cesium in the foods were far smaller than 1% of 1 millisievert/year, the upper annual dose limit value used as evidence in establishing the limit.

To investigate the level of radioactive cesium contained in actual foods, the Ministry of Health, Labour and Welfare has conducted measurements using the “Market Basket method” and “duplication portion method” since 2012 and published the results on its website.

Under the “Market Basket method,” foods are purchased through market and the concentration of radioactive cesium contained in such foods are measured in their original form, and after simple processing and cooking to estimate the annual radiation dose people are subjected to in their average dietary life. Under the “duplication portion method,” meals cooked at actual homes are collected and their radioactive cesium concentration levels are measured to estimate the annual radiation dose.

As a result, in all surveys, the annual radiation dose from radioactive cesium in food was found to be less than 0.01 mSv, or 1% of 1 mSv/year, which is a rough indication for additional annual exposure used as evidence in establishing the limit.

Based on the results of these surveys and inspections of radioactive materials in food, which indicate that radioactive materials are no longer detected in many of the food items, it can be said that the amount of radioactive cesium ingested in daily dietary life is too small to have an adverse impact on human health.
The limits for radioactive materials in foods are determined by using radioactive cesium, which is easy to measure, as the indicator after incorporating into calculation the effects of radionuclides whose physical half-life is longer than one year (cesium, strontium, plutonium and ruthenium) among the radionuclides that were released after the accident at TEPCO’s Fukushima Daiichi Nuclear Power Plant.

While radioactive cesium concentration levels can be measured in a short time because it emits gamma ($\gamma$) rays, the measurement of nuclides other than radioactive cesium such as strontium takes more time. For this reason, the handling of these nuclides is difficult and poses a challenge in daily food inspections that need to be conducted promptly.

Thus, the limits for radioactive cesium are set after calculating the proportion of radioactive cesium to the total by examining the effects of other radionuclides so that the total effects would not exceed 1 mSv. Thus, the measurements of cesium by itself would totally limit the annual radioactive effect by 1 mSv or less including the effects of other nuclides.

Since 2012, the Ministry of Health, Labour and Welfare has conducted measurements for radionuclides other than radioactive cesium in a survey answered on page 14.

As a result, the survey showed that radioactive strontium levels that were detected were zero or low values that fall within the ranges before the accident.

Also, plutonium was not detected in any of the specimens.
Q. Where should I go to learn more about matters related to radiation?

A. Please refer to a more detailed brochure titled “Food and Radiation Q & A (Japanese, English)” for information on food and radioactivity.

http://www.caa.go.jp/jisin/food_s.html
Those who wish to have a copy of the brochure are requested to contact the Consumer Affairs Agency.

Please also refer to websites of the related governmental agencies for information, risk communication, etc., on radioactive materials.

“Information on the Great East Japan Earthquake,” Consumer Affairs Agency
http://www.caa.go.jp/disaster/
“Risk communication, etc., regarding food and radioactive materials”
http://www.caa.go.jp/jisin/r_index.html#ris-top

“Radioactive contamination of food in Japan,” Food Safety Commission of Japan
https://www.fsc.go.jp/sonota/emerg/radio_hyoka.html
“Exchange of opinions, etc.”
https://www.fsc.go.jp/koukan/

“Information on the Great East Japan Earthquake,” Ministry of Health, Labour and Welfare
http://www.mhlw.go.jp/shinsai_jouhou/index.html
“Risk communication regarding food safety”

“Information on the Great East Japan Earthquake,” Ministry of Agriculture, Forestry and Fisheries
“Roundtable discussions with consumers”

Information on matters other than food are announced by the respective governmental agency in charge.

Health effects of radiation and condition of accident, etc.
“Unified basic information on health effects of radiation,” Ministry of the Environment
http://www.env.go.jp/chemi/rhm/basic_data.html

“Basic Information on Radiation Risk,” Reconstruction Agency
http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-1/20140603102608.html

Information on decontamination
“Environmental Remediation,” Ministry of the Environment,
http://josen.env.go.jp/index.html

“Environmental Regeneration Plaza,” Fukushima Prefecture, Ministry of the Environment,
http://josen.env.go.jp/plaza/

*All the URLs on this page are for Japanese sites.*
It's important to know the subject well.

(Contact)
Consumer Affairs Agency, Government of Japan
http://www.caa.go.jp/
1-1, Kasumigaseki-3, Chiyoda-ku, Tokyo 100-8958
Common Government Building No. 4
03-3507-8800 (Main switchboard)

(Homepage of related governmental agencies)
Food Safety Commission of Japan http://www.fsc.go.jp/
Ministry of Agriculture, Forestry and Fisheries http://www.maff.go.jp/
Ministry of the Environment http://www.env.go.jp/

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