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Teaching Farm Management and Decision-Making Skills Using a Student-Managed Farm

Mark S. Honeyman

The widespread application of science in production agriculture has placed additional value on higher education for farmers and agribusinessmen. Students enrolled in Agricultural Studies 450 (Ag 450) at Iowa State University learn applied farm management by making the decisions needed to operate the Ag 450 Farm, a teaching farm at the university. The farm and the class are both called Ag 450.

The class consists of junior and senior undergraduates majoring in curricula related to production agriculture: Agricultural business, agricultural education, agricultural mechanization, agronomy, animal science, and farm operation. Most of the students have farm backgrounds and are interested in careers in or closely associated with farming. The Ag 450 class has one prerequisite: Agricultural Economics 330 - Farm Planning, Production, and Organization. Most of the students have also taken extensive agricultural coursework.

This class of students makes all the decisions required to manage the Ag 450 Farm. They develop the plans and budgets and make the decisions in operating

Honeyman is an instructor in Agricultural Studies Department, Iowa State University, Ames, Iowa 50011.

Abstract

Ag 450 at Iowa State University is an undergraduate course entitled Farm Operation and Management, in which the students learn management skills and decision-making by managing the Ag 450 Farm. The farm has been operated as a self-supporting commercial teaching farm for the past 40 years. The farm produces typical midwestern crops and livestock according to students' decisions in a diversified operation. Two full-time operators are employed. Course objectives include teaching the students to (1) manage a farm using farm management techniques, (2) develop an understanding of the opinions of others, (3) learn to function efficiently as a group, (4) participate personally in the challenge of applying current technology to real farm problems, and (5) develop patterns for decision-making. The purpose of this study was to examine the development of this unique educational program at Iowa State University, to characterize the Ag 450 Farm course, and to compile a brief history of the Ag 450 Farm.

the farm. Committees of students explore alternatives and present recommendations to the class for discussion and action by majority vote to determine the farm's course of action.

The Ag 450 Farm has been operated in this way since its inception in 1942-43. At Iowa State University, Ag 450 is an uncommon course in applied farm management, spanning several disciplines and using an actual farm. For 40 years, students have wrestled with the challenges of managing the farm.

History

In the College of Agriculture at Iowa State University, the Ag 450 course is unique. It has flourished and evolved under student management in spite of a rapidly changing agricultural industry and a dynamic educational environment. W. G. Murray originated the idea of a student-managed farm and served as the first instructor. Murray emphasized the vital farm management decisions that a young farmer must make, including what to produce, the size of the farm, whether to buy or rent land, and the details of the farm's crop and livestock system. According to Murray, these decisions represented "the heart of farm management." Murray (1945) believed that before graduation a student expecting to operate a farm should have training in the farm practices of his area; the scientific principles of crop and animal production, including the use of power and equipment; the business principles of farming; and, finally, the making of management decisions.

The development of Ag 450 specifically addressed the area of farm-management decision-making. The course began as an educational experiment and was not administered by a single department, to show the diversity of background needed in operating a farm. Even though the course emphasized decision-making and farm management, it was not included in the Agricultural Economics Department. According to Murray (interview, 1983), the question arose as to whether the student farm should be set up in the farm management section of the Economics Department. The answer was "no," because economists had limited knowledge in livestock breeding, crop production, and other topics important in operating a farm.

Murray urged that "students apply their classroom training and test their ideas on a concrete example" so that "the student will get the feel of making decisions." Murray (1938) concluded that in teaching farm management "what is important is bringing the student in close contact with vital management decisions."

In 1945, after teaching seven classes of Ag 450, Murray was sure the purpose of the course was to give the students experience in decision-making. He observed:

"Decision making is a great unexplored field for agricultural education. A common practice in agricultural colleges has been to give the student

an opportunity to work in the barn or in the field at an hourly wage or to earn his food and lodging. But the student has been the hired hand, not the manager. Many of these students were already expert at doing farm work. What they did not know was how to plan, how to give orders, to be responsible, in short, manage a farm. The fact is that students have been given four years' college training on how to farm but have had little chance to try out their management ability while getting all this information. The farm laboratory was designed to correct this defect" (Murray, 1945).

