

## ON-FARM DEMONSTRATIONS: CONSIDERATION FACTORS FOR THEIR SUCCESS AND VIABILITY AS AN EXTENSION TEACHING TOOL<sup>1</sup>

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### ABSTRACT

*Demonstrations of new or innovative practices carried out on actual farms have long been a key hallmark of program delivery and teaching in extension work. Such demonstrations led to the founding of the extension system in the United States about a century ago. These on-farm demonstrations gained the confidence of farmers who toured the farms, and has led to successful growth and development of the US extension system. Such farm based demonstrations are being used extensively in extension work in other countries as a means of showing and telling farmers exactly what a new or innovative practice is and showing how it will fit under local conditions. Soil types, fertility levels, climatic conditions such as frequency, amounts and periods of rainfall, availability of inputs or their applications, knowledge levels of the farmers and extension workers, available infrastructure and many other factors all come into play when on-farm demonstrations are considered as a program delivery method.*

*Field demonstrations, aptly named on-farm demonstrations, developed under local farm conditions, require a significant amount of time for planning and implementing. The information gained from the demonstration must be adequately communicated to farmers and others regarding the viability of a practice, which also requires considerable time in planning and implementing the teaching process. Yet, minimal emphasis appears to have been placed in the literature on guidance for actual planning and implementing such demonstrations. With additional instructional information, extension workers who are highly trained or those who are less well educated may use such information to guide the process from initial planning to implementation and use of the demonstration for viable educational purposes.*

*This study represents the collective thoughts of seasoned and successful extension workers in North Carolina and in Trinidad who participated in a modified Delphi study. The study sought to identify the many factors to consider in using on-farm demonstrations as a key component of an extension educational program. This study resulted in the development of*

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*both the Advantages and Disadvantages associated with on-farm demonstrations located on private farms.*

## **1. INTRODUCTION**

As organized agricultural extended education work began to be established during the 19<sup>th</sup> century, much of the instruction was through publications, farmers institutes, traveling schools, and itinerant teachers (Jones & Garforth, 1997). While there was an increasing demand for agricultural education, these approaches were teaching information that had been written, and may or may not have been applicable to the audiences receiving the information. Indeed, even published materials were few and far between, and those that were available tended to deal primarily with the natural sciences such as botany and geology (Schaub, 1953). Such agricultural educational opportunities were often mistrusted or dismissed by farmers as only “book farming”, and was not readily accepted as valid by the farmers themselves for their own situations (Rasmussen, 1989).

While organized agricultural research was gaining increasing support in the United States during the latter half of the 19<sup>th</sup> century, it was not until the Hatch Act was passed in 1887 that research stations were established as a part of the government supported quest for agricultural knowledge development that could be applied to the expanding agricultural industry. These research stations then produced publications of their results. Yet, while most people were literate, there was a discomfort with the printed word, and as a result, there was a continuing lack of connection between the informational needs of the farmers and the research stations who were conducting the research and publishing their findings (Rasmussen, 1989). Clearly, with such shortcomings inherent in the fledgling efforts to extend agricultural information, more successful means needed to be found for providing information that farmers would trust.

## **2. ON-FARM DEMONSTRATION WORK**

Around the turn of the 20<sup>th</sup> century, there was an ever-increasing problem with cotton insects in the southern United States. As a means for helping farmers combat these ruinous insects, an experienced agricultural educator and researcher by the name of Seaman A. Knapp was called upon by the United States Department of Agriculture to establish an effective way for farmers to gain the needed information to combat these insects. While initial attempts were made to establish demonstrations involving farmers, these initial demonstrations were seen as being financed and supported by the

“government”, and were not successful in reaching the farmers themselves. Adjustments were made in this approach to establish demonstrations on actual farms within the affected territories infested by the insects, with the boll weevil as the primary culprit. These demonstrations that were established on actual private farms gained great acceptance by the nearby farmers. These farmers subsequently adopted the improved insect control practices that were shown in the farmer’s fields via those on-farm demonstrations that were conducted by their neighbors under the guidance of Dr. Knapp and his agents in the states of Louisiana and Texas (Schaub, 1953).

With the notoriety that the successful on-farm demonstrations gained, word spread rapidly throughout the South, and other locations sought opportunities to establish farm demonstration work. Such demands led to the appointment of the first county agent in Smith County, Texas in 1906. About one year later, the first appointment of a county agent in North Carolina, which is about 1,000 miles east of Texas, was made. Essentially the sole purpose of these first county agents was to meet the demand for more demonstrations be undertaken in the immediate local areas they were appointed to serve (Schaub, 1953). Such demonstration work continued to spread throughout the country, and in 1914, the Smith-Lever Act was passed by the United States Congress to establish an extension system throughout the country to assure that such applied educational efforts be undertaken in local communities where the farmers and their families resided (Rasmussen, 1989).

