

# Education for Agriculture and Development

# **International Student Summit (ISS): A Case from International Activities in Tokyo University of Agriculture in Japan**

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## **INTRODUCTION**

The Tokyo University of Agriculture (TUA) offers a unique, integrated approach to agricultural education. Studies in the core areas of Agronomy, Life Science, Environmental Science and Bio-industry Science serve to advance agriculture and to support agriculture-related industries.

In order to fulfill its responsibilities to society, the faculties of TUA are working together toward innovations in the development of agricultural science and technology, while seeking a harmonious balance with the environment not only in Japan, but also throughout the world.

The primary objective of this paper is to introduce the current situation of Japanese agricultural universities and TUA in Japan, with a special focus on the International Students Summit (ISS) and other related activities organized by TUA for empowering its students. An evaluation of the Summit's impact on both students and faculties, together with TUA's statement mentioned above, will additionally be undertaken.

The first part of this paper discusses the background of Japanese agricultural education in universities in Japan. Next, it looks at TUA's structure followed by its brief history. It then engages the main theme of this paper which is a discussion of the ISS and its evaluation study. Finally, it describes the future prospects of the ISS from our taskforce exercise which was held last year.

## **Background of agricultural universities' current structure and curricula in Japan**

In May 1991, the Standards for the Establishment of Universities were amended by the Ministry of Education, giving greater freedom to universities concerning course content, but also requiring them to monitor, inspect and evaluate the state of their instruction and research.

On the other hand, Japanese agriculture faces various issues which affect not only TUA, but every agricultural university in Japan. The current

issues include: 1) the decline of the agriculture industry in Japan, and 2) the diversification of career routes for agriculture majors.

Therefore, there was a relatively large shift in the number of majors around 1991 when the revisions to the Standards for the Establishment of Universities took place.

After that shift, 26,715 course titles were offered in 2001 across all agricultural universities. According to TAJIMA (2004), clear trends in those courses were evident such as the increasing number of 'Biology' and 'Environment'-related courses and the decreasing number of 'Agriculture' courses (Table 1).

These general trends can be explained as follows: in 2001 the inclusion of courses in "environmental chemistry," "production environment" and "environmental engineering" reflecting the various areas of the term "environment" and the concept of environment were among the changes or innovations made.

Thus, Japanese agricultural universities have moved away from traditional agricultural education to biological resource science during the last two decades, and this trend has affected TUA revision practices as follows:

**Table 1. Changes in course offerings over the last 20 years**

	<b>Biology</b>		<b>Environment</b>		<b>Agriculture</b>	
1983	1,097		179		1,484	
2001	2,689	<b>+145%</b>	1,487	<b>+730%</b>	1,328	<b>-10%</b>

Ref: TAJIMA (2004)

## **Brief history and current structure of TUA**

### **(1) History of TUA**

The Meiji Government (1868–1912) adopted and promoted drastic modernization policies including the establishment of research and education systems. As agriculture formed the basis for economic development during that period, a number of experimental stations and agricultural schools were established throughout Japan.

In 1891 (Meiji era 24), the Tokugawa Ikueiko School was founded in Kojimachi, Tokyo, with three specialized two-year training courses in agriculture, commerce and general science. This agricultural course is the origin of the Tokyo University of Agriculture. It was the initial training institution as practical manners of agriculture in Japan, and since that time, TUA has maintained its fundamental educational policy as one of practical science.

Two years later in 1893, the Tokyo Agricultural School became independent from the Tokugawa Ikueiko School.

In 1924 (Taisho era 13), the Department of Land Gardening was founded on the Tokiwamatsu campus, Shibuya, Tokyo, while the Tokyo University of Agriculture Foundation was established in 1925.

After WWII, educational reforms were enforced by General Headquarters (GHQ). Along with the new university system, TUA was reestablished and moved to Setagaya, Tokyo, in 1946 (Showa era 21).

In 1953, the Graduate School, which has Master's courses in Agriculture and Agricultural Economics, was established. The NODAI Research Institute was set up and designated by the Japanese Ministry of Education and Culture as the center for international scientific cooperative activities with Southeast Asian countries under the Core University System in 1978.

In 1989 (Heisei era 1), the Faculty of Bio-Industry—comprising the Departments of Bioproduction, Food Science and Business Science—was established on the Okhotsk Campus, Abashiri City, Hokkaido. The execution of the core university system was shifted to the NODAI Center for International Programs (CIP) in 1990, and with the re-organization of the Faculty of Agriculture, the Atsugi Campus was set up in 1998.

## **(2) Faculties**

There are currently five faculties at undergraduate level at TUA, as follows:

### a) Faculty of Agriculture

New areas of agricultural studies include ways to conserve the ecosystem and use available resources more effectively so as to realize sustainable farming production. In addition, as environmental issues are now attracting worldwide attention, great emphasis is placed on the role of science in conserving the global environment. This Faculty is mainly involved with agricultural courses which comprise more than 60% of its total course offerings (see Table 2).

### b) Faculty of Bio-Science

This Faculty is based on fundamental chemistry and aims to promote student understanding of basic chemical reactions and to pave the way for applications. It tends to have more of a biological and chemical science-oriented course structure (see Table 2).

**Table 2 Course structure of each faculty**

	Agric.	Applied Bio.	Reg. Environ.	Intl. Food	Bio-Industry
Total course number	266	363	262	423	287
Liberal Arts	66	96	57	225	48
Fundamental Sciences	3	52	17	38	69
Biological Sciences	10	61	4	5	37
Engineering			16		
Business Studies				28	36
Agriculture	140	27	77	73	45
Food	3	110	0	23	37
Environment	4	17	91	32	15

Ref: INAIZUMI (2005)

c) Faculty of Regional Environment Science

With 80% of Japan's population concentrated in urban areas that cover only 20% of its total land area, the country has the dual problems of overpopulation in cities and depopulation in rural areas. The ultimate objective of the Faculty is to solve these issues and to realize balanced development and environmental welfare for the community. One-third of the Faculty is devoted to courses for agricultural sciences and another one-third for environmental sciences out of its total offerings (see Table 2).

d) Faculty of International Agriculture and Food Studies

This Faculty will open new fields of education and research concerning environment-conserving international agriculture, food systems and bio-business systems, and will discuss how to cope with regional and global-level food and environmental issues which will be two of the most serious challenges in the 21st century. Therefore, more than half of the course offerings in this Faculty are liberal arts subjects which include several languages, cultural studies and also business studies (see Table 2).

e) Faculty of Bio-Industry

This Faculty is engaged in research and education in the field of bio-industry—including bioproduction, food science and business science—for the purpose of developing new theories and techniques. Together with the above purposes, the Faculty is building a well-balanced course structure (see Table 2).

Important components in the courses of the above five faculties include practical training/learning of sciences which derives from TUA's fundamental educational policy since it was established (Fig. 1).



**Fig. 1 Expanding Agric. Science at TUA**  
Ref: Adapted from INAIZUMI (2005)

## **International programs at TUA**

### **(1) The Center for International Programs**

The Center for International Programs (CIP) at TUA is working toward educating students by developing a global network of agricultural universities. The global network for educating future generations was initiated in 2004 with support from the Ministry of Education, Culture, Sports, Science and Technology of Japan. This initiative is based on a comprehensive approach to professional education and extracurricular activities aimed at empowering students with professional knowledge and international communication skills to solve problems on a global scale. Development of the network among selected agricultural universities around the world will expand opportunities for students to access a wide range of education. Providing students with opportunities to interact and communicate with other students from various countries is likewise promoted by the global network. TUA believes that an important role of higher educational institutions in agriculture is to educate opinion leaders who solve issues related to food, agriculture and the environment in global society. Along with TUA's fundamental educational policy, emphasis is placed on practical training/learning within this international program.

The Center for International Programs at TUA has initiated several programs and aims to support the global network of students and scholars. The center has established linkages with 18 universities who are leaders in agricultural education around the world (see Table 3), and this network is known as the global partner universities of TUA. This network has contributed and enhanced cooperation between TUA and its global partner universities. For example, approximately 300 international students from more than 24 countries are studying at TUA. Several faculty members and graduate students are also engaged in international development work.

**Table 3. Global Partner Universities as of Feb. 2007**

Univ. Name	Country	Univ. Name	Country
Michigan State Univ.	USA	Kasetsart Univ.	Thailand
The Univ. of British Columbia	Canada	China Agric. Univ.	China
National Chung Hsing Univ.	Taiwan	Univ. of the Philippines at Los Banos	Philippines
Bogor Agric. Univ.	Indonesia	Mongolian State Univ. of Agric.	Mongolia
Univ. Nacional Agraria La Molina	Peru	Kyungpook National Univ.	Korea
The Hebrew Univ. of Jerusalem	Israel	Hanoi Agric. Univ.	Vietnam
Univ. Putra Malaysia	Malaysia	Univ. Autonoma Chapingo	Mexico
Escola Superior Agric Luiz de Queiroz, Univ Sao Paulo (ESALQ)	Brazil	Fed des Ecoles Superieures d'Ingenieur en Agric (ISAB)	France
National Agric. Univ. of Ukraine	Ukraine	Wageningen Univ.	The Netherlands

## **(2) International Students Summit (ISS) and International Students Forum (ISF)**

TUA has developed a novel approach to educate the next generation of agriculturists. The International Students Summit on Food, Agriculture and the Environment in the New Century was first held in November 2001, and is held annually at TUA. The ISS provides an opportunity for students of global partner universities as well as international and Japanese students studying at TUA to come together and exchange ideas and views on food, agriculture and environmental issues in the world, and to discuss the role to be played by youth in the sustainable livelihood of mankind. Based on these experiences and the lessons learned, conclusions were drafted as the "Tokyo Declaration" at the first International Students Summit and an action plan was adopted at the second ISS. In this action plan, TUA appeals to its partner universities to organize student groups to seriously study food, agriculture and environmental issues, and to operate the International Students Forum (ISF). ISF members consist of the student organizations of global partner universities that are engaged in research and educational activities on issues related to food, agriculture and the environment. They regularly conduct exchanges of information and opinions via the Internet, with representatives of each university's ISF meeting once a year at the ISS.

### **An evaluation of the ISS**

#### **(1) Survey for the Evaluation of the ISS/ISF (SUVEDI and SANO, 2006)**

To evaluate ISS/ISF activities, a formal survey was conducted in 2006 which employed an online survey method for all participants who attended the ISS from 2001 through 2005. Table 4 provides a summary of the response rates for all respondent groups.

The data collected include: the impact of the ISS, participants' impressions of the ISS, the usefulness of ISS activities and the impact of the ISS on general student populations at respondents' colleges/universities.

**Table 4. Numbers and response rates for the ISS evaluation**

Respondent group	Total numbers	Surveys sent	Responses received	Response rate
TUA student participants	271	181	89	49.2
International student participants	90	76	49	64.5
TUA/ISS organizing committee	55	49	31	63.3
International advisors	22	21	14	66.7
Total	438	327	183	55.6

## **(2) Impact of the ISS**

### a) The Impact of the ISS on Student Participants

The results from the four respondent groups indicate many impact types. The two statements, "Interest in international relations" and "Interest in studying abroad," received very high mean scores from each of the four groups, ranging from 3.80 to 4.57.

For the impact of "Communication skills," there was an appreciable difference between ISS faculty participants and ISS student participants. ISS faculty participants responded that there was some improvement (mean value of 3.21 and 3.32), while on the other hand, ISS student participants responded that there was good improvement (mean value of 3.95 and 4.04) in communication skills (see Table 5). Other comments from international advisors indicated student leadership and international experience as participating student impacts.

During the ISS week, many of the students who gathered from more than 20 countries shared ideas about current related situations and possible solutions for problems in each country and worldwide, resulting in a positive impact on international relations, especially for students. This impact may influence them to become interested in studying abroad.

Both the international and Japanese students at TUA responded that there was a good improvement in their chance to communicate with international or Japanese students (see Table 6). This impact may heighten their interest in international relations, studying abroad and foreign cultures.

### b) The Impact of the ISS on General Student Populations at Global Partner Universities

To clarify the impact on general student populations at global partner universities, the same questions about the impacts of the ISS were asked of international advisors focusing on the general student populations at their



own universities who wished but did not have the chance to participate in the ISS. The impacts for general students were "Interest in studying abroad," "Interest in international relations" and "Knowledge about Japan" (see Table 7). Other comments included: "Increased awareness of TUA." These results indicate that holding the ISS is affecting not only participating students, but also other students at global partner universities.

### **(3) The ISF and the Global NEFA**

#### a) ISF Activities at TUA

As it is written in the action plan that was adopted during the second ISS (2002), TUA has established the ISF, a student organization. The members of the ISF organize the ISS and engage in several activities throughout the year that are organized by students. The main activities of the ISF at TUA are to study each country and to present the results at study meetings, the pre-summit and the ISS. In addition, the ISF conducts several activities to increase understanding of food, agriculture and the environment around the world.

#### b) The Global NEFA

The Global Network for the Environment, Food and Agriculture (Global NEFA) was established in November 2005 as an alumni association of the ISS/ISF so that student participants could network and continue information exchanges even after they graduate. Because the alumni live all over the world, activities will consist of information exchanges via the Internet. Some gatherings, however, have occurred since the Network's establishment, and some study meetings with ISF students are in the planning stage.

### **(4) Influence of the International Program and Activities**

#### a) Student Perceptions of the International Education Program at TUA

At TUA, several international education programs and special programs are conducted in English as part of the regular courses. Student participants were asked whether they attended or wanted to attend these programs. From Table 8, it can be seen that one-third of the respondents answered that they have attended at least one of the programs.

#### b) Joint International Education Program

Ideas for the program were collected from both TUA/ISS organizing committee members and international advisors. In the comments from both respondent groups, many respondents mentioned that online courses providing credit and allowing the transfer of credits between universities would be ideal (see Table 9).

Table 8. Required of the 100000 people in Japan

Subject	114,000 people in Japan		114,000 people in Japan		114,000 people in Japan		114,000 people in Japan		T-Value	Sig.
	n	Mean <sup>a</sup> (SD)	n	Mean <sup>a</sup> (SD)	n	Mean <sup>a</sup> (SD)	n	Mean <sup>a</sup> (SD)		
Understanding of agriculture, food and environment in own country	74	3.74 (1.07)	47	3.61 (0.99)	26	3.06 (1.09)	14	4.07 (0.79)	0.457	0.71
Understanding of agriculture, food and environment in the world	74	3.03 (0.89)	47	4.19 (0.97)	26	3.04 (1.07)	14	4.00 (0.93)	1.280	0.20
Interest in foreign languages (including English)	74	3.05 (1.29)	47	3.03 (1.09)	26	3.09 (1.17)	14	3.43 (1.10)	2.021	0.04**
Interest in industry (and working) related issues	74	3.92 (1.09)	47	4.02 (0.92)	26	3.03 (1.09)	14	3.71 (0.99)	0.770	0.57
Interest in international relations	74	4.20 (0.89)	47	4.47 (0.88)	26	3.85 (1.09)	14	4.57 (0.91)	2.230	0.03
Interest in studying abroad	74	3.97 (1.22)	47	4.23 (1.10)	26	3.00 (0.99)	14	4.29 (1.00)	1.392	0.26
Interest in international trade and voluntary work	74	3.58 (1.20)	47	3.77 (1.22)	26	3.43 (1.09)	14	3.36 (1.19)	0.942	0.64
Communication skills	74	3.95 (1.00)	47	4.04 (0.89)	26	3.32 (1.11)	14	3.21 (1.26)	4.151	0.00**
Knowledge of food Japan	74	3.03 (1.06)	47	4.53 (0.96)	26	3.20 (1.02)	14	4.29 (0.79)	12.300	0.00**
English ability	74	3.92 (1.19)	47	3.95 (1.29)	26	3.00 (1.09)	14	3.36 (1.00)	1.155	0.34

<sup>a</sup>Mean values were calculated based on responses from 100,000 people with 1.5% of the population in Canada required.

\*\*Significant at 0.00 level

**Table 6 Chance to communicate with Japanese/ international students.**

Statement	n	Mean*	(SD)
To international students: Chance to communicate with Japanese students	41	3.80	(1.17)
To Japanese students: Chance to communicate with international students	57	4.26	(0.81)

This question was only asked of ISS/TUA student participants.

\*Mean values were calculated on the basis of responses on a 1-5 scale with 1=No change and 5=Greatly improved.

**Table 7 Impact of the ISS on general student populations**

Statement	Mean*	(SD)
Understanding of agriculture, food and the environment in own country	3.07	(1.44)
Understanding of agriculture, food and the environment in the world	3.07	(1.21)
Interest in studying and solving global issues	2.93	(1.27)
Interest in international relations	3.21	(1.25)
Interest in studying abroad	3.43	(1.28)
Interest in international and local voluntary work	2.93	(1.27)
Knowledge about Japan	3.21	(0.98)

This question was only asked of ISS international advisors

\*Mean values were calculated on the basis of responses on a 1-5 scale, the same as above

**Table 8 The international program at TUA**

Program	Attended	Want to attend
	Frequency	Frequency
Special program	21	13
Short-term farm study (China, Taiwan, Thailand, Mexico)	12	7
Short-term study program (Canada, France)	7	5
Long-term study program (Global Partner University)	4	8
Farm stay and agricultural training programs (USA)	0	5
None	44	10

**Table 9 Ideas about a joint international education program**

Statement	TUA/ISS organizing committee members	International advisors
	(n=21)	(n=12)
	Frequency	Frequency
Online courses	6	4
Provide credits and allow transfer of credits	4	5
Faculty and student exchange program	2	4
Special lectures by professors from global partner universities	3	0
Need to improve the English ability of students	2	0
Internship program	0	1

**(5) Important Things Students Learned or Experienced Through ISS/ISF Activities**

TUA student participants and international student participants were asked what was the most important thing learned or experienced through ISS/ISF activities. TUA student participants said the “making of friends, chance to interact with students from different countries and to respect the differences in each other” was the most important thing. The International student participants said “learning about and understanding international food, agriculture and environmental issues” was the most important thing they learned or experienced (see Table 10).

This difference may be due to their different positions in the organization of the ISS. However, while there are several differences between the two groups, it is clear that both learned and experienced many things through participating in the ISS/ISF activities.

**(6) Future Provisions**

The results from the “Workshop on International Education Collaboration among the Major Agricultural Universities in the World” which was held in November 2006 at TUA, indicated some future actions that should be taken as follows:

a) Organizational issues

There is a need to establish a Consortium and Executive Committee to take care of daily affairs and to initiate events. Double/Joint Degrees should also be put in place, together with a credit transfer system between member universities.

b) Operational issues

There is a need to involve other colleagues from our own universities and to ask for the cooperation of all faculty members to develop joint web-based courses. At the same time, faculties should provide guidance to students in following existing courses or new ones specifically designed to suit their needs.

c) Contents

E-learning courses should focus on agriculture, food and the environment in each country/region, and simultaneously offer practical training/internships as part of related field and study tours.

Although we have not yet reached formal conclusions from this workshop, the taskforce is continuously working on them.

**Table 10. The most important thing learned or experienced from ISS/ISF activities**

Statement	TUA student participants (n=38)	Intl. student participants (n=36)
	Frequency	Frequency
Learning and understanding of international food, agriculture and environmental issues	2	18
Making friends, chance to interact with students from different countries and learning to respect the differences in each other	24	14
Widening interest and mind to the world and several points of view	10	2
English skills and importance	2	2
Management skills of organization	3	0

The total number of comments exceeded the number of respondents as some respondents mentioned several items

**CONCLUSION**

According to the evaluation study, the ISS/ISF has a strong impact on students such as “Awareness of global issues on agriculture, food and the environment,” “Obtaining knowledge about Japan” and also in gaining physical and virtual contact with international students, faculties and advisors. On the other hand, this evaluation demonstrated that the ISS/ISF’s weaknesses are “Poor knowledge of English” (especially for TUA Japanese students and other non-native English speakers) and a “Lack of understanding about the role of the ISS/ISF among TUA faculties.”

Therefore, several issues are emphasized in this study as follows:

(1) Improving the English abilities of Japanese students at TUA

More intensive English courses in both language and professional subjects from freshman level must be introduced.

(2) Developing/offering model learning courses for freshmen

Although international agriculture, food and environmental issues are compulsory subjects for youngsters, these subjects are completely new at freshman level in most Japanese Universities. No such subjects are offered in Japanese high schools related to theoretical and/or scientific agriculture, food and the environment. There is therefore a strong need to provide appropriate information for choosing/selecting courses in advance, such as a ROAD MAP for learning. According to the evaluation survey, ISS student participants at TUA have a strong interest in international education programs compared to other general students at TUA. This result indicates that many of the students who attended the international education program were ISF members or that many students became interested in the program through the ISS and ISF activities.

TUA's challenges for international collaborative education including the ISS/ISF have just begun, but building the base for these matters is almost finished. Everyone is therefore enjoined to work together and help improve the future of agricultural education.

