

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.

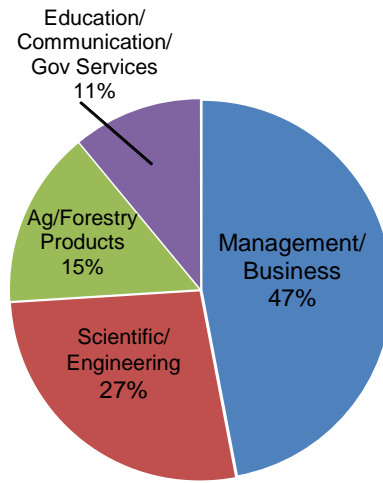
⇒ *A more highly trained and diverse workforce.*

- ◆ 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 27% of agricultural jobs in 2010. (Farm Journal, 2011)
- ⇒ USDA forecast: in 2011 there will be more jobs in agriculture than graduates. (Farm Journal, 2011)
- ⇒ Missouri has 108,000 farms which rank second in the nation. (NASS, USDA, 2008)

FORECAST FOR CAREER OPPORTUNITIES THROUGH 2011
(USDA, 2010)



The Vision and Mission of Agricultural Education

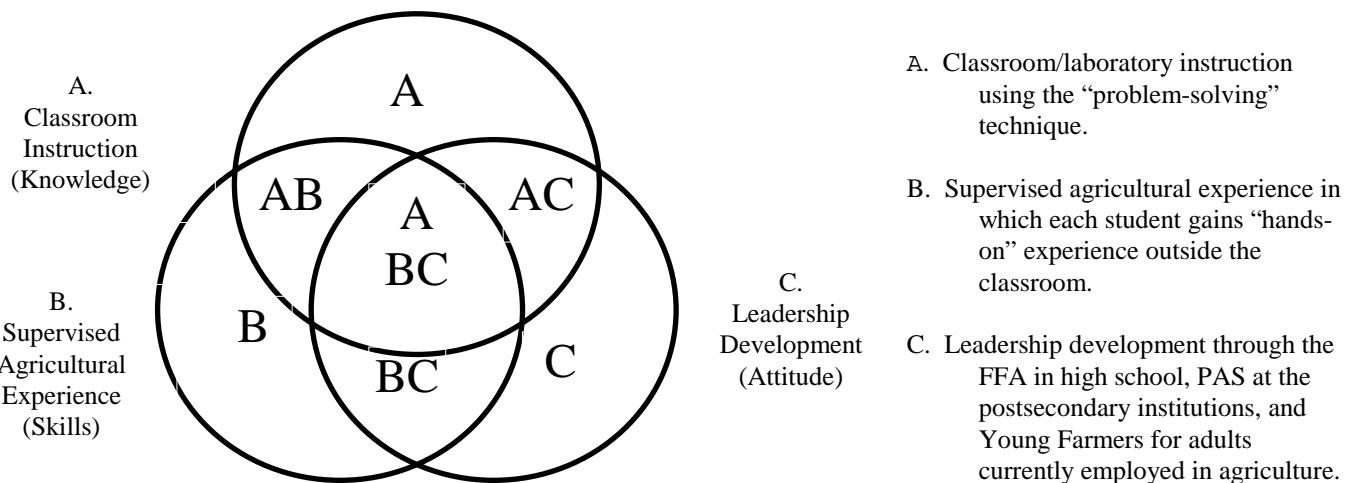
A vision and mission statement for Agricultural Education was developed in 2000 through the Reinventing Agricultural Education for the Year 2020 Task Force; a cooperative effort of practitioners, students, government and industry. The statements have been adopted by the National Council for Agricultural 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>
2010-2011	326	26,813	12,471	2,062	3,295
2009-2010	324	26,455	11,963	1,802	3,178
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

