

## Chapter Ten

### Reporting the Results of Economic Analysis

This manual has presented a set of procedures for doing an economic analysis of on-farm agronomic experiments. The careful use of these procedures will help in selecting treatments for further experimentation and for developing farmer recommendations. When researchers **report** the results of on-farm experiments, a summary of the results of the economic analysis should be included. The following points are a checklist for organizing a report of the economic analysis.

#### **1 Review Objectives of Experiment**

Before beginning any analysis, review the objectives of the experiment. Include a review of the previous diagnostic and experimental evidence that was used in planning the experiment and a review of the tentative definition of the recommendation domain. The purpose of each variable in the experiment should also be reviewed. Does it represent a possible alternative to the farmers' practice, or is it meant to provide initial evidence about the importance, interactions or causality of particular production constraints? In other words, do treatments represent possible farmer recommendations, or are they being used to help design further experiments which will lead to such recommendations?

#### **2 Review Experimental Design and Management**

Review the design and management of the experiment. The marginal analysis presented in this manual is useful only when applied to on-farm experiments with particular characteristics. The nonexperimental variables must be at levels representative of farmers' practice in the recommendation domain, and one treatment must represent the farmers' practice with respect to the experimental variable(s).

#### **3 Calculate Total Costs That Vary**

Identify the variable inputs for each treatment in the experiment. Make sure that all inputs that vary across treatments are included, paying particular attention to changes in labor. Calculate the costs that vary for each treatment, on a per-hectare basis. For purchased inputs, base the costs on realistic field prices that farmers in the recommendation domain must face. For nonpurchased inputs, develop realistic opportunity costs. Sum the total costs that vary for each treatment. (A preliminary calculation of these costs should have been done when the experiment was being planned.)

#### **4 Calculate Average Yields**

Review the results of the experiment at each location. These may be the results of a single year, or of several years. Decide if all the locations represent a single recommendation domain. Decide if any locations should be eliminated because of errors in experimental management. Report the reasoning behind these decisions. Use statistical analysis to help decide if there are any differences in response among the treatments. Locations with results that were affected by unexplained or unpredictable factors must be included in the statistical analysis.

#### **5 Decide If a Partial Budget Should Be Presented**

a) If there are no yield differences among treatments, the one with lowest total costs that vary should be chosen for further experimentation or, if there is sufficient evidence, for recommendation.

b) If there are yield differences among treatments, then a partial budget will have to be developed.

#### **6 Calculate Adjusted Yields**

The first line of the partial budget should show the yields for each treatment averaged over all locations in the recommendation domain. The second line shows adjusted yields based on differences between the experiments and the farmers' fields with respect to trial management, plot size, or time or method of harvest.

#### **7 Calculate Gross Field Benefits**

Calculate the field price of the crop. Remember, an experiment may involve more than one crop, and/or may involve crop by-products, such as fodder, which are of importance to farmers. The field price of a crop is the price that farmers receive, less all costs of harvesting and marketing that are proportional to the yield. The gross field benefits for each treatment are the adjusted yields times the field price.

#### **8 Calculate Net Benefits**

List the costs that vary, and the total, for each treatment. Calculate the net benefits for each treatment. The partial budget should contain only yield, cost, and benefit figures. Assumptions about field prices, yield adjustments, etc. should be presented beneath the partial budget as footnotes. Details on experimental treatments should be clearly presented elsewhere in the report. in the discussion of the experiment.

**9 Do a Dominance Analysis**

Arrange treatments in order of ascending total costs that vary, with corresponding net benefits. Eliminate dominated treatments.

**10 Estimate a Minimum Acceptable Rate of Return**

Estimate a minimum rate of return for a crop cycle. In most cases the minimum rate of return will probably be between 50% and 100% for a crop cycle.

**11 Do a Marginal Analysis**

A marginal analysis presents the nondominated treatments on a net benefit curve and calculates the marginal rates of return between pairs of adjacent treatments. Compare the marginal rates of return to the minimum rate of return in order to select acceptable treatments. Present the results of the marginal analysis in the report.

**12 Draw Conclusions From the Marginal Analysis**

a) If the results of the experiment are being used to help plan further experimentation, then the results of the economic analysis should be discussed in the report in light of the choice of appropriate treatments for experiments in the next cycle.

b) If the economic analysis is being done to develop a recommendation, then the report should contain a discussion of the evidence that has been used to make the recommendation.

**13 Before Making a Recommendation, Do a Minimum Returns Analysis**

If data from enough locations and years are available, do a minimum returns analysis on all the experimental results to examine the implications of the variability in the results for farmer welfare.

**14 Before Making a Recommendation, Do a Sensitivity Analysis**

If variability in prices or costs is expected, carry out the relevant sensitivity analysis and include the results in the report.

**References to definitions of terms are printed in boldface type.**

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