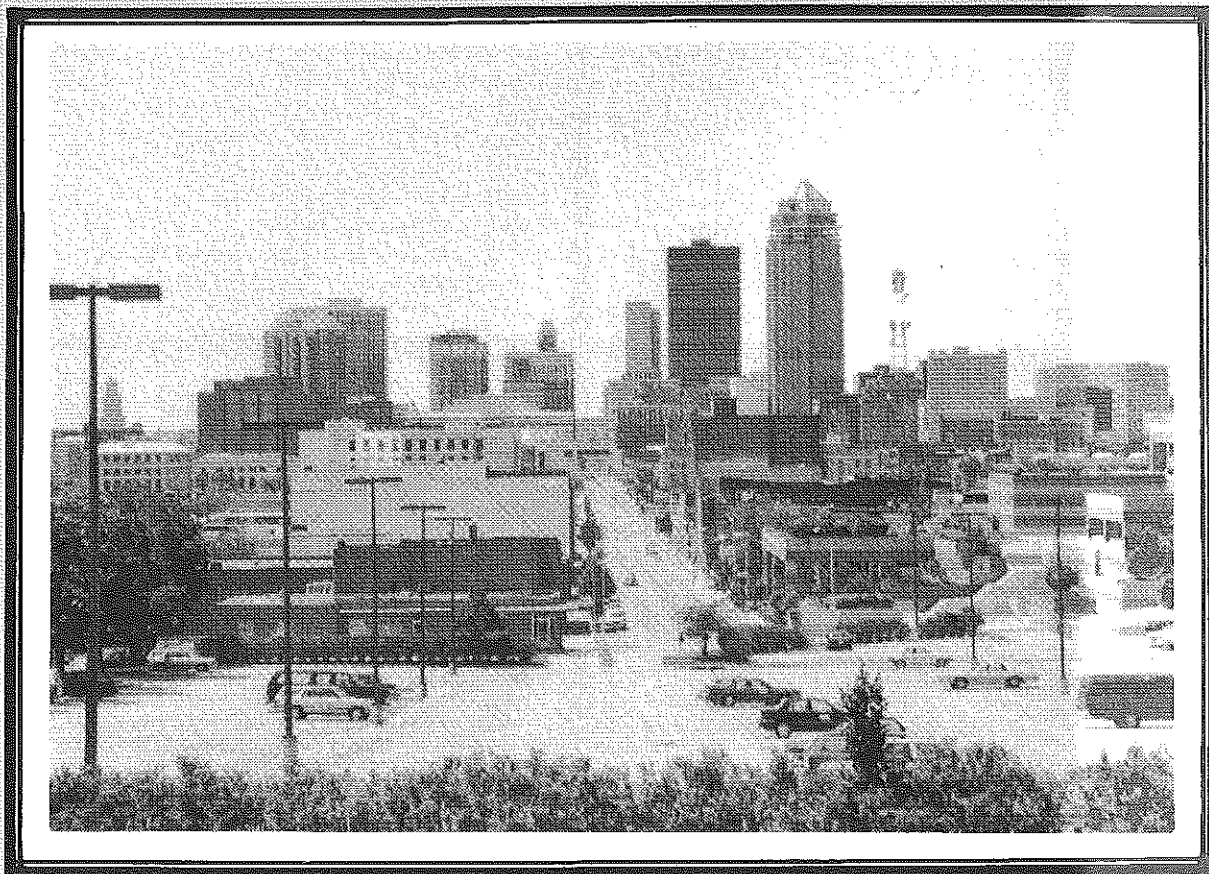


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THEME: Urban Agriculture

THE AGRICULTURAL EDUCATION MAGAZINE



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Hat's Off

My hat's off to the Agricultural Education profession both literally and figuratively! The profession has certainly reacted in a positive and responsible manner to the National Research Council report UNDERSTANDING AGRICULTURE: NEW DIRECTIONS FOR EDUCATION. Progress to this point has not been easy and has required perceptive vision and dedicated work by the leaders in the profession. Further, all components and members of the profession have responded in an enthusiastic and sagacious manner.

In using the term "profession," I mean to include all those individuals be they providers or consumers of agricultural education. Not only have the educators and teacher associations responded to the challenge of a broadened mission for the profession, but equally encouraging has been the response of the other components of this remarkable agricultural education family. The work of THE NATIONAL COUNCIL in undertaking the National Summit for Agricultural Education needs to be acknowledged. It was a stroke of genius to bring the leaders of all components of the agricultural education family together for the first national summit. Such a move was not without risk, but as it turned out, it was insightful! Dr. Larry Case, John Pope and members of the Leading Edge Organization are to be commended for their faith and daring. It would be appropriate, if not redundant, to once again recognize each and every individual who participated in the first national summit for their collective wisdom as reflected in the NATIONAL STRATEGIC PLAN FOR AGRICULTURAL EDUCATION.

In the editorial of February, 1989, "Damn the Torpedoes, Full Speed Ahead," I was very concerned with the profession's reaction to the national study and fearful that philosophical doctrine and dogma would splinter the profession. It was not farfetched to envision a contemptuously rude response to both the National Study and the National Strategic Plan. Certainly, there were those who believed both were devious plots to circumvent the tried and true. Fortunately, the leaders were able to overcome such paranoia and envision a brighter future, a future that includes the best of the past plus the opportunity to serve additional clientele at the secondary school level.

Most assuredly our future is not reality, but the profession is moving quickly to embrace our resolves. Even some of us "old dogs" (I include myself in this group) are getting to the point of using agricultural education and not vocational agriculture when referring to our collective program at the secondary school level (both "in" and "about" agriculture). Believe me, that has not been easy!

The concepts of uniform standards for all programs; a standard curriculum in every school; and, yes, even one-dimensional teacher preparation programs are in for an overhaul. The days of "cookie cutter" programs in agricultural education are part of our glorious past that need to be so considered. The days of attempting to serve urban students and culturally diverse populations with the agricultural education program designed for rural, male,



BY PHILLIP R. ZURBRICK, EDITOR
(Dr. Zurbrick is Professor, Department of Agricultural Education, The University of Arizona.)

students living on farms is ludicrous. We need to retain the basic values in meeting current and future needs in agricultural education. The tactical plans I have reviewed for local agricultural education programs have been amazingly in tune with the needs in their communities and epitomize the concept of diversity going far beyond the scope of vocational agriculture programs of yesteryear.

The profession has come a long way in modifying its concept of supervised experience. I sense an enlightenment that recognizes supervised experience as a form of experiential education. Further, supervised experience may be of several types, the most common types used in agricultural education being supervised occupational experience (SOE) and supervised agricultural experience (SAE). An enlightened sophistication is sweeping the profession that recognizes supervised occupational experience is not the same as supervised agricultural experience. Articles in this issue of THE AGRICULTURAL EDUCATION MAGAZINE illustrate this growing sophistication. It is unfortunate that the profession has not come to accept programs "about agriculture" as readily as it has the term "supervised agricultural experience." On the other hand, perhaps it is fortunate that the profession has not confused "in" and "about" agriculture in the same way it has confused SAE and SOE!

It is time for the various organizations in agricultural education to make some difficult choices rooted in long standing tradition. It is time to change the names of NVATA, AATEA and other groups to reflect the expanded mission of agricultural education and serve all those who encompass our new mission. The same bold leadership championed by those who formulated the STRATEGIC PLAN FOR AGRICULTURAL EDUCATION must be demonstrated by those in leadership positions in the various agricultural education organizations. I have little doubt that this will happen and thus, doff my hat to all those who are so unselfishly serving the agricultural education profession.

About the Cover

Des Moines, Iowa is typical of growing urban areas in need of appropriate agricultural education programs. (Photo courtesy of Margaret A. Ellibee.)

Urban Agricultural Education

"It Works"

The City: Madison, Wisconsin — Population 210,000
The School: Madison East High School — Enrollment 1300

Madison East Agricultural Education Program: Horticulture, Animal Science, Conservation and Environmental Science, Floriculture, and Agribusiness

Total Program and FFA Chapter Enrollment: 65

Insight: "We (the ag students) tell them (other high school students) about all the opportunities available in agriculture other than farming. Agriculture is something that's needed everywhere. It's hard to get the message across, but it works!" — Senior Rodger Niesen, 1988-89 Madison East High FFA Chapter President.

The above scenario is becoming more prevalent in current secondary agricultural education programming. The initiation, development, and expansion of urban agricultural education programs across this country is drawing nearer to the "norm" rather than the "unique" situation — as was the case 10 to 15 years ago. Is this type of program the "now" in agricultural education? Are urban programs really all that different from their rural counterparts, or are we examining quality curriculum applicable to all agricultural education programs regardless of geographic location? The articles in this issue of *THE AGRICULTURAL EDUCATION MAGAZINE* will assist you in drawing your own conclusions to those statements and more. In addition, I believe these articles will introduce the reader to the agricultural education program of today which allows for the growth of tomorrow. A program that accommodates the needs of the student, rather than the student accommodating the needs of the program; a program that educates a student totally, incorporating relevant curriculum, employment (SE) and leadership experiences (FFA); a program that will graduate quality students for continuing education and/or the entry level workforce.

Currently, the demographics indicating the reasons for the emergence of urban agricultural program highlight two very basic societal realities of our modern times. One being, nationally less than 10% of our agricultural education students have a farm background. And two, according to Paul Theobald in "Districts on the Edge: The Impact of Urban Sprawl on a Rural Community," "there are many rural communities in this country which grow closer and closer each year to the ever-extending concentric circles of an urban metropolis." We as educators, must keep these realities foremost in our thinking as we consider the positive future of all agricultural education programs. Dr. Robert Birkenholz of the University of Missouri stated a similar thought in a 1986 journal article, "Teachers, supervisors and



BY MARGARET ELLIBEE, THEME EDITOR
(Ms. Ellibee is Consultant, Agricultural Education, Iowa Department of Education.)

teacher educators should examine the need to modify vocational agriculture programs to address anticipated changes. The future success of vocational agriculture will depend upon the availability of agricultural educators to modify programs to function in the changing agricultural environment." As time, technology, and our society "marches on," and as agricultural education steps with them, is the result a lessening difference between the "rural" and "urban" program? I believe so.

Traditionally, urban agricultural education programs because of their location and diverse student clientele have dealt with a number of educational issues that smaller, rural programs have had to address to a lesser degree (e.g., non-farm student experience, multicultural student populations and increased frequency of student mobility). However, the dictates of today's global society and economy forces us to look at the secondary agricultural education program as a whole, regardless if it is located in a rural or urban setting. Our programs in both locations require us to study some very important components for optimum quality and service.

Component One — Team Effort

As with any secondary agricultural education program, there are three entities that can benefit greatly from having such a program offered as a part of the school curriculum: 1) the students; 2) the school; 3) the community. The goal of the urban program, as well as the rural, is having these groups "team" in a beneficial educational process. For example, students enrolled in agricultural education programs can have access and exposure to numerous learning experiences, which again, should be relevant to their agricultural occupational goals (e.g., small animal technicians, landscapers, etc.). The student in turn, becomes an active learner, and as a result of his/her participatory education, will be a productive contributor to the community and business settings. Urban or rural, the key to these positive benefits is the agricultural education instructors' awareness and integration of relevant occupational skills. These skills must fit the student's needs, and can be applicable to the community and business needs.

