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

LOK SABHA UNSTARRED QUESTION NO. 364 TO BE ANSWERED ON 04/02/2020

NATIONAL INNOVATIONS ON CLIMATE RESILIENT AGRICULTURE

364. SHRI P.P. CHAUDHARY: SHRI SUNIL KUMAR SINGH: SHRI SUDHAKAR TUKARAM SHRANGARE:

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

(a) the activities and facilities under the National Innovations on Climate Resilient Agriculture (NICRA) and the progress of projects under it, State-wise including Maharashtra especially in its drought prone areas like Latur district;

(b) the number of eco-friendly flood/drought tolerant seeds developed in the country and the details thereof;

(c) whether the developed seeds are used widely in farms across the country;

(d) if so, the details thereof, State-wise including Jharkhand and Maharashtra; and

(e) whether the Government has taken assistance from any foreign entities in the development of such seeds and if so, the details thereof?

ANSWER

 THE MINISTER OF AGRICULTURE AND FARMERS WELFARE

 कृषि और किसान कल्याण मंत्री

 (SHRI NARENDRA SINGH TOMAR)

(a) Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers Welfare, Government of India has launched a flagship network project National Innovations in Climate Resilient Agriculture (NICRA). State-of-the art infrastructure facilities for studying the impact of climate change have been established at various ICAR institutes.

The National Innovations in Climate Resilient Agriculture (NICRA) project aims at strategic research on adaptation and mitigation, demonstration of technologies on farmers' fields and creating awareness among farmers and other stakeholders to minimize the impacts of climate change on agriculture. The activities include collection and characterization of large number of germplasms from different hotspot locations of the country as a source material for breeding programs, attempts to develop heat & drought tolerant wheat, flood tolerant rice, drought tolerant pulses, water logging and high temperature tolerant tomato etc. demonstrate climate resilient technologies in 151 climatically vulnerable districts.

In Maharashtra, the research being carried out for development of drought and heat tolerant genotypes in chickpea, pigeonpea and mung bean; and development of drought tolerant onion. In the state of Maharashtra, high throughput plant phenomics facility at ICAR-NIASM, Baramati and rainout shelter facility at ICAR-DOGR, Pune were established. Statewise facilities created under NICRA are furnished in **Annexure-I**.

(b) Rice variety CR Dhan 201 is a medium duration variety (110-115 days), semi dwarf, non-lodging variety suitable for water limited/aerobic conditions with an average productivity of $3.8 \text{ t} \text{ ha}^{-1}$. This variety was released for states of Chhattisgarh and Bihar for aerobic conditions.

Mungbean variety IPM 205-7 (Virat) is early maturing (52-55 days), suitable for summer cultivation in Punjab, Haryana, Uttar Pradesh, Karnataka, Tamilnadu, Madhya Pradesh and Gujarat.

Besides developing 2 varieties, more than 250 climate resilient varieties developed by ICAR/SAUs have been evaluated for adaptation under vulnerable agro-ecologies.

(c) As part of the Technology Demonstration Component (TDC) of the NICRA, demonstrations of location specific climate resilient varieties are being taken up to make the farmers aware about the resilient cultivars so as to enhance adoption of these cultivars. More than 250 resilient varieties evaluated under NICRA Technology Demonstration Component across the country in climatically vulnerable districts were integrated into the district agricultural plans.

(d) Detailed information on drought and flood tolerant varieties demonstrated and the number of farmers involved in demonstrations are furnished in **Tables 1 & 2**. Further, the quantity of breeder seed of drought and flood tolerant varieties indented by different states and National Seed Corporation for 2020-21 is given in **Table 3**.

(e) No, the government has not taken any assistance from foreign entities in the development of such seeds under NICRA project.

State-wise Infrastructure Established under NICRA in Different ICAR Institutes

Uttar Pradesh

1. IVRI, Izatnagar: Real Time PCR, PCR Thermal Cycler, RadioTelemetry & Ultrasound with Color Doppler and Cardiac Probe

2. IIVR, Varanasi: Temperature Gradient Tunnel (TGT), Photosynthesis System & Infrared Thermometer

3. IIPR, Kanpur : Photosynthesis System, Environmental Growth Chamber, Leaf Spectrometer, Pressure Chamber, Rhizotron & Thermal Imaging System

4. IIFSR, Modipuram: Automatic Weather Station, CHNS Analyzer, Gas Chromatography (GC) & Infrared Thermometer

5. CAFRI, Jhansi : Temperature Gradient Tunnel & Soil Respiration System

6. CIRG, Makhdoom : 2-D Gel Documentation System

Telangana

1. CRIDA, Hyderabad : High Throughput Plant Phenomics, Free-Air Temperature Enrichment (FATE), Carbon Dioxide and Temperature Gradient Chamber (CTGC), SCADA based Rainfall Simulator and Precision Lysimeters, Automatic Weather Station, Atomic Absorption Spectrophotometer (AAS), Gas Chromatography (GC), Root Image Analyzer, Environmental Growth Chamber, UV-Visible Spectrophotometer, 2-D Gel Documentation System, Thermal Imaging System & Ultra Low Deep Freezer

