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Living With Death

See Page 4
From the Vice Chancellor

Water is one of Nebraska’s most valuable natural resources. If the water in your home has ever been shut off for a period of time, you no doubt learned then how often you go to the tap in a single day.

Agricultural productivity, the heart of Nebraska’s economy, is also greatly dependent on water. Erratic rainfall over much of the state has led to an increase in irrigation of our farmlands from 3.78 million acres in 1969 to 6.4 million acres today. That makes Nebraska 3rd in the nation in acres under irrigation.

Water is important to agriculture in other ways also. Beef animals, for instance, drink roughly eight gallons of water per day.

Many departments within the Institute of Agriculture and Natural Resources are concerned with water problems or water-related issues, but IANR’S Water Resources Center has as its mission to foster, coordinate, administer and conduct research, disseminate information, and provide educational and training activities that are responsive to the water resources needs of Nebraska.

The Center currently sponsors and administers a research program involving over 25 projects, including the development of surface and groundwater hydrologic models, study of the potential for artificial recharge of groundwater, irrigation scheduling and management, and groundwater management policies and institutions.

The major thrust of the Center’s program is definition of water resources policy alternatives, and the development of procedures and methodologies for facilitating decision making on these alternatives.

The Center administers a number of efforts directly related to policy consideration. Center staff members are called upon repeatedly to advise the legislature, state water agencies, Natural Resources Districts, and others on various aspects of water policy.

All these activities point out the importance of water to the people of Nebraska, and will hopefully produce significant payoffs in new knowledge, improved resources management, a strengthened economic base for the state and the region, and a more comprehensive and equitable national water policy.

M. A. Massengale
EFNEP Teachers Learn, Too

By Harriet Kohn, Constance Ahlman and Robert J. Florell

The teachers in the Expanded Food and Nutrition Education Program (EFNEP) are paraprofessionals called nutrition aides. These aides help teach people with limited resources to improve their food and nutrition practices. Information is provided individually or to small groups. The EFNEP program focuses on food buying and growing; food preparation, cooking, storage and preservation; and use of community resources.

A study was conducted among 49 former nutrition aides who left EFNEP to go on to other jobs or activities. Two of the goals of the study were to discover how aides were helped by their experiences with EFNEP in future employment as well as in personal development. It was found that EFNEP exerted positive influence on the aides, their families and communities. The former aides said they benefited in the following ways:

- Gained self-confidence
- Gained work skills
- Learned much about food and nutrition
- Helped their family members improve their nutritional practices
- Learned to use their own money to better advantage
- Learned to use community resources
- Participated more actively in community activities

The Expanded Food and Nutrition Education Program is part of the Cooperative Extension Service at the University of Nebraska–Lincoln. It currently operates in 21 counties.1

The program reaches out to low-income adults and youth, working with people who need help improving their nutrition and managing their resources.

Nutrition aides tend to be dedicated, hard-working people. Many of them have known poverty themselves. They often live in the neighborhoods in which they work. Aides are given an initial 75 to 100 hours of training in food and nutrition, as well as training in how to reach and teach people. They continue to participate in regular in-service education meetings that help them improve their teaching skills.

Many of the aides felt their work experience in EFNEP helped them get other jobs. Of the 49 respondents, three-fourths were employed after leaving EFNEP. EFNEP employs aides on a part-time basis. Those who left for another job usually went into a full-time position. Over one-third of the former aides indicated they went on to better-paying jobs after leaving EFNEP.

To be a good teacher of food and nutrition it helps to practice what you preach. Former aides, therefore, were asked about a number of practices related to themselves and their families. Most former aides felt they had improved their own nutrition. One aide said, "I am more conscious of the foods I fix for my family. I try harder to fix balanced, nutritional meals."

The majority of former aides felt their children's food and nutrition practices had improved in general. One aide commented, "They became conscious of food values and began to ask what specific contributions each food made. They hated to check their favorite cereals because they knew the first ingredient was sugar."

The spouses of about one-third of the aides also benefited. Many improved their food and nutrition practices. Some learned to eat a greater variety of foods and became more weight conscious.

The aides were made more aware of community services in their

1The counties in which the Expanded Food and Nutrition Education Program operated as of April 1978 are: Box Butte, Burt, Butler, Cedar, Colfax, Dakota, Dawson, Dodge, Douglas, Gage, Hall, Howard, Lancaster, Lincoln, Madison, Merrick, Morrill, Platte, Polk, Saunders, Thurston. The EFNEP changes sites of operation from time to time.

(Continued on next page)
Teachers...

EFNEP training. Almost half the former aides said they made greater use of services such as well-child clinics and legal aid. They became acquainted with the Cooperative Extension Service as a source of information for topics other than food and nutrition.

More than a third of the aides felt they had increased their involvement in continuing learning activities such as reading, watching educational television and attending workshops.

Aides were asked if they volunteered their services more in the community than before EFNEP employment. More than one-third said they helped more in church, school and community organizations as well as 4-H and other youth groups. A number of other aides mentioned that they continued in their previous active pattern of volunteering.

Personal development was another area looked at in the study. One aide summed it up by saying, "I gained a great deal of self-confidence and found out I was capable of doing things I would never have believed possible before EFNEP." More self-confidence was expressed by over half the aides. About one-third of the aides said they had gained an increased awareness of self and others. They also felt their ability to relate to people improved.

This study pointed out that the skills, attitudes and personal development acquired during EFNEP employment continued to enrich the lives of the former aides. Learning how to teach, then teaching, apparently had a positive influence on the learning and living of the former nutrition aides. They not only "know" but use the principles in their daily lives. The aides, their immediate families, and the community at large benefited by the aides' work experience in the Expanded Food and Nutrition Education Program.

HARRIET KOHN is Extension Specialist, Expanded Nutrition; CONSTANCE AHLMAN is District I and II Supervisor of Home Economics; and ROBERT J. FLORELL is State Leader, Studies and Training. The authors are on the staff of the Cooperative Extension Service.

Learning To Live With Death

By Barbara Chesser

Being alive is dangerous, as shown by the fact that life invariably leads to death. Mark Twain made a similar observation when someone asked him why he continued the life-threatening smoking habit. He replied, "No one ever gets out of this life alive anyway."

But seriously, few of us know how to deal adequately with this inescapable fact. Coping with the death of a loved one was part of the study, Rural Families Cope with Crises, carried out in the Department of Human Development and the Family.

More than half the persons contacted in this study said that the death of someone they loved was the worst crisis they had ever faced. They reported that the grief caused by death is perhaps the most intensely anguish of human emotions. Death calls forth many emotions, including loss, guilt, anger, a sense of relief, anxiety, a feeling of helplessness, hostility, and fear. The participants described several reasons that death evokes such strong emotions. Its stark finality and the irretrievable loss of a companion were the most frequently mentioned...
reasons.

Many respondents pointed out that because they had little experience dealing with death, they had no built-in ways of coping with it. Nowadays there is less opportunity to pass along the lessons of how to cope adequately with death. Just a few generations ago people were born at home, and they died at home. Today most people are born and die in hospitals. From the hospital, or the nursing home, the dead are whisked away, barely seen, making it harder for survivors to face the reality of death and begin working out their grief.

Many of the respondents described how a conspiracy of silence surrounds death, making adjustment to the death of a loved one even more difficult. We do not want to talk about death. Talking about it reminds us of our own mortality. Talking about it may make us lose control of our own emotions. Our silence forces people to submerge their grief, to evade, ignore and deny their feelings.

'Be Brave'

Men especially may be admonished to "cheer up" and "be brave" and to cover up their emotions by a facade of stoic "manliness." Gary Anderson is a former state senator from Axtell who established a world record in the 1964 Olympic Games in Tokyo in the 300-meter free rifle event. He described how he felt at age 14, when he had no one to talk to when his mother died. He and others in the study agreed with the professionals who have studied grief. They supported the notion that permission from self, friends and relatives to express the emotions that go along with grief is essential in coming to grips with the reality of death and to begin the grief process.

