

**Central Research Institute for Dryland Agriculture  
Hyderabad**

Sub: Reply to the Rajya Sabha provisional admitted starred/unstarred  
question Dy. No. U2106 regarding **Impact of climate change**

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**a) Whether Government has made any qualitative and quantitative assessment of the nature of risks involved for major crops as a result of climate change and local conditions;**

The Indian Council of Agricultural Research (ICAR) through its network project "National Project on Climate Change (NPCC)" carried out the impact of climate change on some important crops using the crop simulation models by incorporating the projected climate scenarios. Significant impact on crop yields has been predicted in major food crops such as rice, wheat, sorghum (2020, 2050 and 2080 scenarios) maize (2030 and 2080). Climate change may likely benefit certain crops such as chickpea, soybean and potato in India. In Himachal Pradesh, risk management consequent to warming and reduction in chilling temperatures, Apple cultivation has shifted to higher elevations.

**b) If so, the details thereof including major crops classified as risk prone crops, regions-wise;**

**Rice**

Irrigated rice yields are projected to reduce by -4% in 2020, 7% in 2050 and by -10% in 2080 scenarios. On the other hand, rainfed rice yields in India are projected reduced by -6% in 2020 scenario, but in 2050 and 2080 scenarios they are projected to decrease only marginally (<2.5%). Adopting improved varieties and input management can improve the yields by 6-17% in irrigated condition and by about 20-35% in rainfed condition.

**Wheat**

Climate change is projected to reduce the timely sown irrigated wheat production by about 6% in 2020 scenario from existing levels, however, late and very late sown wheat yields are projected to decrease by about 18% in 2020, 23% in 2050 and 25% in 2080 scenarios if no adaptation is followed. However, adaptation by sowing improved varieties coupled with improved agronomic management can improve the yields by about 10% in 2020 (2010-2040) scenario.

**Maize**

Climate change is projected to reduce the irrigated kharif maize yields by up to 18% in 2020 scenario, if no adaptation is followed. However, adapting to climate change by adoption of technologies such as improved varieties and agronomical management can improve the yields by about 21% in 2020 scenario. Climate

change in 2050 and 2080 scenarios is projected to reduce the irrigated kharif maize yields by 18 to 23% and the adaptation is projected to improve the yields by about 10% in 2050 and by 4% in 2080 scenario.

### **Sorghum**

Rainfed sorghum yields, on all India scale, are projected to marginally (2.5%) decline in 2020 scenario while it is projected to decline by about 8% in 2050 scenario. Adaptation strategies such as improved and tolerant variety managed under improved input efficiency with additional nitrogen fertilizer can enhance the irrigated maize net production by about 21% in 2020, 10% in 2050 and 4% in 2080 scenarios.

### **Soybean**

Likely increase in kharif soybean yield in the range of 8-13% under different future climate scenarios (2030 and 2080) is predicted.

### **Groundnut**

Kharif groundnut yields are projected to increase by 4-7% in 2020 and 2050 scenarios where as in 2080 scenario the yield is likely to decline by 5%.

### **Chickpea**

Future climates are likely to benefit Chickpea by an average increase in productivity ranging from 23 to 54%. However, a large spatial variability for magnitude of change in the productivity is projected.

### **Potato**

Climate change may likely to benefit potato in Punjab, Haryana and western and central UP by of 3.46 to 7.11% increase in production in A1b 2030 scenario, but in West Bengal and southern plateau region, potato production may likely to decline by 4 - 16% by 2030.

### **Apple**

In Himachal Pradesh, consequent to warming and reduction in chilling temperatures, Apple cultivation has shifted to higher elevations.

### **Controlled environmental studies**

Whereas controlled environmental studies under elevated CO<sub>2</sub> upto 550 ppm indicated a positive response to pulse crops like chickpea, soybean, Greengram and vegetables like onion and tomato and non-edible oil seeds like castor.

c) whether the existing National Agricultural Insurance Scheme adequately covers all the risks involved in the agricultural sector and provide security to the farmers including small and medium farmers in term of insurance cover to their crops; and

Yes, NAIS adequately covers risks involved in the Agricultural sector. The details of the crops covered by AIS are as follows:

S.No.	Crop	Season	S.No.	Crop	Season
<b>CEREALS &amp; MILLET</b>			<b>COMMERCIAL CROPS</b>		
1.	Paddy	<i>Kharif &amp; Rabi</i>	1.	Potato	<i>Rabi</i>
2.	Sorghum	<i>Kharif</i>	2.	Coriander	<i>Rabi</i>
3.	Pearl millet	<i>Kharif</i>	3.	Cumin	<i>Rabi</i>
4.	Maize (Corn)	<i>Kharif</i>	4.	Fenugreek	<i>Rabi</i>
5.	Finger millet	<i>Kharif</i>	5.	Isabgol	<i>Rabi</i>
6.	Wheat	<i>Rabi</i>	6.	Onion	<i>Kharif</i>
7.	Barley	<i>Rabi</i>	7.	Garlic	<i>Rabi</i>
	<b>PULSES</b>		8.	Chilly	<i>Kharif -Rabi</i>
1.	Blackgram	<i>Kharif</i>	9.	Cotton	<i>Kharif</i>
2.	Greengram	<i>Kharif</i>	10.	Tomato	<i>Kharif &amp; Rabi</i>
3.	Pigeon pea	<i>Kharif</i>	11.	Banana	Annual
4.	Chickpea	<i>Rabi</i>	<b>PERENNIAL HORTICULTURAL CROPS</b>		
5.	Peas		1.	Grapes	<i>Rabi</i>
6.	Lentil	<i>Kharif</i>	2.	Mango	<i>Rabi</i>
	<b>OILSEEDS</b>		3.	Cashew nut	<i>Rabi</i>
1.	Groundnut	<i>Kharif</i>	4.	Pepper	<i>Kharif</i>
2.	Soybean	<i>Kharif</i>	5.	Apple	<i>Rabi</i>
3.	Linseed	<i>Rabi</i>	6.	Coffee	Annual
4.	Rape seed &	<i>Rabi</i>	7.	Orange	Annual
5.	Sunflower	<i>Kharif</i>	8.	Kinnow	<i>Rabi</i>
6.	Sesamum	<i>Kharif</i>	9.	Pomegranate	Annual

d) if not, the steps taken or being taken by the government to address the issue

Along with National Agricultural Insurance Scheme, weather based crop insurance scheme is in research mode.