2. IIRR, Hyderabad : Heat Tunnel Facility, Electroantennogram, Nitrogen Analyzer, Leaf Area Meter, Real Time PCR, PCR Thermal Cycler, 2-D Gel Documentation System & CO₂ Chamber

3. DPR, Hyderabad : PCR Thermal Cycler, 2-D Gel Documentation System, Chicken Isolator & Growth Chamber for Poultry

Odisha

1. NRRI, Cuttack : Eddy Covariance, Photosynthesis System, Time Domain Reflectometer (TDR), IR Image Analyzer & 2-D Gel Documentation System

2. IIWM, Bhubaneswar : Bowen Ratio Tower & Automatic Weather Station

Rajasthan

1. CAZRI, Jodhpur : Rainout Shelter, CHNS Analyzer, Gas Chromatography (GC), Nitrogen Analyzer, Soil CO₂ Flux Analyzer, Photosynthesis System, Environmental Growth Chamber, Leaf Area Meter & Stereozoom Microscope

2. CSWRI, Avikanagar : Automatic Weather Station, Psychrometric Chamber, Environmental Growth Chamber, ELISA Plate Reader, Laparoscope, Blood Chemistry Auto Analyzer & Hematology Analyzer

Maharashtra

1. DOGR, Pune : Rainout Shelter, Environmental Growth Chamber & Leaf Area Meter

2. CICR, Nagpur : Photosynthesis System

NBSS&LUP, Nagpur : Auto Analyzer

3. NIASM, Baramati : High Throughput Plant Phenomics, Photosynthesis System, UV-Visible Spectrophotometer & Real time PCR

Madhya Pradesh

1. CIAE, Bhopal : Total Organic Carbon (TOC) Analyzer, Online Gas Analyzer, Thermo Gravimetric Analyzer & Precision Seeder

2. IISS, Bhopal : Gas Chromatography (GC), CHNS Analyzer, Soil Penetrometer & Plant Canopy Analyzer

Haryana

1. NDRI, Karnal : Animal Calorimetric System, Thermal Imaging System, Nanodrop, PCR Thermal Cycler, 2-D Gel Documentation System, Real Time PCR, Multi Gas Analyzer, Methane Analyzer & Ultra Low Deep Freezer

2. IIWBR, Karnal : Rainout Shelter

3. CSSRI, Karnal : Gas Chromatography (GC), Time Domain Reflectometer (TDR), Nitrogen Analyzer & Lysimeter

Table 1. Drought tolerant/escaping varieties demonstrated under TDC-NICRA across various states of the country

	2011 2012)12	2013		2014		2015		2016		2017		2018				
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.		
	of	of	of	of	of	of	of	of	of	of	of	of	of	of	of	of	Total	Total
	dem	farm	dem	farm	dem	farm	dem	farm	dem	farm	dem	farm	dem	farm	dem	farm	demo	farme
State	os	ers	os	ers	os	ers	os	ers	os	ers	os	ers	os	ers	os	ers	s	rs
Andaman			5	34	2	3			1	4	5	14			1	2	14	57
& Nicobar																		
Andhra	9	135	20	215	9	173	2	54	3	74	18	633	7	175	12	406	80	1865
Pradesh																		
Arunachal	1	30	6	55	6	63	4	65	5	39	1	10			1	10	24	272
Pradesh																		
Assam			1	1	2	71	2	2	2	2	2	17			1	4	10	97
Bihar	14	351	14	362	10	306	8	145	14	354	13	497	21	560	16	732	110	3307
Chhattisg-	34	301	3	20	16	152	5	34	13	153	9	81			9	106	89	847
arh																		
Gujarat	8	350	2	25	2	255	4	202	5	122	4	75	5	98	7	126	37	1253
Haryana	1	17			1	12					2	22					4	51
Himachal	43	1175	19	378	20	465	3	144	6	158	13	303	24	293	9	330	137	3246
Pradesh																		
Jammu &	3	60	1	10	1	6	5	180	5	180	6	209	19	405	19	192	59	1242
Kashmir																		
Jharkhand	7	159	31	590	10	236	18	862	17	799	16	264	34	751	41	910	174	4571
Karnataka	17	262	12	280	11	266	7	67	12	217	15	643	21	1220	14	621	109	3576
Madhya	16	466	18	370	30	349	16	230	28	442	26	227	20	310	26	331	180	2725
Pradesh																		
Maharash-	21	504	13	311	13	510	14	263	17	315	11	266	13	370	16	386	118	2925
tra																		
Manipur			3	10	2	10	1	3	4	28	5	74			3	17	18	142
Meghalaya							2	14	2	36	6	45	1	20	1	2	12	117
Mizoram											1	2			2	9	3	11
Nagaland					3	36	4	90	5	96	4	32	11	135	8	27	35	416
Odisha	5	107	8	179	3	55	9	140	10	282	4	89	15	303	5	115	59	1270
Punjab	4	76	2	38	1	30	1	12	1	12	6	65	5	82	1	10	21	325
Rajasthan	26	954	17	744	13	503	8	414	14	790	11	710	13	514	15	578	117	5207
Sikkim					1	2	1	6	1	6							3	14
Tamil	2	39	5	30	10	84	4	52	6	76	6	137	3	52			36	470
Nadu																		
Telangana			2	10									1	6	1	98	4	114
Tripura	1	11	1	9	1	19					1	59	1	28			5	126
Uttar	24	727	32	1285	25	737	17	558	23	589	18	728	15	469	20	575	174	5668
Pradesh																		
Uttarakha-							3	334	12	391	12	542	6	106	5	236	38	1609
nd																		
West	6	345	5	532	2	36											13	913
Bengal										=								
Grand	242	6069	220	5488	194	4379	138	3871	206	5165	215	5744	235	5897	233	5823	1683	42436
Total																		