The respondents recognized that there are different ways or styles of coping with grief, but they also realized, in retrospect, that there are common steps or stages in the grief process. There appears to be no standard or "normal" length of time to work through these stages. Each of us must work through our grief at our own pace.

Most people first experience shock—a stunned numbness—when a loved one dies. A second stage may include denial or disbelief. As the numbness wears away, anger, guilt or fear may take over. Crying is typical of this stage and it fills an important function in the work of grieving.

Bargaining

Bargaining is the next stage that some experience. This stage may come very quickly for some. For instance, Allen J. Hayek, a native son of Nebraska and now superintendent of the North Dakota School for the deaf, described how in World War II he was fighting in a fierce battle, surrounded by enemy troops for 18 hours. Three of his buddies were killed very near him, and he was wounded. Anticipating the certainty of his own death, he does not recall experiencing the first two stages. He recounts most vividly his bargaining prayer that his life be spared.

The next typical stage, depression, is perhaps the most difficult stage of the grief process. Persons reported to have no energy or motivation in this stage. Dr. Charles O. Gardner, geneticist and plant breeder who holds the Meyer Katzman Professorship at the University of Nebraska, was in his first semester of college when his 23-year-old sister died unexpectedly, leaving four young children. Gardner described how depressed and discouraged he was and how he subsequently did poorly on the mid-term examinations.

With the encouragement of some professors and his fraternity brothers he was able to work through this stage of grief enough to finish the semester on the honor roll. Other participants in the study also attributed their working through this depression stage to the encouragement of family and friends.

The last stage of working through the grief process is acceptance. According to most of the participants this stage may take a year or more, and some people never complete this stage. The clearest evidence of successful adjustment is the ability to remember comfortably and realistically both the pleasures and the disappointments of the lost relationship.

From the experiences of the participants of the study came some additional suggestions for working through these stages of grief. For instance, most of the participants agreed that open communication makes adjustment easier. Talking about the deceased is usually helpful. This involves talking about the good times together as well as processing the less pleasant experiences.

Learning to make decisions in the family without being unduly influenced by what the deceased person would have wanted also requires open communication and aids the adjustment process. In addition, all verbal and nonverbal messages should be honest. This may be particularly essential in the case of anticipated death. Even though the truth may be painful, being truthful helps adjustment in the long range for children and adults alike. One child summed it up this way: "It's much badder to lie to me than to scare me by telling me the truth. To lie to a kid is the baddest thing of all."

Difficult Task

Realignment of family work load or responsibilities has to be carried out after a family member dies. According to several of the participants, this task can be overwhelming. Alice Dittman, president of Cornhusker Bank, described how she felt the responsibility of being both mother and father to her three children after her husband died several years ago. She felt the pressure to provide love and guidance, as well as economic support. Deciding realistically what you can do and not expecting too much of yourself was a general suggestion participants made for persons in this situation.

Consolation, guidance and encouragement based on a religious orientation has proved helpful to many experiencing the death of a loved one. Martin A. Alexander, Professor Emeritus of Animal Science, University of Nebraska, was in the classroom from 1906 to 1968 without interruption as a student, professor and researcher. Dr. Alexander began experiencing the deaths of
Death...

loved ones at an early age. His youngest brother died at three months of age. Two months later his mother died. He was three and one-half years old. Four years later his sister died. Others close to him have died throughout his lifetime, including his wife about two years ago. Dr. Alexander summed up the religious faith which has helped him and many others this way:

From ancient times men have handled frustration by some conviction that could make meaning out of contradiction. . . . It has some 30 centuries of testing behind it. That is more than any scientific view can claim for itself. It is the most universal formula for understanding human nature that is known to our bewildered race.

Many of the participants described the challenges of the legal and financial decisions that often have to be made when a family member dies. E. W. Janike, who is retired from the Cooperative Extension Service, tells of his being left after his father’s death with the responsibility of holding the family estate together during the depression years. He was 22 years old with no experience in major legal and financial affairs. With the help of a trusted attorney he was able to make the right decisions. Dr. Janike and others in the study advocated using professional advice in handling legal and financial decisions.

Get Advice

J. M. Chamberlin, named to “Who’s Who in the Midwest” for his contributions to the textiles industry, suggested getting advice and help from those who have had similar experiences. For example, he and his wife had a baby who was born with multiple handicaps and lived only a short time. The Chamberlins turned for help to friends who had been in a similar situation. People like this, or community organizations designed to help people through their grief, were mentioned by several participants as being invaluable in helping them adjust.

Painful as the experience of the death of a loved one is, many of the participants stressed that it can also be an encouragement for growth for those who accept the challenge. There are two choices when a loved one dies—to live in grief, remorse, and guilt covered thinly by a facade, or to face those feelings, work through them, and emerge with an acceptance of death as a part of life and a stronger commitment to living.

Hilda Black's husband of over 50 years died, but she came to the realization that her life must go on. (See box.) Robert Gifford, farmer and rancher near Gering, Nebraska, and member of the Nebraska Natural Resources Committee, lost his 19-year-old son in an auto-truck crash in 1970. As a distraught father, he said his loss made him see things in perspective and made him more tolerant of others and their different ideas and ways of doing things. He said, “We found these things of minor importance in comparison to not having children at all.” Others agreed with Gifford that the death of a loved one makes you sort out what is really important in life.

A commitment to living was described by others in the study. John Woodward, Associate Dean, College of Home Economics, University of Nebraska, experienced intense feelings of loneliness after his wife died when their daughter was 12 and their son was 8. From this personal experience, Woodward went on to study loneliness. Today his research on loneliness is recognized nationally and has helped others cope with this anguish emotion which universally accompanies grief over the death of a loved one.

Learning to live with death is painful. The suggestions offered by the participants in this study may ease the pain. These suggestions may help survivors gain a renewed sense of purpose in life and to reinvest themselves in living.

BARRABAH CHESSER is associate professor, Human Development and Family.

One Woman's Crisis...

...the crisis of my life came the morning of July 23, 1962, when my husband of over 50 years, Ora Ellsworth Black (“Ode”) hugged me good-bye and drove away to the South Ranch 15 miles from our home in the Village of Lakeside, Nebraska.

It was hayin’ time and the men were all in the field, so Ode would drive through different pastures checking each to see if the mills were all pumping water, that there were no mix-ups among cows and calves, steers and heifers and that the bulls were all scattered out. He would also see how the hay was pilin’ up.

There was not a horse in the hay fields today, and he could not help comparing this to the time, about 50 years ago, when horses were herded into the corrals and were roped, harnessed and hitched to rakes, mowers and stackers and were sweated out for half of a day, then fresh ones would take their places.

He stopped his car beside a meadow fence and gazed across at the hay crew today. He saw the men steering the throbbing monsters that cut, gobbled, baled, bunched and stacked the wild prairie hay.

He usually went into the ranch house for lunch, but some days if he had some cookies and an apple in the car, he would drive up to a nearby windmill to eat them and to drink at the spout of the mill the cold and sparkling water that flowed so freely from it. He liked to lie down in the front seat for a cat nap before going on with his tour of inspection.

This July day was going for me as many had before—busy with the house and yard. I never knew what time he would be coming home. Sometimes early, sometimes late, but this day I had set out things from the freezer and prepared for a quick and nourishing meal for any time he should come.

The crew had left the fields, and my son came to my door to ask, “Has Dad come home? It is late and he should be here.” I said, “No,” and was not the least bit worried, but my son was afraid that Dad’s car had gotten stuck in some sandy rut, and he couldn’t get it out. So he took a pickup and went to find out about it. And find out he did! The car was parked by a mill. Dad had folded an old coat for a pillow and had laid down in the front seat for a cat nap. From this one he would never awaken.

It has been 15 years now since Ode went away, and we have held things together—all is well, buckin’ blizzards, calving and spreading out the bulls.

