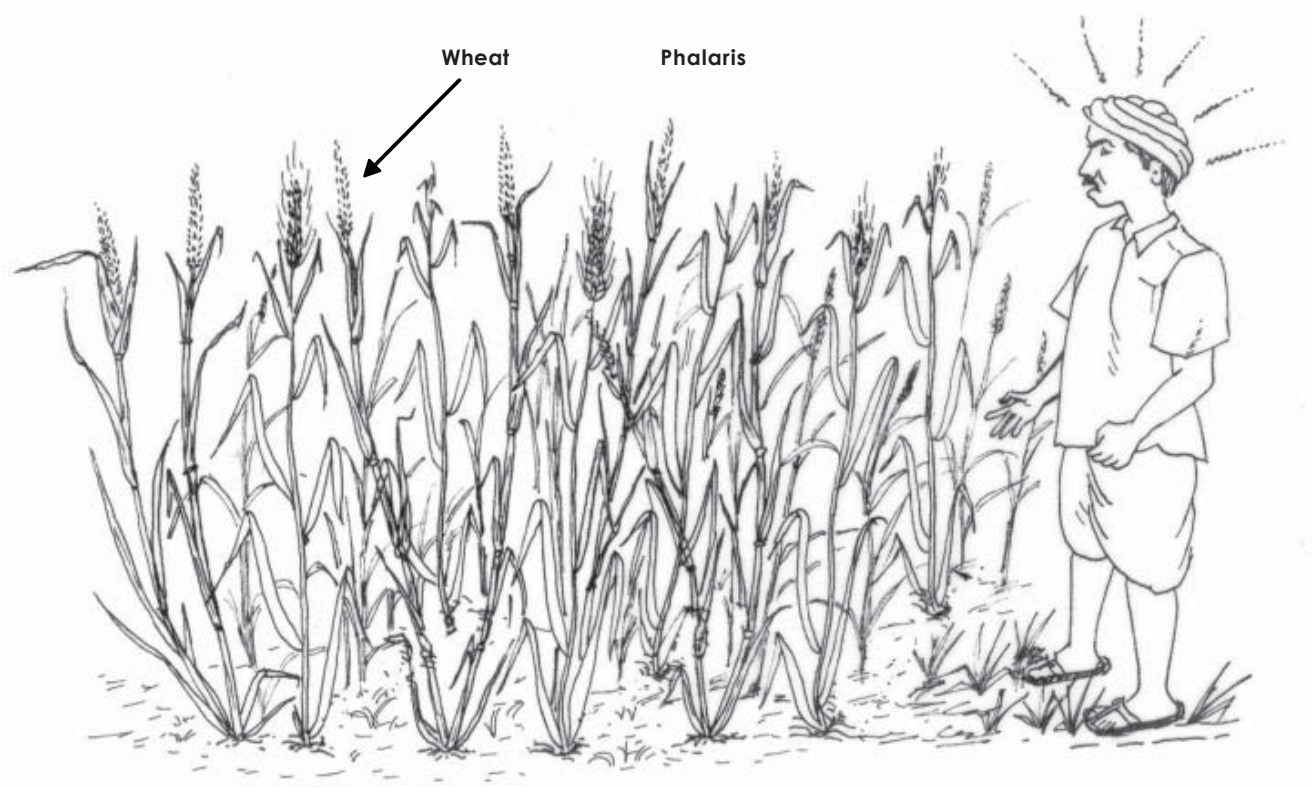
Production Constraints of the Rice-Wheat System

