

AGRICULTURAL EDUCATION IN MISSOURI

Agriculture and the food, fiber and natural resource system is America's most creative, productive and basic industry. Much of this country's success in agriculture can be attributed to a sound program of education. To advance a dynamic and efficient agriculture, food & natural resource system and to assure the continued well-being of our society, first-rate education must continue to be a high priority. A cooperative effort among educational institutions, government agencies and food, fiber and natural resource-related businesses will help Missouri provide leadership for the future through enhanced education.

Developments shaping food, fiber and natural resource systems

Participants representative of the food, fiber and natural resource industry were asked to identify the most important trends and developments over the next 30 years that will shape the future of agriculture and the food, fiber and natural resource systems. Five trends emerged as most important.

⇒ *Accelerating globalization of markets.*

- ◆ Economic globalization with increasing population and falling trade barriers is taking us toward a more competitive international marketplace for agricultural products in which more countries will produce more kinds of foods and market them on an international scale.

⇒ *Growing public demands for environmental protection and safe foods.*

- ◆ As production increases worldwide, pressures will grow everywhere to protect prime farmland from urban sprawl, conserve soil, safeguard water quality and fisheries, use water more efficiently, protect remaining wildlife habitats, and ensure a safe and healthy food supply.

⇒ *Increasing reliance on technology.*

- ◆ Advances in computers, communications, information, biotechnology and other areas of technology will greatly affect education, agriculture and the operation of the food, fiber and natural resource systems.

⇒ *Decline public understanding of Agriculture, Food, Fiber and Natural Resource Systems.*

- ◆ The general population is increasingly cut off from both direct experience and education related to Agriculture, which has serious repercussions in terms of ill-informed consumer behavior, public opinion, regulation and political decision-making.

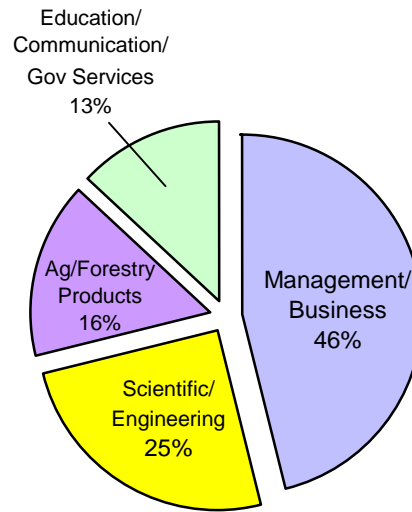
⇒ *A more highly trained and diverse workforce.*

- ◆ A more diverse, highly trained workforce will be needed to manage the development of food, fiber and natural resource systems so that they will be competitive in the global marketplace and successful in an industry whose structure is changing.

Agricultural Industry Employment

- ⇒ Agriculture employs one out of every 6.6 workers in Missouri. (MDA, 2004)
- ⇒ Agriculture/agribusiness provides 540,268 jobs which is more than 16.8% of Missouri's employment. (ERS, 1995)
- ⇒ Missouri ranks 13th in the U.S. in agriculture employment.
- ⇒ U.S. biotechnology employs 200,000 people and is a \$39 billion industry. (ELANCO Co., 2006)
- ⇒ 52,000 job openings a year are added in the food, agricultural and natural resources industries. (ELANCO Co., 2006)
- ⇒ Science and engineering will represent 25% of agricultural jobs in 2010. (ELANCO Co., 2006)
- ⇒ USDA forecast: in 2010 there will be more jobs in agriculture than graduates. (ELANCO Co., 2006)
- ⇒ Missouri has 108,000 farms which rank second in the nation. (NASS, USDA, 2008)

FORECAST FOR CAREER OPPORTUNITIES THROUGH 2010
 (AFA newsletter, Spring 2006)