(Continued on page 15)

Computer Technology Resources

Writing A Spreadsheet Application

Computer spreadsheets are most valuable when used to answer questions that begin "What would happen if . . . ?" Because the computer carries out calculations rapidly, you often get answers quickly that would take hours if done by hand. Used this way, the computer is a powerful discovery tool.

The most commonly used spreadsheet in high school agriculture programs is AppleWorks, but spreadsheets exist for all makes of computers. The spreadsheet template presented here was developed using AppleWorks. If you have never written a spreadsheet, we encourage you to take a couple of hours and type in this spreadsheet template. We have provided step-by-step instructions for you. When you finish, you will have a basic understanding of how spreadsheets work.

Getting Started

Writing a good spreadsheet requires the kind of care and thought you would devote to filling out a tax return. It may be helpful to plan your spreadsheet layout on paper first. After planning on paper create a new spreadsheet file from scratch and call it T.CHECKBOOK. The "T" stands for template. A blank spreadsheet containing rows and columns appears. The first thing you need to do is adjust column widths. In this article we will use OA to represent "Open Apple — A." Position the cursor on cell B1. Press OA-L (layout), C (columns); return to indicate the column you're adjusting, and C (column width). Reduce the column width to one character by pressing OA-left arrow eight times. When the width reaches one character, press return. Continue this procedure and reduce columns D, F, H, J, K, L, and N to a width of one character.

Now place the cursor on cell C1 and repeat OA-L, C, return, and C. Reduce this column width from nine to six characters by pressing OA-left arrow, then return. Also set column E to six characters. In a similar manner, use the right arrow key to set column G to nineteen. Columns A, I, M, and O stay at nine.

Recheck your column widths and adjust as necessary. Next you can enter the labels. Position the cursor on cells A2 through A9 and type the following: TITLE, PRINT, DATE, ACCOUNT, BANK, ACCOUNT #, START DATE, END DATE, and ACCOUNT CODES (any combination of four letters and two numbers).

Put your cursor on cell A16 and type DATE. In cell C16 type CHECK, in cell C17 type NUMBER, in cell E16 type CODE, and in cell E17 type INFO. In cell G16 type ITEM. Cell I16 gets AMOUNT, cell K16 gets I, cell M16 gets DEPOSIT, and cell O16 gets BALANCE. Finally, in cells I17, M17, and O17 type "\$". In cell K17 type N.



BY GAYLAN G. SCOFIELD AND W. WADE MILLER,
SPECIAL EDITOR

(Mr. Scofield is Agricultural Science Instructor, West Marshall Schools, State Center, Iowa.)

(Dr. Miller is Associate Professor, Department of Education and Studies, Iowa State University.)

Center these labels in each column by placing the cursor on cell A16 and press OA-L, R (rows), down arrow, return, L (label format), and C (center). To separate your labels from the data you'll be entering, position the cursor on cell A18 and type "====" across the cell. Now copy cell A18 to the right side of your spreadsheet by positioning the cursor on cell A18 and press OA-C (copy), return to copy within the spreadsheet, return to highlight source, right arrow, a period to start the destination range, right arrow as far as you want to get, and return.

In cell G19 type Balance Forward and on the last row in column G type "Time to copy this line."

Entering the Formula

The formula to determine your balance is very simple: Current Balance = Previous Balance + Deposits - Withdrawals. Enter this formula on your spreadsheet. Place the cursor on cell O20, type in +O19+M20-I20, and press return. A zero will appear in cell O20 since you haven't yet entered any transactions.

Copy this formula down column O by pressing OA-C, return twice, down arrow, a period, and down arrow as far as you want, ending with return. The prompt now asks NO CHANGE or RELATIVE for each term in the formula. Answer RELATIVE each time. This allows the formula to work with the current information.

One disadvantage of this formula is the current balance will be repeated down the length of column O. A more appropriate formula is:

@IF(I20)0, +019-I20+M20, @IF(M20)0, +019-I20+M20, @NA)).

(Continued on page 21)

Urban Agricultural Education Opportunities, Future Directions and Implications for the Profession

Why have agricultural education in urban areas? What value is it? Traditional thinkers may consider urban settings unlikely places for agricultural education. Yet these programs have gained national and state level recognition. Perhaps it is time to explore why urban agricultural education is so successful and if there are implications for other types of programs.

This article describes agricultural education in four urban areas — similarities and differences; observations about their characteristics; opportunities for the future; and implications for other programs. This discussion concludes with two observations. First, the success of agricultural education in these urban schools suggests it is a viable option for schools which do not have such instruction. Second, features of urban agricultural programs have implications for some rural settings where fewer students fit the traditional farm background and lack an interest in production agriculture.

Four Success Stories

This description of four urban agricultural education programs is based on interviews with school officials. Collectively, they illustrate urban agricultural education development, although not totally inclusive nor representative of all such programs.

The agriculture program started in 1917 at John Bowne High School is now a magnet school for over 400 students from the five boroughs of New York City. Students are accepted for admissions based on their interests, career goals, academic abilities and commitment to agricultural experiences required in the program. They ride public transportation, sometimes over an hour each way. One-third of the students speak English as a second language. The diverse curriculum covers the broad industry of agriculture including areas such as small animal care, horticulture and agri-business. Over 90% of the students continue postsecondary education, primarily in agriculture.

Twenty smaller agriculture programs in New York City have characteristics similar to John Bowne, but fewer students, between 60 and 300, and fewer study concentrations, typically horticulture, small animal care or marine science. In New York State students may receive science credit when there is a matrix between the agricultural education and science curricula. Placement rates for college are very high for the city programs.

Walter Biddle Saul High School in Philadelphia has over 650 agriculture students enrolled in turf grass management, agricultural mechanics, livestock production, retail florist, laboratory animal science targeted to pharmaceuticals, hor-



BY DEAN SUTPHIN

(Dr. Sutphin is Associate Professor, Agricultural and Occupational Education, Cornell University.)

tical mechanics, landscaping and nursery production, meat science and marketing of agricultural products, greenhouse management, aquaculture, and agricultural business for entrepreneurs. The agricultural program has a 250 acre land laboratory for experimentation and experiential education.

The Chicago High School for Agricultural Sciences, started in 1985, has 460 students in regular and honors curriculums studying animal science, agricultural business, communications, food science, advanced horticulture, agricultural mechanization and technology. Prospective students are interviewed for admissions to determine their reasons for enrolling and to identify an appropriate curriculum. Parents are included in the interview so they have a perspective of the program expectations and its value. The 72 acre campus has 58 acres useable for cultivated crops, primarily vegetables and landscape plants. Additional construction of an orchard, animal facility and golf course will accommodate a projected enrollment of 900 students. Illustration 1 shows how agriculture units and college academic entrance requirements are fulfilled in a four year program. All students follow this standard curriculum.

Recommended Four Year Program

Chicago High School for Agricultural Sciences

FIRST YEAR	SECOND YEAR
English I	English II
Biology	Geography
Algebra	Geometry
Computer Science	Chemistry
Horticulture Science I	Horticulture Science II
Ag and Science I	Ag and Science II
Ag Careers and Leadership I	Ag Careers and Leadership II
Art	Music or Chorus or Band
Physical Education I	Physical Education II

THIRD YEAR

English Literature
United States History
Advanced Algebra/Trigonometry
Foreign Language I
Physics/Advanced Science Elective
Agribusiness I
Agricultural Applications I
Physical Education III

FOURTH YEAR

World Literature
Social Studies Elective
Advanced Mathematics Elective
Foreign Language II
Physics/Advanced Science Elective
Agribusiness II
Agricultural Applications II
or
Agricultural Coop. Education
(A.C.E.) Work Experience
Physical Education

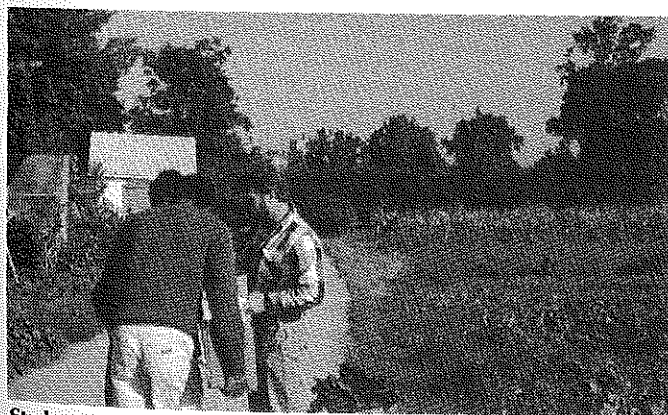
These large city magnet programs have gained national recognition and the respect of their school system. Similarly, smaller urban programs are very successful. So, what are the characteristics that make them successful?

Program Characteristics — Some Observations

The following observations describe features that most of the four programs share. These features give insights on what contributes to their success.

Multifaceted mission. Each of the four programs prepare students for college and jobs during and after high school, develop basic and life skills, and develop agricultural literacy. Thus, the programs are multifaceted. Basic elements of traditional agricultural education including classroom, laboratory, FFA and occupational experiences are all utilized in urban programs — with variations between schools. The curriculums are dynamic, changing to include new technologies. Students are excited about learning. And, each program has unique features that are appropriate for the respective school and community.

Responsive to changes in the school and community. As schools and communities change, so must agricultural education. Increased graduation requirements make it difficult to schedule elective courses such as agriculture and, in some cases, impossible when the course is more than one class period (National Commission on Secondary Vocational Education, n.d.). Urban programs have adapted to give science credit for agricultural instruction, restructured the agricultural curriculum, changed some agricultural classes to a single period, awarded high school graduation credit for occupational experience programs and FFA, and included college preparation in addition to job placement after high school as a program goal. The National Research Council (1988) for agricultural education recommended changes such as these.



Students at John Bowne use the land lab to study plant sciences, floriculture and landscaping. The small orchard and arboretum beyond the greenhouse are not visible in this picture.

Changes in the community such as less area for school and laboratories do not necessarily represent a limitation. For example, the land laboratory at John Bowne High School for 3.8 acres, is adequate for school greenhouses, a floral design laboratory, green grocery, small animal care laboratory, experimental land laboratory plots, a mechanics laboratory and a laboratory equipped with microscopes, devices for analyses and equipment for approved experiments. Large scale crop production is not possible or appropriate in this urban community. The facilities adequately serve the type of agricultural instruction needed in the community.

Urban sites have viable opportunities for agricultural education career exploration experiences, experience programs, placement sites for program graduates, and opportunities for field trips. Often there are agricultural job opportunities in research and development, manufacturing, service and marketing, although fewer opportunities for production agriculture. Successful urban programs publicize the range of agricultural jobs that are available for high school graduates and for those who continue their education up through the Ph.D. level.

