GOVERNMENT OF INDIA
EARTH SCIENCES
LOK SABHA

UNSTARRED QUESTION NO:2271
ANSWERED ON:22.08.2013
CLOUD AEROSOL INTERACTION AND PRECIPITATION ENHANCEMENT EXPERIMENT
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Will the Minister of EARTH SCIENCES be pleased to state:

(a) the areas covered under the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEX) programme;

(b) whether the second phase of CAIPEX has been concluded;

(c) if so, the findings of the same;

(d) whether the Government is seeking to extend the programme to other regions, apart from those earmarked in the second phase of implementation;

(e) if so, the details thereof; and

(f) the targets set and achieved during the last three years and the current year under the said programme?

Answer

MINISTER OF THE STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTRY OF EARTH SCIENCES (SHRI S. JAIPAL REDDY)

(a) Phase I of the CAIPEX consisted of cloud aerosol observations using instrumented aircraft over different parts of the country during the period 24 May − 30 September 2009 from the air- bases of Pathankot, Barelli, Guwahati, Hyderabad, Pune, and Bangalore. The aircraft observations covered almost all the Indian region and some coastal Arabian Sea and Bay of Bengal sea region up to 20 km from the coast.

(b) Yes Madam.

(c) The aircraft flights were conducted from Hyderabad base for the randomized cloud seeding experiment. C-Band Doppler Weather Radar (DWR) was operated from Sholapur in the monsoon season 2010 and from Mahabubnagar in the monsoon season 2011. The area encompassed by the 200 km radius from the DWR location has been the target area for the seeding operations. The aircraft flights were organized for research and seeding purposes using two aircrafts. On the whole, 28 randomized seeding experiments were carried out both by flares and fine grained salt powder following WMO Weather Modification Expert Committee recommendations.

(d) Yes Madam. For getting statistically significant results, a large number of cases (at least 200) are required to be organized.

(e) CAIPEX will be carried out over Ganges valley during monsoon- 2014, which specific focus on the monsoon clouds formation and their propagation over land with augmented ground based observations so as to investigate the effect of aerosol-clouds and monsoon. The randomized seeding program will be continued for some more years from Hyderabad till statistically significant results from seeding experiments are achieved.

(f) Details of the targets and achievements of CAIPEX for the last 3-years and the current year include

Year	Targets	Achievements
2009	Cloud aerosol observations over different parts of country using instrumented aircraft	220 hours of flying was organized with instrumented aircraft during the period 24 May - 30 September 2009

2010	Cloud aerosol observations over seeding area/tropical convergence zone area of north India and randomized cloud seeding operationsseeder along with DWR operating from Solapur (200 km radius from the Radar location has been the target area for the seeding operations)	About 200 hours of flying was organized with 2-instrumented aircrafts (research air-craft was flown for 120hours and the aircraft for 80hours) during September - October 2010.
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 seeding operations)•agents. # 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) partici-pated in the IGOC so as to understand the role of surface and boundary layer processes and their interactions with cloud	An instrumented research and a seeder aircraft carried out during September-November 2011. Both the aircrafts were flying together for 250hours. A fully randomized cloud seeding experiments were conducted using both hygro-scopic flares and the salt powder as seeding agents. C-band DWR from Mehbubnagar and S-band DWR of IMD, Hyderabad were used during the campaign.
2012-2013	Analysis of the phase-I and Phase-II CAIPEX data to understand the rainfall processes	The aircraft measured cloud microphysical and aerosol data and ground based IGOC data has been analyzed to understand the role of aerosols in the rainfall process. The studies so far yielded about 20 research publications in various reviewed national and international journals of repute.