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## CHERNOBYL FORUM

# Chernobyl Forum reports 20-year findings, offers recommendations

**N**EARLY 20 YEARS after the April 26, 1986, accident at the Chernobyl-4 reactor in Ukraine, the Chernobyl Forum met as an international conference, held September 6–7 in Vienna, and arrived at a consensus on its scientific findings, as well as on measures to alleviate the health and environmental problems that remain. The conference, the theme of which was *Chernobyl: Looking Back to Go Forwards*, was attended by some 200 scientists and senior-level governmental representatives, including some from the three most affected countries—Belarus, Russia, and Ukraine.

The Chernobyl Forum was established by the International Atomic Energy Agency (IAEA) in 2003 with the aim of developing an authoritative consensus on the impact of the accident that would guide future research and the rehabilitation of the people and the environment. In addition to the IAEA, the other UN bodies involved in the forum are the Office of the Coordinator for Humanitarian Affairs (OCHA), the UN Development Program (UNDP), the Food and Agriculture Organization, the UN Environment Program, the UN Scientific Committee on the Effects of Atomic Radiation, the World Health Organization (WHO), and

*Nearly 20 years after the Chernobyl accident, an international forum says a different approach is needed in addressing the region's recovery.*

the World Bank. The governments of Belarus, Russia, and Ukraine are also members of the forum.

### Findings

The findings discussed at the conference were prepared by international experts convened as two working groups—on environmental impacts, under the IAEA, and on health impacts, under WHO.

The official consensus summary report describes the accident as explosions rupturing the reactor vessel of Unit 4 and causing a fire that continued for 10 days. The resulting cloud spread numerous types of radioactive materials, most significantly iodine and cesium radionuclides, over much of Europe, with the greatest concentrations occurring over large areas of Belarus, Russia, and Ukraine adjacent to the reactor.

Some 200 000 emergency and recovery operation workers, known as “liquidators,” were initially involved in containment and cleanup work in 1986–1987 at the stricken

site and the nearby area, since designated the “Exclusion Zone.” The number of registered liquidators was later increased to 600 000, but only a small fraction of those were exposed to dangerous levels of radiation. The highest doses were to about 1000 liquidators during the first day of the accident.

About 5 million people are living in areas contaminated above 37 kBq/m<sup>2</sup> of Cs-137, of whom some 400 000 had lived in more contaminated areas, classified by Soviet authorities as areas of strict control (above 555 kBq/m<sup>2</sup> of Cs-137). Some 116 000 people were evacuated from the Exclusion Zone (which is in Belarus and Ukraine, adjacent to the power plant) to noncontaminated areas in the spring and summer of 1986, and another 230 000 in subsequent years.

Reliable information about the accident and the resulting radioactive contamination was not initially made available to the affected people and remained inadequate for

about two years following the accident. This led to widespread distrust of official information and the mistaken attribution of many ill health conditions to radiation exposure. The forum's aim was to fill this void and promote better understanding of the post-accident situation, and also to recommend measures to better deal with the impacts.

### *Health impact*

The findings on health effects raised controversy and lengthy debate over the number of deaths already caused by the accident and how many were anticipated as likely to occur. The report of the WHO-led expert group noted "the deaths of 30 power plant employees and firemen within a few days or weeks," of whom 28 died of acute radiation syndrome (ARS). It did not project a figure for future deaths.

The summary report states, "Claims have been made that tens or even hundreds of thousands of persons have died as a result of the accident. These claims are exaggerated." It says that total deaths amounted to 50 liquidators, who died of ARS in 1986 and other causes in later years, and nine children, who died of thyroid cancer. It put the estimated possible deaths from cancer contracted as a result of radiation exposure at 3940 from among the 200 000 1986–87 liquidators, 116 000 evacuees, and 270 000 residents of the most contaminated areas.

Controversy seemed to be laced with some confusion when cancer specialist Elisabeth Cardis, of WHO, in a detailed presentation during the conference suggested that another 4000 might die from among the 5 million to 6 million in areas with low-level contamination. So, asked a Green Party member of the European Parliament, what is the number now? Another participant said that after 20 years of hearing that this was the world's worst nuclear accident, nobody would believe a total of 4000 deaths—that it was unbelievably low.