Such on-farm demonstration work has remained quite popular over the many years that followed, and this means of conducting extension work has been widely adopted and continues throughout the developed and developing world (Peck, 1990, SAC, 2000, PMAC, 2003, Srinivasan, 1993, Ganpat, 2002, SARE, 1997 and Kaumbutho, 1998). Indeed, on-farm demonstration was the only program delivery mode that was mentioned in a United Senate press release describing the highlights of the 2001 US Farm Bill (Lugar and Harkin, 2001). While more than seventy-two extension program delivery methods have been identified and defined (Richardson, et. al., 1994), the on-farm demonstration concept and means of program delivery remains one of the primary means for effectively delivering relevant information to farmers and others across the world.

### **3. RATIONALE FOR STUDY**

While on-farm demonstrations have been developed, described and used extensively across the world, reviews of available literature appear to indicate that local extension workers are essentially left to their own devices and

common sense to guide them in actually implementing on-farm demonstrations in their extension educational programs.

Also, as evidenced by fewer and fewer extension workers actually coming from a farm background (NCSU, 2001 and Yoder, 2003), the innate familiarity with the vagaries of agricultural production may have to be learned rather than through long standing experience that is gained by living and working on a farm. These individuals will therefore need more training support and materials in order to accomplish their jobs more successfully.

As could be expected, agricultural researchers have developed guidance on developing on-farm tests, which include applied research projects and plot designs that adhere to accepted research and statistical designs (Havlin, Shroyer & Devlin, 1990). Such tests may be far beyond the intended objectives of the particular education program, and may be more closely akin to a simple result demonstration. Richardson, Jenkins and Crickenberger (1994) define these two related means of program delivery as follows:

*Result demonstration* – A presentation that shows the effects of a practice change or task by means of practical application, using visual, experiential, or oral methods; it usually involves a before-and-after comparison.

*On-farm test* – A process in which an innovative practice or solution to a problem is tested on an actual farm to demonstrate its viability or to test its applicability; the test may employ before-and-after, control-versus-test, or other comparisons.

Thus, while the on-farm demonstration may seek to demonstrate a simple non-replicated innovation or application for observation by the farmer and others in a local field situation, the on-farm test can require resources and knowledge levels that may not be possessed by the agent or others responsible for carrying out the test.

Another rationale for conducting the study was for the purpose of developing a training fact sheet to offer suggestions/guidance to field agents on the process of using on-farm demonstrations in their local programs as one component of their program that may use many additional program delivery methods as well. The intent was to identify all applicable considerations that could guide the agent in a simple, straight forward manner so as to assist the agent when planning and implementing on-farm demonstrations as a part of the local extension program.

#### **4. METHODOLOGY**

A modified Delphi technique was used whereby nine highly successful Extension agents and specialists in the North Carolina Cooperative Extension System and one specialist in Trinidad were included in this research project. While a relatively small group of individuals with exceptional knowledge about a given subject area can constitute a Delphi study (McCaslin & Tibeziinda, 1997), the modifications involved variances in the input and feedback mechanisms that were employed by the project leader. Rather than regular face-to-face exchanges and feedback, these were accomplished through e-mail and telephone as well as face-to-face feedback. The ultimate results were reviewed and agreed upon by all persons involved. The study sought to identify the key factors to consider in using on-farm demonstrations as a key component of an extension educational program. This study resulted in the development of both the Advantages and Disadvantages associated with on-farm demonstrations. Following the analysis of these factors, many Do's and Don'ts were specified that can be used as a guide to develop such demonstrations as well as pitfalls to avoid throughout the process.

#### **5. PRESENTATION OF DATA**

##### **5.1 Advantages**

- Located in an actual farm setting
- Keeps Extension close to grower situations
- Locations can be selected for greatest visibility
- Can be widely dispersed geographically
- Cooperators can be selected
- Uses available resources on the farm
- Can reach new clientele
- Can be publicized
- Excellent showcase of innovation & Extension
- Can lead to economic/environmental sustainability

##### **5.2 Disadvantages**

- Extensive planning time may interfere with other program thrusts.
- Cooperators must be secured.
- Coordination needs with cooperator may be extensive.
- Misunderstandings easily occur.
- Labor for assistance is often unavailable or untrained.

- Equipment is often unavailable.
- Transport of materials or machinery are often difficult.
- Calibration of equipment is often incompatible with farm operation.
- Equipment set-up may be time consuming.
- Much time and resources may be required.
- Cooperator may lose interest.
- Availability of suitable land may be limited.
- Farmer may want to use land for other purposes before demonstration is completed.

While the factors above should give the extension worker ample points to consider, there are many considerations that need to be analyzed and remain ever-present throughout the planning, implementation and completion stages of such demonstrations. In this regard, those factors that follow, if adequately considered, can help in assuring that a successful on-farm demonstration is conducted and its educational purpose is sufficiently obtained.

