

## **Research Needs and Priorities**

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### **Introduction**

The research needs and priorities will depend on the state of the art of natural farming in each specific country. For example, countries with advanced research and natural farming experience will certainly have needs and priorities different from those with less experience and research in natural farming. Nevertheless, prioritization is needed, though each country may choose where to begin depending on their own experiences and needs. Three major categories of concern were:

- 1) Technological aspects,
- 2) Methodology, and
- 3) Implementation.

### **Technological Aspects**

Technology is classified under short-term and long-term priorities. These classifications are based on the expected results from the research done.

#### **Short-Term Priorities**

Three factors were identified in short term research needs, and the priorities listed.

**Soil Factors.** Soil factors can be broadly divided into three areas: inputs, use of microbes, and site specific problems. The needs in each follow in order of priority:

- 1) *Inputs.* Research in this area should concentrate on the reduction and/or elimination of the use of organic fertilizer. This can be achieved through research on the use of organic matter, including green manure; the use of mine materials, e.g., rock phosphate, limestone, and gypsum; and the use of byproducts e.g., fly ash.
- 2) *Use of microbes.* Study on the efficient use of microbes to improve soil fertility and plant growth, including research on the use of effective microorganisms (EM). Much research is required in this new area since most researchers have only been exposed to the technological aspects of EM through this conference.
- 3) *Site specific problems.* These include soil amendments to improve physical properties of the soils, and other specific problems such as improving the quality of irrigation water.

**Pest Factors.** Research on pests (including insects, pathogens, and weeds) should emphasize the elimination and/or reduction of the use of chemicals. In this area, three aspects of research were identified, namely:

- 1) *Natural products.* The identification and use of plant extracts and inert materials.
- 2) *Biological control.* The identification and use of parasites and predators, and the possibility of using sterile male techniques.
- 3) *Crop and soil management.* Research on specific crop/soil management techniques to enhance production and reduce the need of using chemicals.

**Animal Factors.** The integration of an animal component (including fish) into the natural farming system should be considered as one of the key considerations for developing a self-sustainable and efficient system.

#### **Long-Term Priorities**

All research needs should have long-term objectives, including the areas listed in the short-term priorities. However, one area which cannot be considered in the short-term objectives is selection and breeding. In this area, the selection of suitable, genetic material and breeding to obtain high-yielding and resistant varieties that are especially suited to natural farming should become a priority to plant breeders. A new program is urgently needed since the current breeding programs are mainly based on high-input technology.

## **Methodology**

Three general methods of experimentation were of concern:

- 1) On-farm research,
- 2) Experiment station field studies, and
- 3) Glasshouse/laboratory studies.

The methodology adopted in any research program depends on the knowledge already available in the country or region with similar environments. Basic studies should precede research on a farmer's field. As an example, work on new technology such as the use of EM should start in the glasshouse and experiment station, and expand to farm research and extension programs after sufficient knowledge and confidence are obtained.

## **Implementation**

The implementation of any research program has two fundamental aspects. It could be either a specific or a holistic approach. The group is unanimous in the opinion that if there are sufficient knowledge and techniques available, a holistic approach should be tried. If not, specific research should be conducted to solve specific problems, keeping in mind the final goal of the holistic approach and develop a package technology for natural farming.

**Note:** The report of this working committee did not touch on the actual methodologies of research, the time frame, and the financial aspects. This is due to the wide disparities in each of these areas between countries, and, as such, these three aspects could not be listed and prioritized.

The group also noted the need for information flow between researchers and the availability of literature/publications to speed up progress towards the goals.