Hilda Black
Summer 1977
The value of any educational program needs to be assessed periodically to know whether the needs of the student and the state are being met. With this thought in mind, the staff in home economics education in the Department of Education and Family Resources at the University of Nebraska in Lincoln, conducted a follow-up study of its home economics education graduates who received degrees from August 1971 to December 1976. From this study a profile of the average home economics education graduate emerged.

The goal was to find out the attitudes of these graduates toward their preparation to teach in consumer and homemaking programs in junior and senior high schools. Information was collected by mailing questionnaires to 442 persons. Sixty-three percent of the graduates, or 278, returned usable surveys. Each respondent was asked to answer such questions as date of graduation, number of hours transferred to UNL, status of employment, salary, community size, coursework taken, available resources at UNL, and attitudes toward their preparation to teach.

Three free-response questions were included to give the respondent a chance to comment about the home economics education teacher preparation program.

Ninety-six percent of the respondents had received an endorsement to teach vocational home economics in Nebraska’s secondary schools. Home economics education as a college major was chosen by 82 percent because of the influence of a high school home economics instructor. Others identified high school courses and 4-H as key influential factors in choosing home economics education as a career.

Forty-seven percent of the respondents were employed in their major endorsement areas when the questionnaires were returned. Twenty-four percent were not employed in the area of their majors. There were 80, or 29 percent unemployed for various reasons: 22 percent were unemployed by personal preference, 3 percent because they were continuing their educations, and 4 percent because no position was available in a desired geographical location.

The first paid position after graduation for 48 percent of the graduates
was teaching home economics. Eight percent, or twenty-three of the respondents, went into Cooperative Extension work as their first paid position. Several of the respondents found first employment in related non-teaching jobs, while 17 percent found their first employment in non-teaching, non-home economics related work.

Sixty-two percent of those who were graduated in the five-year period covered by the study were employed as a home economics teacher at some time after graduation. In addition, over the five-year period, 25 of the graduates had at some time been employed in home economics extension. Four had remained in extension for the five years covered by the study.

The largest number (93) of all graduates employed full time, earned from $5,000 to $10,000 annually. Sixty-three of those employed full-time were in positions where the annual salary was $10,000 to $15,000.

Home Economics First

When they were asked to rank courses taken in general education, home economics subject matter, and educational psychology for how the courses related to job preparation, 79 percent ranked home economics subject matter as first in importance. Graduates of the Professional Semester program as it was structured before July 1973, and the Professional Semester as it is now designed, both rated the supervised student teaching experience as the most valuable learning experience in preparing them for teaching. On a five-point scale, 80 percent of the respondents rated the teacher education program superior to good, with 35 percent rating it excellent, and 41 percent good. Using the same five-point scale, the competencies of the cooperating teachers to whom graduates were assigned during student teaching were considered to be excellent (37 percent) or superior (27 percent).

Those surveyed were asked also to express their feelings about available resources, including staff. More than 75 percent of the respondents indicated that the library facilities were adequate and that the support services provided by the Department of Education and Family Resources were satisfactory. They also felt that the home economics education instructors were prepared to teach the subject matter, that they provided information concerning new developments and innovations in the field, and that students were provided with ample opportunity to contribute to class activities and course content.

Required Courses

There was some question about adequate opportunity to take courses other than those required in the major. While 146 or 53 percent of the respondents said they did have an opportunity to take non-required courses, another group of individuals of nearly the same size, 132 or 45 percent, felt the opportunity was not there.

Respondents who were employed as teachers or who had past experience teaching were asked to react to a set of statements relating to their concerns during the first year of teaching. They were most concerned with (1) holding students' interest, (2) selection of content and media for instruction, and (3) incorporating variety into classroom activities.

Five independent factors were analyzed to determine which were important in attitude toward preparation to teach. The independent variables were: (1) date of graduation, (2) salary earned, (3) size of the community in which employed, (4) number of years of teaching experience, and (5) type of employment. Only the date of graduation was significant. Those participants who graduated after July 1973 had a more positive attitude toward their preparation to teach than those who graduated before July 1973.

It also was thought of interest to this study to separate those respondents who were teaching home economics full-time and determine if there were any significant differences among this population in the attitude toward preparation to teach.

Again, date of graduation was significant (p = .04) with those graduating after July 1973 more positive in their attitudes toward their preparation to teach. Neither the population of the community in which the respondents were teaching, the number of years taught nor the salary earned proved to be a significant factor.

Profile

From this study, a profile of the average graduate of the home economics education program at UNL has emerged. The graduate is employed as a full-time vocational home economics teacher in a rural or village area and earns from $5,000 to $10,000 annually.

Courses in home economics subject matter are regarded as the most important classes taken in the preparation for teaching, and, in particular, the supervised student teaching experience is rated highly.

The graduate is satisfied with the expertise of the home economics education staff members and their personal effort put forth to prepare for a teaching position. The home economics education graduates are generally satisfied with the pre-service teacher education program in preparing them to teach home economics in the secondary schools.

A survey of Home Economics education graduates finds most satisfied with UNL's program.

GWENDOLYN NEWKIRK is chairman and professor, VICKI SCHOLTING is former graduate research assistant, in the Department of Education and Family Resources.
On Eastern Nebraska's Grain Farms

Effects of Production, Marketing Choices

By Lynn H. Lutgen and Glenn A. Helmers

A number of production and marketing alternatives are available to the farmer. This article summarizes research on those alternatives for grain farms in eastern Nebraska.

The goal of the research was to determine the impact of different production and marketing strategies on farm growth and risk. Production decisions cannot be isolated from the interrelated marketing decisions for crops. We examined the returns from several crop alternatives while simultaneously looking at several strategies in selling those crops.

It should be pointed out that the best production alternative for a particular farm depends on the resources of that farm. Our focus was on a broader basis centering on Saunders County Nebraska. Historically, production decisions have received more emphasis compared with marketing decisions. However, in recent years marketing strategies have received increased emphasis because of wide fluctuations in crop prices.

Through a computer simulation program, a representative farm was studied over the 1961 to 1975 period. One hundred 15-year sequences of crop yields were established by random choice of yields. Each 15-year yield pattern was maintained across all production and marketing alternatives studied. Historical data provided the basic yield variability relationships and the important relationships regarding the tendency of yields of the crops (corn, soybeans and wheat) to be related in a particular year. Historical (1961-1975) prices, both cash and futures, were used for wheat, corn and soybeans to simulate the market price for this period.

A variety of production alternatives (PROD), were investigated, including both diversified (PROD 1 & 2), and specialized production (PROD 3 to 5).

PROD 1. Alternative 1 corresponded to historical production in the county (46.05% corn, 11.19% wheat and 42.76% soybeans).

PROD 2. 50% row crop and 50% small grain as 25%corn 25%soybeans 50%wheat

PROD 3. 100% wheat

PROD 4. 100% corn

PROD 5. 50% corn, 50% soybeans

The range of marketing alternatives (MKT) studied ranged from selling on the cash market at various times during the year, to hedging. The hedging alternatives were non-selective, that is, they were routinely placed using July futures for corn and soybeans and May futures for wheat.

MKT 1. Sell all production at harvest.

MKT 2. Sell one-third of production at harvest and store two-thirds with one-half of stored grain to be sold in February and one-half to be sold in April on the cash market.

MKT 3. Store the entire crop and sell on the cash market, one-third in February, one-third in April and one-third in May.

MKT 4. Sell one-third at harvest storing the remainder and hedging (selling futures) for two-thirds of the production with one-half to be liquidated in February and one-half in April.

MKT 5. Hedge the entire crop at harvest time storing the crop and hedging (selling futures) with one-third of the crop to be liquidated in February, April and May, respectively.

The financial transactions of the model were simulated as representative of a 320-acre farm over the 1961 to 1975 period. The farm began with an 80 percent financial equity position. Cash balances were calculated monthly. All production and marketing trials began with essentially the same net worth (approximately $100,000).