	2011		2012		2013		2014		2015		2016		2017		2018			•
	No. of dem	No. of farm	No. of de	No. of farm	No. of de mo	No. of farm	No. of de	No. of farm	Total	Total farmer								
State	os	ers	mos	ers	s	ers	mos	ers	demos	S								
Andaman & Nicobar			1	6									2	4	1	2	4	12
Andhra Pradesh	3	38			7	72	8	205			4	21	4	85	2	65	28	486
Arunachal Pradesh	5	59			4	58	1	5	1	5							11	127
Assam	17	305	6	71	3	15	4	29	5	51	9	52	10	105	13	199	67	827
Bihar	9	195	2	18	1	10	2	42	2	18	1	4	3	46	3	55	23	388
Chhattisg- arh			15	147													15	147
Gujarat			1	225					2	95	2	125	2	106	2	110	9	661
Jammu & Kashmir											1	22	1	39	6	6	8	67
Jharkha- nd													8	347	1	34	9	381
Karnata- ka	1	39															1	39
Kerala	1	41					1	5			1	300					3	346
Madhya Pradesh	2	50							1	25	1	14	3	29	1	15	8	133
Maharash tra											1	50			6	220	7	270
Manipur	3	17					1	1	1	1			1	1			6	20
Meghal- ava	4	70	4	96	2	19	1	6									11	191
Nagaland	6	106	6	84													12	190
Odisha	6	184	1	20		1	2	24	3	46	1	10	2	30	2	31	17	345
Sikkim	3	45	1	15						-		-		-			4	60
Tamil Nadu	1	9							2	115	2	250	1	150	2	285	8	809
Tripura				1		1					1	22	1	35	1	20	3	77
Uttar Pradesh	9	247	3	148	2	26					2	73	1	6	3	23	20	523
Uttarakh- and													1	40			1	40
West Bengal	1	10	2	25	1	12			1	55	2	52	1	60	3	35	11	249
Grand Total	71	1415	42	855	20	212	20	317	18	411	28	995	41	1083	46	1100	286	6388

Table 2. Flood tolerant varieties demonstrated under TDC-NICRA across various states of the country

Table 3-State-wise Breeder seed indents for the year 2020-21

Drought Tolerant Varieties (in quintals)

Сгор	AP	Bihar	CG	HR	HP	JK	JH	КТК	MP	MH	NSC	Odisha	PB	RJ	TLGN	TN	UP	UK	WB	Total
Rice	0.1	16.0	64.0	0.0	0.0	0.0	11.7	1.0	54.2	0.5	6.3	18.2	0.0	0.0	2.4	1.0	0.0	0.0	8.0	183.4
Wheat	0.0	50.0	30.0	10.0	0.0	5.0	0.0	0.0	0.0	0.0	8.0	0.0	2.0	5.0	0.0	0.0	50.0	5.0	0.0	165.0
Sorghum											0.1									0.1
Pearlmillet								0.1	0.1											0.1
Littlemillet									0.4											0.4
Fingermillet	0.1		0.7																	0.8
Groundnut	5.0	0.0	0.4	0.0	0.0	0.0	0.0	66.8	0.0	0.0	160.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	332.2
Indian											0.0									0.0
Mustard											0.0									0.0
Toria		0.5	0.0	0.0	1.0	0.1	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.6	0.0	0.2	2.9
Urdbean											2.0						5.0			7.0
Pigeonpea	5.0	10.0	0.0	0.0	0.0	0.0	0.0	3.0	1.8	3.0	2.2	3.5	0.0	0.0	2.2	0.3	0.0	0.0	0.0	30.9
Chickpea		15.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	85.0
Lentil									5.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
Total	10.2	91.5	95.1	10.0	1.0	5.1	21.7	70.8	61.4	3.5	230.7	122.2	2.0	5.0	4.6	1.3	65.6	5.0	8.2	814.7

Flood Tolerant Varieties (in quintals)

Crop	Assam	NSC	Odisha	Telangana	TN	UP	WB	Total
Rice	105.0	1.2	7.5	1.2	1.5	8.0	4.0	128.4
Maize		0.6						0.6
Jute							0.3	0.3
Total	105.0	1.8	7.5	1.2	1.5	8.0	4.3	129.3