

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.

About Agricultural Education

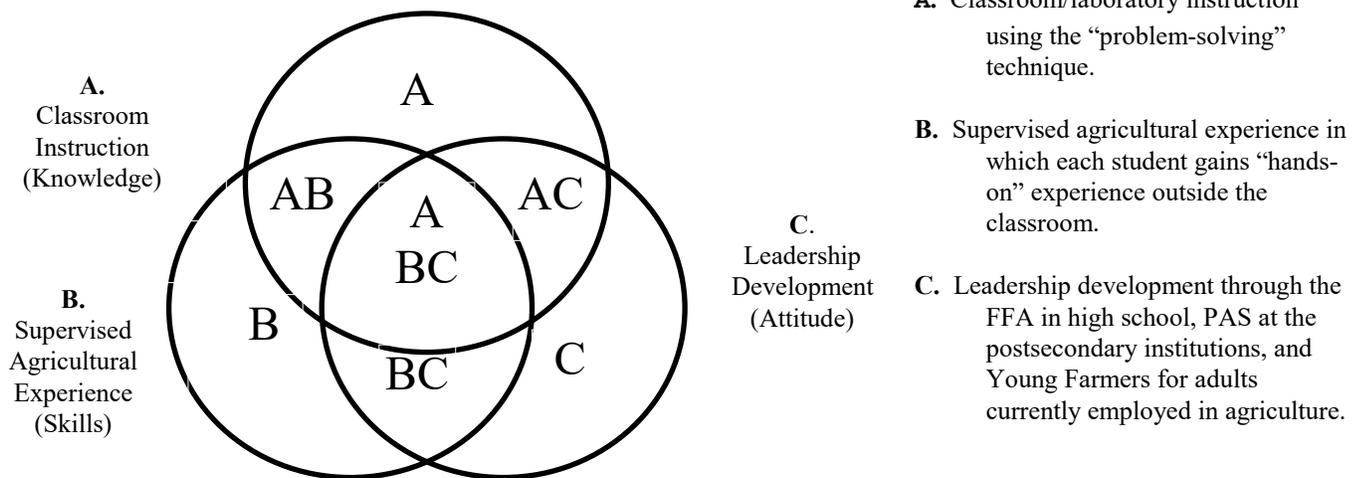
Agricultural education is a systematic program of instruction available to students desiring to learn about the science, business, and technology of plant and animal production and/or about the environmental and natural resources systems. Agricultural education first became a part of the public education system in 1917 when the U.S. Congress passed the Smith-Hughes Act. Today, over 900,000 students participate in formal agricultural education instructional programs offered in grades seven-adult throughout the 50 states and three U.S. territories.

***Ag Ed Vision:** Agricultural education envisions a world where all people value and understand the vital role of agriculture and natural resources in advancing personal and global well-being.*

***Ag Ed Mission:** Agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources 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 1985-86.

Total Student Enrollment

<u>Year</u>	<u>No. of Programs</u>	<u>Secondary</u>	<u>Junior High</u>	<u>Postsecondary</u>	<u>Adult**</u>
2019-2020	348		13,340		
2018-2019	347	36,685	13,375	2,881	3,650
2017-2018	344	36,516	13,289	2,163	3,357
2016-2017	342	36,114	11,359	2,222	3,174
2015-2016	340	37,165	12,874	1,918	3,371
2014-2015	334	33,455	13,167	2,187	3,288
2013-2014	331	27,701	12,125	2,439	2,465
2012-2013	327	26,724	12,274	2,521	2,026
2011-2012	326	26,564	12,471	1,890	1,288
2010-2011	324	26,813	11,963	1,909	1,537
2009-2010	316	26,455	11,245	3,295	1,802
2008-2009	311	26,473	10,732	1,008	3,037
2007-2008	305	26,254	10,429	1,158	3,110
2006-2007	302	25,452	11,452	779	3,585
2005-2006	301	25,180	10,798	317	2,841
2004-2005	294	25,162	9,611	2,246	4,264
2003-2004	291	23,827	9,850	797	2,630
2002-2003	286	22,953	9,835	2,756	2,637
2001-2002	284	21,800	9,850	3,102	2,373
2000-2001	277	21,174	7,665	661	2,308
1999-2000	266	21,196	7,146	702	3,181
1998-1999	266	20,616	7,620	842	3,068
1997-1998	263	20,294	7,678	672	2,906
1996-1997	258	20,169	6,717	672	3,340
1995-1996	253	19,048	5,571	653	2,594
1994-1995	249	18,205	4,545	681	3,076
1993-1994	247	17,441	4,428	680	2,704
1992-1993	245	16,652	4,071	602	3,007
1991-1992	245	15,132	2,950	477	3,650
1990-1991	244	13,920		405	4,190
1989-1990	243	13,993		371	3,803
1988-1989	244	13,705		471	3,721
1987-1988	244	13,555		408	3,852
1986-1987	245	13,443		517	5,743
1985-1986	245	12,865		649	6,243
1984-1985		13,325		613	5,224

* Data from 14 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 2012. 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.