Land prices increased according to a historical land price index over the period. The farm was allowed to randomly purchase land four times during the 15-year period in 80-acre tracts (year 2, 6, 8, and 10). The farm was allowed to purchase land if the ratio of debt to equity did not exceed two.

Machinery was routinely traded at the end of its depreciated life. Machinery depreciation, investment credit and trading costs were determined in the computer model. Variable costs were determined assum-

(Continued on next page)
Choice . . .

ing tractors would do specific field operations based on horsepower.

If the farm required grain storage beyond the farm storage capacity, it was commercially available at 1.8 cents per bushel per month. Interest and repayment of loans were treated in the customary manner. Family consumption expenses were paid at the beginning of each year. The payment of income tax and self-employment tax was determined by simulating IRS regulations.

The 15-year average of net income for 100 trials is presented in Table 1. Again, the yearly 100 trials differing in yield pattern over the 15 years were each maintained across all 25 combinations of five production (PROD) and five marketing (MKT) alternatives so that alternatives could be directly compared.

Results showed that highest net farm income consistently occurred from production strategy 5 (50% corn, 50% soybeans), while the low net farm income occurred from production strategy 4 (100% corn), with overall averages of $15,844 and $6,515, respectively. Net farm income is defined as net cash farm income less depreciation and adjusted for grain inventory.

Corn Lowest

Production strategy 1 (county average) averaged second highest in net income; strategy 2 (half row crop/half small grain) was third and strategy 3 (100% wheat) was in fourth position. These results suggest soybeans tended to be the highest return crop over this time period, with corn the lowest and wheat in between. These results suggest that present area production has been nearly optimal in terms of net returns over the period 1961 to 1975.

In comparing hedging alternatives, marketing strategy 4 (hedging two-thirds of crop) consistently had a higher net income compared with hedging the entire crop (MKT 5). Across all production strategies, selling crops at harvest (MKT 1) demonstrated the highest net income. Harvest selling tended to yield higher returns over the period, because after 1970, harvest prices tended to be higher than later sea-

sonal prices. For pre-1971, later seasonal prices did not rise enough to cover storage costs. Marketing alternative 3 (store entire crop) yielded the lowest average return over the period of all marketing alternatives considered.

It should be pointed out that some marketing alternatives performed better with particular crops compared with other crops. For example, hedging alternatives (MKT 4 & 5) performed much better for soybeans compared with wheat.

Results

The results of various strategies on the growth of net worth are shown in Table 2. These results generally parallel the net farm income results from Table 1. The effects on net worth of the farm unit are presented in terms of average yearly percentage increases over the 15 year period. Where production strategies 1 (historical production) and 4 (100% corn) performed best with respect to net income, strategies 2 (50% row crop and 50% small grain) and 3 (100% wheat) performed better with respect to growth in net worth.

The stability of wheat in production alternatives 2 and 3 allows for greater reinvestment in the farm firm compared with other crops. In regard to marketing alternatives, hedging alternatives performed better in regard to farm growth compared with farm income. The major reason marketing alternative 1 did not perform as well in respect to farm growth compared with net income, was the requirement of earlier payment of income taxes (selling at harvest), which did not allow the use of capital over a longer period.

The income results reported here are based on historical crop prices (cash and futures) and yields for the 1961 to 1975 period, which could change in the future. Yet some implications arise from the results which should be carefully considered.

Both Are Important

First, it is very difficult to rate which is more important, production or marketing decisions. Both are important, and further, both are related. Historical price patterns over the study period favored harvest selling of grain from a yearly net income standpoint. Also, only routine hedging strategies were examined, and selective hedging strategies based on decision rules and market price movements were not analyzed. Finally, a definite production-marketing interaction occurred.

LYNN H. LUTGEN is assistant professor and GLENN A. HELMERS is professor in Agricultural Economics.

Table 1. Average net farm income for alternative production and marketing strategies based upon 100 fifteen-year trials under historical prices. (1961-75).

<table>
<thead>
<tr>
<th></th>
<th>PROD 1</th>
<th>PROD 2</th>
<th>PROD 3</th>
<th>PROD 4</th>
<th>PROD 5</th>
<th>AVE.</th>
</tr>
</thead>
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<td>15,032</td>
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<td>MKT 2</td>
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<td>15,347</td>
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<td>MKT 4</td>
<td>15,514</td>
<td>14,435</td>
<td>12,418</td>
<td>7,084</td>
<td>16,216</td>
<td>13,133</td>
</tr>
<tr>
<td>MKT 5</td>
<td>14,999</td>
<td>13,601</td>
<td>10,802</td>
<td>6,203</td>
<td>15,811</td>
<td>12,283</td>
</tr>
<tr>
<td>AVE.</td>
<td>15,296</td>
<td>14,733</td>
<td>13,199</td>
<td>6,515</td>
<td>15,844</td>
<td>13,118</td>
</tr>
</tbody>
</table>

Table 2. Average yearly rates of growth in net worth for alternative production and marketing strategies based upon 100 fifteen-year trials under historical prices. (1961-75).

<table>
<thead>
<tr>
<th></th>
<th>PROD 1</th>
<th>PROD 2</th>
<th>PROD 3</th>
<th>PROD 4</th>
<th>PROD 5</th>
<th>AVE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKT 1</td>
<td>11.41</td>
<td>11.72</td>
<td>12.13</td>
<td>9.66</td>
<td>11.42</td>
<td>11.27</td>
</tr>
<tr>
<td>MKT 2</td>
<td>11.36</td>
<td>11.62</td>
<td>12.07</td>
<td>9.51</td>
<td>11.41</td>
<td>11.19</td>
</tr>
<tr>
<td>MKT 3</td>
<td>11.24</td>
<td>11.51</td>
<td>11.82</td>
<td>9.04</td>
<td>11.29</td>
<td>10.98</td>
</tr>
<tr>
<td>MKT 4</td>
<td>11.61</td>
<td>11.62</td>
<td>11.72</td>
<td>9.89</td>
<td>11.73</td>
<td>11.31</td>
</tr>
<tr>
<td>MKT 5</td>
<td>11.64</td>
<td>11.61</td>
<td>11.49</td>
<td>9.69</td>
<td>11.77</td>
<td>11.24</td>
</tr>
<tr>
<td>AVE.</td>
<td>11.45</td>
<td>11.62</td>
<td>11.85</td>
<td>9.56</td>
<td>11.52</td>
<td>11.20</td>
</tr>
</tbody>
</table>
Close Rows Can Boost Yields

By Russell Moomaw

Back in the days of the horse-drawn plow, those wide, 40-inch (102 cm) rows were necessary. Today’s big-wheeled tractors also need the wide-row spacings, but not quite as wide as the horse.

What is the prospect for growing crops in close-spaced rows? Soybeans and grain sorghum are low-growing crops likely to respond to close-spaced rows. At the University of Nebraska’s Northeast Station, researchers have conducted small-plot soybean row-spacing experiments. These results indicate that soybean yield increases are possible by narrowing rows to 15 inches (38 cm). (Table 1).

In 1976 and 1977, we decided to go to the farmers’ fields with close-spaced row soybeans. With the help of county agents in Cuming, Dakota, Thurston, and Wayne Counties, we found farmer cooperators. Plot location, co-operator and other information is shown in Table 2.

We had the farmer prepare a soybean seedbed in his field and then brought University of Nebraska equipment for planting close-spaced row soybeans. The farmer would plant a round of wide-row soybeans with his equipment and we would plant a section of close-spaced row soybeans. This was repeated three times for each row spacing at each location. At the 1976 Thurston County location, we used a University-owned Nordsten grain drill to plant 7-inch (18 cm) spaced rows. The Nordsten drill meters seed 15-inch (38 cm) spaced rows were planted with tool bar mounted flex planter units at a seeding rate of 60 lb/A (67 kg/ha). The same soybean seed was used in all row spacings at a given location. Two of the farmers (Dakota and Wayne Counties) had grain drills available and strips of 7 inch (18 cm) spaced rows were also planted.