* 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 2011. 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 in Missouri is 26,813 students. Currently, 284 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 2010-2011, 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	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11
Agricultural Science I	291	294	292	302	305	258	288	298	287
Agricultural Science II	263	266	261	272	262	230	271	265	255
Agricultural Management/Economics	101	91	98	99	89	84	93	93	76
Animal Science	156	136	124	137	132	118	138	143	127
Crop Science	34	34	29	32	38	27	40	37	32
Agricultural Sales & Marketing	92	95	82	97	83	72	89	88	71
Agricultural Power I	74	76	69	68	62	67	75	73	63
Agricultural Power II	17	17	21	19	16	14	12	16	13
Agricultural Machinery	38	32	44	38	33	29	40	40	31
Agricultural Structures	133	123	127	129	105	114	116	135	114
Agricultural Construction	287	289	284	282	223	197	225	232	211
Floriculture	72	62	64	61	49	47	56	55	43
Greenhouse Operation/Management	174	170	179	169	142	139	159	161	143
Nursery Operation & Management	25	22	16	18	16	21	17	22	13
Turf Management	15	12	15	9	15	12	13	14	12
Landscaping	94	92	88	97	98	72	86	88	73
Conservation Natural Resources	90	103	102	101	111	97	122	124	104
Forest Management	19	18	17	15	21	22	22	24	20
Supervised Occup. Exp. In Ag (Co-op)	60	59	70	73	71	82	71	100	84
Agricultural Other	64	55	50	58	46	6	7	7	4
Agricultural Literacy	180	175	186	186	186	208			
Food Science & Tech	37	28	37	40	30	34	43	40	41
Agricultural Communications					31	56	52	67	69
Biotechnology					2	7	9	10	7
Equine Science					6	11	11	12	12
Veterinary Science					3	20	12	21	17

Number of Students Enrolled

Courses	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11
Agricultural Science I	8304	9659	9903	9990	10891	10636	10918	11741	10462
Agricultural Science II	4491	4790	5069	5506	5787	5528	6320	6177	5704
Agricultural Management/Economics	1078	1068	1161	1201	1186	1101	1050	1188	745
Animal Science	2508	2257	2343	2492	2452	1928	2544	2313	1753
Crop Science	421	408	352	363	557	312	469	392	511
Agricultural Sales & Marketing	982	947	892	1098	885	756	963	903	682
Agricultural Power I	1102	1119	1040	1083	1089	906	1242	1008	853
Agricultural Power II	154	145	210	209	148	136	133	146	158
Agricultural Machinery	479	489	620	534	564	462	740	615	489
Agricultural Structures	1748	1862	1875	1917	1709	1836	1698	2192	1689
Agricultural Construction	3845	4117	4402	3872	3936	3795	4228	4785	3297
Floriculture	935	926	871	694	697	736	803	860	752
Greenhouse Operation/Management	2484	2620	2695	2507	2232	2544	2671	2709	2379
Nursery Operation & Management	345	450	272	280	239	287	308	288	171
Turf Management	228	250	242	132	210	181	160	190	150
Landscaping	1325	1335	1338	1353	1430	1060	1416	1329	908
Conservation Natural Resources	1427	1480	1617	1453	1867	1623	2088	1929	1705
Forest Management	213	235	190	197	308	312	313	333	299
Supervised Occup. Exp. In Ag (Co-op)	495	698	612	640	666	1067	755	1280	852
Agricultural Other	831	862	789	1050	916	85	58	119	35
Agricultural Literacy	9850	9611	10798	11452	11452	12471			
Food Science & Tech	382	325	432	432	363	511	469	619	535
Agricultural Communications					377	666	596	711	658
Biotechnology					24	57	99	162	88
Equine Science					82	170	179	185	165
Veterinary Science					113	271	164	277	272