The Vision and Mission of Agricultural Education

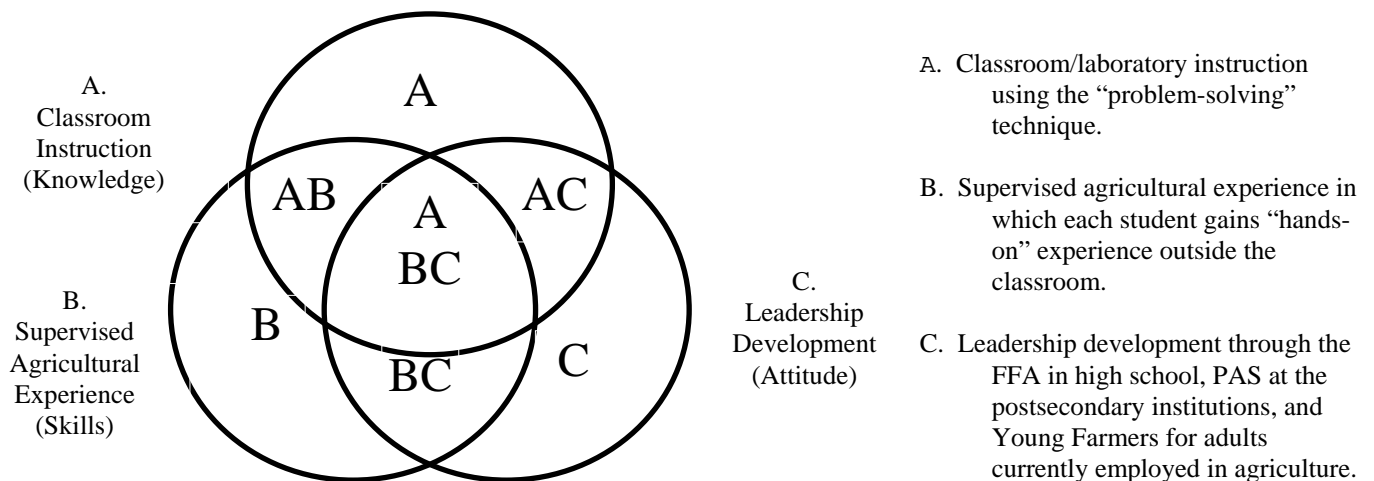
A vision and mission statement for Agricultural Education was developed in 2000 through the Reinventing Agricultural Education for the Year 2020 Task Force; a cooperative effort of practitioners, students, government and industry. The statements have been adopted by the National Council for Agricultural Education family to guide future progress and emphasis. They are as follows:

***Vision:** All people value and understand the vital role of agriculture and natural resources in advancing personal and global well-being.*

***Mission:** Prepare students for successful careers and a lifetime of informed choices in the global agriculture and natural resource systems.*

Agricultural Education Delivery Systems

Agricultural Education - prepares secondary, postsecondary and adult students for a variety of careers and advanced college or technical training in the Agriculture, Food and Natural Resources System. Career opportunities for students range from positions in agribusiness, food science, agricultural mechanics and technology, plant science and horticulture, animal science, and natural resources conservation. Programs of study are delivered by the following: four-year "cluster" programs at comprehensive high schools and area career centers; two-year community college "specific" programs; and "supplemental" and "specific" adult education in high schools, area career centers and community colleges. At each level, training programs consist of three interrelated components:



Missouri Agriculture Enrollment Trends

The following table shows total enrollment in secondary, postsecondary and adult agriculture programs. High school agriculture enrollment has increased steadily since 1985 and is currently at an all time high. This reverses a trend of declining enrollment that began in 1977. Factors which contribute to the increasing enrollment have not been formally studied, but teachers and others indicate they believe that: 1) the economic improvement of agriculture affects attitudes of parents, students and counselors toward enrolling; and 2) agriculture programs have expanded content and increased flexibility. Postsecondary enrollment has also increased in response to a changing agriculture and the public attitude about the future of agriculture. Adult enrollment has fluctuated since reaching a peak enrollment in 1984-85.