Customer-driven curriculum. Successful companies are customer-driven; that is, they meet the wants and needs of a sufficient percentage of the population to stay in business. For an elective course like agricultural education to remain viable, students must "want" to enroll in the course. Ideally, they will both "want" and "need" the instruction. This is frequently accomplished by a curriculum and an instructional program that is interesting and meets both students' personal and career interests.

Professional agricultural careers in chemical companies, veterinary medicine, agricultural law, sales, trade and finance appeal to urban students who are college bound, their parents and guidance counselors. Semi-skilled and skilled jobs that can be acquired with a high school diploma, appeal to another group of students who may continue their education later. Generally, life skills, basic skills, career exploration and developing an understanding of science through agriculture appeal to a broad range of students.

Students do not make course and career decisions alone; they are influenced by parents, teachers, peers and guidance counselors. Urban programs use a customer-driven model which recognizes the perceptions of students and significant others. In the Chicago School for Agricultural Sciences, students and parents are interviewed during the process of admitting students. Thus, urban programs described in this article offer a diverse customer driven curriculum to meet a broad range of student needs without losing program coherence. Also, the programs have resources to accomplish their mission.

Instructional integrity. There is no substitute for high quality instruction in the classroom, laboratory, and out-of-school learning events. Agriculture instruction in these four urban settings includes content from disciplines such as science, economics, mathematics, political science, and English. Teachers make the connection clear to students and to significant others. Barrick (1990) described agricultural education as multifaceted, including other disciplines, yet having a separate body of knowledge in agriculture. This knowledge should be taught by using acceptable principles

of teaching and learning. Some of the more strongly advocated principles that seem appropriate in agricultural education are: use the problem solving method of instruction (Newcomb, L.H., McCracker, J.D., and Warmbrod, J.R., 1986), provide learning by doing experiences (Dewey, 1938), teach for empowerment so students learn how to learn (Novak and Gowin, 1984), and incorporate democratic principles in instruction (Dewey, 1938).

Examples of how these principles appear in the curriculum include students at Walter Biddle Saul High School who conduct experiments in the school laboratory to prepare for the pharmaceutical industry and higher education and work for the Soil Conservation Service, sometimes placed across the United States to earn money and to acquire relevant experiences. At John Bowne High School, students conduct field trials with vegetable crops to learn problem solving, the experimental method and to develop agricultural skills. Similarly, food science at the Chicago School includes quality testing for nutrition, taste and appearance. Students learn principles of democracy through FFA committees and activities at most of the schools discussed in this article.

Traditional methods of instruction with a twist. The same principles and concepts used in traditional rural agricultural education have been adapted to urban settings. According to Terry (1988) FFA and supervised experience activities are as appropriate in urban programs as in rural programs. And, the case presented bears this out. For example, John Bowne High School students have one summer of experiences on the school land laboratory, followed by either one summer on a farm or one year on an urban agriculturally related part-time job. Rarely do the production experiences lead students to a career in farming, nor is this the intent. An annual average of 250 students have summer experience programs that can range up to 500 miles from their home. Teachers drive to employment sites during summer session to supervise these students. FFA activities at John Bowne include the Building Our American Communities (BOAC) program where students engage in activities to improve city neighborhoods. Both the nature of the project and ways of carrying it out may differ from rural BOAC projects.

Value added. In urban programs students learn agriculture, business and technology and, at the same time, develop ways of knowing, understanding, problem solving, discovering, and develop transfer skills. Meaning is added to academic learning as students relate concepts and theories in an applied agricultural and real world context and prepare for college, work and a life as productive citizens. These are unique and distinct contributions to the school which otherwise might have limited content on agriculture or opportunity for applied learning activities. Also, agricultural education adds value to students and the community (Riesenberg, 1989) as a result of relevant curriculum and effective instruction.

In essence, urban agricultural programs meet educational needs and wants of students. Traditional program features are working, but with a twist. Based on the cases presented in this article, urban programs in and about agriculture have a promising future.

Looking to the Future

High school agricultural education is an important option

for students to decide if they should study agriculture in college, build a foundation for such study, help students to intelligently formulate agricultural career choices and provide entry level skills. If these contributions are important to students, then, it follows that all students should have access to such instruction. While space in this article doesn't permit a thorough discussion of equity, it is worth noting. In this case, equity concerns a student's right to educational opportunities that aren't limited by where one lives. Granted, the discussion must recognize that agriculture is an elective course.

Agriculture education addresses the broad industry of agriculture, not just farming. Thus, down-sizing agricultural education in any school because of a declining population of farmers does not make sense if the agriculture curriculum is broad based and includes related issues such as world need for food, global marketplace, the expanding agricultural industry, the expanding agri-business sector and environmental concerns. As times change, urban agricultural teachers are thinking positively, creatively and productively; and using change in demographics, societal values, new technologies, the work place and new thoughts about educating to formulate new options for agricultural education. As Thomas Jefferson stated:

"These times like all times are good times if we only know what to do with them."

Implications for Traditional Programs

Urban areas are expanding and providing new opportunities for agricultural education when educators have the proper attitude, creativity, flexibility and adaptability, and are enthusiastic. The examples in this article show that urban agriculture programs attract high quality students, provide high quality instruction based on sound principles and add value to the school curriculum. Although many components of traditional and urban programs are the same, urban teachers described in this article have created adaptations and twists to make programs compatible with their school and community.

Changes in rural schools and communities are sometimes more subtle and more difficult to detect than in urban areas. Yet, change is occurring and cannot be ignored. In some rural agricultural education programs, fewer than 10% of the students plan careers in agricultural production. Agriculture teachers, regardless of their setting, should be sensitive to their surroundings and new situations and respond to change by making adjustments in the instructional program. To remain a viable component of public education, agricultural education must have a unique agenda and a clientele. Regional differences across the country call for different action. Teachers are on the front lines of change, ones most responsible for maintaining successful programs. However, the total agricultural education team (including teacher educators, state supervisors, agricultural organizations, and others) has responsibilities and opportunities. Teachers and the agricultural education team described in this article exemplify successful responses to change and instructional needs in urban settings.

(Continued on page 16)

Creative Supervised Experiences For Horticulture Students

Change in agricultural education is not something which will happen in the future; a number of major program changes have already occurred. In many secondary agriculture programs the number of production agriculture students has decreased dramatically. However, more students are enrolling in our programs who have no direct ties to the farm. As a result, home-based supervised experience programs are becoming impractical for many students.

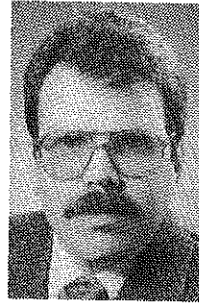
Traditional vocational agriculture laboratories in the past focused on agriculture mechanics shops and school farms. Today, many programs are adding greenhouses, computerized classrooms, scientific laboratory facilities and animal labs. Missouri high schools have built a number of greenhouses in the past several years. Today, over eighty secondary agriculture education programs have greenhouses, which constitutes one-third of the secondary agriculture programs in Missouri. These figures indicate how rapidly horticulture and urban agriculture has been incorporated into our programs.

The majority of secondary agriculture instructors report continued emphasis on supervised experience, although many students have limited opportunities for home-based programs. The limited opportunities for supervised occupational experience coupled with continued emphasis on student needs for supervised experience have motivated agriculture instructors to devise new types of experience programs.

Horticulture and greenhouse-based programs offer many possibilities for the development of creative supervised experiences. Supervised experience opportunities are available for students in areas such as management, production, supervision and sales. School-based supervised experience should provide students with a variety of hands-on experiences. Some examples would include the development of budgets and a calendar of events to plan the year in advance. The calendar of activities and budget should outline to the student and other responsible parties what will be expected as part of the supervised experience program. Speaking and writing skills should also be encouraged through supervised experience. Writing skills could involve monthly progress reports or newspaper articles. Some supervised experience programs may provide opportunities for presentations to school or community groups.

The Greenhouse Manager

The greenhouse manager position provides a good opportunity for students to gain practical experience. Students can earn the prestige of becoming the greenhouse manager for the year or the semester. One of the benefits of the job should be some kind of salary or payment for a job well done. Five or ten percent of the plant sale income would be an incentive for a student to be successful. The position



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should be one which is earned by a student. The greenhouse manager should be selected from applications and interviews. Applications should be submitted which contain information such as grades in selected courses, grade level in school, time available for the job, previous experience, reason for desiring the position, and suggestions on how the greenhouse operation could be improved.

All information requested on the application should be relevant to the position. The student's class grade provides evidence of a commitment to the program. The student should be a junior or senior who exhibits responsibility and maturity. Students who are employed on weekends or are involved in many outside activities, may not have adequate time to manage the greenhouse. Their experience could include previous employment, supervised program experience, experience from class, etc. The applicant should also provide an indication of why they are seeking the position. This will also help them reflect on the importance of the position.

The greenhouse manager could be given the responsibility to water the greenhouse over weekends and/or holidays. They would be expected to cover and uncover plants, check the proper temperature and humidity levels, insect problems, etc. In addition to weekends and holidays, the greenhouse manager should make daily spot checks of the greenhouse. However, the manager should not be expected to do all of the daily watering as it may lower the prestige of the position.

Crop Managers

Crop managers could be used in a similar fashion to the greenhouse manager, except student crop managers would be responsible for only one greenhouse crop. They should

be responsible for such management aspects as pest inspection and control, fertilization levels, crop scheduling, record-keeping, and marketing. This person also could be paid five or ten percent of the gross income or fifteen percent of the income if sales exceed a specified level. The crop manager should also be expected to research the literature in the field and to complete an application and interview for the position in a manner similar to the greenhouse manager.

Bench Rental Space

Another opportunity for supervised experience in the greenhouse involves the rental of bench space to students. This could involve a set fee of approximately 50-75 cents per square foot or as a percentage of their sales volume. Space could be rented for specific crops, for a class term, or for an entire school year. For example, one enterprising student was able to produce and sell \$400 worth of African violets on twenty square feet of growing space.

Space for Experimentation

Greenhouse space can also be provided for lab experimentation. Students could be provided with space to conduct experiments on erosion, propagation, hybridization or tissue culture. When doing experiments with erosion, students could simulate crop conditions and slope of fields to measure erosion. Students could also experiment with propagation using many different species of plants or by trying different techniques with a single plant species.

Students could experiment with hybridizing plants in the greenhouse or in outdoor test plots. Tissue cultures could also be performed using purchased kits, although they require a high degree of sanitation such as a lab setting.

The Plant Doctor

Another greenhouse responsibility involves providing care for unhealthy plants. People frequently bring plants to horticulture programs to be brought back to health. Appropriate facilities are necessary for the isolation of the plants to avoid infecting healthy stock, however, this is a possibility for a supervised experience program. The plant doctor (or plant intern) could provide a number of opportunities for students to develop important problem solving skills, in addition to the positive public relations benefits which could result.