After soybean planting, we broadcast sprayed the entire area with Lasso + Sencor/Lexone at 2 qt (1.9 liter) + 0.75 lb (0.4 kg) commercial product per acre for weed control. Timely rainfall activated the herbicide for good weed control at all locations over all row spacings. Wide-row soybean strips were cultivated by the farmer as part of his field operation. The test strips were 250 to 300 feet long so we could harvest with the farmer’s combine. A portable weight wagon or platform scale was used to record plot weights. Soybean yields were adjusted to 13 percent moisture.

Soybean yields in 1976 are shown in Figure 1. July and August, 1976, were below normal in rainfall over most of northeast Nebraska. Soybean yields from the three row spacings were equal at the 1976 Wayne County location. The drought was severe at the Thurston County location. Soybean yields were very low but equal between the 7-inch (18 cm) row spacing (Nordsten drill) and the 40-inch (102 cm) spaced and cultivated soybeans.

In 1977 we had three farmer cooperators and a test at the Northeast Station. Soybean yields for 1977 are shown in Figure 2. We had increased soybean yields with close-spaced soybean rows, as determined by statistical methods, at three of four locations. Dakota County was the exception. The percent yield increase from 15-inch (38 cm) compared with 30-inch (76 cm) or wider row spacings was 5, 9, and 26 percent in Cuming, Dixon and Wayne Counties, respectively.

Two-year data indicate soybean yield increases from close-spaced rows can be zero to excellent. Chances for increased soybean yield with close-spaced rows seem best when soybean yield is at a high level. Growers with a large soybean acreage can best justify a close look at close-spaced row soybean production. Moderate yield increase from a bigger acreage will more quickly pay for close-spaced row soybean planting equipment.

Uncertainty over weed control is a big roadblock to wide scale adoption of close-spaced row soybean planting. (Continued on next page)
production. However, producers now have available a good arsenal of preplant incorporated or preemergence soybean herbicides for grass and broadleaf weed control. The broadleaf weed herbicide Basagran can be used as a basic part of a soybean weed control program, or as a "backup" in case of a herbicide failure in close-spaced row soybeans. Other new post-emergence soybean herbicides are on the horizon.

In summary, weed control in close-spaced row soybeans may present practical for some farmers and not for others. However, cultivation during the growing season is eliminated. The following guidelines are suggested.

1. Select fields which do not have a serious infestation of weeds such as cocklebur, velvetleaf, or sunflower. Low or moderate infestations can be controlled with a preemergence herbicide combination such as Lasso + Sencor/Lexone.

2. Prepare a weed-free seedbed just before soybean planting. Soybeans need an early advantage over weeds.

3. A preplant incorporated herbicide mixture such as Treflan + Sencor/Lexone can be used as a hedge against lack of rainfall for activation of preemergence herbicides.

4. Be prepared to use Basagran if the preplant incorporated or preemergence herbicide does not control the large-seeded broadleaf weeds.

5. Do not plant close-spaced row soybeans where a serious perennial weed problem exists. Fields infested with shattercane should also be avoided.

Variety selection, planting rate, planting equipment, and lodging-harvesting are important pieces in putting together the close-spaced row soybean puzzle. Adapted earlier maturing varieties for an area appear to be more responsive to close-spaced rows than later maturing varieties.

New short-statured soybean varieties are being developed. These varieties are adapted to highly productive conditions, such as with irrigation. The variety Elf is an example. Elf is adapted where Woodworth and Williams are now grown. Elf should be planted in close-spaced rows without cultivation to avoid soil ridging.

Evidence shows that planting rates in close-spaced rows should be about the same as used in 30-inch (76 cm) rows. Seeding rates for most varieties should be about four seeds per linear foot (13 seeds per meter) of row in 15-inch (38 cm) rows. This will be about 50 to 60 pounds per acre (56 to 67 kg/ha).

There is some evidence that Cornsoy will yield more if slightly higher seeding rates are used. Elf should also be planted at 50 percent higher than normal seeding rates.

Planting equipment for close-spaced row soybeans has been somewhat of a problem. Planter units on a sliding tool bar will plant rows as narrow as 15 inches (38 cm). A grain drill will plant 7-inch (18 cm) rows. However, seed spacing and placement in the soil is not as positive as with corn planter type planting units, and a better seed bed is needed. When surface moisture is low, it may be difficult to get seed planted into moist soil with some grain drills.

Soybean lodging frequently results when planting rates are too high. This fact requires care not to over-plant with close-spaced row soybeans. Lodged soybeans in narrow rows often can be combined in one direction because plants support one another. Uncultivated close-spaced row soybeans generally have a smoother seed bed at harvest. This allows the combine header to be operated closer to the soil surface, which reduces combine losses.

Soil erosion in close-spaced row soybean production should be reduced. Conventional row planted soybeans expose the soil more to erosion than solid-planted soybeans.

Close-spaced row soybeans represent a change, a challenge and a step ahead, and some soybean growers may be ready for it.

RUSSELL MOOMAW is district extension specialist (crops) at the Northeast Station, Concord, Nebraska.
Financial Choices
In Wheat Farming

Editor's Note: This is the second of two articles related to the choice between growth and survival in wheat farming. The first article, in the Summer 1978 issue, examined the effects of various expansion alternatives on the growth and survival of farms.

By Glenn A. Helmers and Larry J. Held

In the Summer issue we showed the trade-off between business growth and the chance of survival in wheat farming when considering various land expansion methods. Including share renting was found to add substantially to survival of the farm, reducing growth potential only slightly.

In this article we examine the impact on growth and survivorship of other financial decisions under the control of a wheat farm operator. These are

- the beginning equity level when starting the farm business, and
- self-imposed credit limits.

We would obviously expect that higher beginning equity levels should increase the potential for both growth and survivorship of wheat farms. A more relevant question, however, is how does the level of beginning equity affect methods of farm expansion? More conservative self-imposed borrowing limits on credit might be expected to increase the chances of a firm surviving variable yields and prices. Yet, what cost in terms of business growth would there be under more restrictive credit limits? It is important to measure these relationships because of the high risk nature of wheat farming.

The financial dimensions of a 960-acre Nebraska Panhandle wheat fallow farm were simulated for the 1976-1990 time period. A beginning land value of $375 per acre was used. This land value was increased four percent per year. Starting total assets of the farm were $391,132. The basic starting equity level was assumed to be 65 percent ($254,236). A number of wheat price yield trends were constructed to represent prices and yields which could occur over the 15-year time period. The basic price-yield trend reported here had an average $3.77 wheat price and an average 31.0 bushel wheat yield. The basic price trend ranged from $2.80 to $4.77 while the yield trend ranged from 22.0 to 44.8 bushels per acre. One hundred 15-year price-yield combinations were selected from a distribution of prices and yields around the basic price-yield trend. The financial performance of the farm was observed for the 100 trials.

Business failure was defined as owner equity falling below 40 percent. For analysis purposes this arbitrary survival limit was necessary and no opportunity to liquidate part of the farm's assets for solvency purposes was allowed. Survival probability was measured by the number of successful completions of 15 years of the 100 trials.

Under the purchase and share rent options, opportunity for expansion occurred six times in alternate years in 320-acre tracts. A seven percent interest rate was assumed for long-term debt and an eight percent rate for short-term debt. A combination purchase-rent option was also explored—the decision to buy or rent based on the net cash flow from year 1 to the decision year (purchase if a positive cash flow, rent if a negative cash flow). All expansion choices were limited by the arbitrary 40 percent owner equity requirement. Finally, an alternative of not expanding was also investigated. Debt was repaid in years of positive cash flows and borrowed in years of negative cash flow.