Total Student Enrollment

<u>Year</u>	<u>No. of Programs</u>	<u>Secondary</u>	<u>Junior High</u>	<u>Postsecondary</u>	<u>Adult**</u>
2008-2009	316	26,473	11,245	1,158	3,110
2007-2008	311	26,254	10,732	1,043	3,585
2006-2007	305	25,452	10,429	860	2,841
2005-2006	302	25,180	11,452	2,246	4,264
2004-2005	301	25,162	10,798	2,797	2,630
2003-2004	294	23,827	9,611	2,756	2,637
2002-2003	291	22,953	9,850	3,102	2,373
2001-2002	286	21,800	9,835	950	2,435
2000-2001	284	21,174	9,850	728	2,308
1999-2000	277	21,196	7,665	661	3,181
1998-1999	266	20,616	7,146	702	3,068
1997-1998	266	20,294	7,620	842	2,906
1996-1997	263	20,169	7,678	672	3,340
1995-1996	258	19,048	6,717	672	2,594
1994-1995	253	18,205	5,571	653	3,076
1993-1994	249	17,441	4,545	681	2,704
1992-1993	247	16,652	4,428	680	3,007
1991-1992	245	15,132	4,071	602	3,650
1990-1991	245	13,920	2,950	477	4,190
1989-1990	244	13,993		405	3,803
1988-1989	243	13,705		371	3,721
1987-1988	244	13,555		471	3,852
1986-1987	244	13,443		408	5,743
1985-1986	245	12,865		517	6,243
1984-1985	245	13,325		649	5,224
1983-1984	242	14,360		613	5,073
1982-1983	240	14,474			

* Data from 12 institutions offering postsecondary agriculture.

** Adult programs are operated as a part of local programs.

Secondary Agricultural Education in the Public Schools

Agricultural education has been a part of the public education system throughout the history of our country. When the Latin grammar schools gave way to the academies of the late 1700s, agricultural courses were sometimes included in the curriculum. While these were general theoretical courses, many states made them a requirement for graduation. With the passage of the Smith-Hughes Act of 1917, many general agriculture courses were replaced with a course called "vocational agriculture." This change from a general to a vocational focus was not well accepted by certain groups, and therefore the new courses were not included in all public school curricula. The goal of the vocational agriculture program was "to prepare young people for employment in farming." After the National FFA Organization was founded in 1928 and became an integral part of vocational agriculture, the total program was adopted by many public schools. Over the years, the program has changed to meet the needs of society and the work force. For example, the number of farmers has declined from 13.8% of the work force in 1947 to less than 2% in 2009. It is now estimated that

agriculture/agribusiness provides 23% of all U.S. jobs. The Vocational Act of 1963 encouraged expansion of the vocational agriculture program to include training for entry into other agricultural occupations besides farming.

Enrollment in high school agriculture is at an all time high in Missouri with 26,473 students. Currently, 274 comprehensive high schools and 42 area vocational schools offer agriculture. Of the students enrolled, over 39% are female. There are 450 agriculture teachers in secondary schools. In 2008-2009, the program was offered in 69% of Missouri's public high schools, and approximately 9% of the high school students were enrolled.

High School agriculture is a four-year program. A student normally earns four to six credits. The following table shows course offerings and enrollments for the past nine years.

Course Offerings and Enrollments Number of Schools

Courses	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	08-09
Agricultural Science I	263	268	274	291	294	292	302	305	258
Agricultural Science II	238	241	237	263	266	261	272	262	230
Agricultural Management/Economics	103	88	98	101	91	98	99	89	84
Animal Science	109	120	112	156	136	124	137	132	118
Crop Science	47	39	46	34	34	29	32	38	27
Agricultural Sales & Marketing	79	86	95	92	95	82	97	83	72
Agricultural Power I	68	73	72	74	76	69	68	62	67
Agricultural Power II	18	21	18	17	17	21	19	16	14
Agricultural Machinery	28	31	35	38	32	44	38	33	29
Agricultural Structures	114	117	108	133	123	127	129	105	114
Agricultural Construction	196	208	206	287	289	284	282	223	197
Floriculture	46	46	45	72	62	64	61	49	47
Greenhouse Operation/Management	117	122	142	174	170	179	169	142	139
Nursery Operation & Management	13	19	17	25	22	16	18	16	21
Turf Management	10	11	11	15	12	15	9	15	12
Landscaping	66	79	78	94	92	88	97	98	72
Conservation Natural Resources	100	79	94	90	103	102	101	111	97
Forest Management	25	17	20	19	18	17	15	21	22
Supervised Occup. Exp. In Ag (Co-op)	48	54	54	60	59	70	73	71	82
Agricultural Other	45	45	56	64	55	50	58	46	6
Agricultural Literacy	146	156	180	180	175	186	186	186	202
Food Science & Tech	23	23	24	37	28	37	40	30	34
Agricultural Communications								31	56
Biotechnology								2	7
Equine Science								6	11
Veterinary Science								3	20