School Groundskeeper

Most school grounds have an assortment of trees, shrubs and flower beds. Responsibility for the care and maintenance of these plants could provide an excellent opportunity for a supervised experience program. Frequently these plants are ignored or cared for improperly. A student with training in the care of trees, shrubs and flower beds could be an invaluable asset to the school. An attempt should be made to make this a year-round position with responsibilities for pruning, mulching, fertilization, planting, weeding, pest control and watering. A calendar of duties should be developed and approved by all parties involved. Attempts should be made to adhere to this calendar without an excess of extra needed time. Frequently schools hire students to help with custodial work around the school. One option would be to encourage school administrators to hire students to maintain the school grounds rather than perform custodial services.

City Park Groundskeeper

The school groundskeeper concept could be expanded to a city park or the downtown business district. In many communities some landscaping has been done in downtown areas which require year-round maintenance. Many downtown areas utilize planters to add color to the downtown region. Talking with the mayor, city manager, or chamber of commerce may reveal some opportunities for student supervised experience.

School Garden/Orchard Manager

Many schools have added orchards and gardens to their laboratory facilities. Orchards and gardens both require continuous maintenance and supervision during the summer. Orchards require frequent spraying during the spring and fall. Also, supervision of the harvest and marketing are required in the fall and summer with some crops. During the winter months pruning is required.

Gardens will require soil preparation in the fall and spring. Planning and planting will also be activities for the spring. Watering, harvesting, marketing, weed control and pest control will be the major activities during the summer months. Students involved in this type of supervised experience should be compensated by an hourly rate of pay or a portion of the profits generated from the sale of produce.

Garden/Orchard Projects

Garden and orchard space could also be rented to a number of students. Each student may be given responsibility for a few trees or an area of small fruit. Garden space could be provided in the same manner, with students paying a fee of five dollars per one hundred square feet or a percent of the profits. Projects of this type would also provide opportunities for cooperative efforts in marketing the produce.

Variety Test Plot Manager

Vegetables, fruits, and flowers could be produced in a variety of test plots. A student manager should provide the management in addition to conducting product evaluations. Quantity, quality, taste, color, and cost should be considerations when appropriate. Detailed records should be maintained and a newspaper article could be developed to publicize the results of the program.

Football Field Manager

In many schools the maintenance of the football and baseball fields is the responsibility of a reluctant maintenance or custodial person. These areas provide an excellent opportunity for students to develop skills in turf management. This experience program would involve activities such as: watering, fertilizing, mowing, aerating, and pest control. This responsibility should be reserved for hardworking, capable, and interested students. The quality of the student's performance on the athletic field will be scrutinized by the entire school and community. Therefore, recognizing the work involved in turf management, it should be a paid position. Agricultural instructors should be advised not to take on excessive responsibilities with turf management, because it can become very time consuming.

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Floral Marketing —

Agricultural Education for the Urban Youth

Today's agriculturalist is a new person, shaped by conditions that did not exist in previous generations. Farmers of today operate on a large scale and are more in tune with an urban as well as a rural society. They continuously deal with not only the problems of everyday rural life, but also with government and community regulations that are associated with the expansion of the urban environment into the rural communities. As the urban environment expands further into the rural communities, the farmer of today is more conscious of the effects of chemicals on the land and the water supply, and the use of natural fertilizers, such as manure, and how it affects the urban-oriented people who have infiltrated the rural scene.

Today, two percent of the American farmers are producing more food and fiber for our nation than the combined population (78%) of those in the farming industry. According to the 1935 census, the United States had 6.8 million farms; now farmers include less than 2.4 million and are farming an average of 427 acres.

Farming has gone through a technological revolution, resulting in better plants and animals through genetic and chemical engineering. Geneticists have produced high-yielding and high-quality pest resistant varieties of crops. Scientists have improved plant nutrition through improved fertilizer formulation and practices. Pesticides have been developed that take care of the 10,000 species of harmful insects, 1,500 diseases caused by fungi, and the 1,800 different kinds of nematodes that cause damage to crop plants yearly. Today's farmer is concerned about the improved timing and methods of pesticide application. No longer do we spray just for the sake of spraying. Our society is increasingly concerned about minimizing pesticide and herbicide residue on food that is consumed by the public. Scientists are studying the effects of breeding resistant crops and sterilization of insects to control problems associated with crop production instead of utilizing chemical means.

Farmers have been forced out of business by the rising cost of machinery, high property taxes, low product prices and the realization that family members are not willing to carry on the farming tradition. In such a high-risk business, you must be a large-scale operation to exist. Farming is hard work! I say that from 20 years experience, having been raised on a farm. Not too many young people are willing to take over a family-owned operation from their parents when they see the many career choices that are available to them nowadays in other fields or alternative careers in agriculture.

Farms are being sub-divided and developed into residential communities. Therefore, landscape architects now have to take this into consideration when planning designs for homeowners.



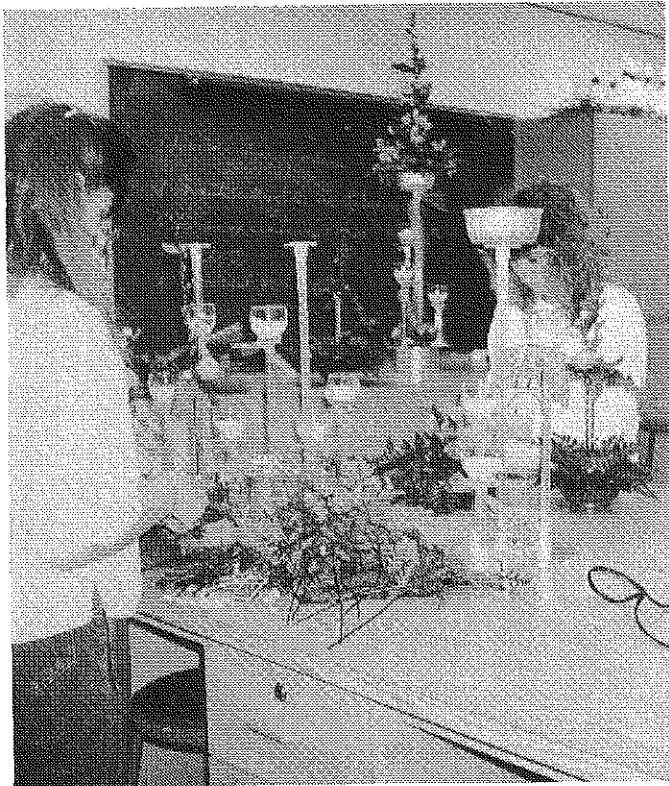
By JANET A. KOONTZ

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With this reduction in farms in the United States, we have found a need for changes in agricultural education. As more land is being used for urban use, jobs in agriculture have changed to accommodate the new trends. Education in agriculture has changed to meet these demands. We are seeing a greater need for agricultural education associated with the sales and service industries in the horticultural professions and not as much emphasis on animal and crop production.

The Genesee Area Skill Center was built in 1969 at a cost of \$2.7 million dollars and provides vocational training for primarily urban students. It was the first vocational-technical school in Michigan to provide both public and parochial students, from 21 school districts in Genesee County, training for the world of work. It operates on a budget of \$5 million dollars annually, providing saleable skills to students sought by today's highly competitive labor market. The student population numbers over 1,700 students daily who come from 32 high schools throughout the Genesee County area. As enrollment in local high schools has dropped, the enrollment in vocational programs at the Skill Center remains steady. Students spend two hours and twenty minutes at the vocational facility and the remainder at their home school.

There are 46 different programs in 12 vocational areas offered to students for vocational training. One such area is Agribusiness, involving training in Floral/Greenhouse and Landscape/Greenhouse Technology. The Genesee Area Skill Center provides vocational education to all students, including those with special needs. Nighttime adult education classes, for a variety of programs, are offered to those wishing enrichment or high school credit. Florists Aide and Landscaping is offered to those adults in the evening classes at the facility. More than 15,000 people have graduated from vocational programs taken at the Genesee Area Skill Center in the 20 years that it has been opened. Students get additional training from businesses in the community in hands-on experiences through co-op, work experience and pre-apprentice training programs. About 40% of all graduates of the Genesee Area Skill Center go on to college.



Students have their own work stations where they work on assigned projects. Here Jennifer and Krista assemble large banquet centerpieces. The students develop their skills by working on projects for functions at the Genesee Area Skill Center and a limited number of other orders from the public.

Approximately 2,400 persons per semester utilize the Skill Center during the evening hours for high school completion classes, service group meetings, college and university classes and seminar meetings. Guests from all over the world have visited and toured the educational facility.

The agribusiness classes at the Genesee Area Skill Center consist of Floral/Greenhouse I and II, Landscape/Greenhouse. Both instructors have approximately 35 students each.

In Floral Greenhouse I and II classes, students are trained to work in floral shops, wholesale florists and greenhouses. A student's success on the job is determined by vocational work habits as much as by the knowledge and skills that they can demonstrate in the work place. Students are given a daily grade based on their ability to demonstrate acceptable work habits. At the beginning of the week, each student fills out a time card for that week. At the end of each day, they list what they did or learned that day. They punch in and out for each day as if they were working in a business. Students are graded on their work for that day, basing the grade on such tangible items as being on time and not leaving early, bringing tools and equipment to class, using time wisely, and performing their clean-up job assigned to them that week. Each student performs in the last 20 minutes of class one or two assigned clean-up tasks for that day. This helps build a sense of responsibility in each student.

Many students have not worked in the private sector when they enroll in vocational agribusiness classes. By utilizing time cards and a time clock, students get a sense of what

the real world of work expects of them. The next day, students receive their time card back with the grade and any comments about their work the previous day. Writing comments on the card allows students to understand why they received a particular grade and gives them a chance to improve on their work skills and grade. Students are also evaluated on laboratory assignments that are tied to 20 major units of instruction. At the end of each grading period, each student is evaluated according to his/her daily work habits (40%), written assignments (30%), and laboratory skills (30%).

In addition to developing good work habits, students in Floral/Greenhouse I and II receive instruction in flower, plant and foliage identification. Students are not without homework. Flower and plant identification and theory tests are given weekly. Common and some botanical names are learned so they are able to successfully go into a flower shop and assist floral designers. It is essential that students recognize and are able to utilize the floral products whether they be perishable or non-perishable. Therefore, the first year is spent identifying products, grooming and maintenance of plants in the greenhouse and utilization of basic materials found in the industry, as well as basic design principles. A major challenge in teaching floriculture is that every flower shop has slightly different procedures, and teachers must constantly try to show students a variety of techniques.

