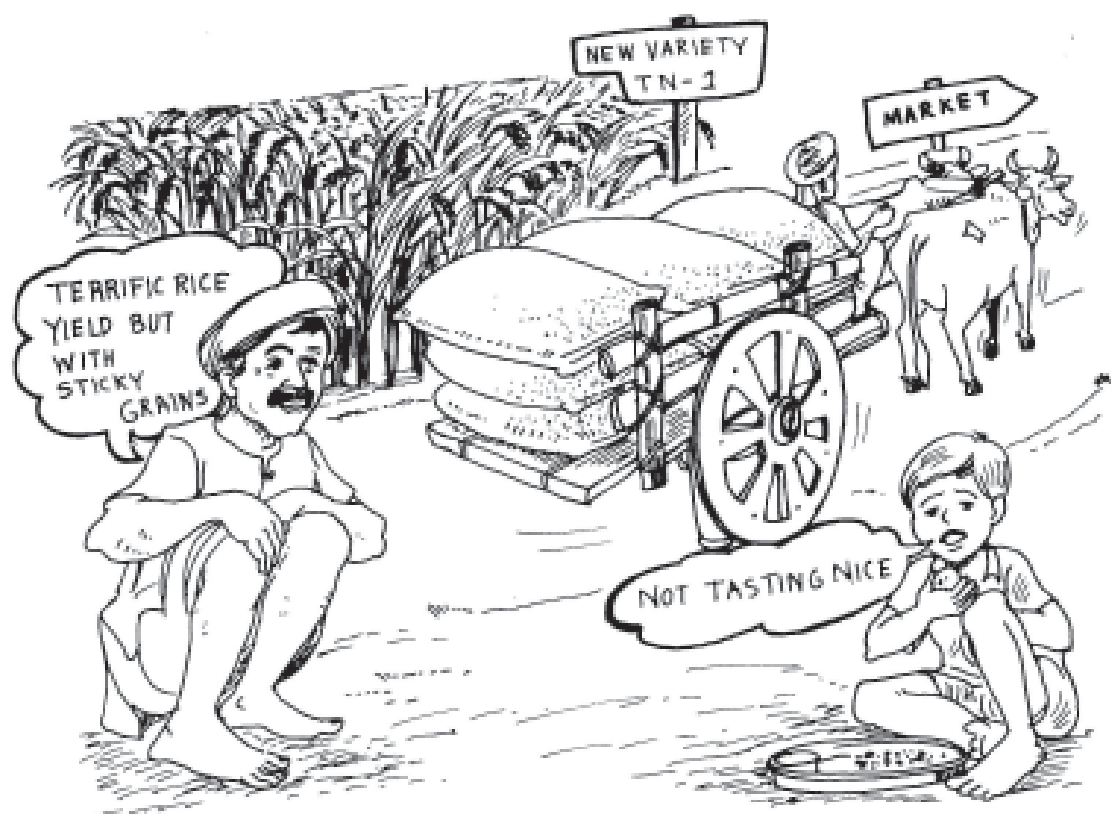


# On-farm Trials and Demonstrations: “Test as You Grow”



**O**n-Farm Trials (OFTs) actively involve farmers to extend and adapt new ideas and innovations within local farming environments. Active participation of the farmers enhances the chances of technology adoption, whether simple or complex. Widely-utilized by researchers and development agencies, OFTs provide both farmers and researchers an opportunity to collectively contribute their intellectual abilities to modify a particular technology in a participatory mode. They support farmer decision-making relating to the on-farm adoption of a new technology. The “test as you grow” approach infers that discovery and adaptation of the new innovation takes place in a participatory manner, out in the farmers’ field through the growing season of the crop. Such an approach has proved to be of immense value in accelerating adoption of innovations because ultimately the farmer takes the decision to accept or reject it. This approach is useful as a decision-making tool because other information, personal experiences, and the environment associated with the farmer and markets are taken into consideration when considering the adoption of a new practice.

#### Advantages of OFT

- Farmers make better informed decisions relating to the new technology or practice.
- “Large plot” trials conducted in farmers’ fields add value to the research and development process.
- Farmers, their advisers and researchers can gain higher degree of confidence in recommendations relating to new varieties.

## What are On-Farm Trials (OFTs)?

OFTs are adaptive research trials conducted out in the farmer's field, allowing for exploration and discovery of the most suited treatment or practice that can then be more widely adapted across farms in that local district. OFT assists in exposing the best treatment for wider adaptability, enabling farmers to compare the best treatments with existing practices at their field. Due to farmers' participation, OFT helps farmers to evaluate and accelerate the technology adoption process. The researcher also gets an opportunity to identify farmers' priorities, determinants of technology evaluation from farmers' point of view. Both, the farmers and the researcher, appreciate each others' perspective and criteria of technology evaluation. In OFT, generally no replications are used and the treatments are kept minimum (one or two) because the farmers find it difficult to compare so many parameters at a time for a meaningful conclusion. The two main components of OFT are: to improve feedback and technology adoption; and to develop methodology for adaptive research.

### Types of On-Farm Trials

- Exploratory trials to gather qualitative information.
- Site-specific trials which are similar to station trials.
- Regional trials that are conducted over a larger area for wider adoption.
- Farmer-managed trials to compare the new technology with the conventional practice as control.