Survival rates under the purchase option are generally low as shown in Table 1. Survival rates are high for the rent and combination options and quite dependent upon the beginning-equity level for the no-expansion alternative. The no-expansion alternative had limited growth potential. The purchase option at the high beginning-equity level (80 percent) showed the greatest potential for growth although the survival rate was relatively low (24 percent).

These results indicate that with a low beginning level of assets, share renting is a definite must in order to have a reasonable hope for survival. At higher beginning-equity levels the share rent and combination plans...
achieve both high survival rates and growth. Only at a high beginning-equity level could the purchase alternative exceed the growth potential of the rent or combination alternative. However, the firm is very vulnerable to risk under such conditions as seen from its survival rate.

It might be argued that the strong growth performance of the renting alternatives may have been caused by 1) an overestimate of tenant share (two-thirds) in the face of a relatively high starting land value ($375) and 2) a constant owner share (one-third) while land values increased (4 percent annually). However, it must be remembered that wheat yields and prices were assumed to increase over the period. Thus, the owner return would increase in general relation to his investment. Also, while different assumptions regarding tenant returns would affect growth, it is unlikely that the survivorship advantages shown in Table 1 would be greatly different.

As earlier stated the farm was allowed to expand if owner equity did not fall below the 40 percent level. More conservative levels of borrowing were investigated through increasing the owner equity level required for expansion, (42.5%, 45%, 50%, 55%, 60%, and 65%).

By increasing these self-imposed limits it would be expected that survivorship would increase while growth potential was reduced. Such a trade-off does exist as shown in Figure 1. A purchase expansion option is shown with a 65 percent beginning owner-equity level.

Such trade-offs between chances of survival and growth can be useful in decisions about credit use. Much of the choice regarding how much risk one can assume is therefore subjective. Because complete assurance of survival is impossible, given the expansion conditions we examined, the level of credit extension and its implication to growth vs. survival depends on the farm operator. Some individuals value growth potential more than stability while the opposite may be true for others. A choice can be made from the settings described in Figure 1. While the economic conditions of the next 15 years are unlikely to exactly match those assumed, the economic trade-offs between growth and survival are important to consider.

In conclusion, a definite situation of general incompatibility exists between growth and survival goals in wheat farming. Survival of stability can be increased by the use of: 1) share renting, 2) higher beginning-equity levels and 3) more conservative borrowing limits. Growth is maximized by liberal borrowing and by expansion through land purchase if beginning equity levels are adequate. Share renting is almost essential when beginning-equity levels are low. Furthermore, the use of share renting increases survival without seriously reducing growth potential. If operators expand through a predominantly purchase route, a clear choice must be made between survival and growth in the level of credit used.

**Table 1. Effect of beginning owner equity upon survival rates and growth for study farm under a 4 percent land appreciation rate with alternative expansion options.**

<table>
<thead>
<tr>
<th>Expansion Option and Beginning-Equity Level</th>
<th>Rate of Survival</th>
<th>Survivor Increase in Net Worth $</th>
<th>Survivor Net Farm Income $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 50% ($195,566)</td>
<td>1</td>
<td>128,789</td>
<td>6,910</td>
</tr>
<tr>
<td>2) 65% ($254,236)</td>
<td>10</td>
<td>300,690</td>
<td>12,721</td>
</tr>
<tr>
<td>3) 80% ($312,906)</td>
<td>24</td>
<td>405,755</td>
<td>16,203</td>
</tr>
<tr>
<td>Rent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 50% ($195,506)</td>
<td>34</td>
<td>325,812</td>
<td>31,922</td>
</tr>
<tr>
<td>2) 65% ($254,236)</td>
<td>93</td>
<td>323,096</td>
<td>31,984</td>
</tr>
<tr>
<td>3) 80% ($312,906)</td>
<td>100</td>
<td>372,401</td>
<td>37,225</td>
</tr>
<tr>
<td>Combination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 50% ($195,566)</td>
<td>34</td>
<td>325,812</td>
<td>31,922</td>
</tr>
<tr>
<td>2) 65% ($254,236)</td>
<td>93</td>
<td>323,932</td>
<td>31,625</td>
</tr>
<tr>
<td>3) 80% ($312,906)</td>
<td>100</td>
<td>379,047</td>
<td>35,450</td>
</tr>
<tr>
<td>No Expansion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) 50% ($195,566)</td>
<td>4</td>
<td>120,083</td>
<td>5,990</td>
</tr>
<tr>
<td>2) 65% ($254,236)</td>
<td>70</td>
<td>104,135</td>
<td>5,024</td>
</tr>
<tr>
<td>3) 80% ($312,906)</td>
<td>99</td>
<td>157,885</td>
<td>9,474</td>
</tr>
</tbody>
</table>

In conclusion, a definite situation of general incompatibility exists between growth and survival goals in wheat farming. Survival of stability can be increased by the use of: 1) share renting, 2) higher beginning-equity levels and 3) more conservative borrowing limits. Growth is maximized by liberal borrowing and by expansion through land purchase if beginning equity levels are adequate. Share renting is almost essential when beginning-equity levels are low. Furthermore, the use of share renting increases survival without seriously reducing growth potential. If operators expand through a predominantly purchase route, a clear choice must be made between survival and growth in the level of credit used.

**GLENN A. HELMERS** is professor and **LARRY J. HELD** is a former graduate assistant in Agricultural Economics.
A black walnut plantation, left, can be a valuable addition to an overall farm management program. The trees are best planted on unused fertile land.

By Frank Hershey

The forest is full of stories about the value of big black walnut trees. A record price, $35,000, was paid in 1977 for one truly exceptional walnut tree sold at auction in Ohio. Over the last 20 years the prices paid for standing walnut trees have increased by 730 percent.

Prized for the natural beauty and outstanding physical properties of its lumber, black walnut has been harvested extensively throughout its natural range. Increased domestic and foreign demand has reduced the stock of large walnut trees. Because of the dramatic increase in price there is more interest in the investment potential of growing black walnut trees as a commercial crop. Black walnut plantations are excellent additions to overall farm management programs when planted on the proper site and managed for the best growth rate and wood quality.

Time is the first factor to consider when evaluating potential planting sites on the farm. Planting walnut trees commits an area to limited use for a long time. For this reason, good farm land is seldom taken out of row crop production and planted to trees.

Black walnut is best used to increase the value and productivity of unused land, odd corners and other so-called waste land. Walnut trees can add value to wildlife habitat areas, farm pond plantings and aid in erosion control.

The best walnut sites are found on stream terraces, flood plains and the lower portions of north and east facing slopes (See below). Examples of poor sites include uplands, steep south or west facing slopes and narrow ridges.

Black walnut requires deep, fertile, moist soils with medium surface runoff and medium internal drainage. Extended periods of flooding cannot be tolerated. Topsoil should (Continued on next page)

Red areas show the best sites for growing black walnut trees.
Walnut . . .

be a loam, clay loam, sandy loam or silt loam. Subsoil should be similar to the topsoil but can include sandy clay loam or clay loam. Soils with a clay pan, gravel layer, permanent or fluctuating water table or solid rock layer within two to three feet (.6 to .9 m) of the surface are poor walnut sites.

Selecting a site with the proper topography and soil usually insures sufficient moisture for walnut tree growth and development in eastern Nebraska. Further west, inadequate moisture may substantially limit tree growth, even on the best sites.

Establishing a plantation of black walnut seedlings costs from $100 to $150 per acre ($247 to $371/ha). Numerous factors can affect the initial establishment cost.

Site preparation is the most variable cost. It requires only plowing and disking are prepared least expensively. Converting areas of undesirable trees to profitable walnut plantations is more expensive, requiring intensive labor and the use of chemical or mechanical methods of site preparation.

Starting the plantation from nuts is cheaper but less reliable than using seedlings. Rodents and poor seed germination can cause a spotty or understocked plantation, requiring replanting.