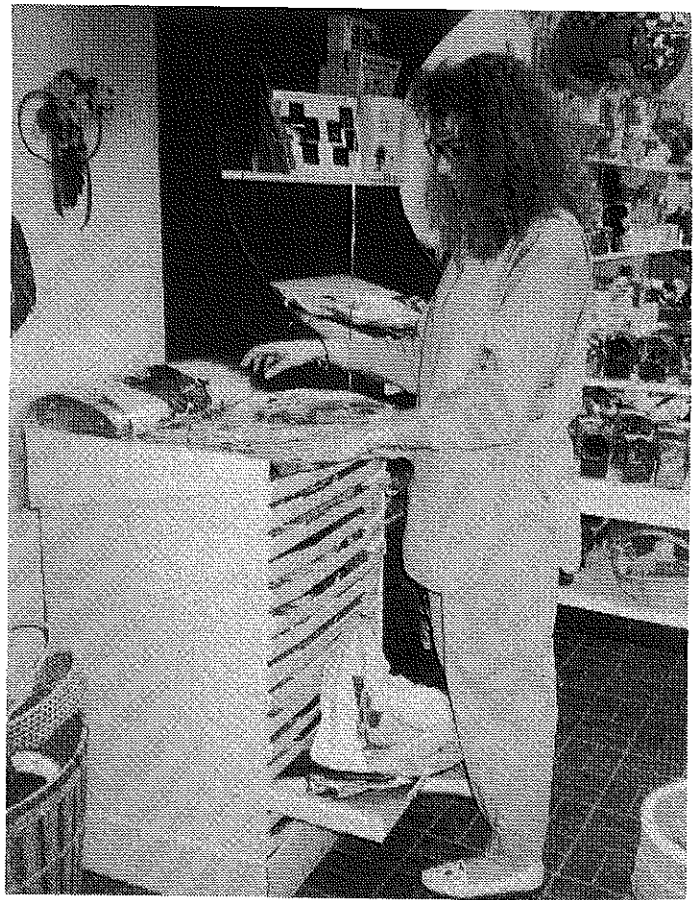
Versatility is crucial to success in the profession. Therefore, a teacher is constantly striving to prepare the student for a variety of situations they may encounter in the indus-



Rick Martin is a first year student in the floral/greenhouse program. Here he is setting up one of 25 centerpieces for the annual dinner for all the Board of Education members in the Genesee county area.

try. The floral business is based on trends and unless a person keeps up with the new ideas and techniques, one becomes outdated quickly. Books are almost outdated by the time they go to press, thus, floral industry magazines are used as textbooks. Attendance at conferences and conventions are used whenever possible to keep up on the new ideas in the industry. Local wholesale florists are also very helpful. They have been very generous in donating discarded materials for use in the classes. Because of the cost of running a floral marketing class, donations are particularly helpful. Another way of offsetting the cost of teaching a class of this nature, is to involve students in running a school floral shop. Second-year students do some of the ordering, pricing and accounting for the business. The main emphasis for this year-long course is pest and disease diagnosis and control, water and fertilizer application, funeral designing, wedding and party work, as well as marketing and display.

Because students come to us with such diverse backgrounds and abilities, the program is designed to train students for all urban aspects of the floral/greenhouse industry including cut flower processors, interior landscape and maintenance personnel, delivery, floral designers, salespersons, owner/manager and greenhouse workers. Instruction consists of lectures and discussion, video tapes, field trips, guest speakers, customer orders and practical hands-on practice. Students do all the table decorations for banquets held at the school, fill customer orders that are called in from the public, and help in promotions for the skill center. Each student demonstrates his or her skills learned during the year at an Open House held in the fall and an Annual Flower Show held in late spring. Judging at the flower show is done by local florist and greenhouse operators. Many of these employers serve on the vocational advisory committee for the horticulture classes. These professionals are very helpful in an advisory capacity. They participate in work experience programs hiring students on a part-time basis. Some former students have used these work sites as stepping stones to their own floral businesses.



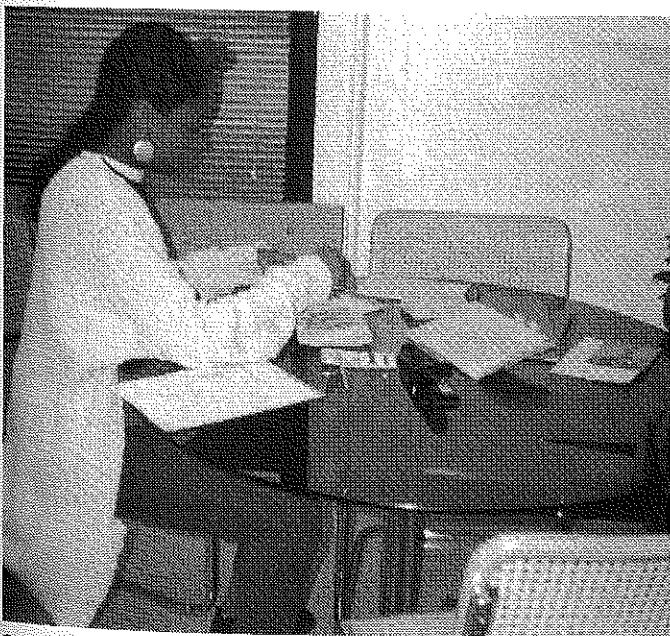
Tana is working part time in one of our local floral shops in the Flint area. Here she gains valuable experience about the world of work. She will be attending Michigan State University next fall in the two year floriculture program.

Many changes have occurred in the floral business education in the past twenty years. Technology in visual aids has evolved from film strips to very effective videos. Students are now being trained on computerized cash registers. These machines do everything. Floral shops have computer/cash registers where orders are placed as they are received by phone. The computer processes the order, bills the customer and actually fills out the enclosure card and the delivery ticket. All the florist has to do is make up the arrangement and deliver it!

Greenhouses now have automatic heat retention/shade cloth, which keeps it warm at night in the winter and helps cool it in the summer. On a recent field trip to Bordine's Greenhouse in Clarkston, Michigan, students saw automated watering and seed planting, saving the grower a tremendous amount of money in labor cost. Everything is becoming computerized and students should become familiar with computer technology. Agricultural education must keep up to date by staying attuned to industry needs. The computer has infiltrated all aspects of the agricultural industry. At present, five new high-tech computers are used in the landscaping program. Hand drawing of landscape designs are almost obsolete! The capabilities of new computers and the design programs available are almost immeasurable.

The floral and landscaping industry is just a small facet of agricultural education for the urban youth. There are

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Students learn a little about the financial aspect of running a business. Here Paris does some of the bookkeeping by totaling the previous days receipts and cash and checking that everything comes out even.

Supervised Experience for Everyone!

Things continue to change. Our high school agriculture and FFA programs, at the local level, proceed to evolve. A larger percentage of our enrollment is coming from cities and towns. Statistics show that this trend will continue.

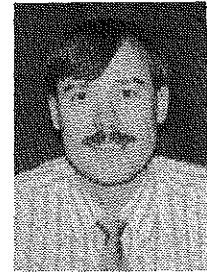
We can all agree that supervised experience programs are beneficial for students. Traditionally it was a fairly simple task to identify a supervised experience for each high school agriculture student; most lived in rural areas where accessibility to crops and livestock were commonplace. Today, the agricultural instructor must be creative to insure that every student has a quality supervised experience.

The challenge that we are faced with is to offer a balanced program that caters to the needs of all students enrolled in our local high school agriculture programs. We propose that science fair projects can be used as a vehicle to accomplish this goal. One beneficial aspect of the science fair approach is that the structure is already established and we do not need to "re-invent the wheel." Science fair projects can be on-going from year to year which dovetails nicely with our FFA recordkeeping system. One drawback is that many projects do not generate income for the student which causes problems for students pursuing their State and American FFA Degrees. As is the case with all supervised experiences, these issues need to be discussed one-on-one between the teacher and student before initiating the supervised experience.

It has been our experience in Chicago that a vast majority of all science fair projects, even at the elementary and middle school levels and even in urban areas, are agriculturally oriented. Why not take advantage of this situation? Not only does providing equal opportunities for supervised experiences increase, but also the side benefits of science fair projects are worth highlighting.

1. They help to infuse more science principles into the agricultural curriculum.
2. If structured properly, they build rapport with the science staff and foster opportunities for joint projects.
3. They serve as image builders for the agriculture department within the school and community.
4. They can be useful recruitment tools for attracting academically motivated students into the agricultural program.
5. Depending on local board policy, the students may be able to earn science credit which can be applied toward graduation.
6. They provide a quality education for the students and an educational process which encompasses cognitive, affective and psychomotor skills.

Students have the opportunity to choose from many agricultural areas for the supervised experiences. One area that, percentage wise, is generally not addressed is food science. Food science is the study of food properties, principles, processing techniques, packaging and food engineer-



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ing technology, varying degrees of deterioration and their controls and creating innovative foods for one's future needs as a society.



Pictured are food science students John Cason and Angie Diaz mixing the ingredients for the experimental bread dough.

In general, food science is not taught at the high school level in its pure form. Many times, components of food science are taught in the Home Economics area, which is fine, except for the fact that the scientific basis of the food's chemical structure is left for further study at a university level. Why not capitalize on a forthcoming subject matter, one that can definitely be scaled down to a high school level without losing its supervised experience flavor.

One might start with the premise that our society's eating habits have changed drastically and are still changing to conform to more convenience (usually processed) foods. During the technological change to processed foods, many

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Creative Supervised Experiences for Horticulture Students

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Landscape Design

Horticulture programs get frequent requests to draw or install landscapes for people. It becomes very difficult for the teacher or classes to respond to all of the requests. One option to help alleviate this problem is to make landscape design a student's supervised experience and the majority of the requests could be referred to them. The student given this responsibility must have a good understanding of trees, shrubs, flowers and the principles of landscape design.

Supplementary Supervised Experience

One option for a supplementary supervised experience program could be the observation of a professional. For example, students doing the landscape design work may be required to observe a person in the field such as: a landscape architect, an arborist, or a landscape contractor. Students caring for the football field could be required to observe a golf course superintendent or a grounds manager. Students caring for variety test plots could gain great insight from a visit to one of the state experiment stations. The orchard/garden manager would benefit from observing a

production orchard or truck farm. These observations should be unpaid learning experiences. They should also be planned with the cooperating professional to provide a variety of experiences. Most of these observations should be for at least twenty hours.

Another supplementary activity could be in the form of intense study in a specialized area of horticulture. If a student is caring for trees and shrubs on the school grounds, they could research problems to look for on the school grounds. This intense study could also include a leaf or photo collection of plants suitable for that region. This project would make an excellent subject to write articles for the newspaper or for presentations to community groups.

Summary

Changes are occurring in our agricultural education programs. Students enrolling in our programs have less agricultural experience. Many students have limited opportunities to conduct home-based or production supervised experience. Several programs have started offering more urban agriculture or greenhouse-based courses. With supervised experience being considered one of the essential components of a complete agricultural education program, we need to be creative in providing quality supervised experience programs.

Urban Agricultural Education "It Works"

(Continued from page 4)

Component Two — Focused Curriculum

To allow for maximum potential of all students (i.e., special needs and academically disadvantaged students) enrolled in secondary agricultural education programs, a focused, articulated curriculum should be offered with a variety of delivery methods and instructional tools. Within this curriculum format higher order thinking skills, learning skills, communication and technology skills must be incorporated. Educational success experienced by the agricultural education student participating in this type of program will lead to those same students becoming competent, productive employees who have a global perspective. Again, the instructor, whether rural or urban, needs to identify and implement a curriculum cycle (planning, development, implementation, monitoring and evaluation) to help insure student success.

