Transformational Education: The Emotional/Economic Tag

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ABSTRACT

Extension is in the transformational education arena. It is difficult to tell farmers that they need to change and have them actually do it. Some will, if a strong enough relationship has been built through years of interaction between the educator and the client. However, most will cling to their past practices, because radical change sometimes leads to failure. Farmers, for all of their claims to 'innovation', are a very conservative group. The educator needs to be certain that change is truly necessary. In North Dakota, two changes have been strongly advocated relating to soils in recent years. First, soil erosion since 1880 has been devastating. Although many farmers in drier western counties long ago switched to no-till production practices, those in the east have been fearful of adopting no-till. A persistent program that reveals how much soil has been lost and continues to be lost has caused an emotional surge of recognition of the devastation in eastern soils, resulting in a change of farmer attitude. Cover crop use has greatly increased and some farmers of high clay soils have begun to adopt no-till systems. Side-dressing corn was rare in eastern North Dakota until recently. After a series of corn N-rate experiments, it was clear that N losses in high clay soils and in sandier soils were extremely high in some years. A case-study was presented in December to farmers in the Fargodome kick-off farm-show that indicated that farmers who did not utilize side-dressing in these sensitive soils would lose up to $500,000 per year on 600 ha of corn. After this presentation, side-dress applicators quickly sold out for spring delivery and side-dress N application has increased each year since the educational campaign. Farmer feedback indicates that over 30% yield increases due to application timing are not uncommon.

INTRODUCTION

The role of Extension is not just taking scientific information in journals and rewriting it so normal people can understand it. With economic, environmental and societal pressures on farmers and agri-businesses, the need for farm management change to minimize off-site negativities while maintaining or enhancing farm profits is a continuing necessity. Farmers are generally conservative and most of them do not embrace change readily. Fear of failure due to change is an ever present companion to most farmer psyches. The challenge for the Extension educator is to develop a program that results in positive change.

Mezirow is a pioneer in transformational education and argues that in order for a person to change an ingrained behavior they have to critically reflect on their experiences, then turn to a change in their perspective. The educator does this by introducing a new perspective which points out deficiencies in past behaviors and reflection on their experiences, which In turn leads to transformational change of behavior (Mezirow, 1991).

A paraphrase of Mezirow concepts related to farmer transformational change are listed below as consecutive phases a farmer goes through before change is embraced-

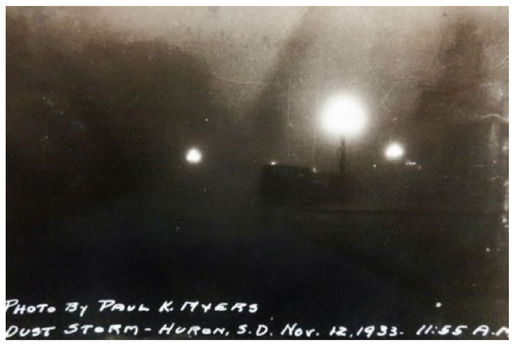
1. Realization of a disorienting dilemma
2. Self-examination with feelings of guilt/shame
3. A critical assessment of past behavior
4. Recognition that the discontent and any change are shared by other and others have negotiated change
5. Exploration of options
6. Planning an alternative course of action
7. Acquire knowledge and skills for implementing change
8. Testing out the new change
9. Incorporating the change into their farming system
10. Building self-confidence in the change
11. Reintegration of the change as an accepted norm of farming

The spark for change is the 'disorienting dilemma'.

For a farmer, outside of a family problem in which Extension educators should not involve themselves, the logical dilemma must be economic. Before evoking discomfort, the educator should also have a Plan B course of positive management available and should be willing to explain the alternative in a practical way, and if possible offer proof that others have used the alternative and manage economically viable operations.

