

## **COLLEGE OF AGRICULTURE AND NON-COLLEGE OF AGRICULTURE STUDENTS KNOWLEDGE ABOUT INTERNATIONAL AGRICULTURE AND RELATED FACTORS**

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### **Abstract**

*The purpose of this study was to assess and compare the knowledge of selected college students, regarding international agriculture and related factors. The population consisted of selected students in the College of Agriculture and Natural Resources, and the College of Communication Arts and Sciences at Michigan State University. Although the study does not represent a representative sample of students in the two colleges, the results may have implications for internationalizing the undergraduate curriculum from a practical basis. Through the use of a validated pre-mastery assessment instrument, the knowledge of the respondents relative to international agriculture and related factors were determined. The results indicated that both groups demonstrated reasonably good knowledge about some of the geographic characteristics in Michigan, but they were less knowledgeable about the geographic characteristics of the USA and the world. Their knowledge about international agriculture was fairly good, but they possessed limited knowledge about some of the most critical factors in regard to U.S. and world agriculture. The findings from this study provides additional research for building the foundation for an internationalized undergraduate curriculum.*

Growing developments in international trade, political and military relationships, scientific and intellectual cooperation, and other factors have increased global awareness of Americans. In light of global changes, educational systems, government, the private sector, and other entities in the U.S., are giving greater attention to international efforts (Bonfiglio, 1995; Michigan State Board of Education 1990; Moore et al., 1989; Ingram, 1996). Land-grant colleges of agricultural sciences have been encouraged to give greater attention to internationalizing undergraduate programs.

Although some faculty have called for increased internationalizing curriculum efforts for many years, the plea from business and industry to prepare students for the global marketplace has caused

colleges to reexamine the issue. Several colleges of agricultural sciences have responded by: (1) requiring students to take foreign language classes; (2) encouraging students to participate in study abroad programs, and enrolling in international relations classes; (3) providing incentives for faculty to participate in faculty exchanges and study abroad programs; and (4) creating multi-disciplinary faculty teams to work jointly on internationalizing the college curriculum.

Several important questions have been raised relative to how best to internationalize the college curriculum. Bonfiglio (1996) and other scholars have raised questions such as: (1) Should an international component be an integral part of each college course or should there be separate courses?;

(2) Should the content be confined exclusively to economic competition, and less on such issues as poverty, environmental degradation, overpopulation, and war?; and (3) Should the internationalized curriculum focus on history, geography, economics, international relations, comparative governments, and agricultural and educational systems? Faculty and college officials should be commended for attempting to respond to the global education movement, especially the questions raised. However, before answering the previous questions, it seems appropriate to assess what college of agricultural sciences students know relative to global agriculture and related issues.

### **Purpose and Objectives**

The purpose of this study was to assess the general knowledge of selected college students at Michigan State University relative to global agriculture and related factors. Selected students in the College of Agriculture and Natural Resources (CANR), and the College of Communication Arts and Sciences (CCAS) were assessed to provide baseline data regarding their knowledge about global agriculture. Two objectives were specified for this study as follows: 1) to assess the level of global agriculture knowledge among selected college of agricultural sciences and non-agricultural sciences college students; and, 2) to compare the level of global agriculture knowledge of both groups.

### **Methods and Procedures**

A data collection instrument organized in two sections was developed for this study. The instrument included knowledge and demographic sections. The instrument was developed using Moore, Stockil, and Williams (1989) work on "Internationalizing Agricultural Education Programs," and a pre-test mastery examination for an undergraduate class taught in CANR at Michigan State University. The items were grouped into three categories which included general geography, the

United States, and the World. The reliability of the knowledge section of the instrument was determined by calculating a Kuder-Richardson 20 (KR-20) coefficient over all knowledge statements. The KR-20 computed for the knowledge section of the instrument was .64.

Demographic variables in section one of the instrument included: primary major, college enrolled, gender, class standing, if completed agriscience class(es), and course enrolled. The second section included knowledge statements about international agriculture. Instructions in the knowledge section directed respondents to select the "best answer for each question," which consisted of fifty-eight multiple choice items and nineteen true and false statements. Faculty who were teaching selected courses at Michigan State University were asked to administer the pre-assessment examination.

### **Results**

Table 1 represents demographic characteristics of the respondent groups. In total, there were 56 respondents in this pilot study. Thirty-six were enrolled in CANR and twenty in the CCAS. Considering both colleges, over one-third were female students, and nearly two-thirds were male students. Forty-two percent of the CANR students had completed one or more high school agriscience classes, and none of the CCAS students had completed such classes.

