O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

STARRED QUESTION NO. 278

TO BE ANSWERED ON WEDNESDAY, MARCH 11, 2026

CROPS EXPERIMENT MODULE

*278. SHRI DARSHAN SINGH CHOUDHARY:

Will the PRIME MINISTER be pleased to state:

(a) whether research is being conducted by the Indian Space Research Organisation (ISRO) to study plant growth, seed germination and biological processes under microgravity and modified gravity conditions under the Compact Research Module for Orbital Plant Studies (CROPS) experiment module;

(b) if so, the major scientific objective of the experiment, types of crops/seeds used and the duration of the study;

(c) whether the findings of the said experiment are proposed to be applied in climate change, agriculture with limited resources, space agriculture and future long-term human space missions and if so, the details thereof;

(d) whether the Government aims to link earth-based agricultural research with practical benefits related to crop productivity, development of stress-tolerant varieties and seed quality improvement through the said experiment and if so, the details thereof; and

(e) whether participation of the Indian Council of Agricultural Research (ICAR), Universities and other research institutes has been ensured in the said project?

ANSWER

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

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(a) to (e) A Statement is laid on the Table of the House.

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STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO STARRED QUESTION NO. 278 REGARDING 'CROPS EXPERIMENT MODULE' ASKED BY SHRI DARSHAN SINGH CHOUDHARY FOR ANSWERING ON WEDNESDAY, MARCH 11, 2026.

(a) Yes. A technology demonstration payload called as Compact Research Module for Orbital Plant Studies (CROPS) as part of PSLV Orbital Experimental Module (POEM-4), in the PSLV-C60 mission was launched on December 30, 2024, to study plant growth and biological processes under micro-gravity conditions, wherein germination of seeds was achieved under microgravity conditions.

(b) The main objective of the CROPS payload was to demonstrate germination of a seed and growth of plant up to two leaves stage in space for 5 to 7 days. Cowpea seeds were selected for the study.

(c) Yes, the findings from the CROPS (Compact Research Module for Orbital Plant Studies) experiment are proposed to be applied primarily in space agriculture and future long-term human space missions, with potential indirect benefits for agriculture in resource-limited environments on Earth. However, there is no direct emphasis on applications to climate change. Growing plants from seed in space under microgravity conditions is an important milestone for space biological research, to produce food in space and as an engaging activity for the astronauts in space during long duration manned missions. CROPS experiment is the first of many innovative steps that has been taken up and continued research & development activities are essential to overcome the challenges in space agriculture and producing sustainable food sources for long duration missions.

Experiments like CROPS are significant for carrying out technology demonstrations related to development of sustainable systems for future long-duration human space missions. Space-based plant growth systems can supplement packaged food and enhance self-sufficiency. Developing technologies and processes for reliable plant growth modules under microgravity condition contributes for the long duration human space missions.

(d) CROPS is a preliminary experiment carried out to demonstrate germination of a cowpea seed and growth of plant up to two leaves stage in space. Further research needs to be carried out for gaining valuable insights towards practical benefits.

(e) It may be noted that the CROPS experiment, was developed by ISRO's Vikram Sarabhai Space Centre (VSSC), which demonstrated seed germination (cowpea) and early plant growth in microgravity as a step toward space agriculture for long-duration human space missions. Indian Council of Agricultural Research (ICAR), or any other agricultural research institutes/ universities have not directly participated or involved in the experiment. However, the data from the experiment is available to these institutes for further studies.

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