Non duplicated enrollment in high school agriculture in Missouri is 27,668 students. Currently, 306 comprehensive high schools and 43 area vocational schools offer agriculture. Of the students enrolled, over 42% are female. There are 496 agriculture teachers in secondary schools. In 2018-2019, the program was offered in 74% of Missouri's public school districts maintaining high schools, and approximately 10% 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	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19
Agricultural Science I	287	306	313	310	311	305	310	308	307
Agricultural Science II	255	268	275	277	280	283	275	268	268
Agricultural Management/Economics	76	81	66	80	60	66	61	59	57
Animal Science	127	141	158	157	153	176	169	172	179
Crop Science	32	33	33	38	45	41	34	47	43
Agricultural Sales & Marketing	71	81	83	88	83	86	83	62	67
Agricultural Power I	63	67	75	74	66	79	73	67	68
Agricultural Power II	13	14	15	18	14	14	20	17	15
Agricultural Machinery	31	31	32	38	30	32	35	39	35
Agricultural Structures	114	125	122	133	131	132	136	131	123
Agricultural Construction	211	226	227	218	223	220	222	218	229
Floriculture	43	46	49	55	45	41	44	46	52
Greenhouse Operation/Management	143	160	174	174	183	175	177	178	175
Nursery Operation & Management	13	12	26	21	12	20	20	20	20
Turf Management	12	11	15	8	8	10	5	7	7
Landscaping	73	78	70	65	78	64	65	77	67
Conservation Natural Resources	104	116	118	114	103	112	102	105	102
Forest Management	20	23	24	26	28	20	19	19	18
Supervised Occup. Exp. In Ag (Co-op)	84	90	81	73	81	73	81	115	115
Agricultural Other	4	1	0	0	0	0	0	0	0
Agricultural Literacy									
Food Science & Tech	41	46	56	54	56	57	51	63	60
Agricultural Communications	69	77	94	89	87	96	108	108	99
Biotechnology	7	8	10	7	6	6	8	7	5
Equine Science	12	12	10	8	11	10	9	12	9
Veterinary Science	17	16	22	32	33	34	33	43	46

Number of Students Enrolled

Courses	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19
Agricultural Science I	10588	9437	9774	9818	9557	9927	9583	9702	9773
Agricultural Science II	5689	5436	5212	5357	5424	5673	5150	4961	4976
Agricultural Management/Economics	833	619	660	591	718	717	648	637	632
Animal Science	1883	1770	1945	1925	2064	2406	2390	2342	2347
Crop Science	480	452	405	607	491	644	430	548	546
Agricultural Sales & Marketing	701	676	684	680	702	855	837	932	616
Agricultural Power I	877	925	880	852	943	1121	958	921	810
Agricultural Power II	171	172	150	142	177	149	212	151	158
Agricultural Machinery	512	493	595	498	575	583	582	548	611
Agricultural Structures	1683	1537	1447	1605	1645	1582	1641	1535	1579
Agricultural Construction	3232	2564	2716	2761	2793	3405	3249	3193	3109
Floriculture	718	539	597	560	794	648	611	762	778
Greenhouse Operation/Management	2205	2311	2198	2379	2069	2529	2620	2397	2439
Nursery Operation & Management	141	160	276	236	260	198	260	142	221
Turf Management	124	174	157	147	55	128	73	119	76
Landscaping	883	748	648	703	685	773	783	808	919
Conservation Natural Resources	1459	1595	1389	1291	1319	1487	1428	1479	1461
Forest Management	285	258	297	316	276	275	256	269	229
Supervised Occup. Exp. In Ag (Co-op)	643	426	458	507	395	527	622	639	575
Agricultural Other	35								0
Agricultural Literacy									
Food Science & Tech	571	576	623	614	579	687	645	778	728
Agricultural Communications	604	715	734	748	789	924	955	837	1001
Biotechnology	88	132	156	154	111	118	96	85	125
Equine Science	151	178	128	189	111	168	146	140	199
Veterinary Science	177	347	308	432	436	441	431	667	583