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# **A High School that has Brought About Affluence to a Small Community - A Case Study on Higashi-mokoto High School that has Succeeded in Alleviating Poverty Leading to Affluence in Hokkaido, Japan**

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## **INTRODUCTION**

This is a report on how poverty alleviation leading to affluence has been carried out under the distinct leadership of a local high school in one of the smallest villages in Hokkaido, Japan.

### **Higashi-mokoto Village, its location, topography, and climate.**

Higashi-mokoto Village is located at 43 degree N. and 144 degree E., and one of the smallest rural communities on the rolling slope facing the Okhotsk Sea in Hokkaido, northern Japan. A mountain called Mt. Mokoto lies at the southern end of the village, and a river originated from the mountain flows down in a northward direction to the Okhotsk Sea. The village is rectangular in shape with length of 20 km. from South to North and width of 9 km. from East to West, covering an area of 18,440 ha. of which 7,600 ha ( 38%) is forest, 5,200 ha.(34%) is farmland, and 4,600 ha.(26%) is residential area and devoted to other uses.

The climate of the village may be said as "continental", because even though the village has an average yearly temperature of 6 °C, temperature in the mid-summer often goes up to 32 °C, and in the mid-winter goes down to -22 °C. Besides, once every 3~5 years, the village suddenly experience cool temperature which occur during crop growing season giving serious damages to the crops. The yearly rainfall of the village is about 800 mm, the smallest amount among all areas in Japan.

## **History and agricultural development**

Although some evidence point to the fact that some hunting tribes lived along the River Mokoto during the Stone Age, no settlers had ever entered the area of Higashi-mokoto until 1906. The first settlers arrived at Higashi-mokoto in 1907 and started to create farmlands by cutting trees and clearing bush. In the initial periods those settlers had a most difficult time since there were no machines available, and they had to do everything by hand or with the aid of primitive tools.

However, they gradually succeeded in expanding farmlands and raised the so-called "easiest food crops to raise on roughly cultivated fields" like buckwheat and millet. Through time more cash crops were added (beans, flax, peppermint, and sugar-beet), and finally rice, which was considered most sensitive to cool weather, but nevertheless was daringly grown out of need or due to strong demand among themselves. For some years the village did not experience cool weather so production of rice increased rapidly and reached 390 hectares in 1930, which was historically the largest acreage of rice in the village.

Such a fortune, however, did not last long, because weather was cool thereafter for several years and long rainy season damaged the crops in the villages generally. As a result, the Government of Hokkaido and the Village Government decided not to recommend production of rice and other cool weather susceptible crops, but instead, recommended production of potatoes, sugar-beet, and one or two kinds of livestock (dairy cattle, pig, and poultry), which were considered "resistant to cool weather". This policy, since then, has been kept consistently until today.

## **Socio-economic development**

The population of the village, increased gradually with the development of agriculture, and reached 6,029 in 1957 then started to decline to 3,028 in 1985, around one half of the number in 1957. Since then, population in the village has become almost steady, and currently, the village has a population of 2,869. One of the serious problems being faced now concerning population is a rapidly increasing ratio of the older generation, which has already reached 24% of the total in 2001. This trend has continued further and there is now a serious worry and threat of lowering labor efficiency in agriculture on one hand, and an increasing expenditure for the welfare of the older generations on the other hand.

With regard to the ratio of population by industry, the primary industry (farming) occupies 50% of the total, the secondary industry (small scale processing, mechanic, etc.) 10%, and the tertiary industry (commercial dealers, civil servants, etc.) 40%.



The number of households in the village was 990 in 1965, and growth since then has been very minimal especially for the last four decades as follows: 933 in 1985, 903 in 1990, and 995 in 2001. However, the matter is different in the case of farming household. It has been decreasing sharply from 536 in 1965, to 246 in 1985, to 220 in 1999, and even to 167 in 2001.

### **Development of farm management**

The number of farms decreased gradually in Higashi-mokoto village, but on the average, sizes of farms had increased considerably because farmlands of those who had quitted farming were absorbed by other farmers. For instance, an average size of farm in the village increased from 7.3 ha. in 1960 to 31.5 ha.(4.3 times larger) in 2001. In the same way, gross sale of farm products increased from 1.37 million yen (11,420 U.S. \$) per farm in 1960 to 28.13 million yen (234,000 U.S.\$) in 1999, which was 23 times larger than that in 1960.

Currently, there exist two types of farming in the Higashi-mokoto Village. The first type is an upland farming (field crop production) which raises four to five kinds of crops in rotation and which considers wheat, potatoes, and sugar beets as major crops. Each major crop is quite resistant to cool weather, well protected by crop insurance program against natural hazards, or by government's price support program. Therefore, farmers consider this type of farming as very safe and reliable.

However, quite recently, trials were done to add cash crops like soy beans as one of the four-year rotation crops. This is rather easy to raise because there is no need for additional investment. Although soy beans are susceptible to cool weather, it generates higher income under ordinary weather conditions. During unfavorable conditions, loss of income is usually limited to one fourth and covered by insurance program. Another trial done is an introduction of two to three kinds of vegetables or flowers as one of the five-year rotation crops to increase cash income. In the case of vegetable, onion, yam, pumpkin, string beans, cabbage, carrot, and burdock, etc. are most popular, and in the case of flower, azalea, and cyclamen are highly appreciated by urban people. Azalea and cyclamen have also become very popular nationwide, and are highly regarded as products of Higashi-mokoto Village.

The second type of farming in this village is dairy farming. In order to get enough income and stability in dairy farming, farmers should have spent long years of "trial and error" period. It is generally recognized that dairy farming is quite safe for unfavorable weather, but yearly earning from the dairy farming is not as high as expected unless the respective farmer has a large acreage of farmland, considerable amount of capital, and higher level of technical know-how to operate large scale farming.

Generally, dairy farmers in the Higashi-mokoto Village are small holders of farmlands and do not have big capital, therefore, they have to make special efforts to get enough income. One effort to raise income is increasing the value of fresh milk by processing, or producing other milk byproducts. Thus, production of various kinds of processed milk products including cheese has become a major activity among village folks.

### **Development of dairy farming and overproduction of fresh milk**

Dairy cattle farming were first introduced in Higashi-mokoto in 1923 by some of the earlier farmers, but it was not successful due to lack of market for milk. The second trial was done in 1931 by other persistent groups under the support and program of the Hokkaido government. The Hokkaido government at that time was worried about increasing loss of fertility of the soil caused largely by successive cultivation of grains and beans. It then recommended the introduction of dairy cattle farming so the soil may regain its fertility through organic matters derived from the excrement of the dairy cattle.

To support the program, the government of Hokkaido adopted a new system called "Pregnant Cow Loan System", wherein pregnant cows were lent to farmers free of charge. Farmers were expected to get some income within a short time from the milk produced by the mother cow and they are to return the newly born baby cow to the government.

This policy functioned fairly well, and the number of dairy cows raised in the village increased up to 200 heads in 1940. This temporarily stopped during the World War II, but got revived after the end of the war under the same policy of the Hokkaido government. As a matter of fact, the number of cows per farm in the village in 1935 was 3 to 4 heads, but increased to 7 to 8 heads in 1962. A new policy for multiplying dairy cattle per farm was adopted in 1964 as a part of the nationwide "Farm Structure Improvement Scheme". In addition, the Kosen (Nemuro- Kushiro) Pilot Farm Project was initiated in 1967 through which an increase of dairy cattle per farm, improvement of grassland and quality of hay which are essential for improving milk quality were promoted. The Higashi-mokoto Village was successful in implementing the above programs, and was awarded twice by the national government in 1966 and 1967 for producing the best quality milk in Japan.

Under such supportive policies of the Central and Hokkaido governments, dairy cow farming in Higashi-mokoto became more popular and increased sharply from around 1,000 heads in 1966 to 3,800 in 1980 and to around 4,000 in 2003. However, due to some difficulties in catching up with technological advancement in dairy cow farming, the number of dairy farms decreased in recent years. However, the number of dairy cows per

farm had increased to more or less 80 heads, which is quite at par with some smaller but advanced countries in Western Europe.

Another important factor of notable development in dairy farming in Higashi-mokoto, particularly after 2000 was said to be attributed to the introduction of a “contract system in hay making”, which replaced the conventional system of individual hay making. The newly established corporation, consisting of a group of large scale machine operators, brought about higher quality of hay, which, in turn, contributed to the improvement of milk quality, and then, finally, to the increase of farm income.

Despite such achievement in developing dairy farming in Higashi-mokoto, the international competition with foreign dairy products became more serious with the advancement of free trade in the world. As cheaper foreign dairy products come in, milk produced locally lost its market resulting “political overproduction” of fresh milk. Because of this, dairy milk production generally became more problematic, and dairy farmers as well as administrators and politicians concerned were obliged to work for solutions to problems related to milk overproduction.

### **The efforts to produce cheese within the village**

Cheese processing in the Village accordingly began in 1979, approximately 30 years ago. Certainly, this grew out of the necessity to raise the value and use of fresh milk. Fresh milk production in Higashi-mokoto then continued due to the “cheese making” business in the Village.

Fortunately, time was very favorable for a small town or village, like Higashi-mokoto Village to initiate something innovative. Developing new industry or creating new source of income at the community level was done because of uprising nation-wide movement of “One Village One Product” and there were already successful examples in eastern district of Hokkaido, such as “potato processing” in Shihoro Town, and “wine making” in Ikeda Town, etc.

Under a social climate, provision of the budget by the Village government for encouraging experimental works on cheese making was easily accessed. As a first practical step, a small study group on cheese making was organized among the technicians in the Village, composed of high school teachers as in charge of food processing, agricultural extension officers stationed in the Village, Village government officers, and representatives of dairy farmers. The Village government provided the group with an initial research fund of one half million yen (4, 200 U.S. \$).

The study group, in order to learn recent techniques in cheese making, in Japan, paid a visit to the president and professors in charge of

dairy processing at Rakunougakuen University (University of Dairy Science) near Sapporo. The group, after having learned some cheese making techniques at the community level, succeeded in having an agreement with the University to participate in the scheduled trials. The group at the same time visited some cheese makers in the farms. After their training and observation tours, the group succeeded to produce four possible products out of milk, namely, cheese, milk curd, cheese-cake, and milk wine.

The study group also collected samples of 10 kinds of cheese from various parts inside and outside the country and organized a cheese eating party just to compare the tastes, and examine the possibility of producing the chosen best cheese in the Village. The "Camembert type cheese" was then unanimously declared as the best.

The group also searched for the most suitable tool and equipment, the kind of bacteria to be used for fermentation, necessary rooms and facilities, and also tried to master the skills and techniques for using them in the most efficient way.

At the outset, a laboratory of Higashi-mokoto High School was used for the tests but in order to control temperature and humidity as well as to avoid unexpected accidents like fire, etc., the group rented one of the public residential houses built and managed by the Village government, for the experimental works. The experimental works were practically conducted day and night, by three high school teachers with the cooperation of other members of the study group. Two years later, the group, after a long experiment, succeeded in making the best cheese in December 1979, which was immediately informed to the Village government and its Council. Both the mayor and all the members of the Council were so pleased with the information that they organized a special party for test eating. Thus, the so-called "Higashimokoto White Cheese" was born under the big cheers of the villagers.

In 1981, the Village government adopted a detailed plan to produce yearly 40,000 packs of cheese (containing 170 grams of cheese each) by processing a total of 72 tons of fresh milk. The "Higashimokoto Research Institute for Milk Processing" was built to implement the plan and 73 million yen (609,500 U.S.\$) was invested for the project.

In 1983, the Village government, to expand sales of the product, entered into contract with Tokyu Department Store (TDS) to sell the cheese made in Higashimokoto at all branch stores of the TDS over Hokkaido. At the same time, the village government remodeled surrounding areas of the research institute for creating the "Cheese Family Land" so as to invite more numbers of tourists and sightseers.

In 1984, the Institute began to experiment to produce another type of cheese and succeeded in producing "Gouda type cheese". The efforts to produce other types of cheese continued, and four other kinds of new cheese products were produced, namely, "Cream Cheese", "String Cheese", "Smoked Cheese", and "Cheddar Cheese".

In 1996, the Village government established a new building named "Higashi-mokoto Dairy House" which occupies an area of 426 square meters. It had research laboratories, a display room, and a hostel for the increasing numbers of tourists. To attract more tourists to this village the Village government further beautified the area by adding a special park (to be covered by phlox in spring) and building another hotel with hot spring. In addition, the government organizes annually the "Phlox Festival" in which special services of various kinds of dairy products (cheese, ice cream, cheese cake wines) as well as special dishes made of native products (vegetables, yam, and edible wild sprout, etc.) were provided. Thus, the Village government succeeded in transforming the old image of "remote, lonely, and poor Higashi-mokoto", to a "beautiful, progressive, and wealthy Higashi-mokoto".

### **Contributions of Higashi-mokoto High School to village development**

Higashi-mokoto High School was created in 1953 as a Branch of Bihoro Agricultural High School. Although the school was established under the big slogan of "Secondary Education for All" of the Hokkaido Government, there was no budget available for building an independent school building at the start. Teaching was done in a borrowed old building by two full-time teachers. After four years in 1957, a new school building was completed, and the school named Higashi-mokoto High School was established.

The story in constructing the school building was established. It is interesting to note that all farms in the village contributed one bale of beans to the Village government to help cover the shortage of funds in constructing the new school building. This just showed how farmers in the village were enthusiastic enough at providing their children with high school education.

The school adopted a "seasonal part-time system", wherein classroom lessons are only given one day a week during the crop growing season from April to October. Students are required to carry out "take home projects" on other days of the week. At this time, agricultural teachers usually visit students in their home farms to inspect and supervise. During the winter season from November to March, the school gives classroom lessons (including laboratory works) for 6-8 hours everyday.

Initially the school had few numbers of first sons as enrollees who are expected to be farm successors. However, after the enactment of the

Fundamental Law for Agriculture in 1962, the number increased. On the other hand, when the urban industry boomed in Japan, movement of village youth to the cities decreased high school enrollment to the extent that there were already suggestions for the Village government to close the high school in 1973.

The Village government however continued the operation and in 1974, a new direction of high school education in 1974 under the title of "High School Education from the Aspect of Life-long Education" was pursued. At the same time, "Community based Approach for Nurturing Agricultural Manpower" was explored in which freshmen students as they enter high school, were given lessons on "Foundation of Agriculture" as well as "All-round Farm Practices".

Here, students are assigned to take care of cyclamen seedlings which had been seeded in the previous fall and raised in the greenhouse. Students are also assigned for 14 months to take care of nursery plants, where they learn skills and techniques like preparation of soil for the plants, soil sterilization, transplanting of young seedlings, pest control, transplanting of matured seedling, etc.

As a second example, "All-round Farm Practices" will be carried out through raising seedlings of Azalea. In this case, too, Freshman students are also given 2,500 seedlings of azalea to be raised in home farms or school farms. Once the plants mature, students bring them to the school farm for transplanting and subsequently market them outside the school.

These experiences and training do not only educate students, they also raise income for the students and the school. A total of 6,000 pots of cyclamen were produced by the school, and they were sold to the nearby market at the price of 600 yen per pot, which made about 10 million Yen (83,300 U. S. \$) for the school and students.

In the case of azalea, 1, 000 seedlings out of 2,500 seedlings may be sold at the price of 350-250 yen per piece, which would make 350,000 ~250,000 yen (2,915~2,083 U.S.\$) per student. This will total to 7-5 million Yen (100,000~42,5000 U.S. \$ ) assuming the number of student per class is 30-20 students.

The school saves the income to be spent during the study tour to Okinawa, and Kyushu areas, and also for travel overseas to learn from farming experiences in Australia.

This unique approach and method in teaching produces good results especially at developing favorable attitudes among students like independence, creativity and "cooperation".

In terms of the practical know-how Higashi-mokoto School students are often top placers in many FFJ technical contests, public speaking contest, and project result presentations held in Nemuro region and in Hokkaido. These activities are well publicized by the media in television, newspapers and other media, hence making Higashi-mokoto High School very popular in Hokkaido. This, in turn, increased order for seedlings of azalea from all over Hokkaido, increased the number of high school applicants for registration from other towns and villages, increased individual income of the villagers, and increased the revenue of the Village government.

Since then until today, this philosophy, practical approach, and method have been continuously implemented by the Higashi-mokoto High School with some amendments. More vegetables are produced other than azalea and cyclamen. More study tours are being conducted in various places other than Kyushu and Okinawa. Additional subsidies are being enjoyed from the Village Council to conduct overseas trips for students, and for better use of income from sales of farm products.

## **SUMMARY OF DISCUSSIONS**

- 1) Higashi-mokoto is a small village located in Hokkaido, northernmost island of Japan. Because of its location, climatic conditions and remoteness from market, development of farming and farm life has not been easy for pioneering settlers in the pre-war periods.
- 2) However, farming developed quickly in the post-war periods, through a clever use of government policies, (land reform, modernized extension and improved farmers cooperative) and by the introduction of numbers of some innovations, such as new resistant crops to cool weather (sugar beets and potatoes ) and dairy cattle.
- 3) Dairy farming in the village has been remarkably developed in the last 40 years, but dairy products had a hard time competing in the international market especially with the coming in of cheaper dairy products.
- 4) To solve the problem of overproduction of fresh milk, Higashi-mokoto High School became not only a training institution for agricultural manpower, it also became the village experiment center to develop cheese and other dairy products under the financial support of the village government and the technical cooperation of the university.
- 5) Higashi-mokoto High School introduced a new concept and approach called the "Education through Practical Production". Cyclamen, azalea and vegetable production were introduced into the curriculum and were successfully implemented. The earnings were used in study tours to southernmost parts of Japan (Kyushu and Okinawa) and in overseas training on farming in Australia.

- 6) Other than the production of dairy products and introduction of new income generating enterprises, new programs related to tourism were undertaken. The village image was then transformed from being remote, gloomy, and poor to a village that is beautiful, happy, and rich.
- 7) All these success and achievements in agricultural and rural development are attributed to the untiring efforts of the dairy farmers themselves, appropriate support of the Village Government, and technical assistance of the university concerned, and great contributions of Higashi-mokoto High School. However, it should be noted that contributions of the High School was the greatest, especially at the early stages of development. As the villagers often say the Higashi-mokoto High School is not only an origin of the remarkable development of the village, it is the greatest actor in bringing about "affluence" to the village.

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### **Notes**

1. Higashi-mokoto Village was amalgamated with Memanbestu Town in 2006, and then, became to be called as Higashimokoto Section of Oozora Town.
2. In writing this paper, we were very much indebted for the hearty cooperation given by the staff of the village government and high school. I would like to express our sincere appreciation and thanks, in particular, to Mr. T. Kojima, Mayor of the village, and Mr. T. Ono, Principal of Higashi-mokoto High School.



# **Pursuit of Career in Agriculture: Preferences of the University of the Philippines Los Baños Agriculture Students**

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## **INTRODUCTION**

The University of the Philippines Los Baños (UPLB) is one of the six constituent universities of the University of the Philippines System. Like all other constituent universities of the System, it is a publicly funded academic, research and extension higher education institution. It started out as the UP College of Agriculture in 1909 and became a full-fledged, autonomous university in 1972. UPLB is mandated to train the country's needed manpower and to undertake relevant researches and extension services in agriculture, forestry, veterinary medicine and allied sciences. It now has nine colleges: Agriculture, Arts and Sciences, Development Communication, Economics and Management, Engineering and Agro-industrial Technology, Forestry and Natural Resources, Human Ecology, Public Affairs and Veterinary Medicine. It also has two schools, namely, the Environmental Science and Management, and the Graduate School (UPLB Website).

UPLB's College of Agriculture (CA) is one of the first three units organized in the University of the Philippines. It has the mission of elevating farming and agriculture from being a poor man's means of obtaining food to a thriving enterprise that is able to meet the demands of a growing market (UPLBCA Website). Its three objectives as a College are to:

1. "train and develop the manpower requirements for agriculture and rural development;

2. undertake research on immediate and long-term problems of Philippine agriculture for the advancement of agricultural science and technology; and
3. disseminate research findings and technology suitable for adoption by extension workers; provide the technical backstop to extension technicians; and conduct pilot action/research projects on agriculture and rural development".

UPLB CA offers the following major areas of discipline: Agronomy, Horticulture, Soil Science, Animal Science, Food Technology, Entomology and Plant Pathology. It also offers Agricultural Chemistry, a joint program with the College of Arts and Sciences. Its Graduate degree programs are offered through the Graduate School.

However, like many other programs in the country today, enrolment for BS in Agriculture at UPLB has dropped through the years. In fact, BS in Agriculture is one of the programs in the country today having the least number of enrollees (Castañeda, 2007.) This is true for all academic institutions offering the program throughout the country.