Weed Control

Once established, the plantation will require weed control, pruning, periodic thinning and protection from grazing, fire and pests to insure survival, rapid growth and high wood quality. Management costs and taxes through the life of the plantation will be from $700 to $800 per acre ($692 to $790/ha). Table 1 is a model management schedule for a walnut plantation on an average site in eastern Nebraska.

Harvest begins when some of the material removed in later thinnings is large enough to sell. Under current market conditions trees 12 inches (30 cm) in diameter at breast height (dbh) are marketable. Plantations on good sites in eastern Nebraska will produce 12 inch (30 cm) dbh trees in 20 to 25 years and the plantations can be completely harvested in 40 to 50 years.

The model plantation in Table 1 shows $929 approximate cash costs per acre ($2,295/ha). Using an annual 6 percent compound interest rate to account for inflationary price increases, these present costs increase by $5,952 per acre ($14,701.44/ha) over the entire 45-year period to total $6881 per acre ($16,996.07/ha).

Cash returns of $29,926.60 per acre ($73,918.70/ha) are from timber harvests and sales (Table 1). If returns from the three early thinnings earn interest at a 6 percent rate from year 30 to 45, an additional $1,487.86 per acre ($3,625.01/ha) interest is received. Total returns are then $31,414.76 per acre ($77,594.46/ha).

There is a net profit of $24,533.76 per acre ($60,598.39/ha) at the end of the 45-year period. The annual increase in value for the acre of trees is $115.32 ($284.84/ha) determined with a 6 percent capitalization rate. This represents a 10.57 percent rate of return on the $929 per acre ($2,294.63/ha) cash cost invested in the black walnut crop.

Changing interest rates can affect the economic outlook of a black walnut plantation. For example, when a 9 percent rather than 6 percent compound interest rate is used in cost and return calculations and applied to Table 1, the total net profit is reduced to $18,003.25 per acre ($44,469.03/ha) and the annual increase in value is reduced to $46.58 per acre (115.05/ha).

Some potential sources of income are not considered in Table 1. The three early thinnings will yield approximately 13 cords of firewood per acre (123.3 m$^3$/ha). Nuts are usually produced when trees are age 8 and older. Markets for nut meats and shells may develop in Nebraska in the future. Many walnut growers raise grain, forage, vegetable and sod crops between widely spaced tree rows in the early years of the plantation.

When grown on the proper site with proper management black walnut plantations are an excellent investment. They pay their own way and enhance the overall conservation program of a farm.

FRANK HERSHEY is a Natural Resource District Forester with the Nebraska Forest Service, Department of Forestry, Fisheries and Wildlife.

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Table 1. Model management schedule of a one-acre black walnut plantation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Item</th>
<th>Costs Per Acre (Approximate)</th>
<th>Costs Per Hectare (Approximate)</th>
<th>Returns Per Acre (Approximate)</th>
<th>Returns Per Hectare (Approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Site Preparation</td>
<td>$ 40</td>
<td>$ 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Tree Seedlings (300)</td>
<td>$ 43.50</td>
<td>$ 17.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Planting</td>
<td>$ 60</td>
<td>$ 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Weed Control</td>
<td>$ 30</td>
<td>$ 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Weed Control</td>
<td>$ 30</td>
<td>$ 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Corrective Pruning</td>
<td>$ 10</td>
<td>$ 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Weed Control</td>
<td>$ 30</td>
<td>$ 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Corrective Pruning</td>
<td>$ 10</td>
<td>$ 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Corrective Pruning</td>
<td>$ 10</td>
<td>$ 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Stem Pruning</td>
<td>$ 90</td>
<td>$ 36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Stem Pruning</td>
<td>$ 50</td>
<td>$ 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Thinning (remove 83 trees)</td>
<td>$ 23</td>
<td>$ 9.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Thinning (remove 78 trees)</td>
<td>$ 29</td>
<td>$ 11.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Thinning (remove 43 trees)</td>
<td>$ 23.50</td>
<td>$ 9.40</td>
<td></td>
<td></td>
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<tr>
<td>30</td>
<td>Thinning (harvest 25 trees)</td>
<td>$ 370</td>
<td>$ 913.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Thinning (harvest 17 trees)</td>
<td>$ 447.10</td>
<td>$ 1,104.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Thinning (harvest 11 trees)</td>
<td>$ 1,826</td>
<td>$ 4,510.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Final Harvest (43 trees)</td>
<td>$27,283.50</td>
<td>$67,390.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-45</td>
<td>Annual Taxes (@ $10/acre)</td>
<td>$ 450</td>
<td>$ 444.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-45</td>
<td>Cumulative Compoud Interest on Expenses (@ 6%)</td>
<td>$5,952</td>
<td>$14,701.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-45</td>
<td>Cumulative Compound Interest on Returns (@ 6%)</td>
<td>$ 1,487.86</td>
<td>$ 3,675.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL: $6,881.00 $16,329.18 $31,414.46 $73,918.71

This model indicates the approximate sequence of treatments and costs of growing black walnut trees. The trees are assumed to be increasing in diameter by 4 to 5 inches annually. All costs and returns are present day costs. It is assumed that all work is hired done. No land costs are included assuming that previously unused land is being utilized for the plantation.
Profits Fly Out When Insects Invade Stored Grain

By Leroy L. Peters and Mary Garbacz

Watch that stored grain! If insects get in, profits slip away.

Frequent checks on stored grain are necessary to see that grain is kept in top shape. If an insect infestation is found early, the pests can be controlled before they cause much damage.

During cold weather, insects will congregate near the center of the grain mass where it's warmest, so the center of the grain should be thoroughly sampled during the winter. In warm weather, infestations begin near the surface, so that's where samples should be taken.

In the winter, samples should be taken every four to six weeks. In warmer weather, however, grain should be checked every two to four weeks. Samples should be taken with a grain probe, which can be purchased or borrowed from a local grain buyer. If problems develop, grain should be checked weekly.

It's important to keep storage facilities in good shape. The grain must be kept viable, because if it loses life, it loses some nutritional value and can't be used as seed.

Pests can damage grain in two ways: by eating it and by contaminating the finished product with broken insect parts or waste products. The contamination happens on the farm in the bin, then carries through to the flour.

Feeding insect-contaminated grain to livestock is not a good practice. It will not harm the animals, but they will have to eat more of the grain because of the lighter weight of the kernels. This will result in higher feed costs per animal.

There is a potential health hazard to humans if contaminated grain is eaten. Rodent-infested grain is particularly hazardous. Some grains

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Checklist

Eliminate Insect Damage:

☐ Bins cleaned and repaired
☐ Apply residual sprays to empty bin walls
☐ Store clean, dry grain
☐ Use grain protectants
☐ Cool grain
☐ Use dichlorvos (Vapona) resin strips if Indian meal moths are a problem
☐ Clean up and burn leaked grain and debris
Grain . . .
eden by insects heat up from the in­
crease in moisture and molds can the form.
It is important to keep wheat below 12 to 16 percent moisture level, because this level is ideal for insect growth. Moisture of above 16 percent can cause molds and fungi to become active. When this hap­pens, the grain should not be fed to livestock. The molds and fungi also reduce nutritive value and hot spots may form in the bin, spreading and causing further mold and fungi dam­age.

