

**GOVERNMENT OF INDIA
EARTH SCIENCES
LOK SABHA**

UNSTARRED QUESTION NO:6875
ANSWERED ON:17.05.2012
EXPLORATION OF ARCTIC REGIONS
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Will the Minister of EARTH SCIENCES be pleased to state:

- (a) the steps/initiatives taken up to explore the Arctic regions;
- (b) the total budgetary allocation for the same during the last three years; and
- (c) the result achieved so far in respect of exploration of Arctic regions?

Answer

MINISTER OF THE STATE IN THE MINISTRY OF PLANNING, MINISTER OF THE STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTER OF THE STATE IN THE MINISTRY OF EARTH SCIENCES (DR. ASHWANI KUMAR)

(a) Madam, India began its scientific endeavours in the Arctic in 2007 when a team of five scientists visited the International Arctic Research Facilities at Ny-Å...lesund on the Svalbard archipelago in Norway to initiate studies in the fields of Arctic microbiology, atmospheric sciences and geology. Following the success of this initial step, the Ministry embarked on a long-term program of regular scientific activities in the Arctic. To date, over 60 scientists from 18 national institutions, organisations and universities have participated in the Indian Arctic Programme, which is being co-ordinated and implemented by the Goa-based National Centre for Antarctic and Ocean Research (NCAOR), and autonomous institution of the Ministry. At Ny-Å...lesund, Indian scientists are engaged with the frontier areas of sciences relevant to the Arctic realm, such as glaciology, atmospheric science, biology and climate change.

To facilitate the Indian activities, a station building at Ny-Å...lesund has been taken on lease to serve as India's Research Base in the Arctic. This station building christened "Himadri" has adequate living and work space for a total of 8 scientists.

(b) Madam, the budgetary allocation for the last three years from 2009 to 2012 was ` 13.33 crores. Year wise budgetary allocation for the Indian Arctic Program for past three years is as below:

2009-10 : Rs 2.60 crores

2010-11 : Rs 1.94 crores

2011-12 : Rs 8.79 crores

(c) Madam, salient features of the studies carried out by Indian scientist are as given below:

Atmospheric Sciences: The studies of atmospheric aerosols, quantification of their physical and optical properties and estimating the aerosol radiative forcing over Arctic region are among the ongoing long-term investigations by the Indian scientists from the Space Physics Laboratory (SPL), Trivandrum, Indian Institute of Tropical Meteorology (IITM), Pune and NCAOR, Goa. A study carried out involved the simultaneous measurements of atmospheric electrical field, conductivity, the concentrations and size distribution of atmospheric aerosols over Ny-Alesund. The total number concentration and size distributions of aerosols observed shows a good correlation with wind speed and wind direction.

Snow-pack production of carbon monoxide and its diurnal variability at Arctic: Photochemical reactions in snow have recently witnessed an unprecedented surge of interest. Recent investigations have shown production and significant release of CO flux from the snow covered region. On the basis of measurements made at Maitri, Antarctica and at Ny -Alesund, Arctic, a group of researchers from the National Physical Laboratory has observed a systematic diurnal cycle in the snow-pack production of carbon monoxide coinciding with the diurnal cycle of solar radiation. This variation implies that photochemical production of CO is active in the snow covered regions of Antarctica and Arctic.

Glaciological Studies: A major multi-institutional program has been mounted by scientists from NCAOR, GSI and JNU for long-term measurements of snow ablation/accumulation on the Vestre Broggerbreen glacier. The glaciological studies also comprise detailed chemical analysis of snow/ice. Preliminary snow ablation/accumulation measurements reveal that the observed short-term ablation/accumulation, especially in the higher and middle reaches of the glacier, is mainly attributed to the wind deflation rather than melting.

The biogeochemical studies programme has been undertaken in the Kongsfjorden system is being implemented by NCAOR. The first phase of studies has focused on the planktonic studies in the fjord while the second phase concentrated on nitrogen cycling.

Biological Sciences: Scientists from various institutions and Universities have participated in the biological programs being mounted in the Kongsfjorden system. Broad-scale changes to Arctic ecosystems and communities illustrate the sensitivity of these systems to changing conditions, both natural and human-induced.