Michael Repacholi, of WHO, and other forum officials were put to some pains to explain that none of the predictions were meant to be exact, but merely to indicate scope. The estimates, he said, were based on models of dose-effect relationships, which in turn were based mostly on data from the survivors of the Hiroshima and Nagasaki bombs. It was noted that the two events were very dissimilar: The bomb survivors received a burst of acute exposure, and the accident at Chernobyl caused a chronic low-level condition. The same models could not be applied to both. The scientists did not want to include numbers for predicted deaths, but public relations officials had wanted them in the summary, Repacholi said in answer to questions.

The other findings on health impacts—relating to exposures, diseases caused and likely to occur, inherited or reproductive ef-

fects, trauma, and possible persistent psychological or mental health problems—were more readily acceptable.

In regard to exposures, the report says that with the exception of on-site reactor personnel and emergency workers, most of the recovery operation workers and people living in the contaminated territories received relatively low whole-body radiation doses, comparable to background radiation levels. Those who worked on site shortly after the accident received external gamma radiation of 2 to 20 Gy, and as a result 28 died within four months and another 19 over the years up to 2004. Doses to recovery operation workers, who worked for short periods during the following four years, ranged up to about 500 mSv, with an average of about 100 mSv.

Exposure levels of the evacuees from the Chernobyl accident area were also of concern, the report says, with doses that could only be estimated some time after they occurred. By careful evaluation of all available information, doses to Ukrainian evacuees were 17 mSv on average, with doses to individuals ranging from 0.1 to 380 mSv. The average dose to Belarusian evacuees was 31 mSv, with the highest average dose in two villages being about 300 mSv.

Ingestion of food contaminated with radioactive iodine did result in significant doses to the thyroid of inhabitants of the contaminated areas of Belarus, Russia, and Ukraine. Thyroid doses varied widely according to age, level of ground contamination with I-131, and milk consumption rate. Individual thyroid doses ranged up to about 50 Gy, with average doses in contaminated areas being about 0.03 to 0.3 Gy. Thyroid doses to residents of Pripjat (the city built to house plant staff) were substantially reduced by the timely distribution of stable iodine tablets. Drinking milk from cows that had eaten contaminated grass immediately after the accident was one of the main reasons for the high doses to the thyroid of children, many of whom subsequently developed thyroid cancer.

The report estimates that the accumulated effective dose (from external and internal exposure) for the general public in the contaminated areas in the 20-year span of 1986–2005 varies in different regions between 10 and 20 mSv, with some receiving up to about 100 mSv. "It should be noted that the average doses received by residents of the territories contaminated by Chernobyl fallout are generally lower than those received by people who live in well-known areas of high natural background radiation in India, Iran, Brazil, and China. Some residents in these areas receive over 25 mSv per year from the radioactive materials in the soil on which they live without any apparent health effects," it says.

Most of the 5 million living in contaminated areas of Belarus, Russia, and Ukraine

currently receive an annual effective dose of less than 1 mSv (the recommended dose limit for the general public), although the roughly 100 000 in more contaminated areas still receive more than 1 mSv annually.

Between 1992 and 2000, about 4000 cases of thyroid cancer were diagnosed in Belarus, Russia, and Ukraine among those who were children and adolescents (0–18 years) at the time of the accident, including some 3000 in the 0–14 age group, attributed to uptake of iodine-131, one of the principal radionuclides released by the accident. Of those treated, nine died of the disease.

Because of differing doses received, an increased risk of leukemia associated with radiation exposure from Chernobyl may become evident for the higher exposed accident liquidators, but would be quite unlikely for the general population. Ongoing studies may reveal possible increased risk to the liquidators, although as the risk decreases over the decades, its contribution to morbidity and mortality is likely to become less significant.

There appears to be some recent increase in morbidity and mortality caused by solid cancers and possibly circulatory system diseases in Russian emergency and recovery operation workers. The incidence of circulatory system diseases should be interpreted with special care because of the possible indirect influence of confounding factors, such as stress and unhealthy lifestyles. There remains no evidence of solid cancers in the general population as a result of the accident except for childhood thyroid cancer in children in contaminated areas. Medical care and annual examinations of highly exposed Chernobyl workers should continue, however, because elevated radiation-induced solid cancer morbidity is sustained for decades after exposure, following a latency period of about 10 years.

Tests on children and liquidators have shown that exposure to radiation doses perhaps as low as 250 mGy could be cataractogenic, the report says. Follow-up studies will allow greater predictive capability of the risk of radiation cataract onset and, more important, provide the data necessary to be able to assess the likelihood of any resulting visual dysfunction.