Water Is Problem
Water is a big problem in stored grain, because insects have de­veloped an adaptability to grain with a moisture content as low as 12 percent. Below 12 percent, however, insect development slows, making the insects quit feeding and repro­ducing. When there is no moisture at all, the insects dehydrate.
Insects are cold-blooded and therefore prefer a temperature from 75°F to 90°F (23°C-32°C). If it’s warmer, activity declines. At 120°F (49°C), the insects die. When the temperature drops to 60 degrees, life slows down and the reproductive processes stop. At 32°F (0°C), most insects freeze, except the cadelle, which hibernates.
Since the insects respond so dra­stically to heating and cooling, tem­perature can be used for controlling pests in stored grain. If the temperature can be kept at 40°F (4°C), no harm will be done to the grain and the insects will be controlled without the aid of insecticides.
If grain is stored only from fall harvest until the following spring, in­secticides usually are not needed. If stored over the warm months, how­ever, insecticide may be necessary.
Several steps must be followed to keep grain free of insect damage. The bins must be cleaned and re­paired; residual sprays applied to empty bin walls; only clean, dry grain stored; grain protectants used; the grain cooled and dichlorvos (Vapona) resin strips used where In­dian meal moths are a problem. Check outside the bin for the grain that may have leaked out and then clean it up. All sweepings and debris should be removed and burned.
Grain shouldn’t be stored near feed rooms, stables or animal feeders, because these areas may harbor insects. Wagons, trucks and com­bines where waste grain accumu­lates also can be sources of infesta­tion and should be cleaned periodi­cally.
Rats, mice and birds can get through a small hole. To prevent entry, keep openings to buildings and bins tightly closed when not in use. Heavy wire screening or sheet metal barriers on lower portions of openings help keep pests out.
Poison baits also should be placed around buildings where there are signs of rodent activity. Other food sources, such as spilled grain, should be eliminated. Trash dumps, lumber and wood piles and old ma­chinery dumps can be sources of new rodent populations and should be cleaned. If storage bin windows must be open, they should be covered with screen or hardware cloth to keep birds out. Doors should be tightly fitted and closed.
Grain with high moisture content should not be stored. Moisture con­tent in corn should be less than 15 percent and other grains should be less than 12 percent for safe storage. Grain containing weed seeds, cracked kernels and other dockage will tend to become infested with in­sects faster than sound, clean grain.

Malathion
Dry, insect-free small grain or shelled corn can be protected from most insect damage by using malathion as a grain protectant— except in the case of the resistant In­dian meal moth.
The insecticide should be applied to the grain before or as it goes into the bin, being careful not to force heated air through grain treated with malathion, because it reduces the insecticide’s effectiveness. When using heat, dry the grain first, then apply the malathion after the grain has cooled.
When binning is complete, the grain should be leveled. The surface grain in the bin should get a “cap out” treatment of protectant. The “cap out” treatment acts as a barrier, preventing insects from entering the mass and from feeding on surface grain. Each time the grain surface is disturbed, re-treat with grain pro­tectant.
If farm-stored grain does develop an insect infestation, the grain should be treated immediately with a fumigant. But fumigants are dangerous and can kill people as well as insects.
Fumigants are listed as Environmental Protection Agency (EPA) re­stricted chemicals and applicators must be certified and must wear protective gear in order to apply the materials. That gear includes a gas mask with full face piece and proper canister approved by the U.S. Bureau of Mines.

Two Wear Gear
At least two persons should be protected with the gear when the fumigants are applied so if one person is overcome by fumes, the other person can rescue the victim.
If a large quantity of grain must be fumigated (more than 10,000 bushels), a farmer might be better off to hire a knowledgeable commercial applicator to do the job.
Grain must be fumigated and tightly sealed for 72 hours to be ef­fective. Recirculating the fumigant is a technique often used in flat storage structures and large round bins. This requires additional equipment.
Properly applied fumigants pene­trate grain and usually kill all stages of insects to a depth of 10 to 12 feet. In deeper bins, most fumigants go to the bottom of the bin and do not re­main on top long enough to kill any infestation near the surface. Grain may be fumigated effectively at greater depths when bins are equipped with proper aeration facilities. This is another reason for consider­ing the services of a commercial fumigator.
Information on applications of pesticide to grain is available in EC78-1534, “Insect Prevention and Control in Farm-Stored Grain,” available at County Extension Of­fices.□

LEROY L. PETERS is District Extension En­tomologist, South Central Station, in Clay Center; MARY GARBACZ is assistant instructor in Agricultural Communications.
Computer Makes Drapery Calculations Easier

By Audrey Newton, Anne Parkhurst and Anna Nevius

Figuring the exact amount of material needed to make draperies can be a difficult and time-consuming task. Perhaps you would never know that simply by shortening a hem a bit you could save yourself a great deal of material and money.

Computers, as we know, can make difficult calculations quickly and accurately. Many factors complicate figuring the amount of material for draperies, including the length of the pattern repeat in fabric, the width of the fabric and the depth and spacing of the pleats.

A computer program has been written at the University of Nebraska to compute yardage and make cost estimates for draperies. In a matter of a few minutes the computer can provide the amount of fabric needed and the costs for as many special options as the user would like to consider. The consumer can compare quickly the cost difference for fabrics of different widths, or the difference in amount of fabric needed if, for example, a variation in pleating is considered. The program lets an individual interact with the computer to obtain best values for these estimates.

The first step in using the program is to gather the information the computer needs for calculating the total yardage and cost. The units of measurement are inches or dollars and cents. Fractions must be translated into their decimal equivalents for entry into the program.

The computer will begin by asking the user to PLEASE TYPE YOUR NAME. After the user responds, the computer takes the user's name and issues a friendly salutation, and if desired, a brief description of the program. After this introduction, the computer begins to request informa-

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tion needed to perform the calculations. The user responds to each question using the appropriate information.

A main concern in the draperies program was to use definitions that could be understood by a wide variety of users. This is a difficult task, so in the event a definition is not understood by the user, a help option is available. By typing the word HELP the user will receive a more detailed description of the terms used.

After all the drapery specifications are entered and the calculations performed, the computer displays the results—the amount of material needed, the cost of the material, the distance between pleats, the pleat depth and the number of pleats.

The drapery program is designed to allow the user to creatively perform minor adjustments quickly and accurately. Special consideration was given to situations where slight adjustments could be made to reduce amounts of fabric and costs. For example, if the bottom hem were shortened an inch or if the pleats were shallower, the computer could quickly calculate the difference in amount of fabric required and the difference in cost.

It was important to make the program responsive to as many different situations as possible. To help meet this goal, the user can figure the draperies either lined or unlined. Another is using pleater tape or custom pinch pleats.

After the program has been run once, additional variables may be altered. These variables are listed in Table 1 along with the initial values assigned.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial Value (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side hem allowance</td>
<td>2.0 = 2</td>
</tr>
<tr>
<td>Seam allowance</td>
<td>.625 = 5/8</td>
</tr>
<tr>
<td>Width of pleat</td>
<td>.625 = 5/8</td>
</tr>
<tr>
<td>Depth of pleat</td>
<td>3.1875 = 3 3/16</td>
</tr>
<tr>
<td>Width in place of return (if return is 0)</td>
<td>3.0 = 3</td>
</tr>
<tr>
<td>Width in place of overlap (lap if overlap is 0)</td>
<td>3.0 = 3</td>
</tr>
</tbody>
</table>

Not all these variables will be of interest to everyone. Width and depth of pleat are used only with pleater tape, while side hem and seam allowance provide for very minor adjustments. However, the last two variables merit a little discussion.

Return is the part of the drapery which covers the outside edge of the wall. If you desire no return, then the width in place of return is the distance from the first pleat to the edge of the drapery. For example, if you are using decorator rods which need no return, you could reset the variable so that the first pleat is figured at only one inch from the edge of the drapery. The same reasoning applies to the variable called width in place of overlap.

In addition to changing these variables, the user may also change any of the other variables, or the user may return to the beginning of the program and start anew. It is possible to stop the program any time. Whenever a response is requested, one can simply type the word STOP.

The program at the University of Nebraska is used in the classroom after students have been through the traditional hand process of figuring draperies. It is available in the counties with computer terminals. If there are questions about this program, channel them through your Home Economics County Agent.

In order to use the program, the user must have access to a computer terminal and the computer in which the program has been stored. The computer program is available on the University Share Library at UNL or contact your County Extension Agent, Home Economics.

The procedure for calling the program is to type the program name, DRAPERIES. If the system you are using does not automatically link the UNL Share Library simply type UNSHARE to get the library. After you are linked with the library, type the name of the program you want to use.