THE CONTENTS, PROBLEMS, AND POSSIBILITY OF TEACHING GENERAL AGRICULTURE THROUGH THE SCHOOL SYSTEMS IN KOREA

Seung Il Na[1], Chyul Young Jyung[2]

[1]Assistant Professor/Chair
[2]Associate Professor
Department of Agricultural and Vocational Education
College of Agriculture and Life Sciences
Seoul National University
103 Seodundong, Kwonsungu
Suwon 441-744, Korea
Phone: 82-31-290-2521 Fax: 82-292-5610
E-mail: silna@snu.ac.kr

Abstract

Agricultural literacy has become an issue in Korea. The purpose of this study was to explore the contents, problems, and possibility of teaching general agriculture through the public school systems in Korea. The survey included all teachers in the elementary, middle, high schools in September 1999. Seven hundred sixty five teachers responded and the response rate was 73.6%.

This study showed the low possibility of teaching general agriculture through the school systems in the future because there were more female teachers and younger teachers in schools. The first reason for teaching agriculture by teachers was to increase students' literacy on the subject matter. However, there were few sequences between grades and subjects. The contents of general agriculture for elementary, middle, and high school students were not enough for informing the society. If general agriculture is instructed to enhance student's agricultural caliber, it should be organized and integrated systematically into the curriculum according to the level of school systems.

Introduction

Throughout the history of South Korea, agriculture has contributed enormously to the country's economic development. However, South Korean citizens' perception of agriculture is relatively negative because of low farmer income, the hard labor associated with farming, and the busy living style of farmers. In addition, because it has become increasingly difficult to teach students the importance of agriculture, food, fiber and natural resources through the public school systems, agricultural literacy has become an issue.

As many studies has indicated the importance of agricultural literacy in diverse aspects, agriculturally literate citizenry is vital to the development of well thought policies covering critical issues affecting the food and fiber system, and a potential supply of high school and college graduate who are prepared to enter the labor force in the food and fiber system (Law & Pepple, 1990). Therefore, education about agriculture should not only be provided for all students from kindergarten to high school, but also be an integral part of education in all schools and instructed by incorporating into existing courses systematically (The National Research Council, 1988; Caulder, 1991; Frick, 1993; Birkenholz, Harris, & Pry, 1994; Frick, Birkenholz, & Gardner, 1995; Chung, 1997). Knobloch and Martin (1997) insisted that agriculture could be integrated into nearly every subject that is taught in schools.

In South Korea, general agriculture was taught either through the integrated subjects or independent subjects, keeping curriculum organization systematically from elementary to high school (Song et al., 1988; Ministry of Education, 1997). The agriculture course is defined as the Practical Arts in elementary schools, the Technology and Industry in middle schools, and simply agriculture in general high schools. Only 7.6% of general high school students took agriculture courses as an elective course in 1995(Ministry of Education, 1996). The technology and industry course, which was created by integrating vocational courses such as agriculture and the technology in the middle schools in 1992, was again integrated into the technology and home economics with the home economics (Ministry of Education, 1997). With these changes, general agriculture education lacked interrelationship among grades (Na, 1998). Deserving special mention is the middle school curricula that lacked important parts of the General Agriculture so much that future problems are indeed inevitable (Na, 1999). Also, teachers who lack agricultural knowledge may be reluctant to teach or incorporate agriculture into their classes (Harris & Birkenholz, 1996). Therefore, the central idea of this study was to survey the contents of agriculture courses in the public school systems and educational backgrounds of their agriculture teachers.

Purpose and Objectives

The purpose of this study was to explore the contents, problems and possibility of teaching general agriculture through the public school systems in South Korea. The specific objectives of the study were 1) to describe the characteristics of teachers in this study, 2) to assess the level of knowledge and perceptions of agriculture teachers, 3) to analyze the contents of general agriculture taught in their classes, and 4) to compare the contents of teaching general agriculture and other school subjects.

Methodology

The survey included all teachers in the elementary, middle, and high schools in September 1999. A sample of 1,040 teachers with 120 schools was selected randomly from the population. The questionnaire for data collection was developed based on a review of literature on agricultural literacy and education. The questionnaire included what teachers taught in their classes, their knowledge of agriculture as well as their backgrounds. A panel of experts in Korean agricultural education established content and face validity of the questionnaire. The Cronbach's a for teacher's knowledge of agriculture was .92. Seven hundred sixty five teachers responded and the response rate was 73.6%. Data analysis was done using the SPSS/PC+ personal computer program and appropriate descriptive statistics.