Number of Students Enrolled

Courses	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	08-09
Agricultural Science I	6989	7415	7160	8304	9659	9903	9990	10891	10636
Agricultural Science II	4287	4110	4158	4491	4790	5069	5506	5787	5528
Agricultural Management/Economics	1178	1016	1030	1078	1068	1161	1201	1186	1101
Animal Science	1727	1718	1744	2508	2257	2343	2492	2452	1928
Crop Science	475	358	437	421	408	352	363	557	312
Agricultural Sales & Marketing	900	991	924	982	947	892	1098	885	756
Agricultural Power I	1124	1143	1069	1102	1119	1040	1083	1089	906
Agricultural Power II	216	178	193	154	145	210	209	148	136
Agricultural Machinery	531	449	511	479	489	620	534	564	462
Agricultural Structures	1390	1453	1440	1748	1862	1875	1917	1709	1836
Agricultural Construction	3105	3536	3278	3845	4117	4402	3872	3936	3795
Floriculture	702	736	792	935	926	871	694	697	736
Greenhouse Operation/Management	2024	2085	2168	2484	2620	2695	2507	2232	2544
Nursery Operation & Management	180	256	245	345	450	272	280	239	287
Turf Management	178	249	199	228	250	242	132	210	181
Landscaping	878	1032	1097	1325	1335	1338	1353	1430	1060
Conservation Natural Resources	1614	1306	1400	1427	1480	1617	1453	1867	1623
Forest Management	315	219	253	213	235	190	197	308	312
Supervised Occup. Exp. In Ag (Co-op)	574	616	381	495	698	612	640	666	1067
Agricultural Other	990	1039	963	831	862	789	1050	916	85
Agricultural Literacy	7146	7665	9834	9850	9611	10798	11452	11452	11245
Food Science & Tech	259	258	280	382	325	432	432	363	511
Agricultural Communications								377	666
Biotechnology								24	57
Equine Science								82	170
Veterinary Science								113	271

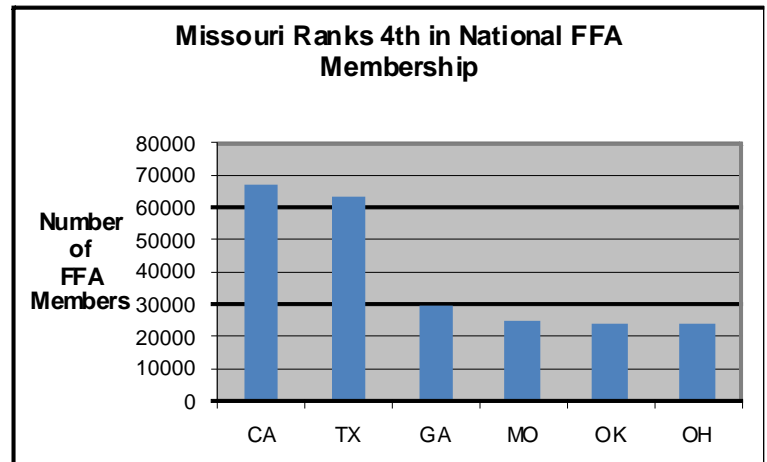
Student Career Interest

All students enrolled in agriculture programs are asked to identify an agricultural interest in one of six Agricultural Career Cluster areas. The following percentages reflect student choices in 2008-09.

	% of Total	With-in Cluster Pathway	
Agricultural Business/Management Systems	16%	Males-44%	Females-56%
Agricultural Mechanics & Technology	29%	Males-92%	Females- 8%
Animal Science Systems	27%	Males-40%	Females-60%
Food Science Systems	6%	Males-43%	Females-57%
Natural Resources/Conservation Systems	13%	Males-75%	Females-25%
Plant Science/Horticultural System	10%	Males-39%	Females-61%

FFA Membership

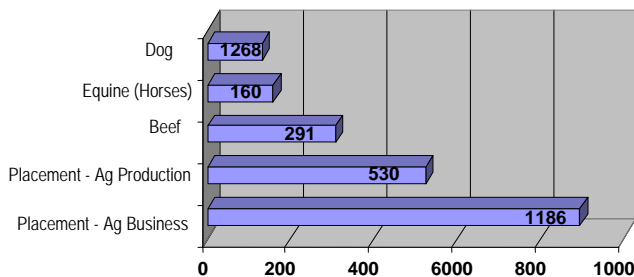
FFA activities are designed to teach leadership and promote personal skill development. Students can become involved at the area, district, state and national levels in various ways. Each agriculture program in Missouri has a chartered FFA chapter. The 2008-09 membership in the Missouri FFA was 24,416.