The issue however is not just decline of enrolment in agriculture education. Another issue that has surfaced recently is that in a recent study conducted by Lasco (2007), it was found out that about half of BS Agriculture graduates of UPLB for the year 2000 to 2005 are employed in non-agricultural related jobs. If this alarming trend will continue, this indeed will pose a serious threat to our agricultural labor force.

One of the most popular theories in economics of education is Human Capital Theory. This theory relates education to economic growth. It postulates that education increases an individual's productivity thereby increasing his earning potential. Most parents in developed countries are in this line of thinking. Parents make tremendous sacrifices in order to provide secondary and higher education for their children, believing that education is the way out of poverty. Children in their young age are left to the care of other relatives because parents, who find their salaries inadequate, work abroad to prepare for their children's college education. Filipinos, indeed, have a deep regard for education. Despite the high rate of unemployment and underemployment, education in the country is still believed to be the primary avenue for upward social and economic mobility.

### **Purpose of the Study**

Considering this Human Capital Theory, the recent issues in agricultural education as far as enrolment and job placement of agriculture graduates are concerned indeed emphasize the need to identify and

understand motivational factors luring people to agricultural-related or non-agriculture-related careers. This is particularly important because the Philippines, being an economy based mainly on agriculture, needs a strong agricultural labor force.

As Zamora (2002) puts it, "we have relied too long on relatively few breeders, few breeding strategies and on few formally trained scientists (who are not even farmers) for food security. With such a grim prognosis for the future, there is a glaring need to reorient economic policies and scientific support programs".

Gary S. Becker (2002), University Professor of Economics and Sociology at the University of Chicago, argued that no country can grow without a strong human capital base. Getting education however is not enough, because more important than getting tertiary education, is realistically choosing a kind of education that gives the graduates the opportunity to land into jobs that fit their interests, their training and one which addresses the real needs of the country.

It goes without saying therefore that other than making themselves better earners (as what Human Capital Theory postulates) agriculture graduates should also be able to use their acquired knowledge to build new tools for agricultural production and substantially increase the country's food security which is one of the real needs of the country.

This study was conducted to support and/or validate earlier studies on placement of UPLB agriculture graduates and to determine the factors influencing career choice in agriculture, the respondents' preferred career jobs and the motivating factors for choosing agriculture-related or non-agriculture-related careers.

Specifically, the study determined:

1. the factors influencing the students' choice to take Agriculture as a degree;
2. the factors influencing the students to choose their agriculture majors;
3. the careers or types of jobs the respondents wish or plan to have after graduation; and
4. the students' motivating factors for taking agriculture-related or non-agriculture-related careers.

## **METHODOLOGY**

Respondents of the study were obtained by complete enumeration of enrollees in the 11 undergraduate seminar classes in the first semester of SY 2007-2008. Respondents covered were 109 agriculture majors of the College of Agriculture, University of the Philippines Los Baños, Laguna who were in their senior standing representing the following major fields offered by the College: agronomy, horticulture, soil science, animal science, food technology, entomology and plant pathology.

The study made use of survey research design to attain the objectives of determining the college major and career choices of the respondents and describing the factors that influence their decision to choose their degree, their major, and choice to pursue agriculture-related or non-agriculture-related fields after college.

The study administered a questionnaire with both open-ended and close-ended questions developed to identify factors related to students' college, major and career choices.

The questionnaire was divided into four parts. Part 1 sought information about the respondents' personal characteristics and focused mainly on demographic information (e.g. age, gender, educational attainment and occupation of parents, etc.). Part 2 sought information about the respondents' career choice(s) wherein respondents were asked what they intend to do after finishing BS Agriculture and where they intend to work. A list of careers is provided in this portion of the questionnaire from which respondents can check their choices. A space is also provided where they could write their choice in case their choice is not among those listed. The listed careers are grouped into two: agriculture-related and non-agriculture related careers. Respondents are free to choose a career not related to his/her present course and were asked to rank their choices if they have more than one choice.

In Part 3, students were given statements reflecting the factors affecting their course major choice and career choice after finishing college. It is a 27-item career factor survey using a four-point Likert scale to determine level of agreements that students have on the given factors that affect choice of their course, their major, and their chosen career. Numeric values and levels of agreement were: **1** for *Strongly Disagree*; **2** for *Disagree Mildly*; **3** for *Agree Mildly* and **4** for *Strongly Agree*. The situational statements given were carefully constructed to reflect the factors affecting students' choices as cited in the literature review.

In Part 4, respondents were given a set of 10 statements concerning their career motivation factors to confirm their answers in the previous section

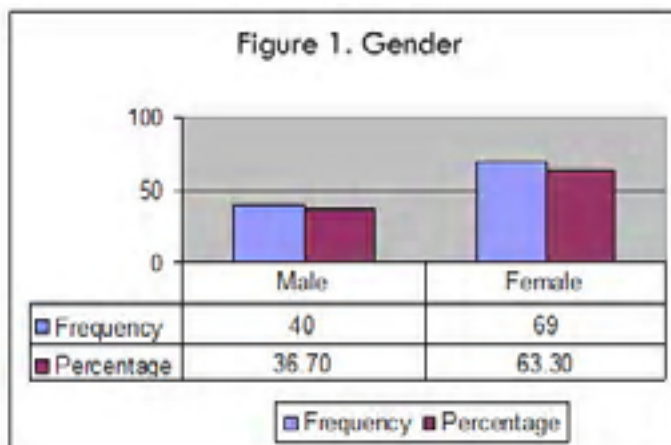
of the questionnaire. This section consists of statement reflecting the motivation factors and uses a four-point response scale ranging from: **1** for *Strongly Disagree*; **2** for *Disagree Mildly*; **3** for *Agree Mildly* and **4** for *Strongly Agree*.

Data were processed through the Statistical Package for Social Sciences (SPSS). Data analysis for all parts of the questionnaire was done by getting frequencies, means, percentages and standard deviation. Analysis of Variance (ANOVA) was used to determine the significant differences in the career choices of the respondents across major fields. Chi-square test was also employed as an analytical tool for categorical variables.

## RESULTS AND DISCUSSIONS

### A. Demographic Characteristics

Majority of the respondents were female (63.30%) (Fig. 1). Distribution of male and female students across major disciplines was significantly different (Table 1). Some majors were dominated by male students and others by female. Specifically, Agronomy and Animal Science as major disciplines were male dominated. On the other hand, major areas such as Entomology, Food Science, Plant Pathology, and Soil Science were more popular among females. These figures imply that both genders nowadays no longer mind pursuing agriculture as a degree which once upon a time was dominated by males and which is still true for such fields of study like engineering and the military.

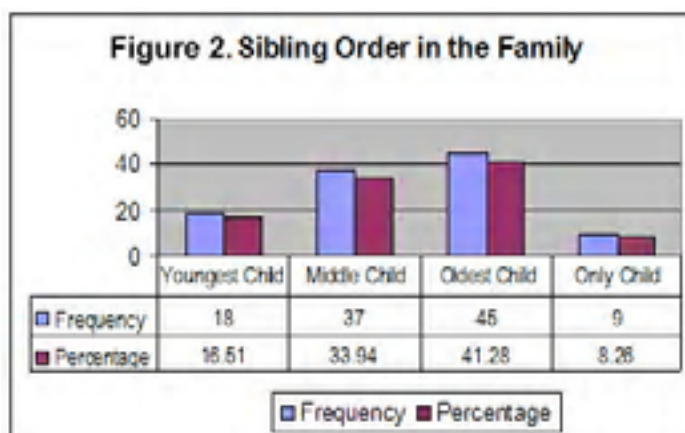


**Table 1. Distribution of Respondents by Gender and Major Disciplines**

Major	Gender		Total
	Male	Female	
Agronomy	11	9	19
Animal Science	10	9	19
Entomology	3	6	9
Food Science	6	27	33
Horticulture	8	8	16
Plant Pathology	1	5	6
Soil Science	1	6	7
<b>TOTAL</b>	<b>40</b>	<b>69</b>	<b>109</b>

Data for the sibling order in the family were also considered in the study as it assumed that this is one factor affecting career choice. Respondents who are youngest among the siblings tend to have better opportunities to study and choose more expensive courses since the older brothers or sisters who have finished their studies ahead and who already have earning capacities can already help the younger ones. In the same way, a student who is the only child in the family may also have more opportunities to study and choose a course of their liking.

In this particular study, majority of the respondents (41.28%) were oldest followed closely by respondents who were in the middle of the sibling order (33.94%) (Figure 2). Few were youngest (16.51%) and only children (8.26%) in the family. This result is quite consistent with common observations that youngest and only children usually take more expensive and more popular courses like nursing and computer science because they have more sources of financial support. This, however, will still have to be studied and verified by further studies.



The study also tried to look into the educational level of both parents of the respondents. This is in consideration of the possibility that while career choice planning is the primary responsibility and choice of the children, educational level of parents might somehow increase the value of students' perception of the value of education. Results of this particular study showed that a big proportion of both parents of the respondents reached or finished college, 60.55% and 68.81% for fathers and mothers, respectively (Table 2).

**Table 2. Parents' Educational Level**

Educational Level	Father		Mother	
	<i>f</i>	%	<i>f</i>	%
Elementary level/graduate	10	9.17	4	3.67
High School level/graduate	26	23.85	16	14.68
College level/graduate	66	60.55	75	68.81
Post Graduate	5	4.59	12	11.01
No Answer	2	1.83	2	1.83
<b>TOTAL</b>	<b>109</b>	<b>100.00</b>	<b>109</b>	<b>100.00</b>

This result supports the views of Blondal(2002) who cited that participation of young people in tertiary education is highly correlated with the educational attainment of their parents. In many countries, those whose parents have completed some tertiary education are about twice as likely to participate in tertiary education as those whose parents lack upper-secondary education qualifications.

In terms of occupation, fathers were generally employees and mothers were household keepers (Table 3). Worth noting is that only four fathers (3.67%) have agriculture-related jobs such as being a farmer or agriculturist which means that occupation of fathers had little, if any, influence on the respondents' choice of degrees. None of the mothers also had agriculture-related source of income. Again, this indicates that the respondents' choice of degrees was not influenced by the mothers' occupation or source of income.

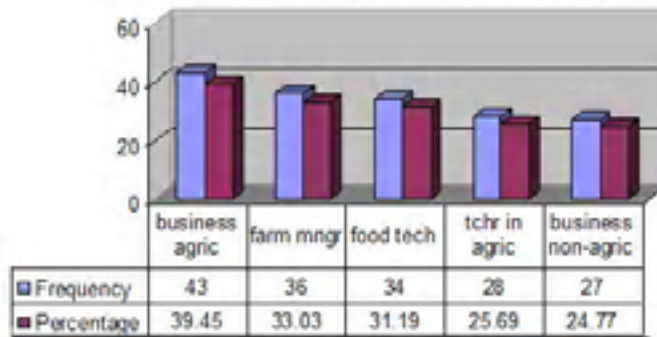
**Table 3. Parents' Occupation**

Occupation	Father		Mother	
	<i>f</i>	%	<i>f</i>	%
Agriculture-related	4	3.67	-	-
Business/entrep./self-employed	20	18.35	13	11.93
Educator	7	6.42	14	12.84
Employee	36	33.03	20	18.35
Housewife	-	-	38	34.86
No answer	6	5.50	8	7.34
None/deceased	11	10.09	6	5.50
Others	25	22.94	10	9.17
<b>TOTAL</b>	<b>109</b>	<b>100.0</b>	<b>109</b>	<b>100.0</b>

## B. Respondents' Career Choices

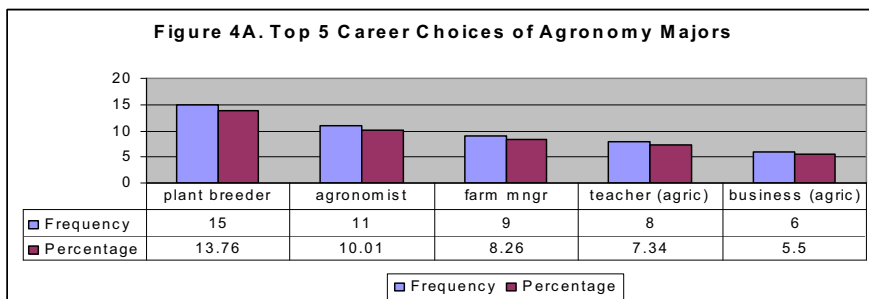
Among the 37 listed agriculture-related and non-agriculture related careers which the respondents were made to choose from, respondents' preference for agriculture-related courses was obvious. Top five most preferred careers were business in agriculture, farm manager, food technologist, teacher in agriculture, and business in non-agriculture enterprise (Figure 3).

Figure 3. Top Five Most Preferred Careers

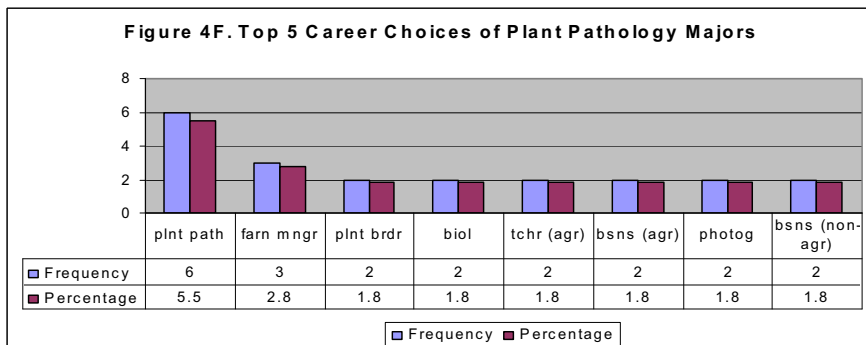
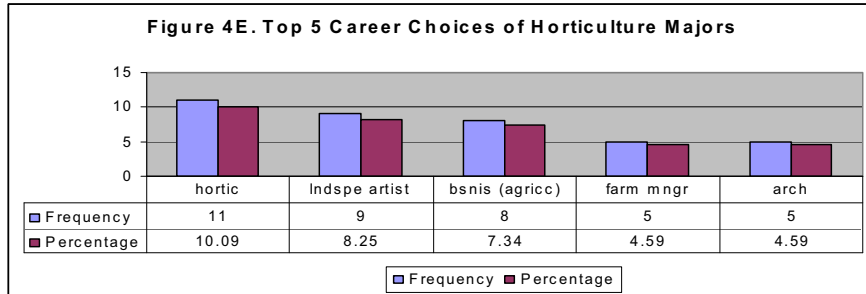
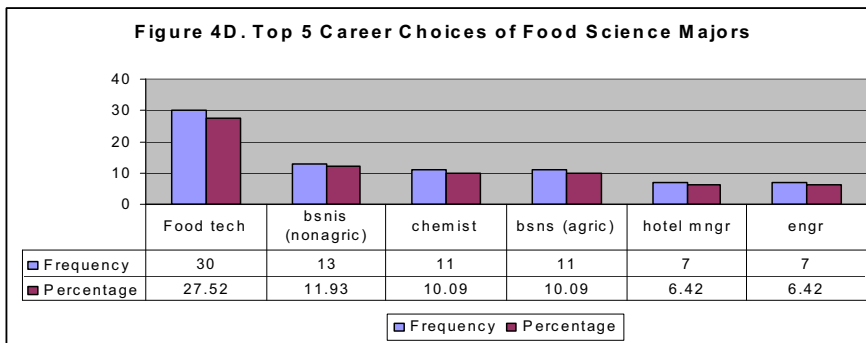
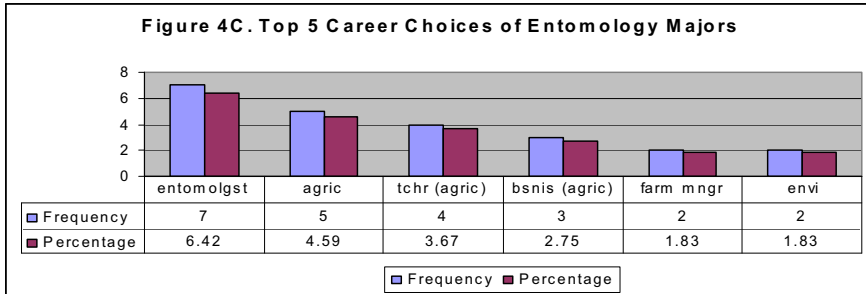
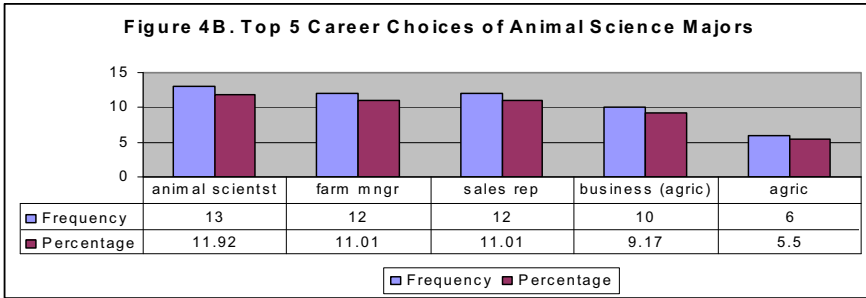


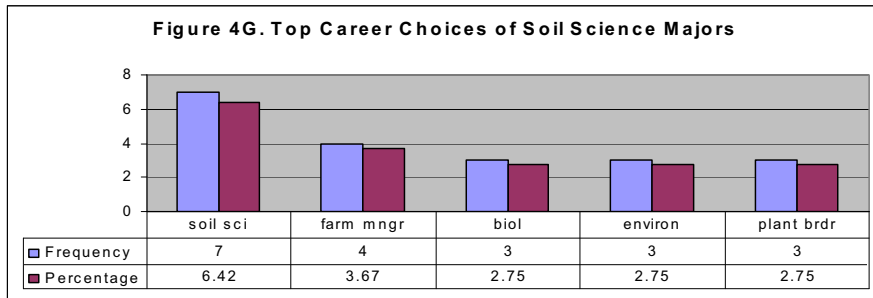
The study recognizes that the groups having greater number of respondents who participated in the survey like the food science majors may have biased the result as far as ranking of the most preferred careers are concerned. If the same students would stick to their own majors in choosing careers, food science will naturally have the greatest possibility among the seven majors of coming out in the top five preferred careers as shown in Figure 3 above. To get more accurate results in the ranking of choices, the study tried to analyze career preferences by group or major fields. Following their own major fields, UPLB agriculture students prefer to become plant breeders, animal scientists, entomologists, food technologists, horticulturists, plant pathologists and soil scientists as shown in the succeeding Figures (4A to 4G).

Figure 4A. Top 5 Career Choices of Agronomy Majors









Choice of agriculture versus non-agriculture career of respondents was also analyzed by major area or discipline using Analysis of Variance (ANOVA). Results showed that BSA students generally prefer agriculture-related careers or jobs after graduation as reflected in the first and second choices they made, regardless of the major discipline they are currently enrolled in (Table 4). However, significant differences were observed in the third choice made by students across major area ( $F = 3.06, p = .009$ ). Among the major fields, Horticulture majors would prefer non-agriculture career as their third choice. This might be explained by the demand for Horticulturists, particularly, landscape architects by private organizations, both locally and overseas.

**Table 4. ANOVA of Career Choice**

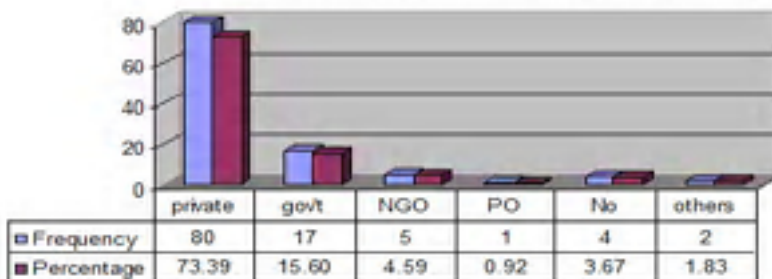
		Sum of Squares	df	Mean Square	F	Sig.
First choice	Between Groups	1.265	6	.211	1.644	.143
	Within Groups	13.083	102	.128		
	Total	14.349	108			
Second choice	Between Groups	1.504	6	.251	1.991	.074
	Within Groups	12.845	102	.126		
	Total	14.349	108			
Third choice	Between Groups	3.387	6	.564	3.063	.009
	Within Groups	18.797	102	.184		
	Total	22.183	108			
Fourth choice	Between Groups	2.667	6	.444	2.187	.050
	Within Groups	20.728	102	.203		
	Total	23.394	108			
Fifth choice	Between Groups	2.257	6	.376	1.663	.138
	Within Groups	23.065	102	.226		
	Total	25.321	108			

Similar significant result was obtained with regard to the fourth choice of students ( $F = 2.19, p = .05$ ). Food Science majors would prefer non-agriculture career as their fourth choice. This might be due to the demand for Food Science majors in food manufacturing industries which is largely dominated by private corporations or entities.

