GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION

LOK SABHA
UNSTARRED QUESTION NO. 1407
TO BE ANSWERED ON 12/02/2019

TOLERANCE MECHANISM OF CROPS

1407. SHRI RAJENDRA AGRAWAL:

Will the Minister of AGRICULTURE AND FARMERS WELFARE
कृषि और किसान कल्याण मंत्री be pleased to state:

(a) whether the Government has carried out any study for understanding the tolerance mechanism of crops in drought and thermal stress environments and if so, the details thereof including the total costs of the projects; and

(b) whether the findings of the study has led to production of various weather resistant crops and if so, the details thereof?

A N S W E R

MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE AND FARMERS WELFARE
कृषि और किसान कल्याण मंत्रालय में राज्य मंत्री
(SHRI GAJENDRA SINGH SHEKHAWAT)

(a) Yes, Madam. Research programmes were undertaken at different institutions at ICAR such as Indian Agricultural Research Institute (IARI), New Delhi, National Rice Research Institute (NRRI), Cuttack and Indian Institute of Wheat and Barley Research, Karnal to understand drought and thermal stress tolerance in different crops including rice and wheat using limited resources available at the Institutes. However, systematic and comprehensive studies on tolerance mechanism of crops in drought and thermal stress environments could be undertaken at multiple institutes under the network project, National Innovations in Climate Resilient Agriculture (NICRA) for rice, wheat, maize, black gram and vegetable crops like tomato and onion with adequate budgetary support. State-of-the art infrastructure facilities to undertake climate change research viz. plant phenomics, free air temperature enrichment (FATE), carbon dioxide and temperature gradient chambers (CTGC), temperature gradient tunnels and rainout shelters etc. have been established in several ICAR institutes across the country. Many institutes of ICAR viz. ICAR- Indian Agricultural Research Institute (IARI), New Delhi, ICAR- National Rice Research Institute (NRRI), Cuttack, ICAR- Indian Institute of Rice Research (IIRR), Hyderabad, ICAR- Indian Institute of Horticultural Research (IIHR), Bengaluru, ICAR- Indian Institute of Vegetable Research (IIVR), Varanasi and ICAR-Directorate of Onion and Garlic Research (DOGR), Pune have been actively involved in developing abiotic stress tolerant cultivars of different crops.

Details of the total cost under the NICRA project to different institutes for the past seven years (2011-2018) are given below:-

Name of the Institute	**Total cost of the project (Rs. in Lakhs) during 2011-2018**
ICAR- IARI, New Delhi	6950
ICAR- NRRI, Cuttack	840
ICAR- IIRR, Hyderabad	1190
ICAR- IIHR, Bengaluru	4055
ICAR- IIVR, Varanasi	714
ICAR- DOGR, Pune	110
ICAR-Indian Institute of Pulses Research (IIPR) Kanpur	542
Total	**14401**

(b) Yes, Madam. Findings of NICRA project so far has led to release of two resistant varieties. One drought tolerant variety of rice (CR Dhan 201) suitable for aerobic rice for Chhattisgarh and Bihar has been released by ICAR-National Rice Research Institute, Cuttack under this project. Similarly, an extra short duration greengram variety (IPM-205-7/Virat) with 60-65 days duration, resistant to yellow mosaic virus, and also suitable to summer cultivation was developed by ICAR-Indian Institute of Pulses Research, Kanpur. Genes responsible for imparting resistance for drought in rice and wheat have been identified and characterized through molecular approaches. Thousands of wild germplasm lines of rice and wheat, collected from several locations across the country, have been screened to identify new sources of resistance for several abiotic stresses. These new germplasm lines could be used in future breeding programmes to develop new varieties tolerant to drought, heat stress and salinity stress. These institutes also developed several climate resilient technologies. In addition, the following climate resilient varieties developed under National Agricultural Research System have been evaluated and demonstrated in 151 climatically vulnerable districts.

Name of Crops	**No. of Tolerant Varieties**
Horsegram	4
Wheat	8
Maize	3
Sorghum	2
Pearl millet	1
Finger millet	2
Foxtail millet	1
Pigeonpea	8
Chickpea	5
Greengram	4
Safflower	1
Sesamum	3
Soybean	6
Niger	1
Groundnut	4
Mustard	3
Total	**56**

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