

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

LOK SABHA
UNSTARRED QUESTION NO. 1829
TO BE ANSWERED ON 06/03/2018

CONVENTIONAL PLANT BREEDING

1829. SHRI RAJESHBHAI CHUDASAMA:
SHRI S.P. MUDDAHANUME GOWDA:

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

- (a) whether it is a fact that the conventional plant breeding has given the country a sustainable agricultural production in major crops like rice and wheat and if so, the details thereof;
- (b) whether it is a fact that farmers have quickly adopted good varieties which have better adaptation and yields and if so, the details thereof; and
- (c) whether it is also a fact that GM technology is the most viable option to get self sufficiency in foodgrains 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. The crop varieties developed through conventional plant breeding system have given impetus for sustainable agricultural production in major crops including rice and wheat. The productivity of rice and wheat has increased manifold from 668 kg/ha and 663 kg/ha in 1950-51 to 2404 kg/ha and 3093 kg/ha, respectively in 2015-16. Wheat and rice varieties developed through conventional breeding methods of hybridization and selection have led to productivity gains in India and abroad starting the era of Green Revolution in mid 1960s. National Agricultural Research System (NARS) is entrusted to develop high quality and high yielding varieties suited to different agro-climatic conditions of the country. Since 1969 till January 2018, 4723 improved field crop varieties have been developed which include highest number in rice (1021) followed by wheat (395). Most of these varieties have been bred through conventional plant breeding.

(b) Yes, some of leading examples where varieties have become popular in a very short span of time due to their high yield potential and better adaptation are as under:

- Wheat flagship variety HD 2967 (2011), has currently occupying about 10 million ha area across the country and unprecedented breeder seed demand has been witnessed which has touched 3600 quintals during 2017-18, highest ever demand of a single variety in the history of Indian agriculture.
- Pusa Basmati 1121 (2008), a landmark variety has become extremely popular in the foreign market due to its superior grain and cooking quality. Approximate cumulative earning due to export of PB 1121 and its domestic share during 2008 to 2016 has been estimated to be ~US \$ 20.80 billion (Rs. 1.5 Lakh Crores).
- Sugarcane variety Co-238 (2009), which has an average sugar recovery of upto 12% has achieved a coverage of more than 14.75 lakh hectares in UP, Haryana, Punjab, Uttarakhand and Bihar in a very short span of time. The variety is responsible for production of 21.72 and 0.873 million tons additional sugarcane and sugar, respectively. This led to additional income of ~Rs. 65,505/- million and ~Rs. 27,913/- million to farmers and sugar industries, respectively in UP, Punjab, Haryana and Bihar since 2013-14.

Some more widely adopted landmark varieties bred conventionally in wheat and rice are as under:-

Wheat: HD 2329, WL 711, UP 2338, WH-147, WH 542, PBW 343, HD 2967, HD 3086 etc.

Rice: IR-8, Jaya, Swarna, Pusa Basmati 1, Pusa Basmati-1121, Pusa-1509, Swarna Sub 1, Samba Mahsuri, MTU 1010, Pusa-44 etc.

Newly released varieties are demonstrated at farmers' fields through many Govt. sponsored extension schemes viz., Front Line Demonstrations, On farm trials, Tribal sub plan (TSP), Bringing Green Revolution in Eastern India (BGREI), National Food Security Mission (NFSM) and Rashtriya Krishi Vikas Yojana (RKVY) which help in faster popularization of these varieties among the farmers.

(c) Crops are exposed to a number of biotic and abiotic stresses at different stages, which lead to poor productivity vis-à-vis low production. There are some traits which are not available in nature in the plant genetic resources or wild relatives of a crop, due to which the improvement through conventional plant breeding is not to the expected level leading to reduced yields. Some of such biotic and abiotic stresses in different crops are insects, diseases, weeds, heat, salinity, frost, water logging etc. Among the available technologies, GM technology has the potential to introgress resistance through transgenes for a particular biotic/abiotic stress viz., pest and disease resistance, abiotic stresses tolerance and also quality traits in different crops including food grains.

Bt cotton is the only transgenic crop approved for cultivation in India subsequent to extensive evaluation and regulatory process. Bt cotton was introduced primarily for bollworm control. All India average yield, which was 189 kg lint per ha in 2001 increased to 504 kg lint/ha in 2015 due to introduction of GM cotton.