## Respondents' Workplace Preference

As to the respondents' preferred place of work, a big majority (73.39%) preferred to work in private institutions rather than in the government (15.60%) (Figure 5) and this is regardless of the major area they are currently enrolled in. This means that while UPLB agriculture majors do prefer to pursue jobs related to their own fields, their target employers are private companies and not government institutions involved in the implementation of agriculture programs in the country. Distribution of major disciplines by preferred place of work was not significant using ANOVA.

Figure 5. Respondents' Preferred Workplace



This result supports the opinion of Fernandez (2000) who said that agriculture students today tend to have “weak mass— and nationalist orientation who would prefer to work for big private companies rather than for local communities and resource-poor farmers.”

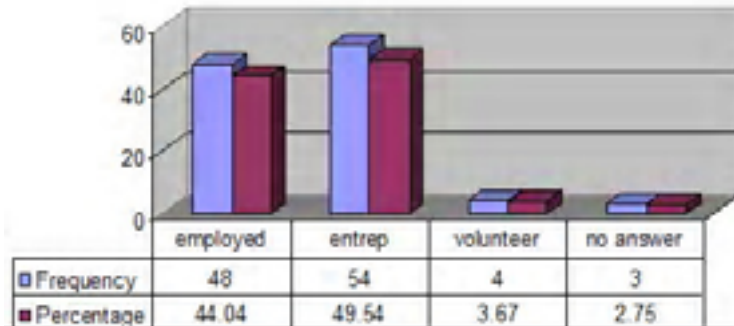
## Type of Work Preferred

Most UPLB agriculture majors (49.54%) want to become entrepreneurs after college while relatively fewer (44.04%) prefer to be employed (Figure 6). This indicates that other than the ones who want to get employed (as most graduates may want), a good portion of agriculture majors do want to treat agriculture as a business enterprise. Earlier study conducted by Daguy and Padua (1999) on supply and demand for higher education graduates in the Philippines citing that employment opportunities for agriculture graduates are not enough might help explain this. The same study may also help shed light to the study of Lasco (2007) which found out that about half of UPLB graduates for the year 2000 to 2005 were in non-agriculture-related careers. A new breed of agriculture entrepreneurs will be most helpful to the country as they are the ones who can help create jobs rather than the ones who get jobs.

## C. Factors Affecting Career Aspiration

Results showed that personal choice of BSA as a degree does not vary across major discipline. This means that regardless of students' field of study, choosing BSA as a degree is a personal decision made by the students.

Figure 6. Type of Work Preferred



Moreover, analysis showed that their choice of BSA as a degree is not influenced by certain demographic factors like educational attainment and occupation of both parents, gender, and sibling order. This indicates that students would still choose BSA as a degree regardless of parents' educational attainment and occupation, gender, and their position in the family. The analysis further showed that the choice of BSA as a degree is not significantly different between male and female students. Both gender groups equally prefer BSA as a degree program.

ANOVA was again used to determine whether certain demographic factors had influenced respondents' choice of agriculture major or discipline. Results showed that the students' choice of their major area or discipline is not influenced by certain demographic factors like father's educational attainment, mothers' educational attainment, gender, and sibling order. This indicates that students would still prefer the major area or discipline they are currently enrolled in regardless of parents' educational attainment, gender, and their position in the family.

On the other hand, there was a significant difference in choosing the major discipline across the different major areas especially on teachers or mentors being an influence in choosing major areas of discipline ( $F = 3.54, p = .003$ ). Analysis showed that the teachers/mentors have the greatest influence in choosing the major track or discipline of the Soil Science majors, in particular.

It also appears that the various dimensions or reasons for choosing a career are not influenced by certain personal factors such as the students' major discipline, parents' educational attainment, sibling order, and gender. However, findings indicated that certain motivation factors have influenced the students' decision in choosing a career in the future. These factors can be grouped into three categories, namely, *personality factors*, the value students place in plants and animals and their interest to be exposed in problem-solving related situation, intention to consider a career that will give them opportunities to lead; *environmental factors* like pursuing a job

that is unique from many others; and economic-opportunity factors like good pay and work in the metropolis.

## **CONCLUSIONS**

Respondents had displayed a certain degree of independence in their choice of degree and major which was largely a personal choice or chosen out of their own volition. Parents, family, friends or significant others had little influence, if any, to their college degree choice. Neither did respondents agree that their decision was influenced by past school and off-campus experiences or by certain limitations like tuition, grades, or proximity of the University to their homes.

The preference of UPLB agriculture majors for agriculture-related careers that are in line with their specific fields after college somehow runs counter to the job placements of UPLB agriculture majors as cited by Lasco's study (2007) whose main finding was that about half of UPLB graduates in agriculture for 2000-2005 are in non-agricultural jobs. One conclusion that can be drawn from this is that UPLB agriculture graduates have less employment opportunities or job prospects, forcing them to accept jobs that are unrelated to their academic training. Daguy and Padua's study in 1999 supported this, citing that "employment opportunities for Agriculture and Fisheries graduates are not enough even if the demands by industries and government agencies were combined..." Thus, according to the study, graduates of these programs are expected to engage in entrepreneurial activities.

The respondents' appetite and concern to serve the country are low as they generally plan to work in private institutions rather than in local institutions run by the government. This must be what Fernandez (2000) meant when she said that "...students are generally close-minded, and unaware if not uncaring of (agriculture-related) issues". Results of the present study also support Fernandez's (2000) opinion that students "tend to have weak mass- and nationalist orientation" as majority in the study want to work in private agencies, big companies or formal institutions instead of "serving for local communities and resource-poor farmers".

The strongest motivating factor considered by the respondents in choosing their degree, major and career is personality. In fact, they merely followed their own likes and inclinations when they chose their majors. They had agreed mildly that their being practical and realistic, the value that they give to plants and animals, their love for degrees and major fields that expose them to problem-solving related situations and their preference for unique majors that are different from many others in the University somehow affected their decisions.

Other than personality, opportunity is another motivating factor considered by the respondents in choosing their career. When it comes to choosing a degree, good pay, especially if it is abroad, seems to weigh more than being in line with one's degree and their desire to serve the country. Again, this might be in consideration of the fact that employment opportunities for agriculture graduates in the country are not enough or that the pay scale is not as attractive. This is despite the fact that they do feel their skills are needed in improving agriculture in the country. This might also explain why more respondents prefer to become entrepreneurs than employees as becoming entrepreneurs is commonly viewed as more financially rewarding than getting employment especially from government institutions.

Lastly, environment can also be seen as a motivating factor to them since they do desire to work for prestigious jobs in the Metro Manila area or abroad and they are generally excited to take jobs that are considered hot and popular. Analysis has also shown that teachers and mentors have the greatest influence in choosing the major track or discipline particularly among Soil Science majors.

## **RECOMMENDATIONS**

In the light of these findings, the study recommends that:

- UPLB should continue to give the graduates relevant exposure to employment and other opportunities in the agriculture fields. The school's collaboration with local businesses to provide work-based experiences, such as tours, practicum work, on-the-job training, and job shadowing can help the students.
- UPLB should continue to provide training on competency building to develop and effectively manage self-reliant, ecologically-sound and economically-viable agriculture or agriculture-related enterprises as first espoused by Zamora (2002).
- Considering the significant role of teachers and mentors, schools must strive to provide students with good mentoring and counseling programs as well as viable support groups that can help students discover their talents, strengths and career interests and for students to have informed and efficient career planning programs.
- UPLB should advocate a more nationalist curriculum to better develop the love and interests of agriculture graduates to serve the country's needs and interests. As advocated by Fernandez (2000), the agricultural education system must find means such that graduates will find interest or relevance in reorienting their

energies toward serving local communities and resource-poor farmers.

- Schools offering agriculture programs should do a market research or conduct a study on the developments in the market to determine actual demands for agriculture graduates. They may also design marketing strategies to sell the BSA as a degree program or profession.
- Program planners and course developers may consider broadening the BSA curriculum by diversifying to other agriculture-related fields like biotechnology, microfinancing and considering the multifunctionality of agriculture — its capacity and potential to do functions other than its being an economic enterprise: environmental, social and cultural.
- CHED and other granting institutions to continue to provide scholarship grants for BSA program to make BSA more attractive and entice potential BSA students to enroll.
- The Philippine government to continue strengthening the agricultural labor force by creating jobs for agriculture graduates and crafting better policies and support programs including policies that rationalize pay scheme of agriculture graduates. This is in response to professionalizing agriculture as a degree by the Agriculture Board Exam in 2003.

Only when agriculture graduates are provided with the right opportunities to land into careers that are economically viable, that fit their interests and training and that cater to the real needs of the country can UPLB's College of Agriculture be able to attain its mission of making agriculture meet the demands of a growing market and attain its objective of "training and developing the manpower requirements for agriculture and rural development".

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# **Career Development Issues of Undergraduate Environmental Education Program Students**

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## **INTRODUCTION**

The needs for career-related assistance among Korean college students are intense and complex. The majority of Korean high school graduates enroll in a college right after they graduate from high school. In 2006, 87.5% of general high school graduates and 68.6% of vocational high school graduates enrolled in a higher education institution (MOE & KEDI, 2007). There are conflicting views on whether the higher education should be vocational specific, but college students are increasingly concerned about the connection between their current education and their future career partly due to the tightening economy and the oversupply of college graduates.

For most of college students, a primary purpose for attending college is to prepare for a career, but often academic preparation in college is not enough to get the job they aspire. Career preparation becomes even more complex when their major does not dictate any specific career path or when the major does dictate a specific career path but does not provide sufficient and quality job opportunities. Undergraduate environmental education programs are typical examples of the latter because even though obvious from the program title, they are specifically designed to train future teachers but only a small number of their graduates can get a teaching job at a middle or a high school and there are not many job opportunities in non-formal environmental education. Career development assistance is an important process for all college students, but in the cases like undergraduate environmental education programs, it is even more crucial.

The fundamental rationale for providing career development assistance is from the fact that finding a satisfying employment is important for an individual to maintain his or her self-respect and dignity and a society has to facilitate it to secure its safety and stability (Little, 1970). Furthermore, when students do not see a meaningful connection between their education and their future career, they may not see the value of their education, which may lead student apathy and dissatisfaction in school.

To provide quality career development assistance, it is important to understand its clients. Even though college students share some career development needs, there are diverse sub-groups and their unique circumstances need to be considered in the career development assistance programs. The primary purpose of this research is to study the career development issues of undergraduate environmental education program students. Very little research has been conducted specifically on this matter. This study will enhance our understanding of their career development issues, which will provide useful information for planning and delivering career development assistance programs for undergraduate environmental education program students as well as other college students who have similar career development issues.

## **LITERATURE REVIEW**

### **A. The Development of the School Environmental Education in Korea**

In South Korea, the school environmental education started in the mid 1970s, when environmental pollution emerged as a social issue and people began to make noticeable efforts to conserve the environment. The new arrangements in the academic arena reflected the social significance of the matter. In 1973, a graduate school of environment was first established in Seoul National University and the openings of several college programs in the area of environment followed. The Korean

Educational Development Institute (KEDI), a government-sponsored research institute on education, set up a division for conducting research on environmental education.

In the 1980s, the school environmental education started to gear up as the 4th and 5th national elementary and secondary curricula that were announced in 1982 and 1987, respectively, emphasizing the "environment-related" component. Also, the Korean Society for Environmental Education was established in 1989 and began to publish its academic journal on environmental education in Korea, the Journal of Environmental Education. In addition, the division of "environmental education research" was set up at KEDI in the 1990s.

A turning point for school environmental education was when in the sixth national secondary education curriculum, "environment" became an elective school subject. Middle schools and high schools started to offer the course in 1995 and in 1996, respectively (Park, 2001). Subsequently, teachers were needed to teach the new environment course and the training of environmental education teachers became urgent. For a temporary relief, the government made a partial amendment to the pertinent regulations in 1994. It issued the environmental education teacher certificate to teachers who were already holding a certificate in another subject area, but attend 320 hours of classes on environmental education at a government-designated institution (Hwang, 1999).

However, the quality of teachers who were issued with certificates through the temporary teacher training programs was questionable. According to a survey study (Kim, Lee, Lee & Kim, 1995) conducted in 1995, 60% of the teachers accredited from the temporary training program did not feel confident in teaching environmental courses (Lee & Choi, 1998). Earlier, some scholars (Choi, 1991) claimed the need to establish new undergraduate environmental education programs to train environmental education teachers. After much discussion, four undergraduate environmental education programs and one additional program were approved to open and admit new students in 1996 and 1998, respectively.

## **B. The Current Statistics on Undergraduate Education Programs**

As of 2007, there are five undergraduate environmental education programs in Korea. Among them, four programs are in a College of Education and the other one in a College of Engineering. The annual admission size ranges from 15 to 30, 110 in total.

**Table 1. Undergraduate Environmental Education Programs (as of 2007)**

	Established Year	Annual Admission Size as of 2006(person)
Korea National University of Education	1996	20
Kongju National University	1996	20
Sunchun National University	1996	15
Daegu University	1998	30
Mokpo National University	1996	25

As of 2006, 10.4% of middle schools and 32.2% of high schools offer the environment course as an elective, but the number does not seem to be on the increase.

**Table 2. The Number of Secondary Schools offering the Environment Course (as of 2006)**

	Number of Schools Offering Environment Courses	Rate (%)
Middle School	312 (2,999)	10.4
High School(General Track)	463 (1,437)	32.2

Source: Ministry of Education and Human Resource Development and KEDI. (2006). *Statistics Yearbook of Education*.

The numbers of environmental education teachers recruited through the state exam for the last 8 years are shown in Table 3. For the year 2007, 138 candidates applied for 7 slots.

**Table 3. The Number of Public Secondary Environmental Education Teachers Recruited Through the State Exam**

Year	2000	2001	2002	2003	2004	2005	2006	2007	total
number of recruited	5	3	9	16	23	1	0	7	64

Source: Choi. (2006). The retrospection and vision of environmental education over the last decade in Korea. *Proceedings of the Environmental Education Conference*, 3-23.

### A. Career Development of Korean College Students

During college years, students explore, crystallize and specify career (Ginzberg, 1972). Their major career development needs include assistance in the selection of a major field, self-assessment and self-analysis, and decision making as well as assistance with access to the world of work (Herr & Cramer, 1996). The most typical sequence of college career guidance programs are 1) self understanding, 2) career exploration, 3) decision making and 4) preparatory action (Cho, Hwang & Kim, 2005).

Research shows, however, that Korean youths experience delayed career development compared to those of American counterparts. The scores of Korean college students on the most recently standardized career maturity inventory did not show the increase that is usually expected as they get older (Cho et al., 2005). Other studies also reported Korean college

students show procrastination in their understanding of social status of occupations, which may imply the possibility of their delayed self-understanding (Hwang, Kim & Yu, 2003; Hwang, Kim & Yu, 2004).

The reasons for the delayed career development of Korean youths may be explained by the lack of proper career guidance in elementary or secondary schools. Too much emphasis of K-12 education placed on the academic preparation for the college exam and career guidance is understood as mostly associated with the choice of a college and a major. Career development tends to be pushed primarily to the postsecondary level. Likewise, previous theories on college students' career development may not properly explain the characteristics of Korean college students and subsequently does not provide a valid foundation for the development of career guidance programs in higher education. This implies the need for rigorous studies on the career development of college students that can provide valid information on the development of career guidance programs.

The employment outcomes of college graduates became an important criterion in the evaluation of higher education institutions, hence considered an indicator of competence of a higher education institution. While increasing number of colleges and universities provide various types of career guidance programs, these programs often do not take the delayed career development of Korean college students into consideration.

## **RESEARCH METHODOLOGY**

For a clearer understanding of the context surrounding undergraduate environmental education program, an in-depth qualitative case study was conducted. Collecting data from undergraduate students and graduates suited the aim of understanding career development issues from the perspective of environmental education programs undergraduate students. Two graduates were included in this study because graduates were expected to provide additional information to undergraduate students who lack know-how about their college education and their career-related concerns. The subjects of this study consisted of 4 undergraduate students and 2 graduates: 1 freshman, 1 sophomore, 1 junior, 1 senior and 2 graduates. Only one student out of 6 respondents was female.

Qualitative data collected from the students were used to identify key career development issues. Semi-structured interviews were conducted through an instant messaging software program. Each researcher analyzed the information obtained from the interviews. Then, the results of the analyses of each researcher were compared and discussed to gain a richer understanding of the data under consideration. The researchers reached an agreement on the main themes related to the career development issues of the subjects.

The following exploratory research questions were asked:

1. How do undergraduate environmental education program students perceive their future career prospect?
2. How do they perceive the value of their college education?
3. What do they do to prepare for their future career?
4. What career development assistance have they received from their school?

## **FINDINGS**

### **1. The interviewees maintain a positive attitude regarding career outlook and the choice of career. Opinions however were not well founded.**

Regarding their future career, the students generally aspire to become a teacher, and other careers related to environment were considered alternatives. The study found out that the more specific the interest of the student is, the more detailed the career plan that was presented (Case 1, 2, 3, 4, 5).

“My first choice is to become a teacher. My second choice is to work for an environmental research center, and the third is a public official in the field of waste disposal.” (Case 1)

“I am considering two career options for now. The first one is to become a teacher, and the other one is to double major in biology and then become a researcher in the field.” (Case 2)

“I decided to pursue a career in the field of waste disposal as I am interested in it. I'm thinking about applying at the Environmental Management Corporation or other similar institutions.” (Case 4)

On the other hand, despite the fact that students are well aware of difficulties in accomplishing their career plan, such as the slim chances to pass the state exam for recruitment of teachers or the few and unstable job opportunities in non-formal environment education areas, they are generally optimistic about their job prospects. Although all career choices have elements of uncertainty in them, if the person knows how to select and obtain appropriate information and then is able to apply a comprehensive and appropriate decision-making process, career choice can be an essentially rational process (Herr & Cramer, 1996). However, the respondents decide on their career goals without accurate information and consider their chances in getting the decent job they aspire as only up to how well they are doing. The students seemingly rely on an unfounded

optimism about their future career. If a career plan is established without comprehensive understanding of the individual himself/herself as well as some realistic factors, it would not work as a viable guide to find a satisfying career. For instance, one of the graduates who have been working as an instructor of non-formal environmental education reported that after he started working, he came to realize that he should have considered the economic side of the job (Case 3, 4, 5, 6).

“My goal is to be one of the best authorities in the waste disposal field. I did not have a critical reason in choosing it. I just think that it would be better to recycle wastes than dispose them. I’m sure of this decision. I’m willing to go on in this field. (What are the chances that you get a job in the field that you have chosen?) It would not be easy to get a job on this field. But, it is also not completely impossible. I may not get a big-time job at first, but I may be able to get one after I acquire experiences and skills.” (Case 4)

“When I first decided on my career, I was just guided by my wish to teach children about environment. I was even seriously discussing with my friends about the possibility of working for several years to make money and invest the money to establish an academy for environmental education. However, when we were already working in a private organization, financial difficulties was among the serious problems we met.” (Case 6)

## **2. Career search and career preparation are done in an individual basis and the interviewee’s school do not provide much systematic career assistance.**

The interviewees repeated they do not receive systematic assistance in their career search and career preparation from their schools and efforts on this are rather done on an individual basis. They often get career-related information from students in the higher years which means that students who actively participate in the school program activities might be in a better position to gain information than the ones who don’t. While active participation in school activities should be encouraged, students who are not interested or who do not participate should be provided with other channels of information. (Case 1, 2, 3, 4, 5, 6)

“I received most help (about choosing my career) from the seniors. They are now working in various areas as a banker, a part-time instructor in a non-formal environmental institute, or an instructor at a private proprietary institute. I get to think about my career when I see them and listen to their stories about their work.” (Case 3)

"While participating in a group study, I got to hear a lot of stories and discussions from among juniors and seniors, which helped me find my job. That was the only career assistance I received." (Case 6)

The freshman and the sophomore feel they receive very limited help. They wish to have more communication with the seniors and get assistance for career planning. They have participated in career assistance programs in the school, but they did not think they were helpful (Case 1, 2).

"Certainly I don't have much information about careers. It is not easy to find the information. I don't know where I can find them... and it is overwhelming... So, I decided to prepare for my career myself although I have very limited idea about what I need to do." (Case 1)

"The seniors and the graduates are also struggling to find a job themselves, so there are no many opportunities to get a useful advice from them. This program is only 10-11 years old, so there are no many graduates yet. We only get to see them about once a year." (Case 2)

Field experience helps students in their career search and career decision. It seems to provide the students opportunities to get to know various employment types and opportunities, therefore, help them expand their list of career options (Case 2, 3, 5, 6).