Table 2 provides data relative to answers by type of students and items grouped according to three different categories, namely, general geography, world, and the USA. In general, all groups demonstrated reasonably good knowledge about international agriculture especially on items regarding geography, and the United States. Both groups encountered some efficiency on world items. A higher percentage of CANR students answered

each category correctly as compared to CCAS students. The greatest difference was in knowledge statements related to the "world."

Table 1. Demographic Characteristics of Respondent Groups

Variables	Groups	
	Agriculture and Natural Resources N=36	Communication Arts and Sciences N=20
Gender-		
Female	34.8 <sup>a</sup>	36.4
Male	65.2	63.6
Class Level		
Freshman	2.8	--
Sophomore	27.8	10.0
Junior	27.8	45.0
Senior	36.1	45.0
Unknown	5.6	--
Completed 1 or more HS agriscience class		
Yes	41.7	--
No	58.3	100

<sup>a</sup> Data are percentages rounded to nearest decimal point

The differences in the percent of correct answers by gender and class standing in college were marginal. CANR students who had not completed one or more agriscience classes in high school performed better on items related to "general geography" than students who had completed high school agriscience classes. The groups performed about the same on items pertinent to the "world" and the "United States."

Table 3 shows the percent of correct answers by selected undergraduate student's knowledge of geographic characteristics in Michigan and the

world. In general, both groups demonstrated reasonably good knowledge about the geographic characteristics in Michigan and the world. Considering the eight geographic characteristic statements, CANR students received a higher percent of correct answers on three of the items than the CCAS students. The CCAS students received higher percent of correct answers for five of the eight items than the CANR students. It is interesting to note that 95 percent of the CCAS students were able to identify the continents in the world as compared to only 58 percent of the CANR

Table 2. Percent of Correct Answers by Selected Undergraduate Student's Knowledge About International Agriculture in the College of Agriculture and Natural Resource (CANR), and College of Arts and Science (CAS) by Student Type and Item Category

STUDENT TYPE	ITEM CATEGORIES		
	General Geography (13 items)	World (31 items)	USA (33 items)
CANR (N=36)	82.5	62.6	74.4
CAS (N=20)	78.0	52.6	68.6
<i>Male (N=23)</i>	82.6	60.9	73.0
<i>Female (N=33)</i>	79.7	57.8	71.7
Sopho (N=12)	84.0	62.6	72.7
Junior (N=19)	81.4	58.7	74.3
Senior (N=22)	79.4	56.9	69.4
Completed H.S. Agriscience classes (N=15)	77.9	61.7	72.2
No H.S. Agriscience classes (N=21)	84.2	61.5	72.7

Table 3. Percent of Correct Answers by Selected Undergraduate Student's Knowledge of Geographic Characteristics in Michigan and the World

Knowledge Items* (Multiple Choice)	CANR (N=36)	CAS (N=20)	TOTAL (N=56)
Which of the following is <u>not</u> a chief port in the state of Michigan?	91.7	85.0	89.3
Detroit is located in what part of the state?	94.4	100.0	96.4
Detroit is a major city in Michigan because...	77.8	70.0	75.0
In general, the United States may be divided into _____ geographical regions.	61.1	75.0	66.1
Midwest (Heartland) states include:	55.6	60.0	57.1
The four main oceans are:	63.9	63.0	64.3
There are _____ continents in the world.	94.4	95.0	94.6
The continents of the world are:	58.3	95.0	71.4
* Complete items and answers may be obtained by contacting the authors.			

students. In examining all geographic characteristic items, the greatest disparity in correct answers was with this particular item. However, considering both groups, only about 57% were able to identify

the midwestern states, and 64% were able to identify the four main oceans in the world.

Table 4 depicts the respondents knowledge about international agriculture. A general review of the data would suggest that both groups possessed a fairly good knowledge about international agriculture. However, 40% or more of the respondents were Not knowledgeable about: 1) Countries likely to be the best market prospects for U.S. agricultural product; 2) whether agricultural imports to the U.S.A. had increased, decreased, or remained the same over the last 30 years; 3) benefits to the U.S. agricultural industry as a result of having military bases abroad; 4) future agricultural products wanted by Japan; 5) where the largest population of the world is likely to be in the year of 2000; 6) future demand for U.S. agricultural products in Taiwan; 7) percentage of the world soil suitable for agriculture; 8) where a majority of the world's hungry live; 9) what agricultural product is not exported from Latin America; 10) what country has the highest percentage of its people engaged in agriculture; 11) approximate percent of the world's population living in Asia; 12) approximate percent of the world's population living in China; and 13) the country which is the major rice exporter in the world. The data from Table 4 also shows that 40% or more of the CANR students were also not knowledgeable about, "some of the main products imported from developing countries to the U.S.," and " General characteristics of Argentine's agriculture."