## Steps in Conducting OFT

1. Establish what it is that you wish to investigate, or have answered.
2. Design the trial, e.g., decide which varieties you wish to compare with the variety currently used, i.e., “control”.
3. Decide where you are going to conduct the trial. Select a relatively uniform site within a field. Avoid trial in areas that differ greatly in soil type, or across areas where different crops may have been sown in previous years. Make sure that the varieties are planted in long but thin adjacent strips. Sow the plots across the known minor variations within the field, e.g., all varieties are planted down a slope, but not across a slope in a field.
4. Select a large plot of one hectare, or contiguous plots of nearby farmers for demonstration so that the impact is conspicuously visible.
5. Make sure that you sow all of the different varieties on the one day. Provide the farmer with complete package of practices so that the operations are performed timely and without error.
6. Make sure that all other practices are exactly the same for all treatments e.g., crop variety. Decide how much fertilizer should be applied, your methods of ground preparation, sowing, weed and pest control.
7. The farmer should keep all the records and provide copies to the researcher.
8. Organize wide publicity. “Farmers’ Day” should be held at the site so that the farmers from the neighboring areas visit the trial, see the improvement and become convinced about the advantages of the technology. A success story should be published in the newspapers for mass circulation.

## Farmer as Partner-An Indian Experience in Rice-Wheat

In participatory research like OFT, the farmer acts as a partner and helps in technology refinement and validation. Under the Government of India scheme, about 1000 trials on wheat production technologies are conducted across the country with the help of the more than 35 cooperating centers in State Agricultural Universities, Indian Council of Agricultural Research's institutes and non government organizations (NGO). A number of technologies, viz improved varieties, weed control, zero-tillage, furrow irrigated raised bed system and line sowing have been demonstrated. In certain cases, the farmers have a chance to modify/refine the technology.

### Indian Innovations

- While successfully adopting bed planting (FIRB) technology for wheat, some farmers planted a relay crop of sugarcane in the furrows, thereby reducing the turn-around time.
- Zero-tillage planters are used after one plowing in weed-infested fields to achieve "reduced tillage" and avoid herbicide use.
- Sand is added to the topsoil to improve drainage instead of periodic gypsum application where only sodic irrigation water is available.

## Statistical Analysis

To get a more accurate and unbiased assessment of the technology, off-farm analysis is advisable. Information received from different farmers is used to reduce "experimental error" which refers to variations (in yield, etc.) between two plots with the same treatment (e.g., crop variety, fertilizer, etc.). Replication, or repeating each treatment in a finite number of plots of one or more farmers, is done to reduce variations caused by factors other than the treatment being tested. Each farmer is given the same set of treatments (e.g., varieties) and his field represents a block, with each plot being a replication of the treatments. The order in which the varieties are planted, say from a water canal or irrigation head, is changed at random for each farmer. This is called randomization. The statistical design, consisting of blocks of random replications of each of the treatments, need not concern the farmer. The data of yield and other parameters generated in the farmers' field can be analyzed by the researchers, who could periodically monitor the crop in the farmers' fields.

## Evaluation

Monitoring and evaluation are integral part of research and development activities. Treatments at the farmers' field are evaluated to reach conclusions based on the information generated by the on-farm trials. The levels are: farmer evaluation; internal evaluation; and external evaluation.

### Comparison by Farmers

Some parameters for comparing the performance of a new variety of wheat to an existing one are:

- yield
- grain color
- bread/roti-making quality
- taste
- response to fertilizers
- crop duration in the field
- resistance to pests
- straw strength and lodging resistance

The farmers can determine the superiority (or otherwise) of the variety under normal field conditions without any complex experimental or statistical design or analysis.

In addition, each plot should be harvested and weighed separately for statistical analysis and a sample from each plot should be assessed for quality characteristics of grain and straw. It is better to have crop cutting experiment to estimate the crop yield.

## Farmer Evaluation

The farmers evaluate the technology according to their own criteria at every step and are the ultimate evaluators who matter the most in the evaluation process. They are interested mainly in the higher returns. They evaluate the technology on the basis of benefit cost ratio of the changes made.

## Internal Evaluation

The trials conducted are evaluated by the implementing agency according to defined objectives. A semi-structured interview schedule is designed to record the perception of the farmers regarding the technology demonstrated and the feedback is used to modify the technology. The suggestions given by the farmers are taken into consideration to improve upon the technology. The researcher looks at the technology from a wider angle, apart from the parameters important from the farmers' point of view. The interest would be in the sustainability of natural resources which may not be of immediate importance to the farmer.

## External Evaluation

In this evaluation system, an independent agency, external to the implementing agency, is given the responsibility to evaluate the technology demonstrated from agronomic, socioeconomic and other parameters along with the suggestions given by the farmers reported without any bias. The chances of mis-interpretation of data are less and the findings are impartial. This method is effective and transparent although it means higher expenditure. The “test as you grow” approach to OFTs and demonstrations provide an open participatory framework in which farmers, researchers and advisers can discover and adapt new technology to suit local farming conditions in a collaborative environment.

### Limitations of OFTs

There are many limitations associated with on-farm trials, many of which can be overcome through proper planning and management. The main limitations are as follows:

- Transport for inputs, monitoring and evaluation.
- Finance for the trial and evaluation.
- Change in operational timings at the farmer level and the need for the researcher to adopt flexible time schedules for work.
- Lack of manpower for monitoring and evaluation by the farmer and agency.
- Low risk taking capacity of the farmers to test new technologies.



### Adapted from:

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