Results and Conclusions

Characteristics of the Teachers

The number of respondents was 765. Two hundred eighty one elementary school teachers, 420 middle school teachers, and 63 high school teachers responded. About 58% of the teachers were female, and about 34% were from rural schools. The average number of years in teaching was 14.3, and the average age was 39.4 years old.

Studying and Working Experience in Agriculture

About 22% had studied agriculture at an educational institution while about 73% knew agriculture through work experience. About 15% of the middle school teachers had studied agriculture at an educational institution.

Teacher's Knowledge Level and Perceptions of Agriculture

Table 1 shows teachers' knowledge level of agriculture as was perceived by them. Responses were elicited on a five-point scale of the extent to which different areas of agriculture were true in their personal agricultural knowledge. Of the 10 areas, teachers perceived that their level of knowledge level on the Natural Resources and Environment and the Living and Agriculture was higher than average, while the other areas were lower. From these statistics, it can be concluded that most teachers may have lack of knowledge and face a serious problem in teaching agriculture.

Table 1. Teachers' Knowledge Level of Agriculture

Area	Elementary School		Middle School		High School		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Introduction to Agriculture	3.23	0.86	2.75	0.92	2.79	0.98	2.93	0.93
Living and Agriculture	3.42	0.82	2.82	0.87	2.77	0.82	3.04	0.89
Natural Resources and Environment	3.47	0.79	3.20	0.91	3.05	0.86	3.29	0.87
Animal Production	2.70	0.94	2.10	0.83	2.11	0.89	2.32	0.92
Plant Production	2.95	0.93	2.29	0.89	2.31	0.93	2.54	0.96
Agricultural Technology and Science	2.85	0.82	2.34	0.86	2.40	0.80	2.53	0.87
Processing of Agricultural Products	2.68	0.81	2.19	0.85	2.15	0.87	2.37	0.87
Marketing of Agricultural Products	2.92	0.86	2.30	0.87	2.31	0.78	2.53	0.91
Public Policies	2.6	0.91	2.22	0.91	2.19	0.81	2.36	0.92
Careers in Agriculture	2.63	0.86	2.17	0.86	2.15	0.83	2.34	0.88
Mean	**2.95**	**0.86**	**2.44**	**0.88**	**2.42**	**0.86**	**2.63**	**0.90**

Scale: 1=very low, 2=low, 3=average, 4=high, 5=very high

Teachers in this study perceived that agriculture is very important (6.4), has values (6.0), and has a future (3.9) for the country (Table 2). They viewed agriculture in a very positive light.

Table 2. Teachers' Perceptions of Agriculture

Perceptions	Elementary School		Middle School		High School		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Importance	6.44	1.19	6.44	1.03	6.21	1.22	6.40	1.33
Profitability	3.87	1.93	3.61	1.83	3.66	1.79	3.68	2.16
Social Recognition	3.60	1.62	3.32	1.48	3.45	1.62	3.40	1.91
Values	5.98	1.35	5.99	1.16	6.03	1.12	5.99	1.50
Future	3.90	1.87	3.93	1.81	4.00	1.76	3.97	2.15

Scale: 1(very negative) - 7(very positive)

Reasons of Teaching General Agriculture by Teachers

As Table 3 shows, the first reason of teachers taught agriculture was to equip students with common sense knowledge about agriculture, while the second reason was that the subject was included in the textbook (or curriculum). Because of these reasons, most teachers didn't think that they were obligated to teach general agriculture thoroughly because of lack of interest, and their students' interest, in the subject.

Table 3. Major Reasons of Teaching General Agriculture in Classes

`Teacher	Major Reasons				
	In the textbook	Commonsense	Students' Interest	Teacher's Interest	Community Needs
Elementary School	100 (35.2)	163 (57.3)	46 (16.1)	35 (12.3)	30 (10.5)
Middle School	129 (31.8)	183 (45.1)	32 (7.90)	45 (11.1)	35 (8.64)
High School	14 (22.2)	27 (42.8)	2 (3.2)	3 (4.76)	4 (6.34)

The first reason given by respondents in the three school levels not to teach general agriculture was because of shortage of time, while the second reason was the lack of knowledge. The third reason was the lack of instructional materials. These three reasons were followed by lack of interest and inappropriateness. In-service training may be necessary to prepare teachers who are willing to integrate instruction about agriculture in their classes, and various instructional materials may be provided for them.