Murray (1945) emphasized that "by all odds the outstanding principle in the [Ag 450] course is that success is obtained in direct proportion as the students are given definite responsibility and allowed to make important decisions."

Course Objectives

One objective of Ag 450 is to give students experience of using their classroom instruction in decision-making. The course also allows the students to make mistakes as part of the learning process. Former instructors have been amazed at how much students learned from "the process of actually **doing** the job of making management decisions" (Wallace, 1963).

The educational activity involves the students learning decision-making techniques with the Ag 450 Farm as the working example. "Some observers of the Ag 450 class imply that the purpose of the Ag 450 course is to teach students how to operate the Ag 450 Farm successfully. This assumption ignores the fact that none of the students will manage this farm after graduation; also that no other farm has the identical combination of resources and management problems which this farm possesses" (Wallace, 1963).

A process of scientific decision-making is followed. This procedure involves six steps (Wallace, 1963; College of Agriculture, 1978):

1. Recognize current problems and anticipate future problems.
2. Gather information relative to the problem.
3. Using budgeting, make an analytical study of the alternatives.
4. Make decision based on the best alternative.
5. Implement the decision.
6. Accept the consequences of the decision.

This process forces the students to search through class notes and read extension bulletins, farm records, and farm magazines. It sends them with questions to former instructors, extension personnel, agribusinessmen, salesmen, fathers, and neighboring farmers. The discovery of these resources proves valuable to the students later in their careers. The application of technology by the students stretches their knowledge base, but, more important, the students gain experience in applied decision-making.

Another general objective of Ag 450 involves group interaction during class meetings. The students make decisions in a group setting, with each student having the opportunity to listen, contribute to the discussion, and practice communication skills, including speaking, logic, and questioning. Gibson (interview, 1983) described this group process as "the give and take necessary to get an idea accepted by the rest of the class members." Not only do the students learn to follow the decision-making process, but also they must justify their plan to the class in discussion and obtain approval for it. Two specific objectives are (1) for the class to learn to function efficiently as a group, and (2) for each student to develop an understanding and respect for the opinions of others.

During the discussions, students with different backgrounds and experiences in agriculture learn from each other. New ideas and original approaches are gained through group interaction. Frequently, at the end of the term, students have remarked that they have come to know their Ag 450 classmates better than those in any other college course.

In Ag 450 the farm becomes the course outline, the decisions are the lessons and the student decision-making process is the primary learning activity. As the students participate in decisions by (1) gathering information, (2) analyzing the situation, (3) formulating alternatives, and (4) deciding the course of action through discussion, they are participating in the Ag 450 learning process.

Ag 450 Structure

The committee system has been the basic organizational unit of the class since 1943. Each committee corresponds to an enterprise on the Ag 450 Farm, for example, corn, swine, or beef cattle.

The most notable feature of the Ag 450 committee system is that it has been used continuously through 40 years as the major framework for the class. The small groups of students develop decision alternatives and recommendations for the class. These student committees operate with little input from instructor or faculty unless the students request it.

The class also elects officers to provide leadership and special services for the class. Major officers include class coordinator, business manager, treasurer, secretary, marketing coordinator, cashflow coordinator, labor coordinator, and farm accountant.

A Case Example

Each spring the class in preparing the crop plan for the new year must select hybrid corn varieties. This annual decision is not easy. The Corn Committee begins the process by gathering information — yield test reports, prior year's varieties' performance, dealer literature, and data on standability, corn borer resistance, stalk strength, ear drop, maturity, price, dry down, etc. The committee sifts through this information and selects a group of hybrids that will

produce top yields under Ag 450's situation. A member of the committee makes a motion regarding corn hybrids followed by the committee's justification. Then the class debates the motion, and sometimes the arguments are heated. The students vote, and the majority rules. If the motion passes, the business manager purchases the hybrids. If the motion fails, the matter is sent back to committee for review and reconsideration. This process is not efficient, but it is democratic and every student participates. Learning is maximized as decisions are discussed and enacted by the class. Subsequent classes review decisions and, in this case, monitor the hybrid performance, recording information in the Corn Committee notebook, which is passed on to the next semester class.