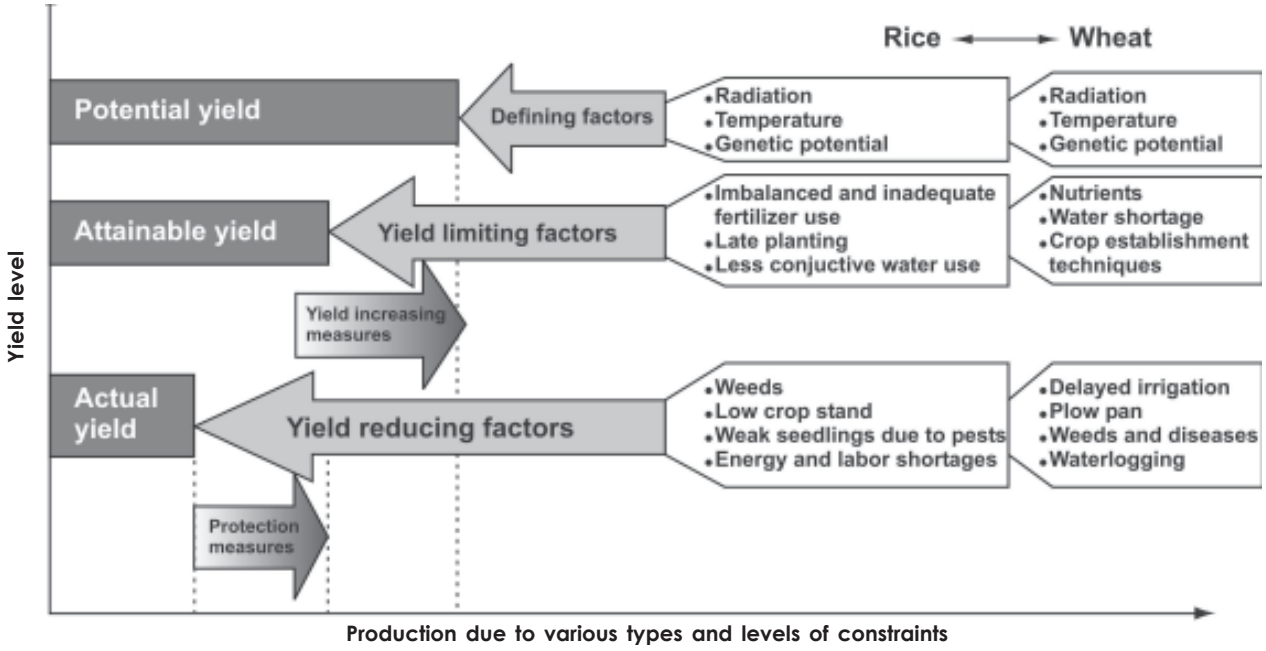


The rice-wheat system has been practiced by farmers in Asia for more than 1000 years. It has since expanded and is currently estimated at 23.5 million ha. The rice-wheat system covers 13.5 million ha in South Asia: India (10.0), Pakistan (2.2), Bangladesh (0.8) and Nepal (0.5). It represents 32% of the total rice area and 42% of the total wheat area in these countries. In the Indo-Gangetic Plains (IGP), which stretches across these four countries, rice is usually grown in the wet summer (May/June to October/ November) and wheat in the dry winter (November/ December to February/March). Although rice-wheat cropped area in the IGP is irrigated or has assured rainwater in sub-humid regions, the soils and crop management undergo drastic changes during the two cropping seasons. Several yield-reducing and yield-limiting factors, together with delayed planting of wheat and transplanting of rice; energy, labor, and other input shortages; resistance of the weed *Phalaris minor* to isoproturon; and crop residue burning have contributed to the stagnating or declining production, productivity and sustainability of this system.

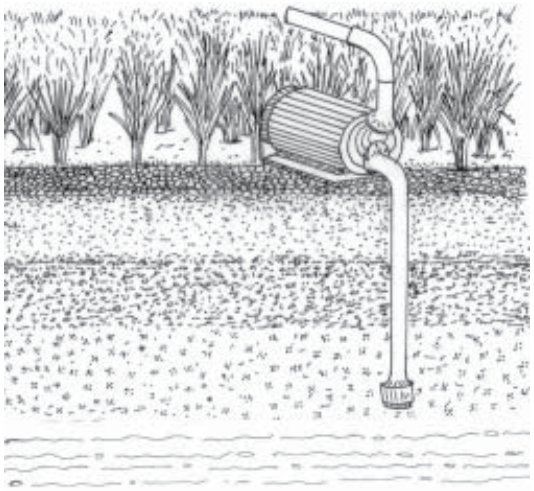
Production Trends

In eastern India and Bangladesh, where rice is the predominant crop and wheat has unfavorable production environments, rice-wheat system expanded during the 1970s in response to the foodgrain shortage and the availability of high-yielding wheat varieties. By 1980, the expansion of wheat plateaued at 5% of the area in Bangladesh and West Bengal. In northwestern India and Pakistan, where wheat has a favorable growing environment and rice can be grown only with full irrigation, the system expanded after the early 1970s in response to market opportunities and the availability of high-yielding rice cultivars. Rice gradually emerged as a commercial crop while wheat remained the principal staple food.

Production Constraints: Sustainability Dimensions



Continuous cropping of rice-wheat system for several decades as well as contrasting edaphic needs of these two crops have resulted in increased pest pressure, nutrient mining, and decline in yields in some areas. In many areas, yields have stagnated at below potential level. The input use efficiency is low. Soil organic matter content has reduced. This can be improved by incorporating crop residue into the soil. But burning of crop residue is common and has increased environment pollution. Nutrients are being mined and transported long distances and lost permanently for the subregion. The water table has receded at several places in the region. Also, there is a reduction in biodiversity due to large area coverage by a single cultivar. Therefore, agronomic research related to rice-wheat system ecology and its environment must be directed at enhanced and sustained productivity of this important farming system at reduced costs.



Adapted from:

Gupta, R.K., P.R. Hobbs, J.K. Ladha and S.V.R.K. Prabhakar. 2002. Resource Conserving Technologies: Transforming the Rice-Wheat Systems of the Indo-Gangetic Plains. Rice-Wheat Consortium – A Success Story. Asia Pacific Association of Agricultural Research Institutions. Bangkok, Thailand. 42 pp.

Corresponding author:
Raj K. Gupta