There is no likelihood of a radiation-related decrease in male or female fertility in the general population given the relatively low dose levels, which are also unlikely to have any effect on the number of stillbirths, adverse pregnancy outcomes, delivery complications, or the overall health of children. Birth rates may be lower in contaminated areas because of concern about having children, and this issue is obscured by the very high rate of medical abortions. No discernable increase in hereditary effects is expected.

Noting that the accident resulted in the traumatization of many people by rapid re-

location, breakdown in social contacts, and fear and anxiety about what health effects might result, the report poses the question: Are there persistent psychological or mental health problems?

Three studies found that exposed populations had anxiety levels that were twice as high as control groups, and they were three to four times more likely to report multiple unexplained physical symptoms and subjective poor health than were unaffected control groups, the report says. In general, the psychological consequences found in Chernobyl-exposed populations were similar to those in atomic-bomb survivors, residents near the Three Mile Island accident, and those who experienced toxic exposures at work or in the environment.

But findings of multiple extreme stresses and culture-specific ways of expressing distress unleashed by Chernobyl are difficult to interpret, the report says. In addition, individuals in the affected population officially labeled "Chernobyl victims" are frequently taking on the role of invalids rather than perceiving themselves as survivors and are encouraged to perceive themselves as helpless, weak, and lacking control over their future.

#### *Environmental consequences*

The report of the IAEA-led expert group on environmental impacts covers radioactive releases and depositions, radionuclide transfers and bioaccumulation, countermeasures, and effects on plants and animals.

The major releases, which continued for 10 days, included radioactive gases, condensed aerosols, and a large amount of fuel particles. The total release of radioactive substances was about 14 EBq (1 EBq =  $10^{18}$  becquerel), including 1.8 EBq of I-131, 0.085 EBq of Cs-137, 0.01 EBq of strontium-90, and 0.003 EBq of plutonium radioisotopes. Noble gases contributed about 50 percent of the total release.

More than 200 000 km<sup>2</sup> of Europe (more than 70 percent in the three most affected countries) were contaminated above 37 kBq/m<sup>2</sup> of Cs-137. Deposition, which was extremely varied, was enhanced by rain. Most of the Sr and Pu radioisotopes were deposited within 100 km of the accident site. While many significant radionuclides have decayed away, Cs-137 will continue for decades as the primary contaminant, and Sr-90 the secondary. Over the longer term (hundreds to thousands of years), plutonium isotopes and americium-241 contamination will be significant.

In urban areas, open surfaces were the most heavily contaminated. Wind, rain, and human activities, including traffic, street washing, and cleanup, which significantly reduced contamination in inhabited and recreational areas, caused secondary contamination of sewage systems and sludge storage. In most settlements conta-

minated by the accident, air dose rate above solid surfaces has returned to the pre-accident background level. But the air dose rate remains elevated above undisturbed soil in gardens, kitchen gardens, and parks in some settlements of Belarus, Russia, and Ukraine.

In rural areas, contamination of agricultural plants and plant-consuming animals was dominated by surface deposits of radionuclides during the first months. Radioiodine caused the most immediate concern because it was rapidly absorbed into milk at a high rate. Later, uptake of radionuclides (chiefly Cs-137 and Cs-134) through plant roots became important, and highly affected areas still may require environmental remediation. Sr-90 could still cause problems in areas close to the reactor, but other radionuclides such as plutonium isotopes and Am-241 did not cause real problems in agriculture, either because deposition was low or they were poorly available for root uptake from soil.

In general, there was a substantial reduction in the transfer of radionuclides to vegetation and animals in intensive agricultural systems within the first few years after deposition, due to weathering, physical decay, migration down into the soil, and reductions in bioavailability in soil. But there has been little further obvious decline—only about 3–7 percent per year in the last decade.

Cs-137 activity concentrations in foods produced in areas affected by the Chernobyl fallout are now generally below national and international action levels. But in some limited areas with high radionuclide contamination or poor organic soils, milk may still be produced with Cs-137 activity that exceeds national action levels of 100 Bq/kg, and environmental remediation may still be warranted.

Vegetation and animals in forests and mountain areas have shown particularly high uptake of radiocesium, with the highest recorded Cs-137 levels found in forest food products. Particularly high Cs-137 activity concentrations have been found in mushrooms, berries, and game. These levels have persisted for two decades, and forest food products still exceed intervention levels in many countries. In some areas of Belarus and Russia, consumption of forest foods with Cs-137 dominates internal exposure and can be expected to continue for several decades.