Sources of Agricultural Information for Teachers

The first source of information of agriculture was magazine/newspaper, while the other sources were the instructional materials, T.V., professional books, and the Internet. However, for elementary school teachers, the first source of agricultural information was the instructional material (Table 4).

Table 4. Sources of Agricultural Information for Teachers

Teacher	Sources of Agricultural Information				
	Instructional Material	Professional Books	Magazine/ Newspaper	TV	Internet
Elementary School	184 (64.7)	30 (10.5)	157 (55.2)	133 (46.8)	4 (1.40)
Middle School	163 (40.2)	42 (10.3)	260 (64.1)	199 (49.1)	55 (13.5)
High School	24 (38.0)	9 (14.2)	36 (57.1)	19 (30.1)	12 (19.0)
Total	**371 (49.3)**	**81 (10.7)**	**453 (60.2)**	**351 (46.6)**	**71 (9.44)**

Instructional Materials for Teaching General Agriculture

As summarized in Table 5, the most frequently used material/media was the blackboard and the others were scrapbook, picture, and video.

Table 5. Instructional Materials Used by Teachers in Classes

Teacher	Instructional Materials						
	Blackboard	Slide	OHP	Video	CD, CAI	Scrapbook	Picture
Elementary Teacher	110 (38.7)	15 (5.3)	41 (14.4)	162 (57.0)	44 (15.5)	123 (43.3)	147 (51.8)
Middle School Teacher	199 (49.1)	16 (4.0)	54 (13.3)	62 (15.3)	45 (11.1)	151 (37.3)	95 (23.5)
High School Teacher	36 (57.1)	1 (1.6)	8 (12.7)	11 (17.5)	5 (7.9)	19 (30.2)	8 (12.7)
Total	345(45.9)	32 (4.3)	103 (13.7)	235 (31.3)	94 (12.5)	293 (39.0)	250 (33.2)

Note: Teachers could respond to multiple choices.

The Contents of General Agriculture Taught in Classes

The results of the survey about the contents of general agriculture taught by teachers are summarized in the Table 6.

Table 6. A Summary of the Contents of General Agriculture Taught by the Teachers in Korea

Area	Contents of General Agriculture	Grade 1-2 Teachers	Grade 3-6 Teachers	Grade 7-9 Teachers	Grade 10-12 Teachers
Introduction to Agriculture	Definition of Agriculture	24.7	17.5	38.4	29.8
	Importance of Agriculture	17.6	13.0	49.8	50.4
	Classification and Areas of Agriculture	17.9	13.6	31.0	27.9
	Development of Agriculture	11.9	11.6	17.0	30.9
	Present Situation and Vision of Agriculture	10.3	10.5	26.1	38.9
	Relation to other industries	14.2	12.5	43.8	42.6
	Population Growth and Food Production	11.9	13.7	66.2	60.2
	Introduction to International Agriculture	6.5	10.8	26.6	25.0
Living and Agriculture	Health and Food Safety	19.3	13.7	63.5	54.6
	Agriculture and Recreation	9.7	12.3	15.9	21.6
	Instruction to Rural Living	19.9	13.5	47.7	50.2
	Gardening	12.8	12.1	13.7	17.8