Case Study One- Soil Erosion

Forty years of soil conservation programs in North Dakota, and innovative techniques for developing effective no-till farming systems from North Dakota growers has resulted in long-term no-till, often over twenty years continuously, in the western area of the state. However, in the Red River Valley, growers were reluctant to consider any reduced tillage system. In an effort to change this behavior, a 10-year no-till, strip-till, conventional till trial was conducted on very high clay (>50%) soils at the Fargo Experiment Station, and experimentation with cover crops to help hold soil were conducted. In addition, a program was developed which documented the historical wind erosion damage done to the region and still continues today. The topsoil depth and organic matter (OM) content (0.6 to 1.2 m topsoil, and < 60 g kg-1 OM) of soils around 1900 from the area were provided, along with the present topsoil depth and organic matter content of soil from the areas (<15 cm at 40 g kg-1 OM). Hundreds of millions of tonnes of topsoil have been lost, and with it, the equivalent of over 200 years of P fertilizer application at today's present historically high rates. The economic loss of crop nutrients produced a strong emotional reaction from growers. Many are now experimenting with cover crops and several farmers are adopting no-till systems. In casual conversation, farmers now refer to wind-blown soil as 'losing fertilizer'.



Franzen personal archive, Huron SD, 11:55 AM downtown scene with streetlights during dust storm 1933.

Aftermath of Red River Valley dust storm, late 1990's.

Soil from north central North Dakota in small area of virgin prairie compared to long-term tilled soil in adjacent field. Soil lost over 120 years is over 2 feet.

Case Study Two- Improved N Management with Side-dress Fertilizer Application

Corn (*Zea mays*) production has expanded over the past twenty seven years from about 100,000 ha in 1990 to over 1.2 M ha in 2017. A large proportion of this production is on fields in eastern North Dakota with high spring rainfall events considerable snow-melt in some years and a mix of coarse-textured soils and soils with high clays. As a result of N-rate trials in corn conducted from 2010 through 2015, we found that soils with leaching potential and high clay soils with denitrification potential required far more N to produce higher yields than soils with loam to silt loam textures. Growers in sandy areas who already side-dressed had much better yields than their neighbors. Corn growers on high clay soils seemed resigned to corn yields hardly ever exceeding 7,000 kg ha-1. Experiments with preplant N and side-dress N on campus high clay soils exceeded 12,000 kg ha-1 yield with side-dress application compared to about 8,000 kg ha-1 with preplant N only.

A case study was presented to about 300 growers at a state-wide farm conference in Fargo. The study assumed that a farm grew 600 ha of corn and applied a normal preplant rate and achieved a final yield of 8,000 kg ha-1. If the farmer had sidedressed, the farmer could have paid for a coulter-liquid N applicator, paid the extra money for the liquid N instead of the normal urea, and paid a hired farm laborer to sit around the shop and watch TV reruns all year except for the two weeks required to apply the side-dress N, and still netted $250,000 at the corn prices of that year. In the days following the presentation, every side-dress applicator in the Red River Valley was purchased and the wait for new units from the manufacturers was over 3 months. In addition, one of the examples I presented was a farmer-collaborator of my acquaintance who always side-dressed, whose corn always looked beautiful and yielded well even though the neighbors who didn't side-dress had consecutive yield disasters in wet years just across the fence. I remarked that I couldn't imagine why the neighbors didn't see the side-dress advantage. The following year, all the neighbors in that area had side-dress applicators.

Before this program, side-dress N application in eastern North Dakota was practiced by only a few farmers. Today, side-dress N application is common in this region and it is an accepted practice by those who use it.

SUMMARY

Two successful transformational education programs were developed to move farmers from environmentally and economically unsound practices. The key points towards the success was attaching the emotional/economic tag to the issue. In the case of erosion, the economic link between soil loss and crop nutrient loss was established as well as the emotional loss connected with the high amount of topsoil depth loss was important, as well as the presentation of examples of farms where the successful implementation of no-till systems and cover crops had started the soil restoration process. In the case of side-dress N, use of research data and expanding the results to a real-world case study, demonstrating the substantial economic gain from adopting side-dress N application on N-loss sensitive soils resulted in almost instant adoption by many farmers.

REFERENCE

Mezirow, J. 1991. Transformative Dimensions of Adult Learning. Jossey-Bass, San Francisco.