Role of the Instructor

Ag 450 instructors come from a variety of agricultural disciplines, which is appropriate considering that the course bridges various disciplines. With classes changing each semester, the instructor provides vital background information, acquaints the students with the farm, and provides continuity by serving as a resource person to the students and as interim farm manager between school terms.

The role of the Ag 450 instructor is not typical for college faculty. Former instructors viewed their position variously. Murray (1945) described the Ag 450 instructor as a "combination auditor and board chairman, leaving all the initiative for action with the student." Odegaard (1949) stated that "to make the management of the Ag 450 Farm the responsibility of the students,... instructors have attempted to withhold their opinions during the discussion of management problems." Weber (interview, 1983) said that he "wanted the students to express themselves and make decisions without his influence."

This passive instruction requires a certain style of teaching. Wallace (1963) described it this way:

"The instructor must be adept at teaching how to properly approach management decisions without unduly influencing the decision. Unless he maintains constant vigilance toward making sure that the principles of production economics are recognized and applied, the course can degenerate into a day-to-day application of production technology. One of his [the instructor's] most difficult, but most important, tasks is to refrain from making management decisions. Rather, he must act as a side-line coach making sure the management function is carried out [by the students]."

The Ag 450 instructor walks a narrow path—teaching the students how to make decisions, but not making decisions for them. He becomes an expert on the Ag 450 Farm, but the students are the managers. He stimulates the students to manage, decide, and experiment while requiring that they have sound solid justification for their decisions.

Ag 450 Farm Operation

The Ag 450 Farm is a reflection of the students' decisions, their education, and the current technology of the times. It is also a farm that is the composite of the ideas from other: administrators, instructors, and operators.

From the beginning, the farm was designed to be self-supporting. Murray (interview, 1983) stated that if the students could not make the farm pay, it might be desirable to examine their previous instruction at Iowa State. According to L. M. Thompson, former professor-in-charge of Farm Operation, and, later, associate dean for Resident Instruction, College of Agriculture, Ag 450 has received no subsidy from university funds. Thompson (interview, 1983) continued, "If we can't teach farmers to make money over the long run, we have no business teaching farm management." Ag 450 has been a class where students managed the farm and where the farm progressed on its own profits.

Today the Ag 450 Farm is a 240-acre diversified grain and livestock operation with two full-time employees and a net worth near 1 million dollars. The farm is totally self-supporting, with the students handling all purchasing, marketing, hedging, labor relations, recordkeeping, and tax preparation, as well as farm production plans and decisions.

Because Ag 450 is a self-supporting entity, it is not an expense to Iowa State (except the instructor's salary). Conversely, when the farm is profitable, the profits remain in the Ag 450 account for the students to use as they see appropriate—usually for machinery or capital purchases. Until recent years the Ag 450 Farm was operated on a cash basis. Profits were used to pay the original land mortgage and acquire livestock and machinery. Recently the students have been permitted to borrow funds for further expansion (including a land purchase) in an effort to simulate further an actual farm business. In years when the Ag 450 Farm shows an operating loss, the losses are covered by cash reserves, loans, or liquidation of assets — identical to the procedures of independent farm businesses. Students are continuously examining the farm enterprises and readjusting the operation with financial success as a criterion. The Ag 450 Farm records and budgets are used repeatedly by students to find information and to learn from prior decisions. Over the long run the Ag 450 Farm business has been profitable and self-supporting while at the same time providing a real-life setting for learning farm management and decision-making.

Crop and Livestock Production

Corn is the principal crop, with soybeans, oats, hay, and pasture also being grown. Additional land is rented from the university and neighboring land-owners. Silage is harvested for beef feeding. No-till farming was initiated in 1983. All the corn raised is fed to livestock on the farm.