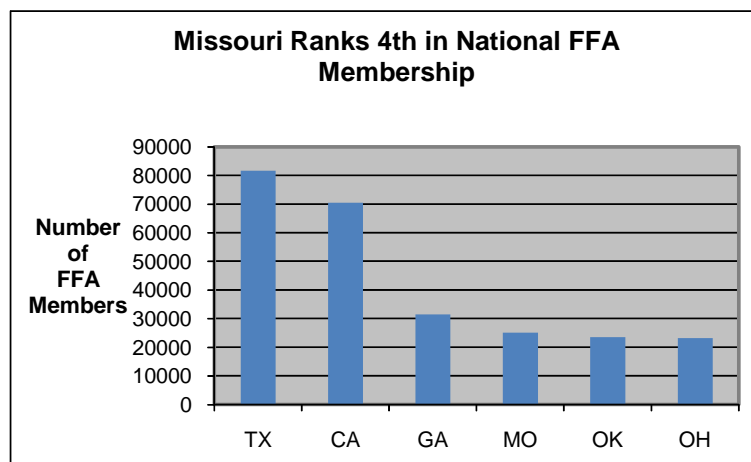
Student Career Interest

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 2010-11.

	% of Total	With-in Cluster Pathway	
Agricultural Business/Management Systems	15%	Males-52%	Females-48%
Agricultural Mechanics & Technology	28%	Males-92%	Females- 8%
Animal Science Systems	29%	Males-36%	Females-64%
Food Science Systems	6%	Males-43%	Females-57%
Natural Resources/Conservation Systems	13%	Males-75%	Females-25%
Plant Science/Horticultural System	9%	Males-39%	Females-61%

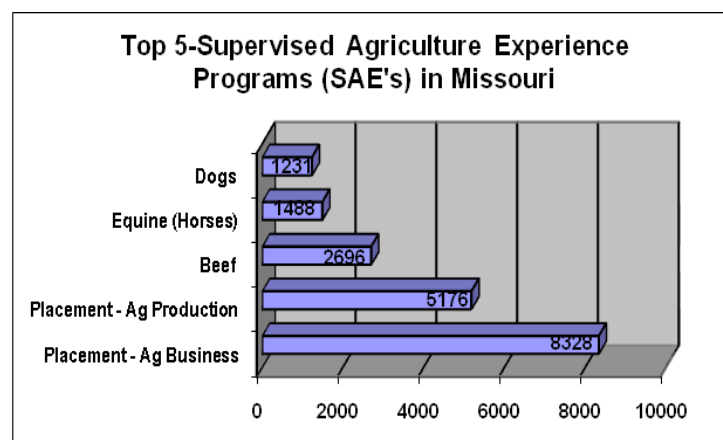
FFA Membership

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 2010-11 membership in the Missouri FFA was 25,077.



Supervised Agricultural Experience

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



Of the 83% of students who completed SAE programs in 2010, 37% had ownership projects and 63% had placement projects (working for someone in an agribusiness or on a farm). The average SAE net income per student for 2010 was \$2,275. Statewide, over \$38,655,177 net income was generated through SAE programs.

<u>Year</u>	<u>Avg Net Income Per Student</u>	<u>State-wide Net Income</u>
2010	\$2,275	\$38,655,177
2009	\$2,287	\$42,067,470
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



These were the types of projects chosen by students in 2010-11.

Ownership Projects

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Horses	1311	1361	1372	1621	1645	1537	1552	1600	1497	1488
Dogs	775	918	930	1091	1063	1199	1208	1268	1166	1231
Rabbits	266	314	315	321	351	612	339	386	346	378
Goats	151	191	193	290	334	401	469	643	499	505
Fish	25	39	39	43	32	51	35	39	50	47
Bees	23	24	24	26	35	18	17	22	25	33
Poultry	409	451	453	568	611	604	647	715	701	796
Sheep	377	425	430	421	407	391	399	420	372	352
Swine	797	804	830	855	848	906	1014	973	844	878
Dairy	241	235	238	238	185	198	209	177	244	182
Beef	3153	3033	3066	3077	2982	3086	2972	2916	2713	2696
Agribusiness	987	847	871	843	827	1043	801	903	942	1172
Custom Work	451	389	392	457	317	318	438	320	376	445
Vegetables	320	419	419	503	375	410	439	478	315	425
Plants	413	452	452	593	426	379	425	437	449	318
Berries/Grapes	24	37	37	45	37	50	54	40	49	39
Trees/Wood lot	109	116	116	167	112	92	106	168	136	135
Sunflowers	21	9	9	10	3	3	7	1	2	4
Tobacco	18	17	17	6	5	5	11	28	6	2
Forages/Hay	261	259	260	263	215	224	271	210	216	207
Rice	7	5	6	14	3	3	6	5	4	3
Cotton	4	9	9	8	3	3	7	8	6	6
Soybeans	350	305	318	269	236	212	254	251	233	252
Milo	32	42	45	30	21	19	17	19	12	6
Corn	205	227	229	215	215	179	202	195	209	247
Wheat	111	131	133	116	106	91	109	105	91	64