Component Three — Action!

"Where the tire meets the road." In urban programs, because of large student enrollments, diverse student populations, increased student mobility and nontraditional course offerings, action by the instructor(s), program advisory committee(s) and administration is key to implementing and continuing a successful agricultural education program. Dealing positively with the constant flux in these areas is where the "urban" program may have more experience than the "rural" program. However, when examining the agricultural

education program of today that builds for tomorrow, once again all programs must take a serious look at all three of these components when striving for optimum student benefit.

A final note. My experience with urban agricultural education comes from the "grassroots" level. I am a graduate of the Madison East High Agriculture Department. As the quote by Rodger Niesen stated at the beginning of this article, urban agricultural education does "work." My agricultural education learning experience at East gave me the interest and foundation to my career today. Myself and other East alumni who have pursued agricultural careers because of our experiences in the urban agriculture program owe much to our proactive agriculture instructors and excellent program opportunities.

The urban agricultural education program at Madison East, as well as programs in other metropolitan areas are working and should continue to work in the future. The urban and rural components of the whole agricultural education picture must maintain a focus for the future as to provide a quality agricultural experience for all.

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Urban Agricultural Education Opportunities, Future Directions and Implication for the Profession

(Continued from page 8)

Summary

This article focuses on the success of urban programs, their characteristics and value. As urban areas expand, so do opportunities for agricultural education. In many rural communities characteristics of the potential clientele for agricultural education are becoming more similar to those in urban areas. Thus, urban programs may have important implications for other program types. Agricultural education in urban and rural schools has been very successful, can continue and even expand with proper planning.

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Floral Marketing — Agricultural Education for the Urban Youth

(Continued from page 13)

many more opportunities available, including horticultural education, occupational therapy, fruit and vegetable production, research and extension work for the student who is interested in other phases of the agricultural industry.

Horticultural programs at the Genesee Area Skill Center provide urban youth entry-level skill to go into the florist and greenhouse industry, as well as prepare those who want to explore further educational opportunities at community colleges or enroll in the two- and four-year programs in horticulture at Michigan State University.

Much has changed in agricultural education over the last 50 years and with the new technological revolution, change will continue. Because of the changes in the focus of agricultural education, changes are needed in the FFA organization and activities. Many horticulture teachers have not been involved in FFA activities in the past because of the focus on farming and crop production. Michigan is now in the process of developing skill contests for FFA chapter members that will focus more on the competencies taught to the urban youth in vocational technical schools throughout the state. For those students not raised on a farm and/or who have no desire or intention of going into farming, but would like to be involved in agriculture, agricultural education can serve them well.

Multicultural Education and Urban Agricultural Programs

Students enrolled in agricultural education in the public schools have historically been white males from rural areas. Enrollment trends indicate an increase in female enrollment; however, ethnic minority enrollment remains proportionately low (National Academy of Sciences, 1988). The low representation of minorities in agricultural education in the public schools indicates that an important and increasing part of the United States' population is not being served by agricultural education. Consequently, minorities are not aware of the broad range of potential career opportunities present in modern day agriculture. Although this low representation of minorities is a problem for agricultural education in general, the need to rectify this situation is especially crucial in urban agriculture programs because of the diverse clientele found in these communities.

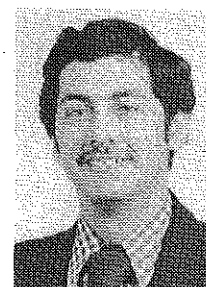
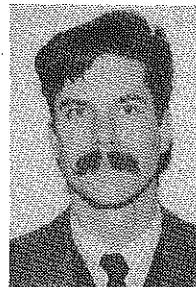
In the report *UNDERSTANDING AGRICULTURE: NEW DIRECTIONS FOR EDUCATION* it was asserted that agricultural educators need to be sensitive to the needs of all students including ethnic minorities. Individual agriculture teachers must take a step toward improving their sensitivity by addressing the needs of all students, regardless of ethnic or cultural background, with the infusion of multicultural education into their agricultural program. Agricultural education programs that accommodate the diverse educational needs of students may be better able to motivate and retain a diverse clientele.

Anderson and Barta (1984) stressed that all students regardless of race, ethnicity, sex, or disability must see themselves reflected in agricultural education. Students who see themselves reflected in the school environment tend to be more highly motivated, and therefore more likely to achieve. Anderson and Barta (1984) concluded that multicultural education concepts should be a visible, integral part of agricultural education programs to insure that students see the contributions, perspectives, and needs of diverse and ethnic groups. Furthermore, Anderson and Barta (1984) asserted if students are not exposed to multicultural education, then students may develop a sense of superiority which can lead to racism and ethnocentrism.

Implementation of Multicultural Education

In implementing multicultural education into secondary agricultural education programs, teachers need to be aware of the many variables that effect the achievement and success of minority students. The attitude of agricultural education teachers toward minorities is a major factor impacting minority student achievement. Is an agricultural teacher's expectation the same for a student whose father is a migrant laborer as is the expectation for the student whose father owns the ranch on which the laborer is employed?

Curriculum and teaching materials are another variable



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which can effect minority student achievement. Does the curriculum being used by agriculture teachers incorporate cultural diversity? Are students of different ethnic backgrounds being depicted in the books, slides, video tapes, and films being used by agriculture teachers? Teachers must be aware of the interrelation of these variables and how they effect minority student achievement.

Attitudes and Values

Teacher attitudes and values are major components of an agricultural education program which must be addressed when implementing multicultural education. The goal is to make teachers aware of their attitudes and values, not to change them. Toward this end, agriculture teachers must evaluate their philosophy of teaching and interlearn with other teachers and pupils. Additionally, teachers must acquire and develop multicultural competencies during this process of mutual cultural learning (Lynch, 1986). Professional development through state sponsored in-service activities are needed to assist instructors in achieving this goal. Lynch (1986) indicated that if successful development of multicultural education is to be realized, then the majority priority for resources should be in-service education about teacher attitudes. Therefore, state supervisors and teacher educators need to take the initiative to develop in-service programs that help teachers recognize their prejudices.

In-Service Education

Essential components of an in-service activity could include: 1) the development of an ethos for multicultural education in programs of agriculture, 2) identification and knowledge of racism and race relations, prejudice acquisition and reduction, and the cultural environment surrounding agricultural programs, 3) defining the expected behavior

and attitudes of teachers and students in an agriculture program committed to multicultural education, and 4) providing an opportunity for the experiential learning of these components as some of these new competencies cannot be learned cognitively.

If agricultural education teachers are going to implement multicultural education into their programs, recognition of the importance of multicultural education must be a priority. In order to develop this ethos, agricultural education teachers must know the basis and theory undergirding multicultural education, as well as experience it, in order to be committed to the concept. Commitment and awareness will help agriculture teachers recognize the various forms of racism and prejudice and subsequently help to create an environment within the agriculture program in which students may begin to recognize that all people are human despite different backgrounds and colors.

Curriculum and Teaching Materials

Interrelated to the understanding of teacher attitudes is the reform of curriculum and teaching materials to reflect multicultural education. The subject matter in agriculture lends itself very well to infusion of multicultural education as agriculture has a commonality among all cultures. For example, it would require little effort for an agriculture teacher to compare the importance of various crops to different cultures during a crop related unit. A specific example would be the teaching of cereal crops. The importance of wheat in Europe and North America can be compared and contrasted to the importance of rice in Africa and Asia. Corn could be studied in relation to its importance to the Indian and Hispanic cultures.

The teaching of the various breeds of livestock in relation to the cultures that developed them, as well as the continued importance of the breeds to those cultures, is another example how multicultural education could be infused into the curriculum. The Hispanic culture has had a profound impact on ranching in the western United States. Many of the production livestock practices in current use are based on traditions and customs borrowed from Mexico. The history of these practices can be infused easily into agriculture teachers' curriculum.

The influence that various cultures have had on the advancement of agricultural knowledge can be incorporated into agri-science units. The historically black land grant institutions of the south have greatly contributed to the science of agriculture. Students need to be aware of the contributions of famous African-American agriculturalists such as George Washington Carver or Tuskegee Institute. George Washington Carver's agricultural research in the areas of soil building and plant diseases helped revolutionize the economy of the south at the turn of the century.

The curriculum and teaching materials also need to reflect the diverse numbers of cultures present in modern society. Teaching materials such as slides and videos need to depict different minorities and cultures as well as the majority. Guest speakers can also reflect the cultural diversity of the community and help serve as role models for minority students enrolled in agricultural education. It is possible with a little imagination and creativity for agriculture teachers to infuse multicultural education into the curriculum and

teaching materials; however, agriculture teachers must be cognizant that correcting the curriculum and teaching materials to reflect cultural diversity does not alone constitute multicultural education.

Agriculture teachers also have at their disposal unique teaching strategies, supervised experiences and the FFA, which can be effectively utilized in implementing multicultural education. Students' supervised experience with some creative thought, can be designed to be multicultural. Production of cultural specific crops are an excellent supervised experience. Growing chiles and peppers for sale to restaurants specializing in Mexican food is an example of one. There are large numbers of specialty vegetables that are highly marketable in areas with large populations of Asian-Americans.

The growing of these crops utilize the same principles as typical crops and have an added advantage of being a specialized product that tends to bring a higher price at market. A prime example of supervised experience which reflects multicultural diversity is the student who processed corn into flour tortillas for his supervised experience and won the FFA Western Region Proficiency Award in Agricultural Processing several years ago. It must be stressed that both minority and majority students should be encouraged to conduct these multicultural supervised experiences. Additionally, agriculture teachers can also use these different supervised experiences as examples in classroom instruction, thereby increasing the exposure of more students to the many cultures present in today's society.

The FFA can also be effectively utilized in the blending of multicultural education into programs of agriculture. Teachers can provide the opportunity for students to address cultural topics that deal with an agriculturally related issue for a unit on public speaking. In turn, students would be exposed to a multicultural topic in depth while preparing the speech, and subsequently would be exposed to a variety of issues upon hearing the speeches of other students.

Topics dealing with cultural issues in agriculture can also be utilized in FFA parliamentary procedure contests. Differing views on an issue can be presented in a way where Roberts Rules of Order can be used to maintain a forum where all sides are heard. Possible solutions can be proposed and students are able to hear the views of different cultures. A logical topic for discussion would be the problem of underrepresentation of minorities in agriculture. Other topics could include the impact of farm worker organizations on agriculture, the mechanization of agriculture and its effect on the infrastructure of agriculture and the rights of farm workers.

There are other FFA activities in which multicultural education can be intertwined into the existing program. The local FFA chapter can also utilize the ethnic diversity present in a community by offering a menu at the annual banquet that reflects the various cultures present in the community. The National FFA program, Building Our American Communities, can also be utilized to help accomplish the goal of multicultural education. Projects that deal with cultural related issues can be designed by local chapters that would help in the acculturation of the students, and ultimately the community.

