

Executive Summary

During the last one hundred years, Indian agriculture has undergone a series of strides. Today, National Food Security is the agenda of India's development plan. Green revolution has brought a sea of change in India's food security status by changing its 'hand to mouth' position to self sufficiency and to even a food exporting nation since middle of last decade. This transformation can be attributed to three major factors: a) Green revolution technologies combined with government support in terms of establishing fertilizer factories, irrigation projects, agricultural universities, marketing network and extension facilities. b) Market support through provision of minimum support price (MSP) and c) Government support through provision of subsidized inputs such as high yielding variety seeds, fertilizers, pesticides etc. However, if we critically analyse the food grain production during last two decades, there is not much progress and we experience a plateauing in the yields of two major cereals, wheat and rice. The reasons could be umpteen and we are unable to pinpoint the exact ones. Further, the reasons for this stagnation are variable under different production situations. For example, in Punjab and Haryana which are considered as Green Revolution states, the production situation is entirely different. Here, the annual compound growth rate of food grains production (5.76%) and productivity (8.24%) is the highest in 1970s i.e., during the period of green revolution and from then onwards it started declining. The highest compound growth rate in 1970s was mainly because of intensive adoption of high

yielding varieties, government support policies, availability of irrigation and use of fertilizers and pesticides. But in other parts of the country, the maximum compound growth rate in production and productivity could be observed in 1980s.

The reasons for the decline in production after 1970s in Punjab and Haryana could be over exploitation of the fertile lands with the use of higher doses of fertilizers and pesticides, irrigation water and continuous cropping of rice and wheat which resulted in resurgence of pests. But situation is different in many other parts of the country. In eastern states viz., Bihar, Assam and West Bengal the soils are fertile. The Government is focusing more on these states through "Bringing Green Revolution to Eastern India" programme and allocating Rs.1000 crores during 2013-14 budget. Now, we need to understand the location specific problems and find out the solutions according to the requirement. The other reasons for decline in the food grain production during the last two decades are crop diversification with emphasis on commercial crops like cotton and sugarcane due to liberalization, changing food habits of consumers towards more fruits, vegetables and animal protein, climatic variability, no major breakthrough in research, fragmented land holdings etc. The demand for food grains in 2050 being estimated at 494 million tones (high demand scenario), there is a need to focus on increasing production through application of various innovations. Adding to this, the passing of Food Security bill by Government of India Cabinet on 19th March 2013 creates a demand of

62 million tons of food grains. All these factors warrant for development and application of innovations in different sectors of agriculture viz., research, policy and institutional reforms.

Suggestions: The problems of declined production of food grains during last two decades are diverse in different states and regions. Hence a location specific strategy needs to be evolved to retort them efficiently. In general, research needs to be geared towards innovative techniques to develop C_4 rice, multiple stress resistant varieties, super rice hybrids and also wheat hybrids. This would be possible through utilization of latest knowledge on biotechnology, genomics etc. In Punjab and Haryana focus needs to be diverted on diversification of crops in order to improve the soil condition as well as ground water condition. Research needs to be focused on development of alternate crop planning strategies with the development of suitable varieties and technologies for inter and sequential cropping. Similarly, in Eastern states there is possibility to enhance area under food grains but with a right mix of other suitable crops. Boro rice can be popularized by providing irrigation facilities through government policies. In Southern states like Andhra Pradesh and Karnataka, the area under rice has almost stagnated and in recent years it started declining in few locations. By bringing changes in quality parameters of hybrid rice, it is possible to enhance its acceptance by the farmers. The soil degradation can be avoided through application of fertilizers and

pesticides judiciously. Bhoochetana programme being implemented in Karnataka could enhance production from the degraded soils through correction of micro nutrient deficiencies, use of quality biofertilizers and application of minimal required quantities of fertilizers. Nutrient based fertilizer subsidy appears to be a good step in avoiding soil degradation. Irrigated area can be increased through proper management of irrigation water by avoiding wastage and application losses. This can be achieved through formation of Water User Associations (WUAs) who can manage the water use more efficiently by proper planning and budgeting. The success story of Andhra Pradesh in this front is an example to emulate. Non availability of labour for agriculture operations is another important problem. This can be tackled by mutual sharing and making some modifications to MNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme) like linking agricultural operations in this scheme and incentivizing the people who work for agriculture etc. The Self Help Group Model of Dharmasthala in Karnataka could succeed in solving labour problem to some extent through compulsory sharing among members. By implementing suitable policies to provide the farmers with better support price and bringing changes in rural employment generation schemes either by integrating them with agricultural activities or by incentivizing the people working for agricultural activities with additional provision of subsidized food grains, it is possible to improve food security in India.