Nutrient management is a key component of successful crop production systems. A synergistic interaction of good genetics (seeds) and balanced nutrition helps the farming community to achieve higher yields and profitability in an environmentally sustainable manner. However, in smallholder intensive cropping systems of South Asia, farmers often over or under use nutrients or apply them in an imbalanced manner, at an inappropriate time, or by wrong methods. Such practices result in low crop productivity and economic returns and often leave a large environmental footprint of fertilizer use.

Fertilizer application decisions in South Asia are usually based on farmer perceptions, which rarely follow balanced nutrition concepts and are often resource driven rather than science driven. Peers, e.g., progressive farmers who usually have access to better knowledge, often influence the average farmer’s decisions in ways that may or may not be science based. The greenness of the crop of the neighboring farmers is always a matter of concern or envy for other farmers, who generally try to achieve the same results by overapplying nitrogen. To avoid such unnecessary and unbalanced application of nutrients, the Departments of Agriculture of each state in India have come up with state fertilizer recommendations for crops that provide nutrient application recommendations to the farmers based on crops and the time of year. The state recommendation is a novel approach to educate farmers about balanced fertilization and provides farmers with a more scientific guidance. However, one has to accept that a single recommendation of fertilizer application for the entire state is an oversimplification of balanced fertilization and therefore is a limitation of the approach. Besides, the mechanism of dissemination of the knowledge of state recommendations has not been very successful in reaching large numbers of farmers. The most rigorous approach could be soil-test-based nutrient recommendations. However, there are nearly 120 million agricultural holdings in India, and it will take about 11 years to analyze the soil samples of these holdings with the present infrastructure and facilities!

The current situation demands a nutrient management recommendation guideline for the farmers that is scientifically robust, user friendly, and simple to use. The International Plant Nutrition Institute (IPNI) has been working on this through the application of the principles of “4R Nutrient Stewardship.” IPNI, in collaboration with several partner organizations, has come up with a site-specific nutrient decision support tool called “Nutrient Expert.” This free tool provides field-specific balanced nutrient recommendations to the maize and wheat farmers of India. The interactive computer-based decision tool, developed in 2010–2011, is very easy to use and can rapidly provide nutrient recommendations for individual farmers’ fields with or without soil-testing data (Pampolino et al., 2012).

The tool estimates the attainable yield for a farmer’s field based on the growing conditions, determines the nutrient balance in the cropping system based on yield, residue management, and fertilizer/manure applied in the previous crop, and combines this information with expected N, P, and K responses in the concerned field to generate a location-specific nutrient recommendation. There are four modules for wheat and five modules for maize that systematically access the necessary information through simple questions that are easy for farmers to answer. Once the N, P, O₂, and K responses for the individual field are calculated, the subsequent modules help the farmer to choose the right source of fertilizer and then modify the recommendations in terms of bags of the chosen fertilizer source.

The “Profit Analysis” module finally does a simple profit analysis comparing costs and benefits between the farmers’ current practices and the recommended alternative improved practices to make the farmers confident that use of this tool will not reduce their income. The maize Nutrient Expert also has a “Planting Density” module that helps farmers to choose the right density of planting to maximize yield and profitability. And most importantly, the entire process can take as little as 15 minutes!