### **5.3 Do**

- Make sure that the issue being addressed is applicable and practical to area.
- Plan the demonstration in advance focusing on written objectives and plans.
- Select locations that are easily accessible and can be easily seen.
- Select farmers who have an interest in the demonstration.
- Select farmers who are respected in community.
- Select farmers with proven cooperative spirit.
- Select farmers who can afford to forgo a part of their farm (especially very small farmers).
- Select farmers who can contribute time, labor and equipment when appropriate.
- Select locations that are not subject to abnormal test conditions.
- Write an agreement with plan of action and all involved parties sign.
- Make sure everyone knows what their role is or will be.
- Make sure cooperator understands ultimate objectives of demonstration.
- Plan to personally oversee implementation.
- Personally visit and maintain frequently.
- Keep site attractive to project positive image of Extension and cooperator.
- Record and document progression, significant happenings and results.
- Plan to use information in presentations and educational materials.
- Properly publicize demonstration with signs, media, and by other means.

- Be open to including new cooperator farmers.
- Keep simple as possible to reach goals.
- Provide recognition to the cooperators.

#### **5.4 Don't**

- • Plan the demonstration upon arrival.
- • Select non-secure locations.
- • Fail to help farmer understand ultimate goals of demonstration.
- • Try to talk a reluctant person into cooperating.
- • Assume that unattended functions will be carried out.
- • Expect resources to always be readily available.
- • Expect the location to be maintained as you desire.
- • Allow weeds or other obstacles to obstruct the demonstration site.
- • Make more complicated than needed.
- • Implement and then fail to utilize to its fullest educational potential.

## **6. CONCLUSIONS**

In summary, field applied training appears to be functioning actively around the world. Such topics as Farmer Field Schools and Farmer Participatory Training, are often heard as key components of field based educational programs in the developing world (Simpson and Owens, 2002, Ganpat, 2002). Such participatory training at the local, on-farm level can also be ascribed to the long established on-farm demonstration as a hands on, participatory, experiential educational approach for effective extension training delivery. From all appearances, the on-farm demonstration is alive and well as a reliable program delivery method, and continues relevant in the evolving world of agricultural extension education in both the developing and developed world.

However, while a popular delivery method for over 100 years, there is some evidence that such time consuming methods such as on-farm tests and field demonstrations are becoming less important to larger farmers in the developed countries than has previously been the situation. In a Virginia study, Obahayujie and Hilson (1988) reported that full-time farmers ranked on-farm demonstrations only ninth most preferred for receiving information as contrasted to part-time farmers who preferred such demonstrations as their number one means for receiving extension information. Also, only a year later,

Richardson (1989) reported that while 62.7% of the 702 North Carolina farmers in his study that were currently using on-farm demonstrations as an informational source, only 25.5% expected to use such demonstrations among their top five methods anticipated for receiving information five years in the future.

Such future predictions have been borne out to be correct, in that in farmer information preference results reported by Maddox, et. al. (2003) found on-farm demonstrations to be only the twelfth most preferred method with 25% preferring this method contrasted with newsletters at 60% and printed articles and bulletins near 50%. Indeed, of the 707 farmers surveyed in this study, only 11.2 % ranked such demonstrations as most important as a means for them to gain information. Interestingly, when respondents were asked to name their most preferred communications channel for information when adopting new farm management practices, personal communication was ranked highest, while printed materials followed, groups/organizations were third, while computer based and electronic means rounded out the top five. If such trends are applicable to other farms in the developed world, it appears that less emphasis will need to be placed by extension workers on the time consuming planning and implementation of simple on-farm tests.

As seen in the literature throughout the world, there is a common lament of declining budgets for public extension, with private advisory services or others filling in the void that is being left when personnel and program resources continue to decline (Rivera and Cary, 1997). Such declines in personnel are pervasive throughout the United States, with such state reductions similar to circumstances of those in North Carolina whereby budget reductions have reduced agent and specialist numbers from well over 550 two years ago to less than 480 in 2003 to serve the 100 counties of the state and its 8 million plus population (NCCES, 2002).

Since all program delivery methods require some allocated time for planning and implementation, the trends in personnel reductions and declining farmer preferences for such on-farm demonstrations would seem to indicate that this means of program delivery is likely to continue to decline in importance to farmers and others within the agricultural industry. Extension workers are likely to become highly selective in implementing such demonstrations on small, local scales due to the expense and resources that are required.

While these predictions are being made for the developed world, there appears to be considerable rationale for NGO's, governments, input supply and others to continue to focus on the on-farm demonstration as a primary



means for farmer education. Observations made by this author and others in Trinidad, South Africa, Vietnam, Ghana, Moldova, The Philippines and other developing country locations indicates that local, small on-farm demonstrations for educating farmers on new or improved practices is and will continue to be an extremely valuable and successful means for delivering information to farmers (Ganpat, 2002, Vos, 2002 and Rurac & Stiopca, 2003).

Clearly, when less than one per cent of the working population in North Carolina and the United States as a whole are involved in farm production (US Census, 2000), less emphasis will be placed by governments and others on supporting strong budgets for agricultural extension. However, in developing countries where the population involved in agricultural production is exceedingly high and sustainable food supply is a critical issue among populations, then it can be expected that the interest levels shall remain quite high for the foreseeable future regarding popularity and utility of on-farm demonstrations as a key means for farmer education.

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