AgriCos e-Newsletter
ISSN: 2582-7049
AgriCos e-Newsletter
Open Access Multidisciplinary Monthly Online Magazine
Volume: 04 Issue: 04 April 2023 Article No: 29

Doubling Farmers Income: Plant Breeding Perspective

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SUMMARY

Doubling farmers' income by 2022 is an integrated approach of various disciplines. Increased availability of certified seed, value chain, market facilities, soil health, increased productivity, integrated nutrient management, policies related to agriculture etc., can contribute to increased income of the farming community. However, from a breeding perspective to increase farmers' income the objective of the breeder is to increase productivity, enhanced nutrition, and resistance to abiotic and biotic factors considering major genes governing desired traits. This work has to be initiated in a direction of benefiting farmers in the agriculture sector to bring back the old glory of India where agriculture was the main backbone.

INTRODUCTION

The green revolution has made India self-sufficient in food grain production and the agriculture sector has witnessed major quantum jumps in production but the farmers across regions have not achieved the desired level of growth. They face uncertain situations every day and the continuation of agriculture as a profession possess a severe threat. Around 12 states in India have less than 40% farm household population earning below the poverty line (Thiagu., 2015). Day by day there was increasing reports of farmers' suicidal activities, henceforth to tackle these activities and make farmer self-sufficient in income across the regions in India union government allocated Rs. 62,376 crores in the budget to the agrarian sector with a motto of doubling farmers' income by 2022. The union government appointed a committee to prepare a blueprint for doubling farmers' income and the committee advised launching a seven-point strategy to achieve the goal (NITI Aayog., 2017).

An insight into plant breeding as a whole in doubling farmers' income is based on necessity and objectives fixed by the breeders. One of the prime core ideas for doubling is increasing the productivity of crops by bridging the yield gap. Crop wild relatives have been extremely valuable in adapting crop varieties to changing disease pressures, farming practices, market demands, and climatic conditions and only 1% of total germplasm collections are used in crop improvement programmes (Dempewolf *et al*., 2017). Henceforth we still have the possibility to enhance the yield by screening germplasm and utilizing crop wild relatives for enhanced productivity. Basic breeding approaches have been widely used and been using in improving yield. A study where paddy and poverty go together is a myth in the case of the kalanamak rice variety. Kalanamak is an aromatic rice variety cultivated in northeastern parts of Uttar Pradesh with a coverage of 50000 ha during the 1990s. But due to deterioration in its genetic purity over the years and its cultivation declined. Hence with the aid of different breeding approaches four varieties of kalanamak (Kalnamak KN3, Bauna Kalanamak 101, Bauna Kalanamak 102 and Kalanamak kiran) were notified and released. These varieties have led to tripling of farmers' income (Yadav *et al*., 2019)

With advancement in molecular markers various marker-aided selection strategies were used for screening plant transformants which are having desired traits of interest. Introgression of bacterial blight resistance genes (*Xa 21, Xa 13* and *Xa 5*) was transferred into the background of the elite popular *indica* rice variety Samba Mahasuri through marker-assisted gene pyramiding. The three gene pyramided lines showed better yield under blight infection and showed tolerance level against the pathogen (Sundaram *et al*., 2008).

The most prominent approach to overcoming loss caused by biotic factors is breeding for resistance with an aid of molecular approaches. In this regard, a successful breeding approach was carried out in sunflowers with the objective to achieve resistance against a destructive pathogen (Downy mildew). It all started during the 1980s when there were first reports of downy mildew in the marathawada region of Maharashtra. To breed resistance, they used CMS-based hybrid development. The new hybrid (LSFH 171) was tested across locations for three consecutive years for seed yield, oil yield and disease susceptible reaction along with ruling commercial hybrids KBSH-1, KBSH-44 and DRSH-1. The newly developed hybrid was found to be superior in all aspects and released for cultivation in Zone II in 2012 (Shirshikar *et al*., 2013). The predicted changes in temperature and precipitation will further accentuate the intensity and frequency of

drought and heat leading to increased risks of farming hence there is a need to breeding of climate-resilient crops. There has been a lot of work carried out in regard to the identification of genes/transcription factors/QTLs which are used in the identification of drought-tolerance crops. Drought-tolerant climate-resilient cultivars were realized across thirteen countries which a 20-25% yield advantage over normal growing cultivars (Vikram *et al*., 2012).

Source of growth in Farmer's income:

Doubling the real income of farmers till 2022-23 over the base year of 2015-16 requires annual growth of 10.41 per cent in farmer's income. This implies that the ongoing and previously achieved rate of growth in farm income has to be sharply accelerated. Therefore, strong measures will be needed to harness all possible sources of growth in farmers' income within as well as outside the agriculture sector.

The major sources of growth operating within the agriculture sector are:

- Improvement in productivity
- Resource use efficiency or saving in the cost of production
- Increase in cropping intensity
- Diversification towards high-value crops

The source outside the agriculture includes:

- Shifting cultivation from farm to non-farm occupation
- Improvement in terms of trade for farmers or real prices received by farmers

Strategy for improving Farmers' income:

- Development initiative and infrasture and technology development, policies and institutional mechanism

CONCLUSIONS

Shri Narendra Modi, Hon'ble Prime Minister of India while addressing a farmers' rally in Bareilly, UP on 28th Feb 2016 coated "My dream is to see farmers double their income by 2022 when the country completes 75 years of its Independence" The Prime Minister's call to double farmers' income by 2022 has brought a major change in the focus of agricultural sector from the traditional production orientation to income orientation and created renewed interest among all major stakeholders in the country, ranging from the agricultural research community, policymakers, state authorities, extension agencies, private players, and more importantly the farming community. participatory research to develop and scale up location-specific, cost-effective and climate-resilient technologies to enhance agricultural production, productivity and profitability in the agriculture sector and increase farmers' income.

REFERENCES

Dempewolf, H., Baute, G., Anderson, J., Kilian, B., Smith, C. and Guarino, L., 2017, Past and Future Use of Wild Relatives in Crop Breeding. *Crop Sci*., 57:1070–1082.

NITI Aayog., 2017, March of Agriculture since Independence and Growth Trends, Doubling Farmers' Income, volume I, Government of India.

Shirshikar, S. P., Ghodke, M. K., Jagtap, P. K. and Giri, S. N., 2013, Development of new downy mildew resistant sunflower hybrid. *HELIA*. 36 (58): 41-46.

Sundaram, R. M., Biradar, S. K., Laha, G. S., Reddy, G, A., Rani, N. S. and Sarma, N, P., 2008, Marker assisted introgression of bacterial blight resistance in Samba Mahsuri, an elite indica rice variety. *Euphytica*, 160:411–422.

Thiagu, R., 2015, Farmers' Income in India: Evidence from Secondary Data. Institute of Economic Growth, New Delhi.

Vikram, P., Kumar, A., Singh, A. and Singh, K. N., 2012, Improving Crop Resistance to Abiotic Stress, *First edition, Wiley publishers*.

Yadav, S. K., Chaudhary, R. C., Kumar, S. and Mishra, S. B., 2019, Breakthrough in improving farmers' income sustainably by producing Kalanamak rice. *Journal of AgriSearch.* 6(1): 1-5.