Supervised Agricultural Experience

Each student is counseled to select courses and Supervised Agricultural Experience Program (SAEP) activities that relate to their agricultural interest.

Top 5-Supervised Agriculture Experience Programs (SAE's) in Missouri



Of the 83% of students who completed SAE programs in 2008, 26% had ownership projects and 74% had placement projects (working for someone in an agribusiness or on a farm). The average SAEP net income per student for 2008 was \$2,570. Statewide, over \$46,758,851 net income was generated through SAE programs.

<u>Year</u>	<u>Avg Net Income Per Student</u>	<u>State-wide Net Income</u>
2008	\$2,570	\$46,758,851
2007	\$2,483	\$45,596,348
2006	\$3,095	\$52,693,189
2005	2,363	43,179,028
2004	3,253	59,780,500
2003	2,385	40,652,420
2002	2,372	39,950,140
2001	2,227	36,256,761

These were the types of projects chosen by students in 2008-09.

Ownership Projects

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Horses	1353	1454	1311	1361	1372	1621	1645	1537	1552	1600
Dogs	684	805	775	918	930	1091	1063	1199	1208	1268
Rabbits	256	280	266	314	315	321	351	612	339	386
Goats	137	141	151	191	193	290	334	401	469	643
Fish	36	51	25	39	39	43	32	51	35	39
Bees	20	19	23	24	24	26	35	18	17	22
Poultry	327	413	409	451	453	568	611	604	647	715
Sheep	375	408	377	425	430	421	407	391	399	420
Swine	732	826	797	804	830	855	848	906	1014	973
Dairy	298	273	241	235	238	238	185	198	209	177
Beef	3176	3446	3153	3033	3066	3077	2982	3086	2972	2916
Agribusiness	796	966	987	847	871	843	827	1043	801	903
Custom Work	337	450	451	389	392	457	317	318	438	320
Vegetables	479	393	320	419	419	503	375	410	439	478
Plants	430	458	413	452	452	593	426	379	425	437
Berries/Grapes	37	27	24	37	37	45	37	50	54	40
Trees/Wood lot	135	119	109	116	116	167	112	92	106	168
Sunflowers	17	17	21	9	9	10	3	3	7	1
Tobacco	21	14	18	17	17	6	5	5	11	28
Forages/Hay	319	290	261	259	260	263	215	224	271	210
Rice	6	4	7	5	6	14	3	3	6	5
Cotton	9	8	4	9	9	8	3	3	7	8
Soybeans	340	336	350	305	318	269	236	212	254	251
Milo	58	59	32	42	45	30	21	19	17	19
Corn	233	232	205	227	229	215	215	179	202	195
Wheat	152	157	111	131	133	116	106	91	109	105

Placement Projects

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agribusiness	8104	8959	9077	10101	10193	10572	10463	8958	9233	11862
Production	4070	4319	4317	4089	4194	4657	4575	5256	5083	5308
Laboratory (usually school site)	1519	1816	1736	1645	1645	1844	1391	1303	1139	1169

Graduate Placement

In 2008, there were 4,432 high school agricultural education graduates. Of this number 93.3 % were placed.

