GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. **1373**
TO BE ANSWERED ON THURSDAY, DECEMBER 12, 2013

CLOUD AEROSOL INTERACTION AND PRECIPITATION ENHANCEMENT EXPERIMENT

1373. SHRI ANURAG SINGH THAKUR:

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a) whether the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX) programme is functioning in the country;
(b) if so, the details of the locations where it has been started and whether its second phase has also started;
(c) if so, whether Himachal Pradesh or other hilly States have also been included in it;
(d) if so, the details thereof; and
(e) the achievements made under the said programme?

ANSWER
MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(SHRI S. JAIPAL REDDY)

(a) Yes Madam.

(b) The CAIPEEX program has completed two research campaign phases during 2009-2011 and the third phase is scheduled during the current five year plan. The Phase I was designed to investigate the aerosol and cloud interaction over different parts of the country (Pune, Hyderabad, Bengaluru, Pathankot, Bareilly and Guwahati) to select a suitable place for cloud seeding studies, which was second objective of CAIPEEX. Phase II was conducted subsequently with Hyderabad as a base for two years (2010-2011).

(c) No Madam.

(d) Does not arise.

(e) Details of the achievements of CAIPEX for the last 3-years and the current year are as per Annexure.

Annexure

Year	Targets	Achievements
2009	Cloud aerosol observations over different parts of country using instrumented aircraft.	Studies on the variation of cloud microphysical properties such as cloud droplet size distribution over geographically different locations in India are pursued.
2010	Cloud aerosol observations over seeding area/tropical convergence zone area of north India and randomized cloud seeding operations along with DWR operating from Solapur (200 km radius from the Radar location has been the target area for the seeding operations).	• Studies on raindrop formation occurring in the slightly mixed cloud parcels, entrainment effects in the background of varying aerosol concentrations are pursued. • Augmented full-fledged Integrated Ground Observational Campaign (IGOC) at the central location Mahabubnagar with surface instruments for measuring boundary layer parameters, aerosols, Cloud Concentration Nuclei, trace gases, and atmospheric thermodynamics were deployed at the IGOC site. TIFR Balloon facility, Hyderabad Space Physics Laboratory (SPL), Trivendrum and University of Pune (UoP) participated in the IGOC so as to understand the role of surface and boundary layer processes and their interactions with clouds. • Studies related to droplet size distribution as a result of in cloud activation of interstitial aerosol particles in cloud updrafts and associated drop size growth are pursued.
2011	Cloud aerosol observations over seeding area/tropical convergence zone area of north India and randomized cloud seeding operations along with DWR operating from Mehabubnagar (200 km radius from the Radar location has been the target area for the seeding operations)	Development of cloud development processes, both in the seeded and unseeded environments, have been studied using C-band DWR installed at Mehbubnagar and S-band DWR of ESSO-IMD, Hyderabad. A fully randomized cloud seeding experiments were conducted using both hygro-scopic flares and salt powder as seeding agents. Processes related to the rise in warm rain depth with increase in aerosol under certain favourable conditions have been studied and further research in this regard is pursued.
2012-2013	Analysis of the phase-I and Phase-II CAIPEX data to understand the rainfall processes.	Treatment of cloud micro-physical processes through the parameterization of the indirect effect of aerosol, cloud droplet, effective radius, rain drop formation, ice nucleation etc. in weather and climate models is taken up using the observations. The studies so far yielded about 20 research publications in various reviewed national and international journals of repute.

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