Summary

To infuse multicultural education into their agriculture programs, urban agriculture teachers, as well as other agriculture teachers, need to follow a few basic guidelines. Commitment and awareness of multicultural education are the first steps agricultural education teachers can take toward the infusion of multicultural education into agricultural education. The reformation of curriculum and teaching materials to reflect multicultural education is a step inter-related to the commitment and awareness of agriculture teachers in regards to multicultural education.

Furthermore, agriculture teachers will take a big step toward multicultural education if they are innovative in their teaching, plan multicultural education into their teaching and assessment, and believe that all students can achieve. In doing so, agriculture teachers will help create a school

culture that recognizes and establishes the cultures of students from the multitude of ethnic and racial backgrounds present in modern society. The incorporation of the perspectives and values of ethnic groups will help minorities gain equality and broaden the lives of minority students as well as majority students and teachers.

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Supervised Experience for Everyone!

(Continued from page 14)

natural nutrients are altered, thus giving our daily diets an imbalance of nutrition. In order to counteract this phenomena and the simple fact that people are consuming lesser quantities of natural protein foods, it is possible to enrich some foods in the diet to help offset any imbalance. Another way to look at this change can also lead directly to food complements or simply, combine two foods at a meal that

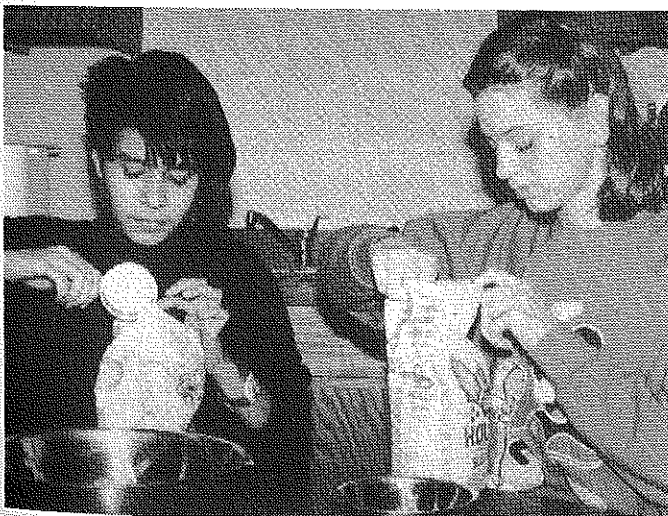
together equal or surpass the individual level of a separate nutrient, such as protein.

One example might be a protein enriched whole-wheat bread. Whole wheat bread on its own has approximately 9-10% protein. By enriching the bread dough with one of many components, the protein value can increase to 20-22%. This can be done by replacing a portion of the flour mixture with anywhere from 1-10% whey protein concentrates or soy protein isolates. (These particular items are usually available from a food manufacturer in the baking industry.)

By replacing the flour mixture with the protein concentrates, the trial and error research method will help the student understand how a common food, such as whole-wheat bread, can change its structure, taste, and eventual cost that is carried onto the consumer. So not only does the project carry itself scientifically, but also it is directly related to Agriculture Science, Food Science, and has a carry-over impact on the marketing/sales industry.

It is said that the larger supermarkets carry over 10,000 individual food products for sale as human consumable items. With that growing annually, it would behoove the agriculture student to become more involved and more aware as early as possible.

The above is just one example of how we can expand our definition of supervised experience. If we open our minds and look for non-traditional, unique and innovative approaches to delivering agricultural concepts, we can truly insure supervised experience for everyone!



Jennifer Rodriguez and Sara Rohl are measuring the dry ingredients for the protein-enriched whole wheat bread.

Teaching Tips

Agricultural Science Laboratory Activity

Rhizobium: The Nitrogen Factor

The best way to teach the science of agricultural practices is through the use of experiments and demonstration laboratory activities. With this approach teachers can use the lab to zero in on the specific underlying science concepts. This way, the science taught in secondary agriculture curricula is targeted to those underlying concepts and principles that have direct application to specific agricultural practices. The lab activity that follows is an example of this approach to teaching science applications in agriculture. The science concepts and principles that follow the lab activity are designed to answer "why" questions of this type: 1) Why is less nitrogen fertilizer added to legume crops? 2) Why is legume seed inoculated? 3) How do soil-inhibiting bacteria improve the nitrogen supply to legumes? 4) Why are only legumes affected by inoculation? Why aren't all legumes affected by inoculation? 5) How does the plant take up the nitrogen made available by the bacteria?

Objective

To illustrate the presence of nitrogen-fixing bacteria on legume roots and compare the root nodules of various legumes (compare the efficiency of bacterial strains)

Materials

- Samples of cultivated (inoculated) legume roots
- Samples of wild legume root systems
- Single-edged safety razor
- Root samples from various legumes (alfalfa, clover, vetch, peas, soybeans, peanuts, garden beans, birdsfoot trefoil, etc.)

Interest Approach

Bring in two samples of inoculum, each containing a different strain of rhizobia. Ask the students what is inside each packet. Open the packets and pass around a small sample of the inoculum from each packet. Ask the students if they saw any living material in the samples. They are alive! (A slide can be prepared to let students actually see the bacteria contained in the inoculum packet.)

See if anyone can explain why we inoculate legume seed. How does the inoculum work? Why don't we inoculate all legume seeds or all crop seeds?

Procedures

1. Collect the legume samples as specified. Plants must be in the active growing stage. Samples from deep rooted crops, such as alfalfa, must be taken when soil moisture is high. Otherwise, the nodules are likely to be scraped off when removing the plant from the soil. An alternative is to grow several samples in the greenhouse. In this case



BY ED OSBORNE, SPECIAL EDITOR

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the rootball can be removed from the pot and the nodules easily seen.

2. Compare the root nodules on various plant species in terms of size, shape and number.
3. Compare the root nodules on several plants of the same species.
4. Compare the root nodules on cultivated versus wild legume plants.
5. Using a safety razor, slice open the nodules on several legume roots and compare. Inefficient strains of rhizobia produce nodules that are relatively small; widely dispersed; and green, white, or brown inside. Efficient rhizobia strains produce nodules that are relatively large and red or pink inside.

Underlying Science Concepts and Principles

1. Bacteria are single-celled organisms. **Rhizobia** are aerobic bacteria that are naturally found in soils. Their populations are increased by soil moisture, soil oxygen, soil aeration, and soil temperature. A pH of 6.0-8.0 supports the greatest rhizobia populations. Also, the greater the exchangeable calcium in the soil, the greater the soil bacteria populations.
2. Rhizobia are **autotrophic** bacteria. They get their energy from the oxidation of mineral constituents, as well as carbohydrates from their host plant. Thus, the rhizobia and the plant live in a symbiotic relationship — one of mutual benefit.
3. The soil bacteria enter the plant through openings in the root hairs and extend into the cortex (outer cells) of the rootlets. This is where the growth of the nodule starts and where nitrogen fixation occurs.
4. Rhizobia convert atmospheric nitrogen into a form available for uptake by plants. This lessens the need for supplemental nitrogen and generally increases the yield and quality of crops. However, these bacteria are crop-specific, with certain strains affecting only certain crops.

This explains why only leguminous plants are affected by rhizobia.

5. As soil temperature increases, soil bacteria become more active. This explains why nodules are not present in legumes during the winter months. Research has also shown that nodules slough off immediately after crop harvest, and then begin to return several days after harvest.
6. The chief source of nitrogen for plants is in the form of nitrate (NO₃). A compound is fixed when it is in a form that resists decomposition. Rhizobia "fix" atmospheric nitrogen (N₂) by converting it to ammonia (NH₄⁺). Ammonia is then converted to nitrite (NO₂) and then to nitrate (NO₃). Nitrite is toxic to higher plants, but the conversion from nitrite to nitrate occurs so quickly that no nitrite buildup in the soil or plant roots occurs. It appears that nitrogen, in the form of nitrate, is then diffused through the walls of the bacteria located in the root

nodules and is absorbed by the host plant through the nodule root system.

7. Thus, seeds are inoculated with rhizobia in order to increase the bacterial populations in the soils of leguminous plants. Increased rhizobia populations will "fix" more nitrogen, thus making more nitrogen available to the plant. The increased supply of nitrogen by rhizobia lessens the need for supplemental nitrogen.

Some Ideas for Experiments

(Note: These can be done in field conditions or greenhouse tests.)

1. The general effects of rhizobia inoculum on root nodule development and plant growth.
2. The effects of various rhizobia strains on certain legume species.
3. The effects of amount of inoculum added to legume seed on nodule development and plant growth.
4. The effects of harvest on nodule presence.

Computer Technology Resources Writing A Spreadsheet Application

(Continued from page 5)

If this formula is used, your balance column shows NA until you make a withdrawal or deposit entry.

Next enter the formula to automatically number your checks. In cell C20 enter: 1+C19. Now copy this formula down column C to the bottom of your spreadsheet. Answer RELATIVE each time. Another way to write this formula would be: @IF(C20)0,+1+C20,@NA). Answer NO CHANGE and then RELATIVE for this formula when copying it.

Columns I, M, and O need to be formatted for dollars and cents. Move your cursor to column I and format it by pressing OA-L, L (layout), C (columns), V (value format), F (fixed), and 2 (two decimal places). Don't select the dollars option — it would clutter your screen with dollar signs. Repeat this process for the other two columns.

Saving the Template

Once you have created your template, save it on a data disk so that you can recall it later. A time will come when your check register contains more data than the computer can hold. To avoid this problem, keep separate files for each month or quarter. After you've saved the blank template, change the filename on your desktop before entering any data by pressing OA-N (name), type CKBK.JAN.90, and so on, then press return. Use a name that tells what the file contains: CKBK.JAN.90=checkbook entries for January 1990.

Entering Reference Data

Entering the information on the upper part of the spreadsheet is self-explanatory (title and so on). The area between rows 9 and 16 is blank so that you can create whatever account codes you need. These are labels and are added here only for convenience and easy reference. Examples of such codes are:

CROP10 Seed Expense HOGS38 Veterinary Expense
CROP15 Fertilizer Expense HOGS40 Protein Expense

CROP20 Herbicide Expense HOGS50 Trucking Expense
MRKT03 Crop Sold MRKT05 Livestock Sold

Checks and Deposits

Your first entries in the register will be the year and your current balance. Enter the year in cell A19 and your balance in cell 019. To enter a check in the register, type in the data as a label in cell A20, since a slash(/) won't work. Next enter your check number in cell C19. Your checks now will be pre-numbered for you. Enter your account code in column E, named CODE INFO and then a description in the ITEM column. Next enter the amount of the check in the AMOUNT column. Type an X into column K, called IN, when your check clears the bank. See Figure 1 for an example of a check register with several entries. A deposit will be entered in the same manner as a check. In place of the check number, type in DEP and then move down one cell and retype the next check number to start numbering your checks again.

Figure 1. A working check register.