"My career goal (to become a teacher) has not changed ... but I also think about working for an NGO ... well ... for non-formal environmental education ... I have not had such thoughts until I participated in the NGO program. The school curriculum was not helpful... I still want to be a teacher but I might pursue a career in the field of non-formal environmental education." (Case 3)

"I participated in a non-formal environmental education program during the summer vacation of my senior year. I worked as an assistant teacher. After the experience, I found it easier to make my mind about choosing my career. I like to watch students learn and change through environmental education." (Case 6)

Since 1999, more attention has been given to non-formal environmental education. The government financed 15 billion won for NGOs (Lee, 1999). Subsequently, the demand for teaching personnel for non-formal environmental education is on the rise. Unfortunately, a communication network is not well formed between the faculty members of environmental education programs and these NGOs. This disconnection puts a barrier



between the students and the job opportunities in non-formal environmental education. The students wish the faculty members could help the students prepare for more various careers.

Despite the increase in financial support for non-formal environmental education and increasing demand for its teaching personnel, they do not create many quality job opportunities, especially in the economic aspect. Lee, Choi & Choi (2002) reported that non-formal environmental education in Korea is provided mainly by small NGOs, which are inadequately supported by the government and often financed by the membership fees (case 3, 6).

"It is important to maintain a continuous communication channel with NGOs. Unfortunately, the faculty members are not interested in non-formal environmental education and they do not know anything about it." (Case 3)

### **3. They did not see the relevance of the curriculum of their program to their future career.**

Most of the interviewees reported that they want to become an environment teacher. However, they did not think the program curriculum would be helpful in preparing them for the state exam and for teaching. The other students contemplating on other environment-related careers did not see the merit of their curriculum, either. The students who aspire to be a teacher have dissatisfaction about their school curriculum because its main focus is on environmental engineering. Most of the faculty members are environmental engineering majors. The students who consider careers other than teaching, for example, a job on waste disposal, find their program curriculum unfavorable to them too because their program does not provide as rigorous training as that of the environment-related programs, like an environmental engineering program (case 2, 3, 6).

"I am not satisfied with the quality of the program. The program is called "environmental education program," but we only learn environmental engineering, not environmental education. The professors should reconsider the relevance of the curriculum. The program should increase the number of environmental education courses and reduce that of environmental engineering courses. I want to learn about environmental education... About a half of the students want to be an environmental education teacher but chances for them to learn are slim. So, they are also looking for other careers not related to environment, or environmental education." (Case 3)

"In 1996, when this program first opened, there was not even one faculty member who was an environmental education

major. All of them were engineering or natural science majors. So, the composition of the faculty members did not fit with the purpose of the program. Currently, the program offers some courses on teacher training, but it seems obvious that additional faculty members to teach environmental education are a real need." (Case 6)

There have been conflicting views on whether it is desirable to set up "environment" as a separate school subject and it still remains unsettled (Jeung, 2004). This uncertain status of the "environment" in the school curriculum subsequently puts undergraduate environmental education programs at a more disadvantageous position.

The students were hoping they can benefit from the close connection between their program curriculum and their future career. The fact that the majority of the graduates are working in the fields that are not related to environmental education may present profound implication as to how the students value the education they get. This indicates the need for school career guidance programs for students to acquire skills in exploring careers and in establishing better career plans (case 2, 6).

"Many graduates are employed in the areas not related to environmental education. For example, some of them work as instructors at private proprietary institutes, recreation instructors, fund managers, or bankers." (Case 2)

"College students who just graduated from high school and enrolled in college need help to make right choices in their school life and career." (Case 6)

## **CONCLUSION**

The findings of this study present important career development issues in the undergraduate environmental education program. First, despite the dismal employment outlook in the area of environmental education, the students tend to limit their career options strictly within their college major. It is an interesting finding because even though most of the students did not choose their major with much consideration of their interest or aptitude or career prospect, their career plan is bounded by their choice of major more strongly than expected. The students seem to skip the process of self-understanding and obtaining occupational information and focus on setting a specific career goal and hope for the best.

Second, they do not receive much systematic assistance from their school. Given the inadequate career guidance in K-12 education and the delayed career development of Korean youths, the importance of comprehensive career development assistance in higher education is

unquestionable. Students are well aware of their limited chance in becoming a teacher and need to plan alternative career paths. For these students, diverse experiences in the areas of environmental education or environment-related areas seem very helpful for their career development. However, the students reported they do not receive systematic assistance in exploring their career choices and making career decision from their school, therefore, these efforts are conducted individually. The finding that they usually get career-related information from their college seniors implies that individuals who are more actively involved in school and exposed to more contacts with seniors have relatively more advantage over students who are not. If the school can intervene and facilitate the career development of its students through arranging the contacts between undergraduate students and alumni and providing information, more students would benefit.

Third, this study shows where the circumstances of undergraduate environmental education programs and their students are placed in. The controversial status of "environment" as a school subject contributes much to the unpredictable career outlook for the students who aspire to be an environmental education teacher. In addition, the students do not see the merit of their programs' curriculum. The adequacy of the curriculum and the composition of faculty members of environmental education programs need to be examined in order to secure its competitive edge as well as to improve the versatility of the program.

A few preliminary implications for practices related to career development in college and universities may be drawn from the findings reported in this study. First, research indicates that undergraduate environmental education program students appear to be in need of comprehensive career development assistance ranging from exploration of job opportunities related to majors, to development of job-seeking skills, to general issues of career preparation and choice.

Second, students are in need of experiential modes of career exploration to clarify their interest and understand the world of work. To expand their career options, the school and the faculty members of the program need to make an arrangement of opportunities to help the students explore diverse careers.

Third, the results of the study indicated that career development assistance for these students should start at early college years. Career assistance has been often equated with job placement; therefore, freshmen and sophomore tend to be excluded from the service. However, career development is not a one time event and to help the students make a viable career plan, it should start early.

Fourth, the results of the study show that these students may need

help in exploring diverse opportunities related to their major as well as other academic areas. Although it is desirable to find employment related to their major, when there is not sufficient job opportunities related to their major, or when students find other areas more suitable to them, viable alternative routes should be presented. Double majors and transfer of majors would be some of the examples.

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# **Introduction of a College Curriculum Track for Training Future Farmers Funded by Korean Ministry of Agriculture and Forestry: An Evaluation Framework and New Directions**

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## **INTRODUCTION**

### **Need for the Study**

Agriculture in Korea is now facing a great challenge for domestic and international reasons. Decreased number of farm population, avoidance of farming as a work-field among young people, low status of agricultural industry, and fluctuations of farm-product prices are the major concerns within the country. Along with these, international negotiations such as WTO and FTA are imposing an open market for farm-products. In particular, dramatic decrease of farming population during the industrialization of the country and the current aging and feminization of agricultural human resources has lowered the quality of its workforce (Kim, 2006).

According to the 'Research on Agriculture and Fishery 2005', the National Statistical Office announced that farm population was estimated to be approximately 3,430,000 as of December 1, 2005. This data indicates a decline of 14.8% compared to the estimate made in year 2000. During the last five years, Korean farm population decreased from 8.7% to 7.3% in total. Moreover, speculating on age group of farm population, the age group of under 40s has decreased, while age group over 50s has increased. Aging of farm population seems to have intensified. According to "Developing Mid and long term indicators in 2030, Agricultural field", decrease of farm population will continue from 3.4 million in 2004 to 1.99 million in 2014, with a decrease rate of 42 %, due to open market of agricultural products and exceeding death rates over birth rates. In 2030, population is expected to decrease up to 1 million and 18 thousands (Korea Rural Economic Institute, 2006).

Therefore, it became very important to develop agricultural human resources in order to resolve these problems. Provision of sufficient education opportunities for people who are employable and already employed in farming has become very crucial.

Since 1981, the Ministry of Agriculture and Forestry has offered financial support to more than 1,000 successors of farmers every year. The Ministry has also provided agricultural materials, equipment, and facilities to agricultural colleges. On top of this, in 1997, the Ministry established the Korean Agriculture Institute to bring up specialized cultivators who can confront worldwide competition of agricultural products in the open-market after UR. This allowed advanced quality of educational support of a total of 1,433 graduates from this Institute at the end of 2006. In addition, the Ministry established a training system for farmers from other countries to solve the problem of under-population in agriculture. Currently, there are 1,994 foreign farming enthusiasts working as trainees in Korea in 2006.

Despite these governmental efforts, lack of future farmers in the farming industry is still the major concern. The Ministry of Agriculture and Forestry suggested that at least 4,500 workers should be recruited every year to the field to diminish the serious level of under-population. In other words, regardless of the effort that Korean ministry is making such as founding specialized institutes, settling foreign-trainee system, organizing funds and various support systems to hold farm population, the number of inheritors in farmland is definitely insufficient to improve agricultural managements in the future. Hence, it became critical all the more to keep hold of students in agricultural colleges and to promise them a better future.

For the reasons mentioned above, the Ministry of Agriculture and Forestry introduced the Chang-up track System (CTS) to the College of Agriculture and Life Sciences in 2006. The system ascertains young people who are interested in the field to stay in by protecting their working conditions, providing on-site experiences and offering proper education.

Hence, attempts for successful and effective management of CTS program are required at present. To do so, limitations and criteria must be specified. For example, differences between CTS and other enterprises in former years must be distinguished. Its adequacy based on the analysis of case studies must also be proven. It is necessary to determine the factors leading to success or failure of the program and what can be done to improve its present conditions. Moreover, the models and principles for annual evaluation provided by the Ministry of Agriculture and Forestry must be scrutinized in detail to determine whether the program is conducted appropriately.

## **Purpose and Objectives**

The purpose of this study was to review the justification, evaluation framework and management of the College Curriculum Track for Training Future Farmers known as Chang-up Track System (CTS), which has been introduced by the Ministry of Agriculture and Forestry to cultivate future farmers since 2006. The specific objectives addressed in the study were to review the justification of CTS supported by the Ministry of Agriculture and Forestry; to analyze the management of three CTS cases; to assess the three CTS programs based on evaluation framework for the Training and Education for Farmers Evaluation by the Ministry of Agriculture and Forestry in 2006 (Na, 2006); and to suggest ways to improve the management and evaluation of CTS.

## **Research Methods**

The research data were taken through literature survey case analysis, observations, and standard assessments of agricultural education and training established by the Ministry of Agriculture and Forestry in 2006.

The literature review was conducted not only to justify the reasons for applying CTS and its assessment system, but also to suggest better strategies for educating people engaged in farming. Published papers, reports on CTS case studies, and consequential data of the program and organizational group were typically used as reference.

The analysis of case studies was undertaken to discern the factors that support and/or oppose the CTS administration. Statistics and CTS-related articles issued by the participating colleges. People in charge of CTS program and on-site evaluation were also interviewed.

Monitoring of the program was done by understanding the current situation of the three participating educational systems and identifying their perceived problems. Monitoring was done from June 2006 to the beginning of December 2006. Administrators of CTS were interviewed over the phone and on-site. Phone-interview was repeated every seven to ten days. Data on operating issues and problems were collected, recorded and analyzed. Frequency of on-site interview was based on schedule of the institutions. Data related to their operation were analyzed and data on trainees' response and learning process were collected.

## **BACKGROUND ON THE CHANG-UP TRACK SYSTEM**

Since 1960s, movement of Korea's human and material resources from the agricultural district to the cities brought about by economic growth and industrialization was rampant. The support and investment from the government was also deemed not enough. Agriculture started to dwindle because farm house income was lower than those in the city. This was also

because the income of farmhouses decreased and farm labor force suffered as people moved from agricultural to non-agricultural areas. As shown in Table 1, farmers were aging and number of farm managers was steadily increasing since 1985. In 1985, population of farmers under 30 years old was 51.3%, but decreased to 22.9% in 2004, a decrease of about half compared to previous years. Farm managers, aging 30 to 49 used to keep a certain rate, but in 1985, farm managers under 30 years old decreased rapidly to 4.4%, 0.8% in 1995, and 0.1% in 2004. Because of this sudden decrease and aging of farmers and farm managers, the number of future farmers and vitality in farming industry will be at stake causing a problem in unifying agricultural society in Korea.

**Table 1 Farm house population trend in age (Unit: People)**

Division	1985		1990		1995		2000		2006	
	Farm population	Farm managers	Farm house population	Farm house manager	Farm house population	Farm house manager	Farm house population	Farm house manager	Farm population	Farm manager
Under 30	4,368,180 (51.3)	83,804 (4.4)	2,914,243 (43.7)	36,719 (2.1)	1,677,571 (34.6)	12,311 (0.8)	1,137,984 (28.2)	7,270 (0.5)	710,058 (21.5)	1,624 (0.1)
30-49	1,846,530 (21.7)	789,297 (40.9)	1,448,948 (21.8)	593,685 (33.6)	1,051,618 (21.6)	406,695 (27.1)	883,719 (21.9)	321,983 (23.3)	645,143 (19.5)	207,405 (16.7)
50-59	1,128,991 (13.2)	582,097 (30.2)	1,110,983 (16.7)	583,964 (33.0)	867,002 (17.9)	447,256 (29.8)	676,367 (16.8)	348,067 (25.2)	601,418 (18.2)	302,053 (24.5)
Over 60	1,177,372 (13.8)	470,671 (24.5)	187,148 (17.8)	552,665 (31.3)	1,254,889 (25.9)	634,483 (42.3)	1,332,995 (33.1)	706,148 (51.0)	1,347,555 (40.8)	734,000 (59.0)
Total	7,343,701 (100.0)	1,925,869 (100.0)	5,474,174 (100.0)	1,767,033 (100.0)	3,596,191 (100.0)	1,500,745 (100.0)	2,698,070 (100.0)	1,383,468 (100.0)	3,304,174 (100.0)	1,245,082 (100.0)

Source: Na. (2006), p.23-25

Also, the number of students and farm employment rate of graduates is steadily decreasing even in agricultural schools who should take the role of educating new farming workforce. In 1990 to 2002, the number of students in the agricultural college, considered higher education institutions in agricultural areas, to have decreased by 68%. Agricultural universities also decreased by 47%. Farming employment rate is only 5% (Kim, 2003). Therefore, to improve condition and competency in education for the future agricultural workforce became a mission.

To educate the next generation of agricultural industry leaders, the government and the Ministry of Agriculture and Forestry operated an agricultural workforce developing project supported through a national fund, beginning in 1981. Succeeding farmer educating projects, like scouting for young men with passion in farming, were supported systematically to develop a viable agricultural work force for the future and longevity of agriculture. Costs for agricultural management and initial expenses in



farming, by those who are under 35 years old trying to settle in an agricultural area within 5 years were provided. Educating future farmers project was able to identify 127,000 individuals from 1981 to 2006, and spent almost 2.5 billion won for them (Ministry of Agriculture and Forestry, 2006).

In 1990s, the education institute support policy was operated for educating future farmers. At that time, because there were few agricultural universities to carry out workplace education and the farming employment rate of agricultural school graduates was extremely low, they provided equipment, resources etc. to 9 self-management agricultural schools in each province (which is called 'Do' in Korea) and 14 agricultural universities. Also, legitimate support was made such as establishing advanced country-type Korean Agricultural College in 1997 to educate exclusive agricultural workforce who will sustain technical agriculture and knowledge industry. Legitimate support was made such as establishing an advanced country-type Korean Agricultural College in 1997 (Kim, S. S., 2003). Korean Agricultural College increased distinction from the other theory-based agricultural universities by reinforcing the field-based education relying on the theory and practice, despite the continuous decrease in farming population, aging of farmers and the graduates of agricultural high school and university avoiding to get a foot into the agricultural field (Na, 2004). Also, the Korean Agricultural College succeeded in getting the lead role as future farm workforce institute by producing 1,268 graduates and getting a high farm managing employment rate of 95% in 2007.

Regardless of these efforts, the total number of educated workforce that increased until mid 1990s, gradually decreased after 1995. The reasons, as already cited were decrease in enrolment in the agricultural school and decrease in number of families settling in the agricultural areas due to economic growth and rapid industrialization.

The farm population has decreased steeply by about 7% compared to the total population in 2004. Agricultural infrastructure has also been weakening with the aging of agricultural workforce structure. Managers over 60 years old for instance are about 60%. The objective of educating workforce in specific field is to educate 70,000 households to work full-time in rice farms, 110,000 households to engage full-time in horticulture, and 20,000 households to work full-time in stock raising. Educating for new workforce plan is a project aimed to train annually about 4,500 individuals to be settled down in farms. But as shown in Table 2, farming workforce successors in Korea was 45,163 individuals in 2005, which had decreased by about 95% from 926,656 in 1980.

By investing in human resource development, and in order to educate young farmers with new set of knowledge, technology, and management skills, an agricultural education system reorganization plan was setup in 2006. This emphasized acceleration of inflow of young and

competent new workforce which train young people to learn to make money while attaining the agricultural education objective.

On the other hand, CTS, operating as a model in the agricultural education system reorganization plan, was introduced in 2006 emphasizing the workplace-based farming education. Chang-up tracking system identifies sophomore students who wish to manage a farm after they graduate, and train them by connecting field theory and practice, and giving opportunities to benchmark some best practices in the country. Funds allotted to schools using the Chang-up tracking system is 230 million won intended to develop teaching materials, to cover workplace education cost, successful case study education managing cost, and also for scholarship or training abroad to be awarded to excellent students.

**Table 2 Succeeding Farming Workforce in Yearly and Scholastic**  
(Unit: People)

Year	Total Succeeding Farming Workforce	No Education	Primary School	Middle School	High School	University Under 3 years	University Over 4 years
2005	45,163 (100.0)	199 (0.4)	1,317 (2.9)	3,315 (7.3)	21,018 (46.5)	7,463 (16.5)	11,851 (26.2)
2000	151,503 (100.0)	794 (0.5)	7,085 (4.7)	15,962 (10.5)	80,365 (53.1)	20,461 (13.6)	26,836 (17.7)
1995	197,161 (100.0)	1,551 (0.8)	13,841 (7.0)	30,070 (15.3)	112,059 (56.8)	14,467 (7.3)	25,173 (12.8)
1990	291,172 (100.0)	1,123 (0.4)	18,181 (6.2)	59,907 (20.6)	169,011 (58.1)	16,507 (5.7)	26,443 (9.1)
1980	926,656 (100.0)	5,744 (0.6)	199,119 (21.5)	344,831 (37.2)	338,787 (36.6)	19,816 (2.1)	24,103 (2.6)

Source: Korea National Statistical Office. (2005). Agriculture Census.

As shown in the table above, although the farm-settlement rate of graduates is low and there are few future farmers, Chang-up tracking system is a very significant project because it can positively produce agricultural university students who are young and competent, and who are workplace-based experts, that will pursue farming as a career.

### **Three Operation Cases of a Chang-up Track System**

#### **Initial Stage**

Chang-Up system was introduced as a business case in 2006 and was financially supported by the Ministry of Agriculture and Forestry. In 2006, three universities (Kangwon University, Kongju University, Jeju University) were identified and selected to have enough competency to develop future agricultural workforce and experiment stations using the system in their operation.

During the first year of its operation, the Chang-up system was initially aimed at attracting and inspiring agricultural students to work for agriculture

and settle in rural agricultural areas where they are given systematic training. At the same time, it helps the universities carry out the social function of solving social problems in the field. It develops professional agricultural managers, develops the ability of individuals to settle in rural areas and establishes networks for sustainable rural settlement.

### **Operational Stage**

The Chang-Up System was operated for 160 students by 3 universities. The curriculum of Chang-Up tracking system, unlike the traditional agricultural education that focused in theory and lecture, uses practical approach and includes on-farm on-the-job training. Trainees learn from the success, experiences and the best practices of the farmer leaders in the country. Table 3 shows operation of CTS in three universities in 2006.

CTS was operated in the Agricultural College in the three universities, which had different structures and set-up. In the case of Kangwon University, it has three agriculture-relevant colleges which include the College of Agricultural and Life Science, College of Animal Life Science, College of Forest and Environment Science. Among these three, the College of Agricultural and Life Science was the college that used the program in its operation. It is comprised of Applied Plant Sciences Program, Applied Biology Program, Regional Infrastructure Engineering Program, Biological Systems Engineering Program, Department of Horticultural Science, Department of Biological Environment, Department of Agricultural and Resource Economics. Therefore experts from various departments participated in the program. Three departments from College of Industrial Sciences of Kongju University (Department of Plant Science, Department of Horticultural Science, - Department of Animal Resources Science) participated in the program.

In the case of Cheju University, 4 departments in the College of Applied Life Sciences joined, namely, Department of Horticultural Science, Department of Animal Resources Science, Department of Applied Industry Economics, and Department of Plant Resource Environments. Accordingly, compared with other two Universities, professors in Cheju University were the most multi-disciplinary as they have different fields including horticulture, animal science and agricultural economics. This is common among universities adopting the Chang-up Tracking System where fields of the operating team vary from plant science, horticulture, animal science, and agricultural economics.