	Interior Designing with Plants	15.0	13.1	15.6	20.6
	Consumption of Agricultural Products	15.0	13.0	34.7	35.5
Natural Resources and Environment	Contamination of Natural resources	19.3	14.6	90.4	88.6
	Preservation of Natural Resources	19.0	14.2	85.0	77.1
	Relation of Production and Preservation	14.5	13.5	61.1	58.1
Animal Production	Present Situation and Vision of A. P.	9.6	9.3	10.1	21.9
	Introduction to Raising Animal	37.5	11.6	13.2	10.9
	Raising Pet	15.1	13.6	13.8	12.6
Plant Production	Present Situation and Vision of P. P	9.1	10.0	18.1	23.3
	Classification and Use of Cultivated Plants	15.1	11.8	23.2	15.8
	Introduction to Cultivation Environment	13.9	12.3	27.9	21.9
	Cultivating Vegetables	15.0	13.4	20.1	24.3
	Cultivating Flowers	15.1	13.2	19.0	16.5
	Planting trees and Cultivation	17.9	12.6	34.5	21.9
Agricultural Technology and Science	Use of Biological Technology	8.5	9.9	25.1	31.8
	Mechanization of Agriculture	10.7	12.3	35.2	39.0
	Automation and Equipment	11.6	12.3	27.1	34.1
	Information and Computerization	9.6	8.8	22.7	25.8
	Relation of Agriculture and Technology	10.2	11.5	31.0	42.7
Processing of Agricultural Products	Importance of Processing	11.6	13.3	29.9	33.1
	Present Situation and Vision of Processing	8.2	11.4	18.2	14.4
	Principle of Processing and Storage	11.6	8.8	20.9	25.1
	Processing and Use of Livestock Products	15.6	9.0	30.1	30.0
	Processing and Use of Traditional Food	15.9	12.1	37.9	34.5
	Processing of Healthy Food and Drink	11.6	11.1	23.4	23.1
Marketing of Agricultural Products	Marketing Institution	15.3	11.8	19.7	15.7
	Introduction to Marketing Process	17.3	12.1	26.1	28.3
	Present Situation and Vision of Trade	8.0	11.0	23.5	24.3
	Commercialization and Standardization	9.9	10.8	16.4	15.5
Public Policies	Succession Planning of Farmers	6.9	9.4	11.3	10.9
	Policies and Preservation of Environment	13.4	12.3	44.6	42.4
	Policies of Self-Supporting Food	11.4	11.1	45.6	40.4
Careers in Agriculture	Classification of Agricultural Vocations	11.4	11.3	20.6	14.9
	Role and Mission of Occupants	9.1	10.2	19.3	22.3
	Licenses in Agriculture	7.1	8.8	5.2	16.4
	Searching and Planning of Careers	7.4	9.7	12.0	17.9

The first and second grade teachers answered that 'Animal Production' area was the most part of general agriculture taught in their classes, especially 'Introduction to Raising Animal' as the main content of that area. The next area was 'Natural Resources and Environment'. The third to sixth grade teachers answered that 'Introduction to Agriculture' was the most part of General Agriculture taught in their classes, specifically 'Definition of Agriculture' was the main content. The next area was 'Natural Resources and Environment'. In addition, 'Contamination and Shortage of Natural Resources' and 'Preservation of Natural Resources' areas were occupied beyond the mean percentage of the contents taught by teachers.

The middle school teachers answered that 'Natural Resources and Environment' area was the most part of General Agriculture taught in their classes. 'Introduction to Agriculture', ' Public Policies' and 'Introduction to Agriculture' were above average percentages. On the other hand, 'Animal Production' was the least area of General Agriculture.

In general, high school teachers taught General Agriculture more than any other teachers. They answered that 'Natural Resources and Environment' was the most part of General Agriculture taught in their classes; specifically 'Population Growth and Food Production' was the main contents of that area. 'Introduction to Agriculture', 'Living and Agriculture', 'Agricultural Technology and Science' and 'Public Policies' was covered beyond the average percentage of what other teachers taught. However, even though Grades 10-12 is the most important grades to decide one's career, 'Careers in Agriculture'

was the least taught area in general agriculture.

In conclusion, most teachers in their school subjects, such as social studies, practical arts, and Korean language, taught some areas of the General Agriculture curriculum. However, most teachers briefly covered 'Animal production' and 'Careers in agriculture'.

The Contents of General Agriculture Taught by School Subjects

Table 7 shows the contents of general agriculture taught in different subject classes. The subjects indicated in the table were based on the response rate. Of the elementary school subjects, 'ethics' classes taught some agriculture areas such as 'Living and Agriculture 'and' Natural Resources and Environment. Compared to the analysis of the national curriculum, 'ethics' included smaller areas than the national curriculum. Even if 'Plant Production' were included, 'ethics' classes did not teach it. On the other hand, Social Studies (including 'Wise Living') classes taught all areas of General Agriculture except 'Animal Production' and 'Plant Production.' Compared to the analysis of the National Curriculum, 'social studies' had a lower area in the National Curriculum. Even when 'Agricultural Technology and Science' was not in the text, 'social studies' classes taught it. 'Science (including 'Nature', 'wise Living')' mostly included 'Natural Resources and Environment'. 'Practical Arts' (including 'Wise Living', 'Technology and Industries', 'Home Economics', and 'Environment', 'Agriculture') mostly included all areas, but 'Careers in Agriculture' was not covered enough. Considering that it was an optional subject in high schools, agriculture was generally in accordance with the national curriculum.

