

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

**LOK SABHA
STARRED QUESTION NO. 199
TO BE ANSWERED ON 20TH DECEMBER, 2022**

EFFECTS OF CLIMATE CHANGE ON CROPS

***199. SHRI RATTAN LAL KATARIA:**

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

- (a) whether climate change is causing new kinds of diseases which are hugely affecting the health of humans and animals as well as crops;
- (b) whether the Government is taking any step for continuous research on the said aspects;
- (c) if so, the details thereof;
- (d) whether the Government is taking any steps to avoid emergency situations like the heavy loss of crops and animals that occurred due to the attack of locust swarms in many States during the corona period last year; and
- (e) if so, the details thereof ?

ANSWER

THE MINISTER OF AGRICULTURE AND FARMERS WELFARE
कृषि और किसान कल्याण मंत्री (SHRI NARENDRA SINGH TOMAR)

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

**STATEMENT IN RESPECT OF PARTS (a) TO (e) OF LOK SABHA STARRED
QUESTION NO. *199 TO BE ANSWERED ON 20TH DECEMBER, 2022 REGARDING
“EFFECTS OF CLIMATE CHANGE ON CROPS”**

(a) Yes, certain climate sensitive health issues / diseases have been identified in human beings viz. air pollution related illness, climate change and disaster related diseases, heat related illness, vector borne diseases and water borne diseases under the National Action Plan on Climate Change and Human Health (NAPCCHH). The emergence, transmission and establishment of animal diseases are also influenced by climate change. Indian Council of Agricultural Research (ICAR) has been studying the impact of diseases and insect-pests under changing climates in various crops and animals. Climatic conditions influences the outbreaks of some diseases viz. Lumpy Skin Disease (LSD), Avian influenza, African Swine Fever (ASF), Classical Swine Fever (CSF), Theileriosis, Gastro-intestinal Parasitism (GIP) and Anthrax etc. Amongst the field crops, the diseases like alternaria blight in groundnut; blast, sheath rot and blight in rice; dry root rot in chickpea; stem rot in mustard and vegetable; thrips in chillies and white fly in various crops had direct correlation to changes in climate. Similarly the effect of rise in sea surface temperature (SST) and its impact is visible on fish habitat, changes in phenology, trophodynamics, abundance and catch of fish species, as well as distributional shift of fishes and shift in the breeding season.

(b) and (c): Indian Council of Medical Research (ICMR) has identified four priority areas viz.,(a) Climate Change and Vector Borne diseases, (b) Aerosols and Respiratory Diseases, (c) UV-A and UV-B and Corneal Damage and Cataract and (d) Environment and Heart Diseases and has initiated research on those areas.

Indian Council of Agricultural Research (ICAR) has launched a flagship network project to study the impact of climate change on agriculture including crops, livestock, horticulture and fisheries, to develop and promote climate resilient technologies in agriculture, to address the vulnerable areas of the country and to help the districts and regions prone to extreme weather conditions like droughts, floods, frost, heat waves, etc. to cope with such extremes. Under this programme, the pest dynamics in relation to climate change under field conditions was studied through database development on diseases, insect-pests and weather of crops of importance across 12 agro-climatic zones.

ICAR has developed climate resilient varieties in different crops tolerant to diseases and insect-pests. Since 2014, a total 1752 climate resilient varieties were developed which include 1352 resistant to diseases and insect-pests. Besides, sixty eight location-specific climate resilient technologies have been developed and popularized for wider adoption among the farming communities. Agricultural contingency plans for 650 districts have been prepared. Based on vulnerability assessment, climate resilient technologies are being demonstrated on farmer's fields in 151 clusters covering 446 villages. ICAR has also developed ICT based pest surveillance for data accrual; Location specific weather based models (rule based & empirical) to predict the pest status; Digital tools of pest forecasting (web and mobile apps on Pestpredict); Mobile apps on integrated pest management of target crops including insecticide and fungicide calculators and forecast modules.

Directorate of Plant Protection, Quarantine and Storage (PPQ&S), Department of Agriculture and Farmers Welfare through its 36 Central Integrated Pest Management Centres (CIPMCs) across 28 States and 2 UTs conduct various training programmes, such as regular survey & surveillance of crop pests, Farmers Field Schools (FFS), 2 and 5 days HRD programmes, IPM Exhibitions, Seed Treatment Campaigns and Kisan Gosthis to train farmers on the Agro-Ecosystem Analysis (AESAs) based decision-making and management of crop pest/ disease; need based, safe and judicious use of chemical pesticides to manage the crop pests and follow the label claims & instructions as approved by the Registration Committee (RC) and the benefits of using bio-control agents and bio-pesticides to manage the crop pests / diseases and advised farmers to use chemical pesticides only as the last resort.

The NADRES (National Animal Disease Referral Expert System) provides disease outbreak prediction two month in advance and the prediction models also account for climatic factors. The disease emergence, transmission and establishment were found to be influenced by climate changes. ICAR conduct studies for diseases like Lumpy Skin Disease (LSD), Avian Influenza, African Swine Fever (ASF), Classical Swine Fever (CSF), Theileriosis, Gastro-intestinal Parasitism (GIP) and Anthrax. In recent years ICAR has developed many vaccines like LumpyProVax^{Ind} for LSD, Ancovax for coronavirus in animals, PPR Marker Vaccine (*peste des petits* in ruminants) and Plague vaccine for duck.

(d) and (e): Desert Locust (DL) is a trans-boundary migratory pest. It has the ability to fly hundreds of kilometres collectively in swarms. Recent locust attack reported in India during 2019-20 and 2020-21 is an example of large scale locust upsurge after a gap of 26 years. To deal with the problem of locust swarms, Government of India has established Locust Circle Offices, 8 in Rajasthan and 2 in Gujarat, one Locust Warning Organization (LWO) at Jodhpur, one Field Station for Investigation on Locust (FSIL) at Bikaner. Being global transboundary migratory pest, the Department coordinates with Food and Agriculture Organization (FAO) and South West Asia Commission (SWAC) for exchange of information on actual status, movement and control of locust. Forewarning and advisories were issued regularly and management strategies were communicated in advance through different communication modalities to the farmers of affected areas. The chemicals were made available in time and the various modes, which *inter alia* included helicopters, drones, and different machineries like tractors and pickup vehicles installed with latest spray pumps, were used to spray chemicals.

For different crops, respective ICAR crop-based institutes make surveillance, prediction of diseases and issues advisories for different diseases and insect-pests. Similarly, ICAR- National Institute of Veterinary Epidemiology and Disease (NIVEDI) and NADRES provides forecasting and forewarning of disease outbreak prediction two month in advance. It takes care of the climatic factors.

There has also been emphasis on development of vaccines and vaccination of animals for diseases like LSD, CSF, ASF, Bluetongue, Anthrax etc., for protection of animals.