Kangwon University, requires 42 credit hours from two related majors (double major), and theoretical subjects can be taken from the previous agricultural curriculum. Also, 6 credits from the student's own major are credited in the Chang-Up tracking System. In the case of Kongjoo Universities 42 credit hours are required from two related majors (double major) and

**Table 3. Operation of CTS in Three Universities in 2006**

		Kangwon University	Konju University	Cheju University
<b>Department</b>		Applied plant sciences program Applied biology program Regional infrastructure engineering program Biological systems engineering program Department of horticultural science Department of biological environment Department of agricultural and resource economics	- Department of plant science - Department of horticultural science - Department of Animal Resources Science	-Department of horticultural science -Department of Animal Resources Science -Department of Applied Industry economics -Department of Plant resource environments
<b>Form of operation</b>		Related major curriculum (Double major)		
<b>Curriculum</b>	<b>Existing curriculum</b>	Production subject Distribution and marketing subject	Production subject Distribution and marketing subject	Production subject Environment-friendly agriculture Management of distribution
	<b>New curriculum</b>	- Internship at leading farm - Case study of successful farmer - On the spot study in developed foreign country for excellent student - Regular meeting with field farmer	- Internship at leading farm - On the spot study in developed foreign country for excellent student - Regular meeting with field farmer - Special program	-Internship at leading farm -On the spot study in developed foreign country for excellent student -On-the-Job Training and Field Trip
<b>Selection of student</b>		Total 50 students - 50 students expecting entering second grade - people who has farming base preferred - woman applicant preferred	Total 50 students - 50 students expecting entering second grade - people who has farming base preferred - woman applicant preferred	Total 60 students -basic :40 students(students expecting entering second grade) - people who has farming base preferred - woman applicant preferred
<b>Time required</b>		Total 1,936 hours -Theory 1,110 hours -Field Trip and Internship 826 hours -On the spot study in developed foreign country 80hours(10 days)	Total 1174 hours -Theory 450 hours -Field Trip and Internship 450 hours -Seminar 1day 2nights - On the spot study in developed foreign country 32hours(4days)	Total 1,024 hours -Theory 228 hours - Field Trip and Internship 652 hours - On the spot study in developed foreign country 144 hours(18days)

Source: Kanwon University(2006). Plan of agricultural settlement education of agricultural college. Kangwon University.

Source: Kongju University(2006). Plan of agricultural settlement education of agricultural college. Konju University.

Source: Cheju University(2006). Plan of agricultural settlement education of agricultural college. Cheju University.

subjects on theory can be taken from the previous curriculum from the College of Agriculture. Credits which are taken either from students' major or from Chang-Up Tracking System were credited.

Unlike other universities, Jeju University selects 40 students from the sophomores and 20 students from junior and senior level. The sophomores will need to take 42 credit hours and subjects on theory can be taken from the previous curriculum. For juniors and seniors, 15 credits were required to be taken. All three universities were using the previous curricula from the College of Agriculture. In the Chang-up, only internships, field practice, and overseas training are the newly opened subjects. However, these are not credited in most cases, because newly opened subjects are reorganized just recently.

The Chang-up tracking System has transformed the theory-centered education to practical exercise. Required activities include case study on successful farming, regular meeting with field farmers, and on-farm study in a developed foreign country by students who excel in class. The three Universities differ slightly in terms of selection standards but they are similar in the major criteria of accepting only students or applicants who are determined to pursue agriculture-related careers and their preference for women applicants due to lack of women in the agricultural workforce.

Generally, the three universities were similar in terms of time duration of study. All three have in their curriculum the required activities in the Chang-up tracking System, which includes internship at leading farm, case study on a successful farm, on farm study in a developed foreign country for students excelling in class, and regular meeting with field farmers which were all needed for students to adjust themselves to the real farm life. Kangwon University, however, had longer credit hours and higher percentage assigned to lectures. Cheju University on the other hand assigned more hours to the study in a developed foreign country.

The Ministry of Agriculture and Forestry allotted 230 Million Won to each of the three universities totaling to 690 Million Won as financial support.

### **Accomplishments and Problems**

The Chang-up Tracking System has shown to have effectively implemented the program to develop the future agricultural workforce. First, through a realistic field exposure, it develops in students the capacity to work and settle in the farm. Second, most trainers and contents of the program are effective at developing the skills and expertise needed by the students. Third, it enriches actual agricultural experience of agricultural college students and facilitates the agricultural college to perform the function of developing agricultural workforce.

However, despite the positive outcome of the program in its trial

operation, there were some problems met and bottlenecks to be unclogged. First, contents and curriculums offered were limited depending on the major of participating professors and therefore cannot accommodate all the various students' needs. Subjects and curriculum contents should be made more comprehensive and wider in scope so as to be able to respond to more needs of the students. Second, concept of agricultural settlement covers only primary agriculture, which means actual cultivation only. Primary agriculture is important but agriculture-related concerns are increasing and expanding. Therefore, in this context, it needs to expand or broaden the concept of agricultural settlement and pursue expanded scope of agriculture.

### **Evaluation Results of the Three CTS programs**

Since the CTS only started in 2006, the researchers find it too early to give valid assessment as to its outcomes. The study therefore focused on its potential to grow and to carry out its mission. All three CTS programs were evaluated based on their purpose, competency, program management, etc. and all of them were rated high in each category. The results are shown in Table 4.

### **Purpose of Training and Trainee**

The goals of CTS programs in all three universities are well defined and are aligned with the mission of CTS to develop new agricultural workforce. Also, the target subjects of CTS programs, the recruiting systems and trainee selection procedures are properly defined. Since all participating organizations are agricultural colleges, their missions and roles correspond with those of CTS. However, the results show that CTS programs have to consider more effective ways to meet the needs of students. It could be partly accomplished by examining the goals and objectives of the training and revising them such that they would truly cater to the needs of students.

Criteria for identifying training goals and selecting students need to be improved to make sure that students recruited are truly deserving. Also, the validity of the student selection procedure needs to be reexamined. Moreover, training procedures should be improved such that the CTS program will be able to accommodate the regional needs as well as the requirements of the national government.

### **Training and Educational Competency**

All of the three universities have reliable organizational set-up, workforce, educational materials and facilities to operate CTS. The implementation of the program is jointly managed by 3-7 departments in the universities' College of Agriculture. The staff consists of faculty members,

**Table 4. The Evaluation Framework for CTS Programs and Results of the Evaluation**

Evaluation Field	Evaluation Item	Evaluation Criteria	Distribution Scores	Kangwon UNIV.	Gongju UNIV	Jeju UNIV
Purpose of Training and Trainee	Purpose of The Training	-Concreteness and Suitability of the training purpose	4	4	4	4
	The Trainees	-Suitability between Trainees and program purpose -Trainees' needs met -Recruitment of trainees (adequacy and Systemic)	12	11	11	11
	The role of Organization and its consistency with the purpose	-Consistency between the role of Organization and its consistency with the purpose	4	4	4	4
	Subtotal		20	19	19	19
Training and Educational Competency	Organization in charge and workforce	- Separate division in charge - Professional staff with adequate specialty	4	3	3	3
	Educational Facilities	- Adequate educational facilities and proper use	4	4	4	4
	Educational Materials	- Adequate educational materials and proper use	4	4	4	4
	Output of the program	- Adequacy of yearly accumulated outcomes	4	4	3	3
	Subtotal		16	15	14	14
Implementation and management	Program and curriculum	- Appropriateness of program's goal and contents - Program and curriculum with facilities	6	6	6	6
	Training Period and Agenda	- Adequacy of facilities Training Period and its frequency	4	4	4	4
	Trainers	- Alignment of the contents with the trainer's profession - Evaluation of trainers	6	5	5	5
	Teaching Method	- Suitability of teaching methods to educational contents - Development of Teaching Material and its applying with felicity	8	8	8	8
	Financial Management	- Adequacy of financial resources - Provision of fund for training expenses - Appropriate / reasonable spending	12	12	12	12
	Training Management	- Devotion of training management - Sincerity and service of training staff	8	7	7	7
	Subtotal		44	42	42	42
Evaluation of Outcomes	Accomplishment of training goals	- Recruitment and completion rate	6	6	6	6
	Evaluation of the trainees	- Methods of evaluation - Trainees' satisfaction	8	6	6	6
	Application of the Training result	- Adequate discussion of topics and application to educational improvement	6	6	6	6
	Subtotal		20	18	18	18
Total			100	94	93	93
Grade			A	A	A	A

Reference : Na. (2006). An Evaluation of Agricultural Education and Training Programs. p. 207. The Ministry of Agriculture and Forestry.

farm owners participating in the field practice programs and instructors. However, none of the universities have fulltime staff taking exclusive charge of CTS, which is important to the success of CTS. In evaluating the program, more attention should be given to having a reliable staff to work fulltime for the CTS.

### **Implementation and management**

The three universities had appropriate training topics or program contents which are consistent with the program objectives and each of their curriculums was systemically organized. In the case of Kangwon University, the Ministry of Education and Human Resources Development has approved that the credit hours earned through CTS programs will be recognized and credited in other related programs. Kongju University offered a specialized curriculum that was designed to develop a positive perception of business in agriculture among youths and encourage them to consider agriculture as an enterprise. The University hosts lectures by successful farmers and arrange field trips to New Zealand to learn some advanced agriculture techniques and practices. Jeju University has also a well developed curriculum that helps students take the courses with flexibility.

The universities also had to be given more autonomy in their use of funds. They are to enjoy some authority in disbursing money for training purposes to allow flexibility in running the CTS programs. Meanwhile, students' selection of courses should be limited due to the lack of faculty members to teach certain areas. Relevance of professional background of the participating faculty members in the CTS program should therefore be included in the evaluation.

### **Outcomes and Evaluation**

The three universities had 100% recruitment rates and their completion rates were over 98% after one-year training, suggesting that the CTS programs are under effective management. Some areas however need to be improved in terms of evaluating students. Only one final examination is given to students in the field training, hence they need to incorporate more methods of evaluation. While all give big value to field practices, they only rely on students' reports in evaluating students of their achievements in the field. To become competent farmers, practical field training is essential, hence the need for more evaluation methods.

Students showed some dissatisfaction because there are none or less incentives in participating in the CTS programs. It is recommended to increase the allotted points for evaluating the "Outcomes". This is important because CTS is yet in its initial stage and the program and student accomplishments as well as students' satisfaction can provide valuable information and basis to improve the CTS programs.



## **Conclusions**

The Chang-up Track System (CTS) is a valuable initiative because it helps develop young and professional practitioners in the agricultural field. This is especially because CTS programs offer field-based curriculum for university students to improve their field adaptability.

Second, one of the major accomplishments of the CTS programs is the assistance they give to students who are interested to engage in business in agriculture by developing their expertise in the field. In addition, the CTS programs promote positive perception on business in agriculture among university students. However, there are several issues. Only the students and the faculty members of the host departments are participating. Therefore, students' participation is mostly passive and the courses the faculty members can handle are limited. Also, there has been too much emphasis on production of agricultural products and other aspects of agriculture business have not been properly taught.

Third, all of the CTS programs are rated highly in all of the criteria. The objectives of the CTS programs in all three universities are well defined and aligned with the mission of the CTS. Also, the target subjects or trainees of the CTS programs, the recruiting systems and the trainee selection procedures are properly defined. All of the 3 universities have good organizational set-up, adequate workforce, educational facilities and instructional materials that can be used to operate the CTS. However, none of the universities have fulltime staff taking exclusive charge of the CTS. The Universities also need a certain level of autonomy in managing funds for the CTS to allow more flexibility. In addition, the results show that the CTS programs have to consider more effective ways and methods of teaching to meet the needs of students.

Fourth, evaluation criteria set by the Ministry of Agriculture and Forestry for the CTS programs are mostly appropriate, but some minor changes are recommended. First, it is important to devise evaluation criteria to make sure selection of participants fit the purpose. Training competency and outcomes should also be given more weight in the evaluation.

## **Implications**

First, legitimate support for field-based workforce should be improved. CTS have been operating but no concrete outcome has been seen so far, although it is a viable program. Therefore, legitimate support should be given to universities who are involved. Agriculture related education institutions are also to be trained in operating successful CTS especially when it comes to budget, facility and workforce.

Second, more studies on the introduction and operation of field-

based education programs should be done. There has been little research for example on successful programs and success factors and barriers in carrying out similar field-based systems.

Third, CTS should be actively promoted and advertised not only among those involved in the system but to the general public. Farmers are aging and there has been a felt need for more competent agriculture workforce. Students of all the Colleges of Agriculture are all potential participants that can give CTS a boost.

Fourth, information and knowledge sharing should be encouraged among the universities operating the CTS to increase efficacy of operation and encourage cooperation among them. Periodic workshops and business associations can be organized to share information, experiences and know-how of operation.

Fifth, criteria for the future CTS evaluation should be reviewed and modified to cover not only to identify problems in the implementation but to increase objectivity and validity in the selection process of participants.

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# **Awareness on *Halal* Food Production: Insights from Selected Industry and Academe**

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## **INTRODUCTION**

The island of Mindanao is the seat of most Filipino Muslims, which consists of 13 tribes. Some are also found in the Sulu archipelago and on the island of Palawan, south of Puerto Princesa. Thirteen linguistic groups have been identified as Muslims namely: Maguindanao, Maranao, Tausug, Samal, Yakan, Iranun, Jama Mapun, Badjao, Kalagan, Kalibugan, Sangil, Melebuganon and Palawani (Fianza, 1998). About 94% of the 22 million Muslims are found in four groups namely: the Maguindanao of Cotabato region, Maranao of Lanao region, the Tausug who are also called "People of the Current" and the Samal of Sulu (Gowing, 1979). All of these groups constitute roughly one third of Mindanao and Sulu's 12 million populations including the Christians and the indigenous non-Muslims — the Lumads (Fianza, 1994).

Although they still are a minority in their own island, Filipino Muslims are scattered all over the country. They have successfully made their own community in key cities of the country particularly those found living in the Northern and Southern parts of Luzon such as Isabela, Baguio, Angeles, Bulacan, Laguna, Batangas, Cavite, Sorsogon and some parts of the Visayas. Their primary source of living evolved out of trade and commerce.

Muslims believe that it is imperative to follow what the Holy Book, the Quran, prescribes. Muslim culture and traditions always have a bearing with their religion, Islam, such as mode of dressing, with whom to socialize, and even the kind of food to eat. Islam prescribes all Muslims to eat *Halal*

foods. However, there is a problem on accessibility of *Halal* foods in the market even at their own vicinities more especially in key cities of the country that are dominated by non-Muslims. The researcher believes that there is a pressing need to teach the basic principles of *halal* food production to Muslims and non-Muslims alike to make *halal* foods accessible. This is also a way of getting away of feeding Muslims with *haram* foods.

*Halal* is an Arabic word, which means "something permissible and lawful in the Islamic faith." On the other hand, *haram*, its antonym, means "impermissible and unlawful in the Islamic faith." *Halal* in this paper pertains specifically to food. Eating *haram* foods is a very serious matter for Muslims. It has religious sanctions. For most Muslims, the concept of *halal* and *haram* with respect to food is all about ingredients, their sources, the kind of animal meat eaten and the manner of slaughtering the animal. Not all edible animals are considered *halal*. Certain kinds of food are in themselves considered *haram*. Slaughtering is also one important aspect of *halal* foods to be considered as Islam has a prescribed way of slaughtering.

*Halal* food production is the focal point of discussion in this paper as more and more individuals are getting concerned on the need for healthier foods and food sources. In this regard, there is a need to educate the people on the proper way of handling *halal* foods and to improve and enhance food availability in the local market particularly in Lanao del Sur, where Muslims outnumber non-Muslims. Perhaps through the eventual agreement in food preference it could also open another door for a more harmonious relationship between Muslims and non-Muslims. This study hopes to pave the way for the integration of the *halal* food production in the B.S. Agriculture curriculum of the college department of Mindanao State University-Lanao Norte Agricultural College (MSU-LNAC).

### **Rationale of the Study**

The rationale of this study is in line with Executive Order No. 481 promoting development of organic agriculture in the Philippines issued on December 27, 2005. The Islamic way of processing and handling *halal* animals runs parallel in some aspects with this order. On the global level there is a movement that set standards on organic products from crops and cropping system to livestock management and production. This is the International Federation of Organic Agriculture Movements (IFOAM) Accreditation Criteria. However, the Philippine government has yet to establish its own *Halal* certifying body based on the International *Halal* Standards. In this view Malaysia is the renowned World *Halal* Food Hub. Malaysia's standards are being reckoned to be the best by countries in the world that wanted to cater *Halal* Foods.

*Halal* food production is based on Islamic faith and would therefore be expected to have widespread adherents, particularly in Mindanao and maybe elsewhere in the country. *Halal* and organically produced meat

would be in great demand not only by Muslims but also by non-Muslim consumers since Filipinos have become more discriminating and health conscious in their food preference. The projected increase in demand for *halal* and organic meat can invigorate the livestock industry and perk up consumption of meat products. Muslim communities in other countries have specialty market of *halal* foods.

The educational system is one of the most effective channels through which the mainstream population, particularly with respect to food preference, can appreciate Islamic culture. In the country today, only the Mindanao State University System (MSU) offers a separate course on the History of the Filipino Muslims, though *Halal* food is not a focus on this course. Hence, MSU is an avenue to initiate the teaching of *halal* food production. Teaching the real concept of *Halal* is one way of bridging the gap between Muslims and non-Muslims in terms of understanding food preferences.

This paper attempted to answer the following questions: Do people understand the concept of *halal* food? How well informed are the people with the concept of *halal* food? Are there scientific explanations of *halal* food production? Is awareness on *halal* food required only to Muslim people? Within the people from the industry, this study attempts to know the following: Is there a ready market for *halal* foods? Is *halal* food production a promising industry? What are the needs of the consumers pertaining to *halal* foods? How do food companies in the Philippines get the label *halal* in their packaging? Where do they get to certify their food products as *halal*? Do these food companies really follow the standards on *halal* food production? And while the study wants to see where the academe could begin, the following would attempt to answer as to: What are the marketing needs of the people in *halal* industry that can be addressed by the academe? And how can the academe help in proliferating the awareness and recognition of *halal* foods?

The study will generally analyze the profile of the *Halal* Industry and know the level of awareness on *Halal* Food Production based on two aspects: a) the industry and b) the academe. Specifically, it aims to:

1. identify the intervention parameters in the food industry about *Halal* Food Production; and
2. identify the point of entry of the academe to address the market and industry of *Halal* foods.

The paper was limited to the survey and key interviews conducted last August 11-22, 2007. Representing the academe were students and professors of Xavier University and the Mindanao State University (MSU). The industry was represented by a mixture of owners and managers of different establishments, who sell and cater *halal* foods such as restaurants, grocery and meat vendors of Cagayan de Oro City, Iligan City and Marawi City. The government officials interviewed were limited only to persons that

handle livestock industry of their respective areas as the focus of the study was on *halal* food production. The respondents and interviewees were Muslims and non-muslims.

## METHODOLOGY

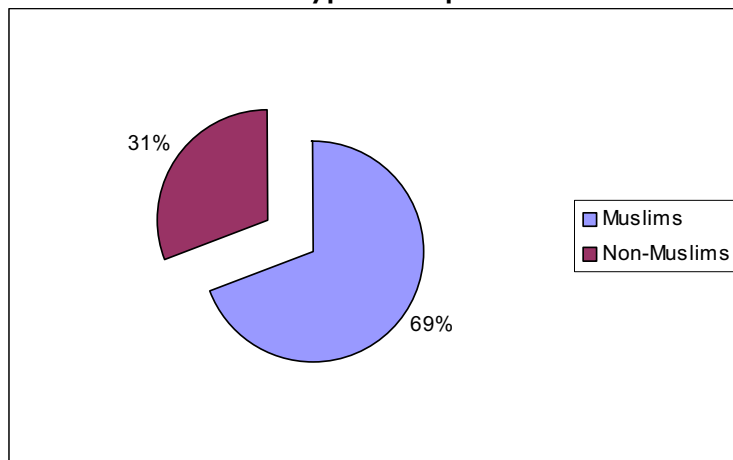
The area of the study was purposively chosen, as these were accessible to the researcher: two cities in Region X, Cagayan de Oro and Iligan and the provincial capital of Lanao del Norte, Tubod. For the Autonomous Region of Muslim Mindanao (ARMM), Marawi City was chosen as Muslims dominate this area.

This study employed purposive sampling using survey and key interviews. Information about the concepts of halal and haram, the global halal industry and the Philippine programs on halal were taken from secondary literatures such as journals, books and researches posted in the Internet. Primary information came from the key interviews and survey. The data gathered were analyzed descriptively.

## FINDINGS

A total of 69% of the respondents were Muslims and 31% were Non-Muslims (Figure 1).