Radioactivity from Chernobyl-contaminated surface water systems in areas close to the reactor site and in many other parts of Europe was initially due primarily to direct deposition of mostly short-lived radionuclides on the surface of rivers and lakes. Contamination fell rapidly within weeks, through dilution, physical decay, and absorption of radionuclides to catchment soils. Bed sediments are an important long-term sink for radioactivity.

Secondary contamination by runoff of long-lived Cs-137 and Sr-90 from contaminated soils continues, but at a much lower level. Activity concentrations in surface waters and in fish are currently low, so irrigation with surface water is not considered a hazard. Cs-137 and Sr-90 levels in water and fish of rivers, open lakes, and reservoirs are currently low, but in some "closed" lakes, with no outflowing streams, water and fish will remain contaminated with Cs-137 for decades.

Irradiation caused numerous acute adverse effects on the plants and animals in high exposure areas, up to a distance of 20–30 km from the site (the Exclusion Zone). No acute effects have been reported in plants and animals outside the zone. The natural environment responded in a complex interaction between radiation dose and plant/animal radiosensitivity.

Cell death was observed in biota within the Exclusion Zone, at the individual and population levels, with increased mortality of coniferous plants, soil invertebrates, and mammals, and reproductive losses in plants and animals. No adverse radiation-induced effect has been reported in plants and animals exposed to a cumulative dose of less than 0.3 Gy during the first month after the accident.

With radionuclide decay and migration, biological populations have been recovering, starting in the first growing season following the accident but taking a few years for recovery from major radiation-induced adverse effects. Genetic effects in both somatic and germ cells were observed in plants and animals in the Exclusion Zone during the first few years. Different cytogenetic anomalies attributable to radiation continue to be reported from experimental studies, both in and beyond the Exclusion Zone, but it is not known whether the anomalies have any detrimental biological significance.

Biota recovery in the Exclusion Zone has been facilitated by the removal of humans and the cessation of agricultural and industrial activities. As a result, populations of many plants and animals have expanded. Indeed, environmental conditions have had such a positive impact on the biota that the Exclusion Zone has paradoxically become a unique sanctuary for biodiversity.

#### **Forum recommendations**

The scientists, politicians, and government officials attending the conference were in agreement that the health and socioeconomic recovery of areas affected by the Chernobyl accident now depends on weaning people away from a pervasive "victim" mindset and helping communities become economically productive.

To help people move forward more actively, the Chernobyl Forum decided that UN-led activities related to Chernobyl



would in the future be coordinated by the UNDP, rather than OCHA. "This shift in responsibility recognizes that the challenges facing the communities of Chernobyl are best met by focusing on economic development and the creation of new livelihoods, rather than on the provision of humanitarian aid," as has been done up until now, said Kalman Mizsei, UNDP assistant administrator.

Participants in the conference called on the national and local governments of the three most affected countries—Belarus, Russia, and Ukraine—and other governments and organizations that contribute funds and services for rehabilitation to focus resources more realistically. It stressed that the sick must be properly treated, rather than everyone being treated as sick. Funds could thus be freed to help the larger community fashion its future and return to normality.

Focusing resources—which already are scarce—on those most in need while actively fostering mainstream growth is the only alternative if sustained recovery is the aim, the conference participants agreed. People in real distress must be adequately treated. At the same time, a process of community healing, based on good information, would address the widespread psychosocial effects of the accident. A holistic approach would protect the most vulnerable and promote an orderly process of recovery over the coming years.

#### *Informing the public*

The forum report presents a series of specific recommendations, with public information topping the list. Communication with the public on the effects of the accident was poor at the start and remains inadequate, the report says. "Accurate information on living in conditions of low-dose radiation is available, yet it is either not reaching some people, or people are unable to digest it or act upon it."

Innovative ways need to be developed to increase knowledge about how to live safely in environments that have suffered radioactive contamination, the report says. Equally, those living in areas where exposure is too low to pose any real threat to health and well-being need to be reassured of this. Problems of credibility and comprehensibility have hampered past efforts. "Information targeted to specific audiences is needed, as well as trusted community sources" that could both help identify the type of information required and transmit it.