Placement Projects

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agribusiness	9077	10101	10193	10572	10463	8958	9233	11862	9021	8131
Production	4317	4089	4194	4657	4575	5256	5083	5308	5136	5011
Laboratory (usually school site)	1736	1645	1645	1844	1391	1303	1139	1169	1117	1120

Graduate Placement

In 2009, there were 4,684 high school agricultural education graduates. Of this number 93.8 % were placed.

24% are employed

15% in agriculture

9% in other areas

65% are continuing their education

37% in agriculture

28% in other areas

4% are in the military

2% in agriculture related fields

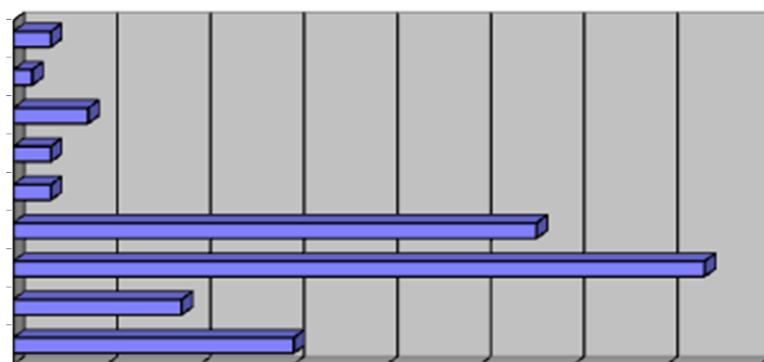
2% in non agriculture related fields

4% are not employed

<1% are not available for employment

>2% could not be found (status unknown)

Of the total, 54% are pursuing agriculture as a career.



Postsecondary Agricultural Education

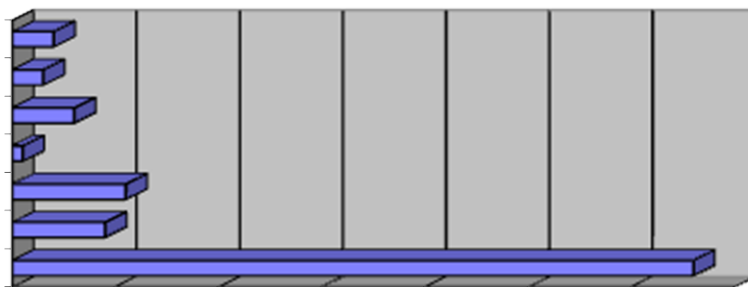
Eleven community colleges and one state technical college in Missouri staffed with 16 instructors currently offer postsecondary-level training in agriculture. During 2009-2010, these 12 institutions served 2,062 students in 8 career programs:

- ⇒ 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 137 postsecondary/adult (2 year) agriculture graduates in 2009, 89.6% are placed.

- 75% are employed
 - 66% in agriculture
 - 9% in other areas
- 11% are continuing their education in agriculture
- <1% are continuing their education not in agriculture
- 6% are not employed
- 3% are not available for employment
- 4% could not be found (status unknown)



Of the total, 77% 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:

- ⇒ 3295 adults enrolled in DESE reimbursed agriculture classes in 2009-2010.
- ⇒ 44 schools received DESE reimbursement for adult classes in 2009-2010.
- ⇒ There were 34 active Young Farmers/Young Farm Wives chapters in 2009-2010. State membership totaled 821.
- ⇒ Agriculture instructors in 24 schools had part or all of their time scheduled for adult instruction in 2009-10 and over 149 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.

In 2011, Missouri had 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 2010-2011 to 12,471 seventh and eighth grade students in 208 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.