

GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO.6109
TO BE ANSWERED ON 04.04.2018

USE OF NUCLEAR ENERGY

6109. DR. BHAGIRATH PRASAD:

Will the PRIME MINISTER be pleased to state:

- (a) the details of use of nuclear energy in electricity production, agriculture, medicine and health sector;
- (b) the comparative status of usage of nuclear energy in the said sector in the country *vis-a-vis* China and Japan; and
- (c) the steps taken by the Government to encourage the use of atomic energy in the said sector?

ANSWER

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND
PRIME MINISTER'S OFFICE (Dr. JITENDRA SINGH):

- (a) Applications of nuclear energy and radiation have played a significant role in the field of electricity production, agriculture, medicine and health. Contributions of Department of Atomic Energy (DAE) have made a positive impact on improvement in the treatment of disease and the quality of life of citizens in the country.

Electricity Generation :-

The total electricity generation from the Nuclear Power Plants during the last three years was 115292 Million Units.

Agriculture :-

Using radiation induced mutagenesis technology, DAE has developed 42 varieties in oilseeds (groundnut, mustard, soybean and sunflower), pulses (urdbean, mungbean, Pigeonpea, cowpea), rice and jute, which have been released and notified for commercial cultivation across the country.

Government of India (Department of Atomic Energy) has set up two radiation technology demonstration units, one commissioned in the year 2000 for high dose irradiation at Vashi, Navi Mumbai, and another in 2002, for low dose irradiation, i.e. Krushi Utpadan Sanrakshan Kendra (KRUSHAK) facility at Lasalgaon near Nashik. The facilities are being operated by the Board of Radiation & Isotope Technology (BRIT). Two plants are also set up one each by Maharashtra government and Gujarat government. Currently, 15 irradiation plants including those in Private Sector are functional in the country carrying out radiation processing of agricultural/food products. Presently fruits like Mango and Pomegranate and vegetable like onions and garlic are being irradiated for shelf life extension.

Medicine and Health :-

BRIT under DAE India is responsible for production and supply of Medical products linked to human health. The radioisotopes produced in nuclear reactors/ cyclotron is employed for medical applications. The nature of radiation emitted from the radioisotope determines its utility for diagnostic or therapeutic application. Under this category diagnostic and therapeutic radiopharmaceuticals are manufactured.

Some of the Radiopharmaceuticals manufactured and supplied are :-

- 1) ^{99m}Tc -Technetium based radiopharmaceuticals: For diagnosing diseases related to all the important organs of the body comprising cerebral, myocardial, renal, liver, lung, etc. and for cancer detection.
- 2) ^{18}F -Fluorine based diagnostic radiopharmaceuticals: PET based products for diagnosis of cancer, cardiac and neuro diseases.
- 3) ^{131}I -Iodine based products for diagnosis and therapy of thyroid and related cancers.
- 4) ^{32}P -Phosphorus, ^{153}Sm -Samarium and ^{177}Lu -Lutetium based Therapeutic radiopharmaceuticals for relieving the cancer borne pain and cancer therapy.

Other than the above radiopharmaceuticals BRIT supplies ^{60}Co (Cobalt) source for Bhabhatron Teletherapy unit used as radiation source for treatment of cancer. Also ^{125}I based in vitro Radioimmunoassay kits for diagnosing the low concentrations of hormones, proteins, etc. present in blood are supplied.

- (b) The nuclear share of **electricity generation** in the year 2016 in the country was about 3.4% and is comparable to China (3.6%) and Japan (2.2%).

In so far as **medicine and health Sectors** are concerned, around 220 Nuclear medicine centres are currently operational in India which employ above radioactive products for medical applications. However no such data is available for countries like China and Japan for direct comparison.

- (c) In so far as **electricity generation** through nuclear technology is concerned, the government has taken several enabling steps to increase the nuclear power capacity and to provide adequate quantity of fuel. These include:

- (i) Resolution of issues related to Civil Liability for Nuclear Damage (CLND) Act & Creation of Indian Nuclear Insurance Pool (INIP).
- (ii) Accord of administrative approval and financial sanction of - ten (10) indigenous 700 MW Pressurized Heavy Water Reactors (PHWRs) to be set up in fleet mode & two (02) units of Light Water Reactors (LWRs) to be set up in cooperation with Russian Federation.
- (iii) Amendment of the Atomic Energy Act to enable Joint Ventures of Public Sector Companies to set up nuclear power projects.
- (iv) Entering into enabling agreements with foreign countries for nuclear power cooperation including supply of fuel.

In so far as **Agriculture sector** is concerned, Ministry of Food Processing Industries (MOFPI) grants subsidy to gamma radiation processing plants under SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) which are installed for gamma radiation processing of food products.

In so far as **Health & Medicine sectors** are concerned, the Government provides all impetus to the use of nuclear energy in health care by promoting Nuclear Medicine practices in the country. This is with respect to indigenous development of import substitutes and also providing cost-effective treatment. The medical cyclotron of Radiation Medicine Centre provides the PET imaging facility to patients at no cost. Use of a Lutetium-177-labeled product (DOTA-TATE) for treatment of cancer patients having neuroendocrine cancer is 10-15 times less than the imported radiopharmaceutical (Rs.10,000 vs. Rs.1,50,000).