"Any new information strategy should embrace a comprehensive approach to promoting healthy lifestyles, and not simply focus on radiation hazards. Health education aiming at reducing internal and external radiation should be just one part of health promotion." Policies and interventions that aim to reduce the main causes of

## International Briefs

**ASME HAS OPENED AN OFFICE IN BRUSSELS TO BUILD UP ITS TIES** to the engineering community in Europe and surrounding regions. The initial role of the American Society of Mechanical Engineers' first European office is to assess the state of engineering practice in Europe, Africa, and the Middle East and to gauge the technical community's interest in ASME's array of technical products and services.

The Brussels office will promote dialogue with local engineers, corporations, educational institutions, and technical associations and will administer programs and events. The focus of the outreach efforts will include government relations, continuing education, and technical codes and standards. ASME staff have already begun to meet with engineers and their employers to gain an understanding of the needs and challenges facing Europe's engineering and technology community and also to assess the interests and needs of young practitioners.

**GENKAI-3 HAS BEEN CLEARED TO OPERATE WITH MOX FUEL** by Japan's Nuclear Safety Commission and Atomic Energy Commission. According to the Japan Atomic Industrial Forum, with these two assessments presented at the end of August, the Nuclear and Industrial Safety Agency can now give the go-ahead to Kyushu Electric to load mixed-oxide (MOX) fuel into the 1180-MWe pressurized water reactor. The utility, however, must still obtain agreement from the local municipalities.

**ONAGAWA-1, -2, AND -3, IN MIYAGI, SHUT DOWN AUTOMATICALLY** when a strong earthquake hit the region on the morning of August 16. According to the Japan Meteorological Agency, the epicenter of the event—which measured 7.2 on the Richter Scale—was offshore of the Miyagi Prefecture. All plants were operating normally when the earthquake struck. At Onagawa-3, an 825-MWe unit, glass windows in the visitors' gallery of the reactor building cracked, and a tank in the plant's Environmental Radioactivity Measurement Center leaked about 45 liters of dilute sulfuric acid. The earthquake did not affect operations at other reactors in the region, which include Tokyo Electric's Fukushima and Kashiwazaki Kariwa sites.

**THE START OF COMMERCIAL OPERATION OF HIGASHIDORI-1** has been delayed two months, from October to December 2005. According to the Japan Atomic Industrial Forum, Tohoku Electric has pushed back the date to allow sufficient time to inspect isolation valves similar to a main steam isolation valve that malfunctioned during trial operations in June. The unit achieved its first criticality on January 24 and was connected to the grid on March 9.

**ARMENIA WAS PROMISED SUPPORT FOR ESSENTIAL SAFETY UPGRADES** at the Metsamor nuclear power plant by International Atomic Energy Agency Director General Mohamed ElBaradei during a two-day visit to the country at the end of July. ElBaradei also promised help to revise an assessment of Armenia's energy needs during a meeting with the country's president, other government ministers, and the head of the Armenian Nuclear Regulatory Authority, and agreed to provide assistance for a feasibility study for constructing a new nuclear power plant in the country.

Also included in ElBaradei's visit was a courtesy call to His Holiness Karekin II Supreme Patriarch and Catholicos of All Armenians at St. Etchmiadzin. The Armenian Apostolic Church leader said the safe and uninterrupted operation of Metsamor, which provides more than 35 percent of Armenia's domestic energy needs, was vital to Armenia.

disease and rising mortality that affect Belarus, Russia, and Ukraine should also address a variety of causes other than radiation, such as excessive drinking and smoking, participants said.

The report notes that government intervention programs need to take into account the fact that levels of contamination vary in the different zones and to focus intervention on highly contaminated areas. They also should clarify to the public that many areas previously considered to be at risk are, given natural processes as well as corrective measures, now in fact safe for habita-

tion and cultivation. The far smaller areas with higher levels of contamination require a different strategy focused on greater monitoring, provision of health and social services, and other assistance.

Also noted is that programs should be streamlined and refocused to meet the objectives of reducing the exposure to radiation and providing support to those directly affected, in a cost-effective way. They should abandon measures that have created a dependency mentality and energize those that support opportunity, promote local initiatives, involve the people, and spur confi-

dence in people shaping their own destinies with available resources.