Table 7. The Contents of General Agriculture Taught by School Subjects in Korea

Area	Contents of General Agriculture	Elementary School						Middle School			High School
		1	2	3	4	5	6	1	2	3	1
Introduction to Agriculture	Definition of Agriculture	W	W	Ss	Ss	Ss.P	S.P	K.Ss.P	P	P	Ss
	Importance of Agriculture		W	Ss	Ss	P		K.Ss.P	K.Ss.P	K.S.P	K.Ss.P
	Classification and Areas of Agriculture	W	W	Ss	Ss	Ss	P	Ss		Ss.P	Ss
	Development of Agriculture			Ss	Ss	Ss					Ss
	Present Situation and Vision of Agriculture		W	Ss	Ss	Ss	Ss	Ss			Ss
	Relation to other industries			Ss	Ss	Ss	Ss	Ss	Ss.P		Ss
	Population Growth and Food Production			Ss	Ss	Ss	Ss	K.Ss.**S**.P	A	K.Ss.**S**.P	K.Ss.**S**
	Introduction to International Agriculture			Ss	Ss	Ss	Ss	Ss	Ss	Ss	
Living and Agriculture	Health and Food Safety			P		P		K.Ss.E	A	K.Ss.P	P
	Agriculture and Recreation			Ss	Ss	Ss					
	Instruction to Rural Living	W	W	Ss	Ss	Ss		K.Ss.E	K	K.Ss	K.Ss
	Gardening			P	P	P	P				
	Interior Designing with Plants		W	Ss		P	P				
	Consumption of Agricultural Products		W	Ss		P	P	Ss			
Natural Resources & Environment	Contamination of Natural resources				**S**	**S**	**S**	A	A	A	A
	Preservation of Natural Resources	W				**S**	**S**	A	A	A	A
	Relation of Production and Preservation			P			**S**	Ss.**S**.P	Ss.M.S.P	A	A
Animal Production	Present Situation and Vision of A.P										
	Introduction to Raising Animal	W				P	P				
	Raising Pet				P	P	P				
Plant Production	Present Situation and Vision of P.P			Ss							
	Classification and Use of Cultivated Plants	W	W			P	P			P	
	Introduction to Cultivation Environment	W				P	P	P		P	
	Cultivating Vegetables		W	P	P	P	P				
	Cultivating Flowers	W		P	P	P	P	P			
	Planting trees and Cultivation		W	P	P	P	P	K		P	K
Agricultural Technology	Use of Biological Technology o									P	**S**
	Mechanization of Agriculture			Ss	Ss	Ss	Ss	Ss	Ss.P	P	Ss

and Science	Automation and Equipment		Ss	Ss	Ss		Ss			P	P
	Information and Computerization					P					
	Relation of Agriculture and Technology		Ss				Ss	P			
Processing of Agricultural Products	Importance of Processing				P	P	Ss.P			P	P
	Present Situation and Vision of Processing				Ss						
	Principle of Processing and Storage				Ss					P	P
	Processing and Use of Livestock Products	W			P		Ss.P			P	P
	Processing and Use of Traditional Food	W	Ss		P	P	K	K		K	P
	Processing of Healthy Food and Drink						K				
Marketing of Agricultural Products	Marketing Institution	W	Ss	Ss	Ss	Ss		P			
	Introduction to Marketing Process	W	W	Ss	Ss	Ss	Ss	P			
	Present Situation and Vision of Trade		Ss	Ss	Ss	Ss	Ss	Ss			Ss
	Commercialization and Standardization		Ss	Ss	Ss	Ss					
Public Policies	Succession Planning of Farmers			Ss	Ss						
	Policies and Preservation of environment			Ss			Ss	Ss		P	K
	Policies of Self-Supporting Food			Ss	Ss	Ss	K.Ss	Ss.P		K.Ss.P	Ss
Careers in Agriculture	Classification of Agricultural Vocations		Ss	Ss	Ss					P	
	Role and Mission of Occupants I				Ss						
	Licenses of Agricultural-Related Area										
	Searching and Planning of Careers										

Note : A = All Subjects, W = Wise Living, Ss= Social Studies, E = Ethics, P = Practical Arts, S = Science, K = Korean Language

Educational Importance

This study shows the low possibility of teaching General Agriculture through the school systems in the future because there were more female teachers and younger teachers in schools. In addition, they lacked teaching experiences of agriculture while the number of educated teachers is decreasing.