27% are employed

17% in agriculture

10% in other areas

61% are continuing their education

33% in agriculture

28% in other areas

4% are in the military

2% in agriculture related fields

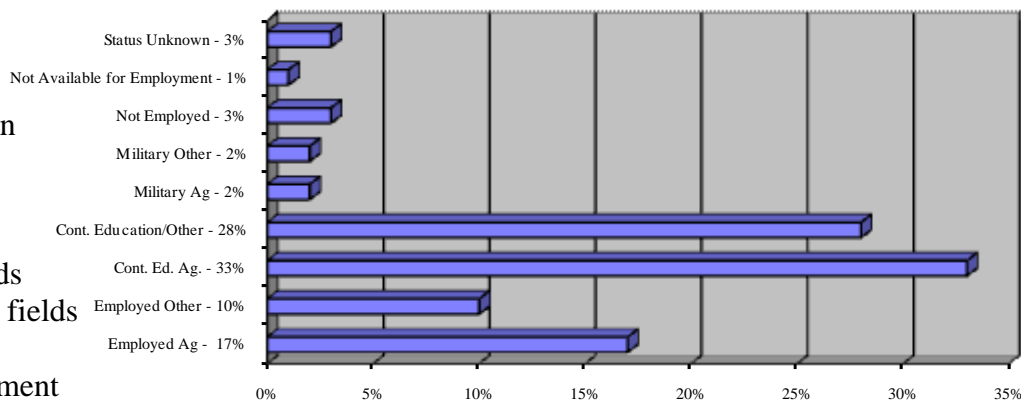
2% in non agriculture related fields

3% are not employed

<1% are not available for employment

>3% could not be found (status unknown)

Of the total, 52% are pursuing agriculture as a career.



Postsecondary Agricultural Education

Eleven community colleges and one state technical college in Missouri staffed with 16 instructors currently offer postsecondary-level training in agriculture. During 2007-2008, these 12 institutions served 1,158 students in 8 career programs:

- ⇒ Agricultural Production/Farm Management
- ⇒ Animal Health Technology
- ⇒ Agricultural Business
- ⇒ Agricultural Equipment
- ⇒ Agricultural Power and Machinery
- ⇒ Horticulture
- ⇒ Landscape, Nursery and Turf Management
- ⇒ Biotechnology

The typical postsecondary student is a high school graduate who wants to train for a middle-management position and/or transfer to a baccalaureate institution. Postsecondary programs provide 64 credit hours of instruction in a two-year program for a full-time student. Programs include supervised occupational experience gained through internships and on-the-job training. Students are employed throughout Missouri and, in some cases, in other states. In most areas, students are paid for their services during the internship and also receive academic credit.

Of the 113 postsecondary/adult (2 year) agriculture graduates in 2008, 88.5% are placed.

81% are employed

75% in agriculture

6% in other areas

6% are continuing their education in agriculture

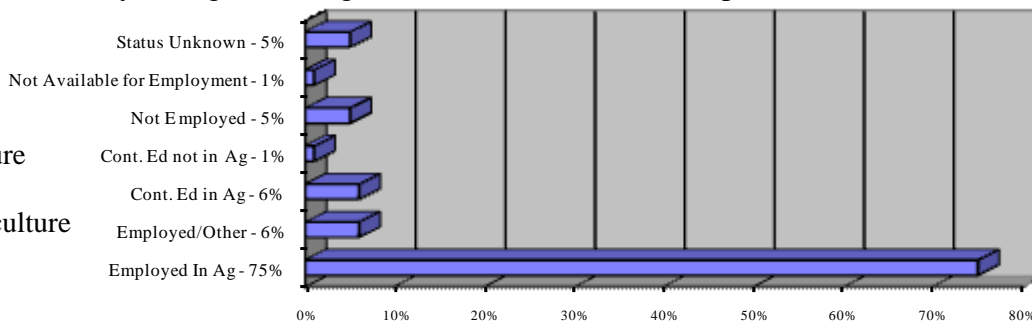
1% are continuing their education not in agriculture

5% are not employed

<1% are not available for employment

5% could not be found (status unknown)

Of the total, 81% are pursuing agriculture as a career.



Leadership development is available through the Missouri and National Postsecondary Agricultural Student Organizations (PAS). The Missouri Postsecondary Agricultural Student Organization (MPASO) was established in 1981. Membership is open to any student enrolled in a postsecondary agriculture program. In Missouri, seven institutions have local PAS organizations. PAS members have the opportunity to participate in the state conference where contests are held, state officers are elected and the state business is conducted.

Adult Agriculture

Adult agriculture classes were organized soon after the Smith-Hughes Act was passed in 1917 and have been recognized as a part of agricultural education ever since. Several types of adult education have been offered through the years in Missouri.

"Topics" classes that highlight one-session meetings have long been, and still are, a viable part of adult education in agriculture. These classes tend to address current problems and issues, update enrollees with new

technologies, and explore subjects of general interest to a fairly diverse audience. Currently, they are the most common type of adult class offered. "Topics" classes typically include 8 to 12 sessions and meet weekly, biweekly or monthly, primarily during the winter months.