#### *Targeting the needy*

State benefits should be targeted better. “Many entitlements,” the report says, “are not related to the health impact of radiation, but are mainly socioeconomic in nature and correlated with residence rather than with any demonstrated need.” These should be replaced with programs that target the needy. Benefits and privileges should be folded into a conventional social assistance system that is targeted and means-tested. Elimination of benefits should be considered for people in areas of mild contamination, the report suggests.

It also points to the enormous sums “currently spent on benefits that make little significant difference to individual households, yet pose a huge burden on national budgets—or are not paid at all owing to revenue shortfalls. Moreover, correlating benefits with area of residence alone is unsound public policy, particularly where radiation levels are as low as natural background levels in other parts of Europe. Inhabitants should not be eligible for most benefits unless a causal connection between the accident and individual ill health can be demonstrated. Those who need state assistance on poverty grounds should be covered by a nationwide targeted and means-tested system of social assistance.”

#### *Strengthening health care*

The report stresses the strengthening of primary health care services in contaminated areas, saying that this should be a priority and should include the promotion of healthy lifestyles, improvements in access to and the quality of reproductive health care, especially obstetric health care in the most contaminated areas, and the provision of psychological support as well as diagnosis and treatment of mental health problems, especially depression. On the other hand, the provision of medicine and dental services should be eliminated [from Chernobyl-focused programs], except where some causal connection can be demonstrated between the accident and health status.

The report recommends a rethinking of “health recuperation” programs. “The provision of sanatoria and recuperation is not cost-effective, and such holidays offer little that is of direct health benefit to those exposed to low-dose radiation. In addition, they carry a strong suggestion that the affected areas are somehow ‘poisonous’ and thus unsuitable for human habitation. Moreover, access to the programs is not always equitable.” The money spent on them could be better used to provide primary health care and promote healthy lifestyles. International charities that offer health holidays should also be asked to rethink this policy

and encouraged to refocus their energies on measures that promote better health outcomes in affected communities—or to label their activities something broader than “Chernobyl.”

#### *Producing safe food*

On the desirability of promoting safe food production where radionuclides are present in the soil, the report says, “Knowledge is available, but some countermeasures are currently not being applied due to the lack of funds. Little is being done to ensure the production of clean food on private plots, and thus to address the issue of food being produced for personal consumption or for sale on village markets. But cost-benefit analysis is essential in propagating [radionuclide] mitigation measures, as the costs of producing ‘clean food’ may exceed any reasonable market value.”

#### *Promoting economic, social viability*

The report stresses that development aiming to make the affected communities economically and socially viable in the medium and long term should be at the core of strategies to address the effects of Chernobyl. Very large resources would be needed to promote economic recovery in these communities, but community self-

sufficiency and self-reliance would free up large national resources, which at present are tied up in subsidies and special Chernobyl-related assistance.

An improved business climate and the encouragement of investment, along with support for private sector development, are advocated. “Appropriate national policies would need to be supplemented by a proactive approach to stimulating economic development at the regional and local levels. Economic incentives, such as special zones, should be used only in tandem with improvement in the business environment, as the use of tax and other incentives to attract entrepreneurial and skilled people to the region may not work in an unfriendly business environment, or because badly designed instruments may lead to perverse incentives.”

The report encourages support for initiatives that promote inward investment, both domestic and international, to create small and medium-size enterprises in the affected areas and in the adjacent towns and cities “using the whole range of business support techniques that have been tried and tested in other parts of the world.” Particular efforts are needed to promote indigenous agricultural and food processing businesses.

The report urges giving high priority to supporting very small-scale businesses at

the local level, including village-level enterprise clusters, to boost the incomes of the poorest households. “Such initiatives must draw on the growing body of international experience in this area and be sensitive to the very special problems affecting communities that largely depend on food production in areas suffering from radioactive contamination.”

The report stresses that community structures need to be built to replace those lost in the process of evacuation and as a result of the breakup of the Soviet Union. Initiatives specifically designed to strengthen social interactions and promote community and economic leadership in towns and villages are needed to underpin sustainable recovery. Possibilities for promoting “specialized ecological tourism” and for maximizing the contribution that these areas can make to the preservation of international biodiversity should be explored.

A digest report, *Chernobyl’s Legacy: Health, Environmental and Socio-economic Impacts and Recommendations to the Governments of Belarus, the Russian Federation and Ukraine*, contains the forum’s findings and recommendations and is available on the IAEA’s Web site at <[www.iaea.org](http://www.iaea.org)>.—*Gamini Seneviratne*