Over half of the teachers indicated that the first reason of teaching agriculture was to increase students' literacy on the subject matter. Some teachers reported that other reasons for teaching agriculture were their interests, students' interests, and because of community needs. These results indicate that teachers may need an in-service training about agriculture. In fact, major reasons why teachers did not teach agriculture included 'lack of time' 'lack of knowledge and skills of agriculture', 'lack of instructional materials' and 'lack of interest'. These findings implied the possibility of agricultural education if teachers were provided in-service training program and instructional. Agricultural educators should develop and provide training programs and instructional materials for teachers.

The contents of general agricultural education for elementary, middle and high school students was not enough taught for informing the society. This fact may cause students to hesitate taking agriculture in high schools. In long -term perspective, the proper political and financial plan for general agricultural education should be established.

The school subjects that covered agriculture in classes include the following in elementary school: 'Social studies', 'Sciences', ' Korean languages', 'Ethics', 'Practical arts', 'Wise livings.' In the middle school, the subjects were 'Technology and industries', 'Sciences', 'Social studies', 'Ethics' while high school subjects were 'Agriculture', 'Technology and industries', 'Sciences', 'Ethics.' However, there were little sequences between grades and subjects. If general agriculture is instructed to enhance student's agricultural caliber, it should be organized and integrated systematically into the curriculum according to the level of school systems.

References

Balschweid. A., Thompson, G. W., & Cole, R. L. (1998). The Effects of an Agricultural Literacy Treatment on Participating K-12 Teachers and Their Curricula. Journal of Agricultural Education, 39(4), 1-10.

Birkenholz, R. J. et al (1992). Strategies to Promote Agricultural Literacy, AAAE Adhoc

Agricultural Literacy Work Group.

Frick, M.J., Birkenholz, R.J., Gardner, H., & Machtmes, K. (1995). Rural and Urban Inner-City High School Student Knowledge and Perception of Agriculture. Journal of Agricultural Education, 36(4), 1-9.

Birkenholz, R. J. et al. (1993). Pilot Study of Agricultural Literacy. Final Report.

Birkenholz, R. J., Harris, C. R., & Pry, H. W. (1994). A Pilot Study: Assessment of Agricultural Literacy among College Students. NACTA Journal, 38(1). 63-66.

Chung, N. Y. (1998). Assessment of Agricultural Literacy and Attitude toward Agriculture among Selected College Students in South Korea. Unpublished Docotoral Dissertation, University of Missouri.

Frick, M. J. (1993). Developing a National Framework for a Middle School Agricultural Education Curriculum. Journal of Agricultural Education, 34(2), 77-84.

Harris, C. R, & Birkenholz, R. J. (1996). Agricultural Literacy of Missouri Secondary School Educators. Journal of Agricultural Education, 37(2). 63-71.

Knobloch, N. A., & Martin, R. A.(1997). Perceptions regarding Integration of Agricultural Awareness Activities by Elementary Teachers in East Central Iowa. Master's Thesis. Iowa State University.

Layfield, K. D., Knoblock, N. A, & Davis, C. (1999). Teaching Elementary Students in Fast Changing Times. The Agricultural Education Magazine, 72(1), 10-11.

Ministry of Education. (1996). Statistical Yearbook of Education. Seoul, South Korea.

Ministry of Education. (1997). The Seventh National Curriculum. Seoul, South Korea.

Ministry of Education. (1992). The Sixth National Curriculum. Seoul, South Korea.

Na, S. I..(1998). Analysis of the Contents of General Agriculture Education Integrated into the 6th Curriculum. Journal of Korean Agricultural Education, 30(3). 81 100.

Na, S. I. (1999). A study on the Contents of General Agricultural Education for Elementary, Middle School and High School Students in the Information Society. Korean Research Foundation.

National Research Council. (1988). Understanding Agriculture: New Directions for Education. Washington, D. C.: National academy Press.

Song, H. K. et al. (1988). Agricultural education. Seoul National University Press. Seoul, Korea.