"In-depth" classes are becoming a popular way of providing education to adults in agriculture. An "in-depth" class is a series of sessions on the same topic (for example, a two-to-eight session series in horticulture, marketing, forestry or ag mechanics). Because content is specialized, enrollment is sometimes lower. Traditionally, "topic" and "in-depth" classes are offered as a part of local programs, and instructors are paid an hourly rate based on instructional time.

The Farm Business Management Analysis (FBMA) program is a third type of adult education in agriculture. The program involves class work, on-site visitations and record analysis, all designed to improve the management of the farm business and to help farmers achieve their personal, financial and farm business goals.

A significant development in adult leadership training was the formation of the Missouri Young Farmers/Young Farm Wives organization in 1972. This organization involves adults in educational and leadership activities at the local, district, state and national levels. Membership in the organization is open to persons of any age. State activities include a 2-day convention in February, a 2 1/2-day tour in August and participation in the Governor's Conference on Agriculture.

These facts and figures describe the status of adult agricultural education in Missouri:

- ⇒ 3110 adults enrolled in DESE reimbursed agriculture classes in 2008-2009.
- ⇒ 35 schools received DESE reimbursement for adult classes in 2008-2009.
- ⇒ There were 43 active Young Farmers/Young Farm Wives chapters in 2008-2009. State membership totaled 980.
- ⇒ Agriculture instructors in 24 schools had part or all of their time scheduled for adult instruction in 2008-09 and over 184 farm families enrolled in the FBMA program.

Many schools offer adult education in various combinations and formats. The following options are the most common:

Traditional Adult Education Classes Plus Alumni-----	48 schools offered
Alumni Only -----	53 schools offered
Joint Traditional Adult Education & Alumni-----	25 schools offered
Adult Education Offered Cooperatively With Other Groups-----	59 schools offered

The Development of Professional Teachers of Agriculture

Missouri law and the Department of Elementary and Secondary Education's regulations require all teachers and administrators in vocational education programs to be specifically certificated for their teaching assignments.

Missouri has five institutions training agriculture teachers: University of Missouri-Columbia, Northwest Missouri State University at Maryville, University of Central Missouri at Warrensburg and Missouri State University at Springfield and College of the Ozarks, Point Lookout.

Preservice programs alone cannot adequately prepare all teachers in all competencies. Therefore, professional development programs are designed and offered to assist the teachers in meeting their needs and the needs of

their clientele. The program is jointly planned by teachers, teacher educators and state supervisors. A Professional Development Specialist manages the state-wide effort.

Agriculture as a Part of General Education

Agricultural education began in this country as a part of general education. Passage of the Smith-Hughes Act in 1917 promoted the concept of "vocational agriculture" as a separate program. The narrow focus of vocational agriculture was broadened somewhat through the Vocational Education Act of 1963, which encouraged training for non-farm agricultural occupations. Today, however, the basic differences between the "general" and "vocational" approaches remain.

Our society's basic knowledge of agriculture is declining. More and more people in agriculture-related jobs will know less and less about their industry. In addition, a growing number of young people who do not have a background in farming or agriculture are training for agriculture-related occupations. For example, 40-45% of the students now enrolled in the University of Missouri-Columbia's College of Agriculture are non-farm, urban students. Another important issue today is providing a vocational education for adults. Many adults, for example, are interested in studying agriculture--not for career purposes, but to meet a vocational, hobby or secondary-income objectives. Additionally, more public and social interest is being focused on issues related to agriculture, food and the environment. Such trends signal a need for students and citizens in general to be better informed about the importance of agriculture and its relationship to their lives. In other words, our American society needs to be agriculturally literate.

Several projects are now underway in Missouri to develop agricultural literacy by promoting public awareness and understanding of agriculture's role in our economy and society. At the junior high/middle school level an Agricultural Literacy course has been developed, field tested in 1989-90 and offered in 2008-2009 to 11,245 seventh and eighth grade students in 202 schools. As a part of consumer information activities, adult education programs, sponsor a "Speak Out for Agriculture" contest. Other examples of this effort are the "Agriculture in the Classroom" project, supported by Missouri Farm Bureau and the Ag Literacy projects by the Missouri Department of Agriculture and commodity organizations, which introduce young students to concepts about agriculture and food production.

Building public awareness and understanding about issues and trends affecting agriculture in our state and nation is vital to having an informed citizenry.