Livestock production has been prominent and diversified. Farrow-to-finish swine production (1,100 head per year) and beef cattle feeding (80 head per year) have been continuous enterprises. The livestock production has become more specialized and intensified over time with the dairy cows sold in 1952, and the poultry enterprise discontinued in 1954. A ewe flock was maintained from 1952 until 1961. Feeder lambs were purchased and fed from 1976 to 1978. In 1981 a beef cow herd was initiated, and in 1984 a pasture farrowing feeder pig enterprise was started.

Conclusion

The Ag 450 Farm has evolved as the product of countless decisions by numerous and continually changing groups of students. The farm has endured and flourished. The farm activities have resulted from a mix of the current agricultural technology experienced by the students in the classroom and on their home farms. Over the long run, the enterprises on the farm generally follow trends occurring throughout the Corn Belt. Specialization, intensification, and capitalization have been evident, particularly in corn and swine production.

Two men are primarily responsible for shaping Ag 450. William G. Murray identified the need for teaching applied farm management with a focus on decision-making. As the first Ag 450 instructor, Murray developed the concept of student control and management of the Ag 450 Farm. Louis M. Thompson first came into contact with Ag 450 as professor-in-charge of the Farm Operation curriculum and served briefly as instructor of the course. He established the precept that the Ag 450 Farm should be maintained as a self-supporting farm business, adding the quality of real life to the student's management experience.

In the array of educational opportunities for agriculture students at Iowa State University, the Ag 450 class offers a rare experience. Seldom in the college setting have students been allowed to control their own class time and manipulate an operating business for credit. In Ag 450 learning is remarkably practical and applied, perhaps the one true test of education. Certainly in Ag 450, the students' education is applied via the decision-making process.

When the class faces a decision, the students gather applicable information, discuss the alternatives, and vote. The students are involved in this procedure repeatedly. The experience of learning how to make decisions using the resources of one's education is highly valuable. This experience exemplifies Iowa State university's motto, "Science with Practice." The Ag 450 course has proved to be an unusual brand of participatory learning in agricultural management.

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Utilizing Industry's Support For Two-Year Program In Agricultural Machinery

David A. McCarthy

This article discusses the joint role of education and the farm machinery industry in providing teaching excellence. Recent trends involving the farm machinery industry and expanding technology, which increase the complexity of the educational process, are addressed. Finally, an educational strategy that has proven successful in forming an educational partnership with industry is offered.

Over recent years increasing numbers of farm machinery industries have filed for bankruptcy or have been drastically restructured to prevent bankruptcy. Many other agricultural industries have or are presently relocating factories outside the U.S., moving their factories from one state to another, or are closing their factories. The recessed farm economy, labor costs, availability and increasing costs of raw materials, tax inconsistencies from state to state, and certain governmental policies have forced these changes. Presently, the farm machinery industry is faced with severe competition, as each company strives for its market share.

In addition, farmers and educators have and will continue to be faced with industry's advancements in technology. The present state of "technology overload" and accompanying new terminology add to the confusion. One important example involves the nationwide change in tillage practices, in which the shift from conventional tillage to some type of conservation tillage has been gradual, yet almost imperative. This change has been met with confusion not only to farmers and educators, but also to the farm machinery industry. Farmers and educators may be noted for blaming the machinery industry for the slow transition to reduced tillage. Whether a just criticism or not, economic self-interest is mentioned with industry's broader line of tillage equipment. All three groups have had to deal with the new terminologies that have accompanied this national tillage trend. In the text *Fundamentals of Machine Operation (FMO) Tillage* (1976), several relatively new terms are identified. Till-plant, zero-till, mulch tillage, conservation tillage, economy seedbed, reduced tillage, optimum tillage, minimum tillage, and conventional tillage are explained. Other titles for reduced tillage practices, such as profit till and econo till, add to the growing list of labels.

McCarthy is assistant professor and discipline leader for the Agricultural Mechanization program at the University of Minnesota Technical College at Waseca, MN 56093.