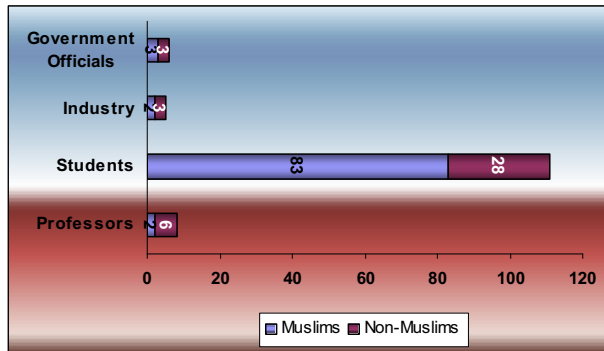
**Figure 1. Percentage of Muslims and Non-Muslims in each type of respondents**



The respondents were six government officials from Marawi City, Iligan City and Tubod (Capital Town of Lanao del Norte), five *Halal* restaurant owners/managers, 111 students from Xavier University-Ateneo de Cagayan and MSU-Marawi City and six professors in agriculture courses from Xavier University-Ateneo de Cagayan and MSU-Marawi City (Figure 2), for a total of 130 respondents.



**Figure 2. Demography of each type of respondents**



### **Perception on Halal Food Production**

On awareness about Halal food, all respondents had prior knowledge about halal foods though in a varying degree. Muslim respondents had deeper understanding of halal especially the older ones as it accordingly was taught to them since childhood. Non-Muslim respondents had limited understanding of halal but the concept was not totally unknown to them. They had heard and learned about it from few acquaintances with Muslims. They had seen it in labels of food and non-food products in some food establishments although they had no understanding of its intricacies, and its religious aspects. Furthermore, non-Muslims thought that eating halal food is exclusive for Muslims only. Generally, all respondents believed that halal products are widely accepted. Muslims were more conscious of the ingredients of processed products sold in the market than were the non-Muslim respondents.

### **Perception on the Halal Food Business**

Some respondents had skepticisms as to the potential of the *halal* industry because of the following reasons: Philippines is a non-Muslim country, local *halal* food establishments cannot compete with established food establishments of non-Muslims and halal foods accordingly have poor food presentation and are not strategically located. Most *halal* restaurants are accordingly found in the inner streets of the city as very few can afford to establish *halal* restaurants in malls where frequent mass of people goes.

### **Role of the Academe in Enhancing Awareness**

All respondents believed that the academe is indispensable and very important in enhancing education about *halal* in all aspects and in boosting the *halal* industry. The respondents believed that the academe is an area for growth of learning. Indeed, education helps eliminate ignorance, which causes antagonism, and mistrust between Muslims and non-Muslims as well as among Muslims themselves. Education has the pool of experts on livestock, animal science etc. The concept of *Halal* in food

production could be incorporated in some courses in agriculture and other agriculture-related courses.

Professors suggested some teaching approaches in making *Halal* Food Production a part of the curriculum. One is an actual visit to noted halal food establishment to observe the processing of their products. This will allow students to have an actual observation of the practices of halal food production. Giving scientific explanation and practical applications of the Islamic way of producing halal foods would strengthen educating people about *halal*. On the other hand, professors interviewed suggested conducting advertising campaigns and promotion of programs on halal foods and their production to encourage larger audience in the country to patronize the product. This will allow the people to have a comparison between *halal* and *haram* in the Muslim world and to encourage proactive discussion when introducing the benefits of *halal* products.

Students preferred group work or hands-on learning approach, as they believe with its effectivity in combination with chalk-talk or lectures. The students would prefer a complete set of instructional materials and visual aids to be more effective.

People from the industry, believed that the establishment of halal certifying board would help in bringing truth about halalness of food, from the source of the food/meat, slaughtering of animals to the processing plants. *Halal* industry has its standards that must be followed from source to processing.

Establishment owners interviewed were able to identify niche of Muslim customers of *halal* meat. Maranaos, specifically, prefer carabeef than cow's. Their preference is more freshly slaughtered meat instead of frozen products.

### ***In Boosting Halal Industry***

Most respondents were convinced that halal as an industry has great potentials because most people are meat eaters; there is a growing number of Muslims and health conscious individuals who believe that *halal* food is healthier; and that the Philippines is free from FMD and avian flu. Furthermore, the respondents believed that the government should develop or enhance local *halal* industry by taking care of the market needs of the Muslims and market potential of Muslims and non-Muslims alike. There should be more *halal* programs like awareness campaign, training on cuisine, contemporary restaurants, design and ambiance offering *halal* foods. In this way, local *halal* restaurant owners can compete with other mainstream food chains. Advocacy and local legislation could help boost the industry and establishment of functional *halal* abattoirs. The government and the people can emphasize *halal* goat and chicken production as these two animals are proliferating positively in the country. Private *halal* processing plants



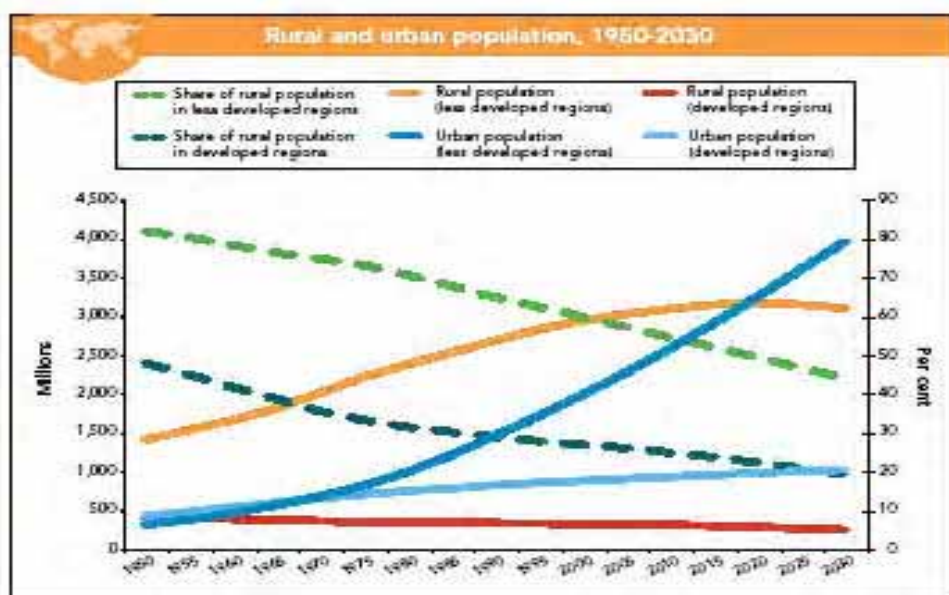
# Improving the Reach of Higher Agricultural Education in Asia-Pacific: Some Lessons for Improving Education for Rural People

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## INTRODUCTION

### Importance of education for rural people

The world's population is ever increasing where it is currently estimated to be 6.6 billion people. Of these some 50 percent or more of the population is rural based, and the rest are located in urban areas. When looked at from the perspective of developing countries, however, we find that a much larger proportion of the population, some 80 percent or so, are rural based. See Figure below. Further, it is also this segment of the population that constitutes the poor in most countries.



Source: UNDESA (2005 and 2006).

Note: Developed regions comprise all regions of Europe plus Northern America, Australia/New Zealand and Japan; less developed regions comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia.

It is for these reasons that the Food and Agriculture Organization of the United Nations (FAO) and partners had initiated in Johannesburg in September 2002 at the World Summit on Sustainable Development, under the “Education For All” or “EFA” initiative a special Flagship Programme that is focused on “Education for rural people” or “ERP”. ERP is a vehicle to give attention to the educational concerns of rural people as a means to empower them and to improve their knowledge and skills so as to bring them out of poverty. Through such efforts, the Millennium Development Goals (MDGs) 1, 2, 3 and 8 relating to overcoming poverty and hunger, ensuring universal primary education, ensuring gender equity and facilitating and promoting partnerships are addressed respectively. For as Sir John Daniel observed, “Achieving EFA means going to where the greatest numbers of unschooled and uneducated people are....in particular to rural areas”<sup>1</sup>.

The objectives of ERP are as follows:

- i) building awareness on the importance of education for rural people as a crucial step to achieve the MDGs and particularly eradicating extreme poverty and hunger, achieving universal primary education and promoting gender equity
- ii) Overcoming the urban/rural gap in education
- iii) Increasing access to basic education for rural people
- iv) Improving the quality of basic education in rural areas
- v) Fostering national capacity to plan and implement ERP as part of national Education for All and rural development plans<sup>2</sup>.

ERP is also focused on higher education, in fact, the focus is on all forms of education that assists the lot of rural people through both formal and non-formal education.

### **Some lessons from the FAO-led Flagship Programme on “Education for rural people”**

Since its inception in 2002, the ERP flagship programme has actively collaborated with partners to improve educational access and educational quality concerns. Examples of some of the work in Asia-Pacific are highlighted here to illustrate lessons for possible application and trial elsewhere and as a means for improving access and the reach of higher educational institutions both in formal and non-formal education and training.

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<sup>1</sup> Sir John Daniels made the remark in a keynote speech in Bangkok, Thailand in 2004

<sup>2</sup> [http://www.fao.org/sd/erp/index\\_en.htm](http://www.fao.org/sd/erp/index_en.htm)

## **Improving access in China via Open and Distance Learning (ODL)**

The Chinese Broadcast and Television School (CABTS) is the largest distance education institution catering to agriculture and rural development in the world. CABTS is a distance education school jointly sponsored by 21 Government Ministries in China under a Memorandum of Agreement but with close links to the Ministry of Education. It is the only institution providing distance education to rural areas in China.

Between 2001 and 2004, FAO collaborated with CABTS under a Technical Collaboration Programme (TCP) project that was aimed at strengthening the capacity of CABTS to use digital technology and training to deliver its programmes to its rural clientele scattered throughout the country.

In a large and diverse country where the populations are widely dispersed and where development is varied, many opportunities as well as challenges exist, some of which include poverty, resource and infrastructure variations and out migration is increasingly becoming important due to the availability of employment opportunities in urban centers or the lack thereof within the rural areas. Thus, access to education and training can provide options and opportunities for rural based people. To cater for such, CABTS has a framework that includes services and linkages at five levels:

- a Central School located in Beijing
- 39 Provincial Schools
- 330 Prefecture Schools
- 2,408 County Schools
- 23,000 Township Training Stations.

Through such a system CABTS, has been able to offer a range of educational and training programmes.

In 2006, the following kinds of programmes were offered to its clients:

### *A) Degree Education*

Secondary diplomas to 1.87 million persons  
Post-secondary diplomas to 0.10 million persons  
College-level education to 0.17 million persons

## B) Certificate level programs

Green Certificates to 4.23 million persons  
Vocational Certificates to 0.46 million persons  
Rural Youth Farmer Program to 2.62 million persons

c) *Short duration training on applicable technologies* for 146 million persons.

*Key lessons* - A well planned and delivered education and training system has been developed and implemented in China that utilizes multi-media formats for comprehensive educational delivery that is implemented and supported by well trained staff at all levels and which is guided by a forward looking management who are constantly seeking out improved methods and technologies and who are also involved with promoting a learning organization which also seeks out and utilizes available opportunities. Programmes targeting some of the minority languages have also been included and courses and training materials and information are also made available at strategic locations throughout the country<sup>3</sup>.

## **Improving access via a Loudspeaker system**

CABTS has also successfully piloted a Loudspeaker system in rural China which has made use of and has expanded the system previously used for the Government's political programs with the aim at facilitating last mile linkages from the Center in Beijing down to rural villages. The aim of the programmes was simplicity of the system used which consists mainly of audio cassette players or CDs and MP3 players, an amplifier and a set of 4 loudspeakers that cost about USD \$500 per site.

*Key lessons* – The loudspeaker system provided a potential medium to supplement and support learning and utilizes multiple formats in the teaching/learning delivery that includes lectures, question and answer sessions, guest speakers/interviews, links to newspapers, periodicals and even the internet with use of relevant languages for delivery including having content that is relevant to clientele needs and expectations. Success is also due to the small investment requirements for the system that is considered very cost effective while also utilizing well trained “Information Workers” who are well supported at all levels<sup>4</sup>.

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<sup>3</sup> See Strengthening Distance Education for Agriculture and Rural Development in China TCP/CPR/0172 (T) Wrap-up Report of Project 2004

<sup>4</sup> See Education and Training via Loudspeakers in Rural China: Findings of a Case Study, 2008, p 63-66

## **Improving access via Open and Distance Learning from five case studies**

In 2006, FAO and partners collaborated in studying the innovative practices used for Open and Distance Learning (ODL) at five educational institutions in four countries as well as in the South Pacific region by a regional university. The institutions included the following:

- National Institute of Agricultural Extension Management (MANAGE), India
- Allama Iqbal Open University (AIOU), Pakistan
- The Open Academy for Philippine Agriculture (OPAPA), Philippines
- Suthothaithamthirat Open University (STOU), Thailand
- University of the South Pacific (USP) School of Agriculture, Samoa

The study investigated the adherence and adoption of the FAO principles for ODL being promoted by FAO. These principles include:

1. ODL to be undertaken for the right reasons
2. ODL to be sensitive to the context in which it is being applied
3. ODL makes use of existing infrastructure with sustainable cost structures
4. ODL that engages stakeholders in participatory processes
5. ODL that uses sound pedagogical and administrative models<sup>5</sup>.

*Key lessons* – All five institutions were found to adhere to and to have utilized the FAO principles in their programmes. All have also practiced and implemented location specific innovations. Important themes arising from the studies include: the importance of networking and partnerships; having appropriate technologies; integrating practical experiences into the curriculum; the importance of infrastructure; and ensuring cultural sensitivity<sup>6</sup>.

## **Improving educational access and capacity for different clientele**

### **a) Universities of Agriculture outreach to local communities**

Under UNESCO Institute for Educational Planning (IIEP) leadership, FAO collaborated in 2005-2006 with several partners in case studies to

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<sup>5</sup> See <http://www.irrod1.org/content/v3.1/mclean.html>

<sup>6</sup> See Report on Expert meeting on rural information networks in Asia-Pacific: Innovative practices and future directions, p.9



assess innovation by agricultural universities regarding community outreach. The cases included eight institutions in five Asian countries which included the following:

- China Agricultural University (CAU), Republic of China
- Institut Pertanian Bogor (IPB), Indonesia
- Kasetsart University, Thailand
- Universiti Putra Malaysia (UPM), Malaysia
- University of the Philippines Los Banos (UPLB), Philippines
- Obihiro University, Japan
- University of Nagoya, Japan
- Tsukuba University, Japan

*Key lessons* – Although variable research findings were obtained partly relating to the variable research capacity of the researchers involved in the different institutions, the studies underlined the role Higher Agricultural Education institutions must play in contributing to achieving EFA goals, poverty alleviation and rural development. It also emphasized the fact that lifelong learning is essential for stimulating innovation in local economies and communities and that universities should engage more directly as partners of local educational institutions and their communities in the education of rural people<sup>7</sup>.

## **b) Youth helping rural youth**

In relation to rural youth<sup>8</sup>, FAO was assisted by a Thailand based student run NGO known as Thai RuralNet that is affiliated with Thammasat University. Their members were able to assess and provide Information and Communications Technology (ICT) training to 4-H Club youth members from selected areas of rural Thailand. Through such a project, university student members of Thai RuralNet shared their expertise with rural youth<sup>9</sup>.

*Key lessons* – Youths and youth organizations are a useful means for learning and sharing as youths are able to communicate effectively with other youths. Members of youth NGOs are able to apply their expertise on helping people of their own age group and through the process they gain valuable experience while contributing to the education and training of others who are often less fortunate than themselves. ITC training enabled wider networking, learning and sharing,

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<sup>7</sup> Report yet to be published

<sup>8</sup> According to United Nations definition, youth includes persons between 15 and 24 years of age

<sup>9</sup> See Best Practices for Education and Training of Rural Youth – Lessons from Asia, 2003, p. 21

and even marketing of a club's agricultural products to local and foreign clients while also facilitating community access to use the IT facilities for personal communications.

### **c) University student volunteers**

University students can also take part as volunteers and through such programmes, they not only impart their knowledge and skills obtained in the university as their participation is also a means for their further training and for gaining work-related international experience prior to graduation. FAO has enabled students to volunteer their services within the work of the organization through a matching of the interests and fields of the students to the work of the Technical Groups. Through such a scheme, students learn about the work of the organization in addressing its mandate of addressing poverty and sustainable development. Students share their expertise, network, attend meetings and seminars and some even undertake preliminary studies that they later pursue for graduate studies.

*Key lessons-* University students, graduates and some undergraduates, are enabled unique learning opportunities through being exposed to the workings of a United Nations agency where they learn on the spot and, through interactions and networking, are availed the chance to contribute as well as to learn and even to begin preliminary studies that they later pursue for graduate studies. Both students and FAO benefit from the programmes.

### **d) Information professionals and practitioners**

FAO offers training courses utilizing the Information Management Resource Kit (IMARK) which is a partnership based e-learning initiative that aims at increasing awareness, understanding and improving skills of information professionals and practitioners. Courses offered have included specific subjects via modules on Management of Electronic Documents, Digitization and Digital Libraries, Investing in Information for Development and Building Electronic Communities and Networks. The courses utilize the latest e-learning technologies with the aim to build capacity at national and local levels and are distributed via CD-ROM and the internet free of charge<sup>10</sup>.

*Key lessons* – Information professionals and practitioners benefit from the expertise of IMARK instructional designers including about

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<sup>10</sup> See <http://www.imarkgroup.org>

methodologies and their application. IMARK enables a wide audience reach for informal learning and thus facilitating greater impact.

## **Conclusions**

Given the large proportion of the populations of countries in the Asia-Pacific region that are rural based and are also poor, specific attention to their educational and training needs can have positive impacts to poverty reduction and provision of employment opportunities including for learning for its own sake and for self improvement. Thus, attention to education and training for rural people should be important components of development efforts. Through such efforts, the MDGs can be addressed and the disparities faced by rural people in comparison to those living in urban areas can be reduced. It also enables them improved livelihood possibilities. There are opportunities and an obligation for more strengthened attention by institutions of higher learning in addressing ERP. Lessons and innovative practices are available for addressing the unique needs of rural people which provide potential starting points and guidance for ensuring the extended reach of their education and training endeavors.

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# **Agriculture Education for the Young Formative Learners to Enhance the Higher Agriculture Education and Environment**

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## **RATIONALE**

Quality education has always been an issue in the Philippine Educational System. Fisheries Modernization Act of 1997 clearly declared the policy of the State to give priority to education and training on science and technology in order to accelerate social progress and promote total human liberation and development.

The development of agriculture education is an imperative factor to meet the demands on educational modernization of the learning society to ensure food security, economic stability, and social progress.

Everything in the school and in the educational process is a very important factor in the proper upbringing and development of its individual learner. Teaching is more than helping the students to acquire knowledge, habits, skills, abilities, attitudes and appreciation leading to his changed behavior and growth as a person. However, the present agricultural system in the elementary and secondary level cannot limit itself in designing a curriculum appropriate for the student; it must consider the availability of resources, the methods of teaching and qualification of mentors handling the subject.

In our quest for social and economic progress to keep away the country from a deep-rooted tyranny of poverty, agricultural education plays a very important role. It is an instrument of ensuring food security in the country. It is through the sustainable agriculture, which is the primary vehicle for the economically and socially marginalized society that can lift them out from poverty.

The declining trend of enrolment in agriculture and agriculture related courses in the tertiary level have remained unsolved. The paradigm shift of the society from one trend to another is as fast as the changing and upgrading of the electronic devices. However, the researchers decided to conduct an in-depth study on the philosophy of teaching agriculture in the elementary and secondary levels because they observed rapid changes and trends in agriculture education, the fast declining area devoted to school garden, the students' views and concept on agriculture and their limited knowledge about plants and animals. Agriculture is treated mainly as an art on basic education (Sangalang and Papa,2000).

Nowadays, the tremendous increase in population and the fast declining acreage of agricultural land are some of the problems that remain unsolved plus the fact that the majority of youths are more interested in computer than agriculture. It is now time to attract and give heartfelt pleasure to this sector through agricultural education. This study has envisioned that it will provide useful information to the following:

Lawmakers. It is expected that lawmakers would pass a bill making the teaching of agriculture subjects compulsory starting elementary through college as well as in graduate schools in all courses;

The Department of Education. The result of this study could be a basis for revision of the curricula to enhance agricultural implantation to the minds of the youth.

State Universities and Colleges (SUCs). This finding will benefit SUCs offering agriculture course for they are the absorbing institutions of the secondary graduates.

Administrators. The administrators will be guided in assigning qualified teachers to handle agriculture subjects.

Teachers. This could provide the teachers insights on improving their methods and strategies of teaching agriculture.

General Public. For the youth is the hope of the nation and knowing the value of agriculture at their early years will surely ensure the vision of sustainable, healthy, safe and nutritious food on every table of the Filipinos; and

Youths. To internalize and fully understand the value of agriculture to the life of human being, this study will provide opportunities.

Education was directed to institute reforms, to make education relevant to the needs and aims of the new society. Shift in emphasis in elementary and secondary schools to vocational education be done to

meet industrialization and agricultural progress of the government, and to introduce in all educational levels the work oriented curriculum. (Educational Decree, 1972)

## **OBJECTIVES**

The general objective is to determine the philosophy of teaching agriculture in the early and formative years of education to the young citizens of the country, the elementary and secondary students in the province of Rizal to address the problem on agriculture education.