Forty percent or more of the CCAS students were not knowledgeable about:

- 1) where the greatest demand for agricultural products were likely to occur;
- 2) whether U.S. agricultural exports for the last 30 years have remained the same, decreased, or increased;

Table 4. Percent of Correct Answers by Selected Undergraduate Student's Knowledge about International Agriculture in the College of Agriculture and Natural Resources (CANR) and College of Arts and Science (CAS), at Michigan State University, 1995

<b>Knowledge Items* (Multiple Choice)</b>	<b>CANR (N=36)</b>	<b>CAS (N=20)</b>	<b>TOTAL (N=56)</b>
Which countries are some of the best market prospects for U.S. agricultural exports?	58.3	30.0	48.2
The demand for agricultural products is likely to be greater in:	83.3	60.0	75.0
The economic strength and well-being of a country can be analyzed by:	80.6	70.0	76.8
Which of the following are benefits of exporting U.S. agricultural products to developing countries from a U.S. point of view?	86.1	90.0	87.5
U.S. agricultural <u>exports</u> from the last 30 years have in general:	86.1	50.0	73.2
For the last 30 years, the amount of agricultural products <u>imported</u> by the U.S. has in general:	41.7	45.0	42.9
A developing country is characterized by:	77.8	65.0	73.2
A developed country is characterized by	94.4	90.0	92.9
Economic benefits to the U.S. resulting from trade are:	100.0	80.0	92.9
What are the benefits of the U.S. agriculture industry from having U.S. military bases located abroad?	61.1	55.0	58.9
Exporting U.S. agricultural products to other countries will assist in areas such as:	94.4	85.0	91.1
Projected future demands for U.S. agricultural products in Japan are for:	33.3	15.0	26.8
Projected future demands for U.S. agricultural products in Taiwan are for:	77.8	65.0	73.2
Projected future demands for U.S. agricultural products in Canada are for:	83.3	80.0	82.

**Table 4 -- Continued**

Knowledge Items* (Multiple Choice)	CANR (N=36)	CAS (N=20)	TOTAL (N=56)
Every additional \$1 billion of U.S. agricultural exports generally will create:	97.2	75.0	96.4
Some of the main products imported from developing countries to the U.S. may include:	52.8	70.0	55.4
Why does the United States need to trade with other nations?	72.2	95.0	71.4
Another term to describe <u>developing</u> countries is:	83.3	50.0	71.4
Some developing country(ies) in Asia would include:	63.9	80.0	69.6
Which country is projected to be the best market for U.S. agricultural products?	91.7	65.0	82.1
Some developing country(ies) in Africa would include:	86.1	85.0	85.7
Exporting Michigan agricultural products to other countries will:	94.4	85.0	91.1
The future demand for U.S. agricultural products in Taiwan is (are):	38.9	35.0	37.5
Exporting Michigan agricultural products abroad will:	91.7	80.0	87.5
Considering world agriculture productivity, what product is most needed?	83.3	90.0	85.7
World hunger is most severe in:	97.2	95.0	96.4
The most populated country in the world is:	88.9	95.0	91.1
A factor(s) which has (have) an effect on world grain production is (are):	97.2	70.0	87.5
What percentage of the world soil is suitable for agriculture?	33.3	15.0	26.8
The United States is a leader in world grain production due to a number of factors, including:	94.4	90.0	92.9
Ways to increase world grain production would be to:	91.7	70.0	83.9
The majority of the world's hungry live in:	11.1	00.0	7.1

**Table 4 -- Continued**

Knowledge Items* (Multiple Choice)	CANR (N=36)	CAS (N=20)	TOTAL (N=56)
Which crop is <u>not</u> a major agricultural export of Latin America?	47.2	50.0	48.2
Approximately what percent of the American population is now employed in farming?	83.3	70.0	78.6
Which of the following countries spends the lowest percentage of income for food?	86.1	40.0	69.6
Of the following countries, which has the highest percentage of its people engaged in agriculture?	38.9	15.0	30.4
Which of the following characterizes Argentine's agriculture?	58.3	70.0	62.5
Approximately what percent of the world's population is in Asia?	30.6	30.0	30.4
The approximate percent of people engaged in farming in China is:	16.7	10.0	14.3
The country which is the major rice exporter in the world is:	19.4	30.0	23.2
Which of the following continents has the lowest percentage of population growth rate?	86.1	65.0	78.2
Paying farmers not to grow a particular product, to remove surplus commodities from production is a type of:	91.7	70.0	83.9

\*Complete items and answers may be obtained by contacting the authors.

