

Working with Farmers to Enhance Productivity of Local Cultivars in India



Local cultivars of many crops have been cultivated under marginal environments with little care for improved agronomic management practices. The productivity is often half of the potential but the qualities of such local cultivars ensure their local adaptation to the various biotic and abiotic factors of production. However, genetic erosion of local cultivars has increased through the diffusion of modern and high-yielding varieties. Improved varieties have high yield potential and yield is the important decisive variable in crop production. The lower productivity of local cultivars is one of the factors triggering the loss of traditional varieties and crop species.

Productivity enhancement in local cultivars through a change in their agronomic management or genetic improvement or by a combination of both can be a direct incentive to promote the on-farm conservation of local cultivars. Technological packages recommended by the agricultural extension systems are not site-specific and have ignored traditional knowledge and techniques developed by farmers through trial and error experiments. These packages developed for improved varieties are often not suitable for traditional cultivars. It is important to evolve site-specific farmer-friendly technologies, which have wider adoption value in a heterogeneous environment. The participatory mode of technology development helps generate improved agronomic practices.

The following case study illustrates how farmers evaluate technologies while adopting them, even if only incremental yield advantage is associated with the technique.

Promoting On-farm Conservation

Kollihills, located in the southern part of eastern Ghats in south India, is characterized by inter and intraspecies millet diversity. A *Malayali* tribal community inhabits the region. In the recent past, millet diversity has started declining and was on the verge of disappearance due to the introduction of cash crops and other socioeconomic factors.

Different approaches have been attempted as direct and indirect incentives to promote on-farm conservation and to ensure local food security.

Productivity enhancement is one intervention tried in "little" millet (*Panicum sumatrense*) cultivars using participatory approaches. Specific emphasis was given to the participation of women based on their greater participation in production.



Sadana Samai *Kattavetti Samai*

"Little" Millet

The agronomical characters and ecology of the different landraces and cultivation practices were studied before initiating the activities. Thirty knowledgeable men and women farmers selected from all over the region served as a core group that assessed the constraints and opportunities in "little" millet cultivation. The potential areas for enhancing productivity were identified by the farmers. These included sowing methods, nutrient management, cropping system and drought management.

Participatory Learning and Decision-Making

A participatory adaptive research was undertaken to study and monitor productivity aspects of "little" millet. A demonstration plot was set up and a training program evolved in consultation with the core group members. Regular training programs were conducted in the field. In consultation with farmers, four different types of simple, low-cost interventions were designed: method of sowing and spacing, seed treatment methods, different sources of nutrients, and intercropping with cassava and pulses.

Two different types of landraces were cultivated and accordingly, experiments were designed to test one short-duration and one long-duration landrace. Farmers regularly monitored and evaluated the

experiments at different growth phases using a set of indicators. They were actively involved right from the beginning, from constraints identification, design, layout, and criteria identification for treatments. Constant monitoring and evaluation activities were undertaken in the field including field evaluations at vegetative stage, flowering, and harvesting stage of the crop.



Farmer Preferences for Improved Agronomic Management Practices

Nutrient Management

Farmers preferred using lessons from the trial on nutrient management using biofertilizers, poultry, inorganic and farmyard manure. Biofertilizers gave a good response (30% increase in yield). The practice is very simple and could be applied either through seed treatment or soil application or both.



Seed Sowing and Hardening

In the sowing and seed hardening experiments, farmers appreciated the results but did not adopt them on their own farm due to management constraints: the traditional approach involves broadcasting of seeds in a leveled field, which hardly takes one labor day. In the line sowing approach, a 25-60% increase in yield was noted over the existing practice, but the limited availability of draught power, drudgery, undulating terrain, and high labor demand discouraged the adoption of the improved practice.

Similarly, in the seed hardening experiment, water soaking for 24 hours gave a 20% higher yield advantage. However, the unpredictability of monsoon and sowing time hindered its adoption. In the same way, intercropping experiments with cassava at different densities showed that short-maturity cultivars are suitable as intercrop. However, the different sowing times of the two crops involved more labor, and thus, prevented farmers from adopting the practice.

Perceptions on the agronomical practices varied between farmers and researchers. Researchers considered mostly the yield advantage, factor productivity, and cost-benefit analysis without looking at the environmental and farmer labor constraints, whereas farmers give more priority to factors that combine less management intensity and yield advantages. The participatory demonstration approach facilitated a discovery learning process in the field. The group learning process encouraged farmers to share experiences among themselves and to become active learners. Continuous monitoring and evaluation also helped the farmers to analyze and choose options.

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