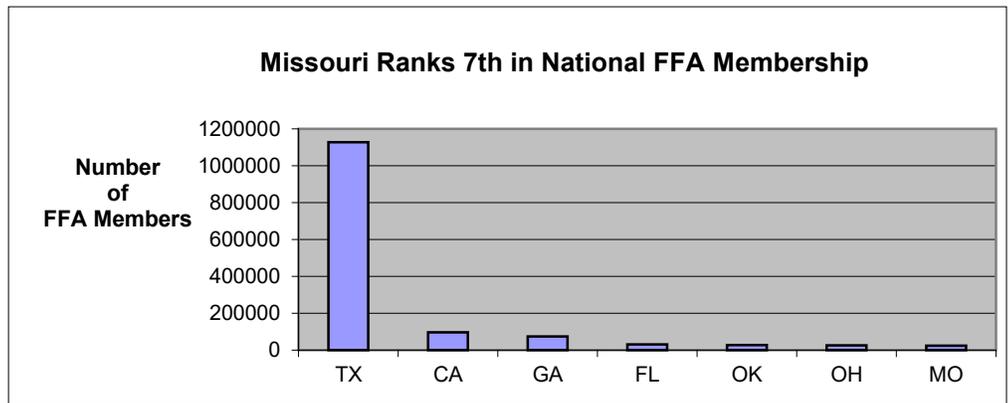
Student Career Interest

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 2017-18.

	% of Total	With-in Cluster Pathway	
Agricultural Business/Management Systems	15%	Males-51%	Females-49%
Agricultural Mechanics & Technology	29%	Males-88%	Females-12%
Animal Science Systems	27%	Males-35%	Females-65%
Food Science Systems	8%	Males-45%	Females-55%
Natural Resources/Conservation Systems	11%	Males-69%	Females-31%
Plant Science/Horticultural System	10%	Males-41%	Females-59%

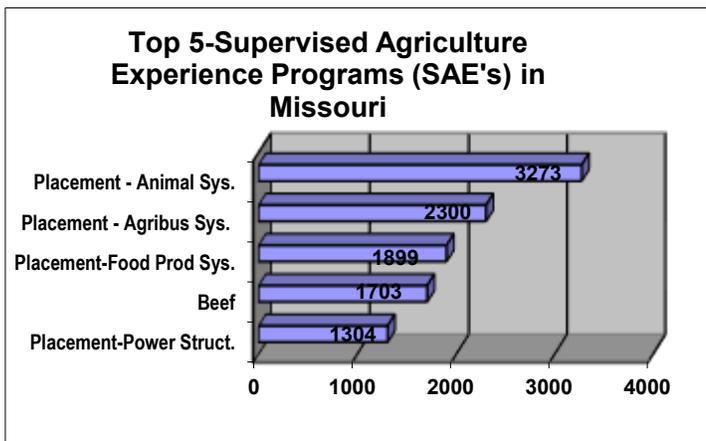
FFA Membership

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 2019-2020 membership in the Missouri FFA was 24,975.



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 80% of students who completed SAE programs in 2020, 33.4% had ownership projects and 65.6% had placement projects (working for someone in an agribusiness or on a farm). The average SAEP net income per student for 2020 was \$2,843. Statewide, over \$32,819,031 net income was generated through SAE programs.

Year	Avg. Net Income Per Student	State-wide Net Income
2020	\$2,843	\$32,819,031
2019	\$2,755	\$48,943,868
2018	\$2,990	\$50,586,030
2017	\$2,786	\$52,529,788
2016	\$2,716	\$46,414,747
2015	\$2,672	\$44,633,669
2014	\$2,756	\$47,824,750
2013	\$2,443	\$45,093,218
2012	\$2,430	\$44,217,043

These were the types of projects chosen students in 2019-20.

Ownership Projects

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Horses	1488	1457	1570	1439	1152	1139	1125	1077	996	606
Dogs	1231	1200	1345	1231	995	954	991	989	1037	620
Rabbits	378	392	448	446	444	446	431	417	378	204
Goats	505	544	571	528	518	516	481	487	516	300
Fish	47	35	37	36	17	20	23	15	20	19
Bees	33	22	31	42	60	56	76	1194	84	55
Poultry	796	883	979	1002	993	1055	1154	1064	1099	683
Sheep	352	340	390	365	351	332	349	374	321	216
Swine	878	876	903	822	963	917	961	914	880	595
Dairy	182	184	189	145	134	129	135	93	114	68
Beef	2696	2786	2904	2647	2407	2359	2405	2845	2325	1703
Agribusiness	1172	1040	1067	1126	1118	1791	1157	746	1127	630
Custom Work – Other	445	566	495	427	450	56	55	11	12	3
Vegetables	425	401	425	415	422	325	280	343	433	152
Plants	318	249	431	343	274	235	226	237	313	73
Berries/Grapes	39	38	44	45	56	39	38	24	26	18
Trees/Wood lot	135	120	133	133	139	125	130	154	189	108
Sunflowers	4	2	4	4	10	8	5	2	4	2
Tobacco	2	1	0	3	2	1	1	1	0	1
Forages/Hay	207	171	244	237	186	189	156	154	173	105
Rice	3	4	5	2	1	1	3	3	4	4
Cotton	6	7	7	7	6	5	1	5	4	2
Soybeans	252	245	302	282	221	299	186	197	377	116
Milo	6	7	9	8	15	9	8	7	18	2
Corn	247	189	233	213	190	158	171	157	182	98
Wheat	64	69	109	82	73	61	59	54	55	23
Hams						303	355	318	363	282
Small Grain						10	9	4	9	8
Pasture						309	305	288	328	196
Tree Nuts						14	11	19	23	1