- 3) types of agricultural products the U.S. receives from developing countries;
- 4) other terms for describing developing countries;
- 5) what country spends the lowest percentage of income for food; and,
- 6) Taiwan and its agricultural production system.

The respondents were asked to respond to several true and false statements. Both groups performed well in giving the correct answers to these items. However, as shown in Table 5, fifty percent or more of the respondents failed to give the correct answer for the following statement: 1) agriculture has become less energy-intensive during the second half of the 20th century; 2) there is not much room for expansion of grain-growing areas throughout the world; 3) world population is projected to increase more rapidly in urban areas

Table 5. Percent of Correct Answers by Selected Undergraduate Student's Knowledge About International Agriculture in the College of Agriculture and Natural Resources (CANR) and College of Arts and Science (CAS), at Michigan State University, 1995

Knowledge Items* (True/False)	CANR (N=36)	CAS (N=20)	TOTAL (N=56)
It is projected that there will be approximately six billion people in the world by the year 2000.	75.0	90.0	80.4
The main cause of hunger in the world is that the world no longer has the capacity to produce enough food.	86.1	90.0	87.5
Agriculture has become less energy-intensive during the second half of the 20th Century.	52.8	40.0	48.2
The population of the world is growing faster in Africa and Asia than in North America and Europe.	94.4	70.0	85.7
There is not much room for expansion of grain-growing areas throughout the world.	50.0	50.0	50.0
Although the United States and China are about the same size, China has much more mountainous terrain and the U.S. has more arable farming land.	69.4	70.0	69.6
The greatest potential for expansion of U.S. agricultural exports is with the developed nations of the world, not with the developing nations.	61.1	70.0	64.3
China has its population under control because of the one-child-per-family policy.	63.9	75.0	67.9
The United States is the world's largest producer of soybeans and corn.	83.3	90.0	85.7
The food surplus in North America and Western Europe results largely from subsidies and other incentives that stimulate production even in the absence of demand.	61.1	60.0	60.7
The primary reason for major agricultural production increases in the U.S. since World War II has been because of increased amount of land being farmed.	91.7	65.0	82.1
Most of the industrial wood in the world comes from developed countries.	52.8	50.0	51.8
U.S. per capita grain production has decreased significantly during the past two decades.	47.2	75.0	57.1
World population is projected to increase more rapidly in urban areas than in rural areas.	50.0	15.0	37.5
Corn thrives well in a climate where a cool, dry, short growing season is present.	86.1	35.0	67.9
Many countries in Southeast Asia are major exporters of wheat.	77.8	55.0	69.6
It is expected that grain exports from Africa will increase significantly during the next decade.	47.2	45.0	46.4
Social class, family, and government are three of the main organizational elements of culture.	97.2	95.0	96.4

\* Complete items and answers may be obtained by contacting the authors.

than in rural areas; and 4) it is expected that grain exports from Africa will increase significantly during the next decade.

Additionally, 50% of the CANR students failed to give the correct answer to the question, "U.S. per capita grain production has decreased significantly during the past two decades." On the other hand, 50% of the CCAS students failed to give the correct answers to the questions, "most of the industrial wood in the world comes from developed countries," and "corn thrives well in a climate where a cool, dry, short growing season is present."

### **Conclusions and Recommendations**

This study found that undergraduate students in two different colleges at Michigan State University were reasonably knowledgeable about some of the geographic characteristics of Michigan, but were less knowledgeable about the geographic characteristics of the USA and world. Therefore, it is recommended that future curriculum internationalizing efforts should emphasize geographic characteristic of the USA and the world. CANR students and CCAS students were reasonably knowledgeable about international agriculture, particularly issues related to the U.S., and less knowledgeable about world agricultural issues. Future curriculum internationalizing thrusts should give greater attention to world agriculture and related issues. CANR students were more knowledgeable about international agriculture than the CCAS students. Therefore, if agricultural and food industries are going to be hiring graduates outside of Colleges of Agriculture and Natural Resources to fulfill various positions which are linked to international agriculture markets, it is

recommended that these students receive additional international training in order to be successful.

In looking ahead, the challenges for universities to internationalize undergraduate programs are phenomenal. For many undergraduate students, college is a time for building self confidence, discovering who they are, and preparing for a life after receiving the bachelor's degree. Yet, university personnel are interested in helping students to become self-directed learners who must learn to adapt to a complex, interconnected, diverse, and ever-changing global society. The findings from this study should be used to develop a more research-based internationalize undergraduate curriculum.

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