TITLE	Checkbook Register
PRINT DATE	February 1, 1990
ACCOUNT	Farm
BANK	Main Street Savings
ACCOUNT NO.	557869
START DATE	January 1, 1990
END DATE	January 31, 1990
CROP10 Seed Expense	HOGS38 Veterinary Expense
CROP15 Fertilizer Expense	HOGS40 Protein Expense
CROP20 Herbicide Expense	HOGS50 Trucking Expense
MRKT03 Crop Sold	MRKT05 Livestock Sold

Date	Check No.	Code Info	Item	Amount \$	I N	Deposit \$	Balance \$
1990			BALANCE FORWARD				12,267
Jan. 14	1016	CROP10	Joe's Seed Farm	5,760	X		6,507
Jan. 17	1017	HOGS40	Farmers Elevator	2,400	X	4,107	
Jan. 24	1018	HOGS38	Vet Clinic	177	X		3,930
Jan. 24	DEP	MRKT05	Feeder Pig Coop			10,500	14,430
Jan. 27	1019	HOGS50	Sam's Trucking	2,290	X		12,140
Jan. 31	DEP	MRKT03	Farmers Elevator			8,800	20,940
		1020					NA
		1021					NA
		1022	TIME TO COPY THIS LINE				NA

(Continued on page 23)

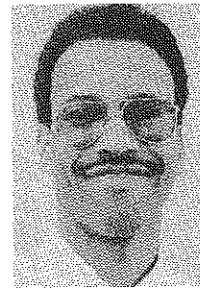
Cultural Diversity in Urban Agricultural Education

The ethnic demography of the United States is changing dramatically. The 1980 CENSUS OF POPULATION reported that minorities comprised 21 percent of the total U.S. population and that the rate of the growth of the minority population was approximately twice the rate of growth of the white population. In California, it is projected that within the next two decades, minorities will become the majority population (Suzuki, 1987). By the year 2010, it is also estimated that, nationwide, one out of every three Americans will be non-white.

Suzuki (1987) further reported that the demographic changes in the school age population are even more striking. Currently, 25 percent of all public school students in the United States are minorities. In California, this figure is reported at 43%, and in Los Angeles, the minority public school student population is over 50%. A prediction for the year 2000 indicates that minority students will comprise the majority in over 50 major cities throughout the United States.

The 1970 national census (U.S. Department of Commerce, 1972) confirmed that middle class population growth was occurring in suburbia, with the segregation and isolation of poor and minority groups intensifying in urban cities. Dichter (1989) verified this by reflecting that "our urban schools are increasingly dominated by one segment of the population — disadvantaged and minority youth" (p. 12). She further commented that "our educational system has become almost two-tiered, divided into suburb and city, middle class and . . . underclass" (p. 13). Although cultural heterogeneity is now found in most communities, urban school systems, with their greater and more concentrated cultural diversity, face formidable challenges in achieving educational equity and success for all persons. Many challenges of the urban educational environment have been investigated and reported. Perritt and Spell (1984) cited urban barriers of poor public support, lack of appropriate facilities, and uninvolved parents. Passow (1982) identified thirteen difficulties facing urban educators including differing values, revolving-door programs, and unresponsive students. Even John Naisbitt (1982), the popular futurist, commented on the urban educational environment.

With over 600,000 total students, the Los Angeles Unified School District is the second largest district in the United States. Los Angeles' forty-nine regular high schools enroll approximately 57,000 students. Stretching from the lower income, higher crime areas of South-Central Los Angeles, to the exclusive and high income areas of beach-front communities such as Playa del Rey, this district presents a focused contrast in cultures, ethnicities, languages, and learning expectations and outcomes. District-wide, Latinos comprise 47% of the high school enrollments, blacks,



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whites, and Asians account for 22%, 21%, and 8% respectively of the high school population.

The challenges of providing for educational equity in the Los Angeles Unified School District are further magnified by the intense proliferation of gangs, drugs, and violence. These days, many urban high school students are pressured by such influences as "bloods," "crips," "skin heads," "punks," "nouveau," "druggies," "slangers," "mods," and "dealers." Current estimates of the number of drug gang members in Los Angeles County are sobering. The Los Angeles County Sheriff's office maintains a computer system which presently logs more than 70,000 gang members (Lieberman, 1990). Although schools often take measures on the increasing violence and gang activity, by restricting gang clothing, signs, and "gang hair" on campus, gang activities and violence are pervasive.

Another challenge to educators in the Los Angeles Unified School District is the high dropout rate (Woo, 1989). This rate is 39.2% district-wide but varies from a high of 79% at Locke High School in Watts to a low of 11% at Westchester High School near Playa del Rey. American Indians account for the highest dropout rate, with 57.3% of American Indian students dropping out before they graduate, followed by blacks (46.9%), Filipinos (43.7%), Latinos (40.1%), and whites (33.8%). Fully, 10,579 Latino students should have graduated with the class of 1988, but did not because they dropped out.

The diverse multitude of educational challenges affect all levels of urban instruction, even including agricultural education. With forty-four agricultural programs, the Los Angeles Unified School District enrolls over 6,000 middle, junior, and high school students in agricultural classes.

Roger Neal has taught agriculture at Carson High School for the past six years. This inner-city school, located in the Harbor area of Los Angeles County, has an enrollment of 2171 students. Approximately 90% of Carson's students are minorities. The Carson agriculture program consists of a classroom building, greenhouse, lath house, and vegetable garden area. The educational pressures placed on this agriculture teacher are typical of those experienced by other teachers in the Los Angeles Unified School District. Drug abuse and gang activity are common. Last year's Carson dropout rate was 23%. During the past semester, 115 students enrolled in Carson's horticulture classes, with 94 students being from minority groups. Seven students did not speak English.

In spite of the difficulties encountered, the successes of this program are visibly apparent. Enrollment has increased during the past three years by 15% annually. Vandalism is now virtually non-existent. Agriculture students, through their participation in student council activities, have assumed leadership roles within the general school population. The Carson FFA was a recent recipient of the BOAC award. Approximately all of Carson's agriculture students participated in SOE's/SAE's. Seventeen students are presently members of the FFA. At the county-wide "LA Beautiful" banquet, Carson earned three "first" awards. During the Carson's FFA banquet, the spirit of achievement and camaraderie was highlighted.

The educational successes of the Carson High School agriculture program are due, in part, to the efforts of its instructor in developing and maintaining a comprehensive multicultural program and in maximizing the benefits created through cultural diversity. The attitudes of Mr. Neal reflect that disadvantaged minority students have the same capability to learn as other students. During the past two years, this instructor began "STOP," a Student Outreach Program. Through this program, at-risk agriculture students are identified and innovative measures taken to ensure their educational success. Those students who are not effective in the school environment are assisted. Students, teachers, and graduates of the program serve as mentors to these agriculture students. Students in the Carson program are enlisted to serve as interpreters to the program's limited English proficient students.

Cultural awareness for all students is expanded through fostering a close alliance and participation of the Carson High School's ethnic club sponsors with agriculture students. Other school personnel, including security staff, special education teachers, and work experience coordinators are actively involved in the program's activities. Student camaraderie and participation is also enhanced through intramural horticultural competitions promoted in the agriculture program.

Traditionally, educational expectations for minority children in inner-city schools are low (Emihovich, 1988). However, throughout all aspects of the Carson program, these expectations run high. Academic rigor in Mr. Neal's horticulture classrooms is emphasized. This also helps to promote a climate of respect for learning. The academic emphasis, balanced with the continued recognition of benefits accrued through participation in the FFA and experiential learning opportunities, has helped to legitimize the concept of an agriculture program in this urban setting.

In the development of his curriculum, the agriculture instructor has attempted to provide curriculum relevant for Carson's urban setting. Through his redesign of the standard horticulture curriculum, Mr. Neal has incorporated minority perspectives. Latino and Asian horticultural practices are infused throughout his instruction. Also, an ongoing occupational survey with horticultural businesses in the City of Carson enables this instructor to successfully match his curriculum to the needs of local employers.

Another feature of the Carson agriculture program is the dramatic involvement of parents. The inner-city environment traditionally features a high number of broken homes/families. The support and encouragement to succeed in school related activities which these children receive may often times be limited. Through a comprehensive student home visitation program, Carson's parents or guardians are regularly updated on the school's agriculture program and encouraged to assist. Parent groups have responded by regularly supervising activities in the agricultural compound on weekends. Without the involvement of parents in agricultural activities, and without their support of their children's academic efforts, the instructor and his school would face alone an almost impossible task.

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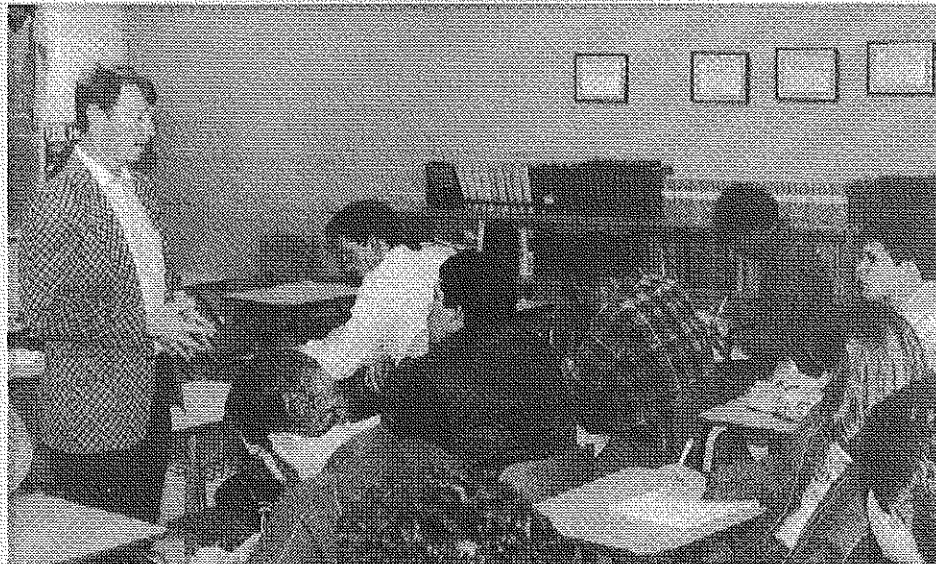
Writing a good spreadsheet is hard work, but this work

can be rewarding and fulfilling, and the rules cited here can help you or your students do this work well. Spreadsheets are excellent educational tools to be used in the classroom. They work well in both individual and group learning situations.

Stories in Pictures



Mr. Kenneth Bridges, teacher of agriculture at Oconee County High School, Watkinsville, GA (center) received the 1988-89 Robert Knowles Award for Outstanding Supervisor of Student Teachers given by the Georgia Association of Teacher Educators. Also pictured (left to right), are the local and state presidents of GATE, Mrs. Bridges, and Mr. M.J. Iverson, University of Georgia.



In addition to his work with 30 apprentice teachers from the Agricultural Education program at the University of Georgia, Mr. Bridges has supervised over 200 individuals in early experience internships at Oconee County High School. Pictured is a University of Georgia class in Agricultural Education being oriented to the profession by Mr. Bridges.