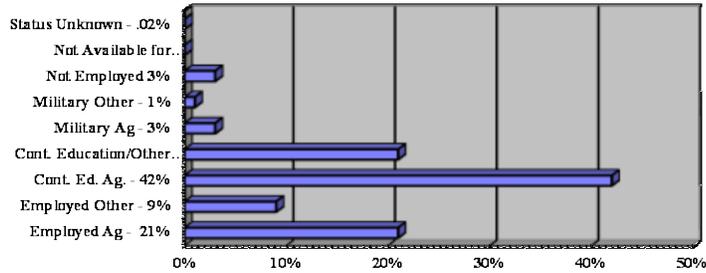
Placement Projects

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Agribusiness Sys	8131	8806	8264	7874	7707	4004	3671	3719	3619	2300
Food Prod/Proc Sys	5011	5796	5746	5470	5557	2417	3455	2983	3002	1899
Directed Lab unpaid	1120	1293	1330	1502	1535	692	472	619	702	395
Animal Systems						3325	3407	3068	3053	3273
Biotech Systems						38	29	93	94	42
Enviro Science Sys						289	356	285	378	217
Natural Res Sys						581	1051	617	561	424
Plant Systems						1553	1603	1397	1727	1100
Power Struct/Tech Sys						1401	1624	1710	2585	1304
Agriscience unpaid						768	248	188	286	225
Exploratory unpaid						1121	653	506	685	397
Analytical unpaid						707	527	87	21	57

Graduate Placement

In 2018, there were 5,660 high school agricultural education graduates. Of this number 96.1% were placed.

- 30% are employed
 - 21% in agriculture
 - 9% in other areas
 - 63% are continuing their education
 - 42% in agriculture
 - 21% in other areas
 - 4% are in the military
 - 3% in agriculture related fields
 - 1% in non agriculture related fields
 - 3% are not employed
 - <1% are not available for employment
 - <2% could not be found (status unknown)
- Of the total, 66% are pursuing agriculture as a career.



Postsecondary Agricultural Education

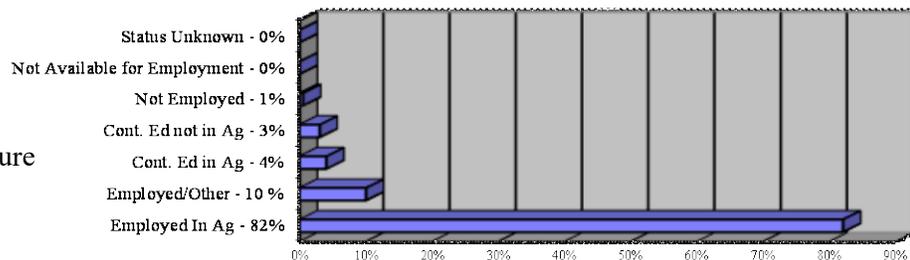
Thirteen community colleges and one state technical college in Missouri staffed with 16 instructors currently offer postsecondary-level training in agriculture. During 2018-2019, these 14 institutions served 2,881 students in 8 career programs:

- ⇒ 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 108 postsecondary/adult (2 year) agriculture graduates in 2018, 98.1% are placed.

- 92% are employed
 - 82% in agriculture
 - 10% in other areas
- 4% are continuing their education in agriculture
- 3% are continuing their education not in agriculture
- 1% are not employed
- <1% are not available for employment
- 0% could not be found (status unknown)



Of the total, 86% 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:

- ⇒ 3,650 adults enrolled in DESE reimbursed agriculture classes in 2018-2019.
- ⇒ 24 schools received DESE reimbursement for adult classes in 2019-2020.
- ⇒ There were 24 active Young Farmers/Young Farm Wives chapters in 2019-2020. State membership totaled 331.
- ⇒ Agriculture instructors in 39 schools had part or all of their time scheduled for adult instruction in 2019-20 and over 175 farm families enrolled in the FBMA program.

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 2019, Missouri had seven institutions training agriculture teachers: University of Missouri-Columbia, Northwest Missouri State University at Maryville, Southeast Missouri State University at Cape Girardeau, Missouri State University at Springfield, College of the Ozarks, Point Lookout and University of Central Missouri at Warrensburg.

Pre-service 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, Agricultural Literacy courses were offered in 2018-2019 to 14,193 seventh and eighth grade students in 234 schools. 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.