### **Specific Objectives**

The specific objectives to attain are:

1. Identify the demographic characteristics of the administrators and teachers implementing/teaching agriculture education in the elementary and secondary schools in the province of Rizal in terms of age, sex, civil status, position, length of service, monthly salary, educational qualification and training/seminars attended;
2. Appraise the status of teaching agriculture in the elementary and secondary schools in the province of Rizal in terms of the substantive agriculture content of the curriculum, adequacy of resources and activities relative to teaching agriculture ;
3. Categorize the level of perception and awareness between the administrator and agriculture and non-agriculture teachers and;
4. Verify the course preferences of graduating students when they go to college.

## **METHODOLOGY**

### **Research Method**

The researchers went into browsing and surfing the records of the Department of Education, by request, to get the total number of elementary and secondary schools, public and private schools in the whole province of Rizal and other pertinent data to be able to provide an appropriate description on the philosophy behind teaching agriculture. They interviewed supervisors, mostly the principals, in the administrators' level, and randomly, the agriculture and non-agriculture teachers as well as the graduating students. Printed questionnaires were also given them.

### **Subject of the Study**

Sample respondents were taken from 545 elementary and secondary schools from the thirteen (13) municipalities and a lone city in the province of Rizal represented by the selected school administrators, agriculture teachers, non-agriculture teachers, and the graduating senior high school students.

## Setting of the Study

The study was conducted in the province of Rizal. It is located directly east of Metro Manila. It is bounded by Bulacan province on the north, on the east by the provinces of Laguna and Quezon and the south by Laguna de Bay.

**Map of Rizal Showing the Location of the Study**



The total land area of Rizal is 130,383 hectares or 1,308.83 square kilometers. The City of Antipolo, municipalities of Rodriguez and Tanay have the biggest areas. Cainta is the smallest municipality in the province in terms of land area. The only island in the province is Talim Island which is covered by the municipalities of Cardona and Binangonan.

The province's topography is characterized by a combination of valleys and mountains. The flat-low lying areas are located on the western section of the province while the gently rolling hills and a few rugged ridges can be found in the eastern part of the southern foothill of Sierra Madre Mountain ranges which can be found in the eastern part of the province. Laguna de Bay has an approximate area of 51,000 hectares under the jurisdiction of Rizal province.

**Table 1. Frequency and Percentage Distribution of the Subject Schools**

School Respondents	Frequency			Rate of Response (%)
	Schools	20%	Sample Size	
Public Elementary	267	53	37	69.81
Public Secondary	65	13	13	100.00
Private Elementary & Secondary School	213	43	21	48.84
<b>Total</b>	545	109	71	65.14

Most of the schools were public, i.e. 267 elementary and 65 secondary schools. On the other hand, Private Elementary and Secondary Schools numbered 213.

A total of 109 schools or 20% of the total school population was selected as the subject of the study. This consisted of 53 public elementary, 13 public secondary, and 43 private elementary and secondary schools. It took a long process before a private elementary and secondary schools was able to cooperate to answer the interviews and set of questionnaires. They consider their data confidential that they cannot release at once the data needed by the researchers.

Table 2 shows the frequency and percentage distribution of the respondents.

**Table 2. Frequency and Percentage Distribution of the Respondents**

Respondents	Frequency	Percentage	Rank
School Administrators	59	6.22	4
Elementary School Teachers	178	18.76	2
Secondary School Teachers	81	8.53	3
High School Graduating Students	631	66.49	1
Total	949	100.00	

There were 631 (66.49%) student respondents, 178 (18.76%) elementary school teacher respondents, 81 (8.53%) secondary school teachers and 59 (6.22%) administrator respondents .

## DISCUSSIONS/INNOVATIONS

### Demographic Characteristics of School Administrator and Teacher Respondents

There were more female administrators (mostly principals) and teachers than male. It shows that few males are going into teaching profession for obvious reason that female students dominate Bachelor of Science in Education (BSE) and Bachelor in Elementary Education (BEEd) courses. The administrators were in their 41-50 age bracket and the teachers



in their 31-40 age bracket and mostly were married. The administrators had long experience in the service; earn PhP16, 000 to PhP18, 000 a month and most of them have earned units in doctoral programs. Teachers, on the other hand, had less than 5 years experience in the service, earning PhP10, 000 - PhP12, 000 a month and mostly are college graduate. Only 4.63% of 259 respondents were holders of BS in Agriculture and related courses which only ranked 3<sup>rd</sup> with leading course in either BSE or BEEEd. It implies that quality of instruction in agriculture is affected by the teachers' background in agriculture. It is supported by the study of Terry et al. (1990) which suggested that effort should be made to improve teacher's perception and increase their technical knowledge in agriculture to enhance their teaching of agriculture concepts. The study also shows that majority of the administrators and agriculture and non-agriculture teachers of this learning institution have not attended training and seminars related to agriculture. The fact shows that they are not updated with the present agricultural technologies and development in agriculture.

### **Status of Teaching Agriculture in the Elementary and Secondary Schools in Rizal Province**

The curriculum content showed that agriculture subjects in the elementary and secondary education curriculum were substantially enough for the student to appreciate the value of agriculture in human life due to several topics included in basic education curriculum. However, the inclusion of agriculture only as a component subject in MAKABAYAN affected the acquisition of knowledge in agriculture.

The school resources were fairly adequate because the government allocated budget for the basic needs in education. It further stressed that the school administrator often assigned teachers to teach agriculture based on the criteria required because they know well the ability and capability of teachers and they were the instructional leaders in the school system.

The schools were often engaged in community/school gardening activity because of the availability of the area for cultivation.

### **Perception and Level of Awareness of Teaching Agriculture among Elementary and Secondary program Implementers**

#### **School Administrator and Agriculture Teacher**

Both the school administrators and teachers are agreeable in the different issues and concerns regarding the Agriculture Education Program. They do not differ because they are both part of the educational system.

## **Level of awareness of Agriculture and Non-Agriculture Teachers in Elementary and Secondary Schools in Rizal Province**

Agriculture and non-agriculture teachers have the same level of awareness (Moderate Knowledge) with respect to the knowledge perception in agriculture of the respondents. They both strongly agree that agriculture is important in human's life because agriculture is the mother of all industries and the source of food supply.

There was a slight significant difference in the level of awareness of the agriculture and non-agriculture teacher with respect to their perception on the knowledge in agriculture of the respondents because the standard deviation is low which magnifies that there is somewhat homogeneity in their response.

## **Course Preference of Graduating Senior Students in College**

Most graduating senior high school students prefer to take medical courses with 133 (31.25%) followed by engineering courses with 117 (18.69%). The students do not prefer to take agriculture courses because agriculture is associated with the social status of the individual. The primary reason in their preferences of the course is to get employment after graduation. It implies that they are more concerned with their economic status. The implication is the acquired knowledge in agriculture from elementary to secondary level was not enough to realize the importance of agriculture in one's life and the nation as well.

## **CONCLUSION**

In general, the respondents of the study were predominantly female; School Administrators were highly qualified for the positions; however it appears that agriculture teachers need teaching experience in agriculture. Teachers' training for elementary and secondary instructions in agriculture is needed.

The administrator felt that the schools meet the minimum standard of resources needed to teach agriculture and the provision of agriculture related activities is in the average level.

It is apparent that the school administrator and agriculture teachers tend to agree regarding the issues about agricultural education program. The school administrators and agriculture teachers have accurate perception on some selected issues about agriculture education.

Agriculture and non-agriculture teachers were aware of the agriculture knowledge of the respondents. Both groups were aware of the importance of agriculture in one's life as well as of the country.

High school graduating students are not interested to take agriculture course after graduation. They are interested to take medical and engineering courses because it is easy to get employment, however the students acquired knowledge was not enough to feel the value of agriculture in their life.

## **POLICY IMPLICATIONS**

A bill should be passed requiring agriculture subjects to be specific and compulsory at all levels beginning from elementary to college even in the graduate programs, be it government or private educational institution at a longer time, in order that the students develop a deep sense of value in agriculture.

There is a policy stating that it is compulsory at all levels, the integration of values and population education to all courses. It is much more important to include in all course curricula level agriculture subjects since it is the source of food, clothing, shelter and medicine of mankind, energy and ultimately the source of income of Filipinos.

## **RECOMMENDATIONS**

Based on the outcome of the study the following suggestions are drawn:

- **Lawmakers.** It is suggested that a bill be passed requiring agriculture subject to be specific and compulsory at all levels beginning from elementary to college even at the graduate school be it government or private educational institution at a longer time, in order that the students develop a deep sense of value in agriculture.
- **Department of Education.** The Dep-Ed should carefully review the content of the agriculture in elementary and secondary schools in order that it shall deliver effectively and efficiently the course curriculum in agriculture.
  - a. Strict monitoring is recommended in the delivery of instructions in agriculture to enhance the implementation of agriculture in the minds of the youth;
  - b. Agriculture training program for agriculture teacher be developed to equip the teachers with appropriate knowledge in agriculture and agri-related activities.
  - c. Monitor the hiring of qualified and certified licensed agriculture teachers to build a breed of efficient and effective teachers in agriculture.
- **Department of Agriculture.** Department of Agriculture should design an agricultural training program for agriculture teachers

in order to equip them with knowledge and keep them abreast with new technologies in agriculture.

→ **School Administrators.**

- a. Assign educationally qualified agriculture teachers equipped with knowledge, skills and experience to capture the interest of the pupils' students to deepen their sense of value in agriculture.
- b. Send agriculture teachers to in-service training related to agriculture to update their knowledge in new and modern agriculture technology.
- c. Close supervision of all activities of agriculture, and teachers in the delivery of instructions to the pupils/students in order to guide the teacher in the use of appropriate strategies and methods of teaching agriculture.

→ **Teachers.** There is a need to update teachers on agriculture knowledge through research and trainings to further develop and enhance their ability and capability in teaching agriculture subjects.

→ **Agriculture Instructors** or teachers should give more attention on the quality of instructions in agriculture so that students develop a deep sense of appreciation in agriculture.

→ **General Public.** Provide initial education to inculcate in the minds of the children the value of agriculture in their lives.

→ **Researchers and Students.** Further research is highly recommended to establish additional information to validate and /or strengthen the study and determine the status of agriculture education in the elementary and secondary school in other places to have a more precise recommendation.

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Wei Fang, © Copy right, 1995 Wei Fang @ Brown.edu City farm @ unixg.ubc.ca CD 01 6799) – CIP 01.9999 – Vims 01.9901 Approved covers for the Agricultural Education Curriculum in Missouri Comprehensive

# **Analysis of Kolb's Learning Style of Grade 12 Students at Photawattanasenee School, Ratchaburi Province, Thailand**

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## **INTRODUCTION**

Learning is usually defined as a change in an individual caused by experience (Mazur, 1990). Educators, psychologists and other social scientists have developed various learning models. There are different learning styles appropriate with different learning situations. David Kolb, Professor of Organizational Development at Case Western Reserve University in America, published his learning models in 1984. His model focused on the fundamental concepts towards understanding and explaining human learning behavior. It offered a way to understand individual people's different learning styles and at the same time an explanation of the experiential learning cycle. Kolb's experiential learning theory has four stages: immediate or concrete experiences which provide a basis for observations and reflections. These observations and reflections are assimilated and distilled into abstract concepts producing new implications for action which can be actively tested in turn creating new experiences (Kolb, 1985).

Moreover, Kolb emphasized that different people prefer different learning styles. According to him, learning styles could be: diverging style combined Concrete Experience (CE) and Reflective Observation (RO); assimilating style included Abstract Conceptualization (AC) and Reflective Observation (RO); converging style gathered Abstract Conceptualization (AC) and Active Experimentation (AE) and; accommodating style assembled Concrete Experience (CE) and Active Experimentation (AE) (Kolb, 1985).

Mumford (1992) believes that students can be helped to identify their learning style so they would understand how they learn (learning to learn). This is perhaps an added benefit of incorporating learning styles into course design. Otherwise students can find their field in continuing study or working appropriate with their capability. To recommend students to plan after graduation, employing Kolb's learning style test is a selected method to assist grade 12 students at Photawattanasenee school in finding out themselves. Moreover, teachers and administrators can formulate appropriate instructional design to support and develop students to become worthy and useful citizens of the community and nation as a whole.

## **STATEMENT OF THE PROBLEM**

1. What is/are the Kolb's learning style(s) of grade 12 students at Photawattanasenee school?
2. What factor (s) relate with plan after graduation of grade 12 students at Photawattanasenee school?

## **OBJECTIVES OF THE STUDY**

1. to find out the characteristics of grade 12 students at Photawattanasenee school;
2. to describe Kolb's learning stages and styles of grade 12 students at Photawattanasenee school;
3. to analyze relationship between factor(s) and Kolb's learning style of grade 12 students at Photawattanasenee school; and
4. to analyze relationship between factor(s) and plan after graduation of grade 12 students at Photawattanasenee school.

## **DEFINITION OF TERMS**

Kolb's learning stage refers to a learning cycle of experiencing, reflecting, thinking, and acting. Immediate or concrete experiences lead to observations and reflections. These reflections are then assimilated (absorbed and translated) into abstract concepts with implications for action, which the person can actively test and experiment with, which in turn enable the creation of new experiences. The cycle consisted of four stages:

Concrete Experience (CE) refers to feeling or experiencing

Reflective Observation (RO) refers to observing or reflecting

Abstract Conceptualization (AC) refers to thinking

Active Experimentation (AE) refers to doing or acting

Kolb's learning style refers to learning according to a preferred method. It is a matter of using emphasis on the first best with the given situation and a person's learning style preference. There are four learning styles according to Kolb:

Diverging style refers to learning from CE (feeling) and RO (observing). People with the diverging style are able to look at things from different perspectives. These people are sensitive. They prefer to observe rather than do, tend to gather information and use imagination to solve problems. They are best at viewing concrete situations several different viewpoints. They prefer to work in groups, to listen with an open mind and to receive personal feedback. They are reflexive.

Assimilating style refers to learning from RO (observing) and AC (thinking). People with this style are concise and logical in approach. Ideas and concepts are more important than people. These people require good and clear explanation rather than practical opportunity. They excel at understanding wide-ranging information and organizing them in a clear logical manner. They prefer reading, listening to lectures, exploring analytical models, and having time to think things thoroughly. They are theoretical.

Converging style refers to learning from AE (doing) and AC (thinking). People with converging style can solve problems and will use their learning to find solutions to practical issues. These people prefer technical tasks, and are less concerned with people and interpersonal aspects. They like to experiment with new ideas, to simulate and work with practical applications. They are pragmatic.

Accommodating style refers to learning from AE (doing) and CE (feeling). People with an accommodating learning style are 'hands-on', and rely on intuition rather than logic. These people use other people's analysis and prefer to take a practical and experiential approach. They are attracted to new challenges and experiences and to carrying out plans. They commonly act on 'gut' instinct rather than logical analysis. They prefer to work in teams to complete tasks. They set targets and actively work in the field trying different ways to achieve an objective. They are active.

## **METHODOLOGY**

This study utilized the survey research design. Respondents of the study consisted of grade 12 students enrolled during the first semester, 2007 at Photawattanasenee school. The total student sample of 255 was chosen using the stratified sampling method. Breakdown of the sampling done is shown below:

<b>Respondents</b>	<b>Population</b>	<b>Sample</b>	<b>Retrieved</b>	<b>Percentage</b>
Class 1 (Mathematics-sciences)	43	39	10	25.6
Class 2 (Mathematics-sciences)	30	28	10	35.7
Class 3 (Mathematics-sciences)	27	25	9	36.0
Class 4 (Mathematics-English)	34	31	26	83.9
Class 5 (English-Chinese)	26	24	20	83.3
Class 6 (English-French)	31	29	25	86.2
Class 7 (Physical education)	34	31	28	90.3
Total	255	144	128	88.9

Both descriptive and quantitative research methods were employed to gather data. The research instrument used was the questionnaire and learning style test modified version of Kolb (1985). Descriptive statistics such as frequencies, range, means, standard deviation, and percentage were used to describe the profile of respondents. Inferential statistics was employed to draw conclusions from the selected sample to corresponding



parameters of the population, using the statistical Package for Social Science (SPSS). Chi-Square was used to analyze factors affected by Kolb's learning stages and styles of students.

## **NULL HYPOTHESES**

1. Gender, age, education of parent, occupation of parent, class, program, and GPA do not affect Kolb's learning style.
2. Gender, age, education of parent, occupation of parent, class, program, GPA, learning stage, and learning style do not affect plan after graduation.

## **RESULTS AND DISCUSSION**

### **Profile of Students**

Slightly less than half of students (44.5%) were male. Most of them (62.5%) were 17 years old. Most of the student's father finished primary (37.5%) and secondary (37.5%) school. Most of student's mother (59.4%) finished primary school. Labor was the dominant occupation of both parents. One-fifth of students were in class 7. Almost one-fourth of students (22.7%) studied program in mathematics-sciences. Most of students (35.9%) have GPA between 2.01 to 2.50. Almost 100% (95.3%) of students had planned to study after graduation. Majority (87.5%) of students needed to pursue bachelor degree. Humanities was a field of specialization (18.0%) want to study. For students who wanted to work after graduation, they desire to have a personal enterprise (Table 1).

### **Kolb's Learning Stages and Styles of Students**

Almost 30% of students manifested Active Experimentation (AE) while almost one-fourth preferred the Concrete Experience (CE) (24.2%), Abstract Conceptualization (AC) (21.1%) and Reflective Observation (RO) (19.5%) learning stage. Meanwhile, a small proportion of the students exhibited the Abstract Conceptualization & Reflective Observation, Active Experimentation & Concrete Experience, Active Experimentation & Reflective Observation, Abstract Conceptualization & Concrete Experience, Concrete Experience & Reflective Observation, and Abstract Conceptualization & Concrete Experience & Reflective Observation.

Almost 20% of the students use the assimilating learning style. While almost 15% of the students are engaged in diverging learning style (14.1%), accommodating-converging style (13.3%), accommodating style (11.7%) and well rounded learning (11.7%). There were only a few who prefer the accommodating-diverging, assimilating-converging, converging and assimilating-diverging learning style (Table 2). The diversity of student's learning style both single and mixed style indicated students can develop themselves in various behaviors in different situations.

### **Relationship between Factors and Kolb's Learning Style**

Among the factors analyzed which include gender, age, education of parent, occupation of parent, class, program, GPA, plan after graduation, level of study after graduation, faculty to pursue, and job after graduation

**Table 1. Profile of students responding to the questionnaire**

Item	f (n=128)	%
Gender		
Male	57	44.5
Female	71	55.5
Age (years)		
14.00	1	.8
17.00	80	62.5
18.00	43	33.6
19.00	1	.8
20.00	3	2.3
Education of father		
Primary	48	37.5
Secondary	48	37.5
Vocational	20	15.6
Tertiary	12	9.4
Education of mother		
Primary	76	59.4
Secondary	22	17.2
Vocational	10	7.8
Tertiary	19	14.8
Non-literacy	1	.8
Occupation of father		
Government employee	25	19.5
Farmer	14	10.9
Company employee	8	6.3
State enterprise employee	1	.8
Labor	45	35.2
Personal business	26	20.3
No job	2	1.6
Officer	1	.8
Death	6	4.7
Occupation of mother		
Government employee	11	8.6
Farmer	13	10.2
Company employee	8	6.3
Labor	45	35.2
Personal business	34	26.6
No job	15	11.7
Death	1	.8
No answer	1	.8
Class		
1	10	7.8
2	10	7.8
3	9	7.0
4	26	20.3
5	20	15.6
6	25	19.5
7	28	21.9
Program		
Mathematics-Sciences	29	22.7
Mathematics -English	26	20.3
English-Chinese	20	15.6
English-French	25	19.5
Physical education	28	21.9
GPA		
Less than 2.00	21	16.4
2.01-2.50	46	35.9
2.51-3.00	33	25.8
3.01-3.50	19	14.8
3.51-4.00	4	3.1
No answer	5	3.9
Plan after graduation		
Continuing study	122	95.3
Work	6	4.7
Level of study after graduation		
Diploma vocation	7	5.5
Bachelor degree	112	87.5
Military school	3	2.3
Work	6	4.7
Faculty to pursue		
Nursing	4	3.1
Engineering	10	7.8
Science	4	3.1
Architecture	11	8.6
Humanities	23	18.0
Social science	8	6.3
Communication art	15	11.7
Art	7	5.5
Education	17	13.3
Agriculture	5	3.9
Information technology	2	1.6
Literature	1	.8
Administration	6	4.7
Political science	2	1.6
Law	3	2.3
Military	3	2.3
Work	6	4.7
No answer	1	.8
Job after graduation		
Salesman	1	.8
Personal enterprise	4	3.1
Government employee	1	.8

and learning style, only class, program and level of study after graduation affected Kolb's learning style of the students (Table 3). This is because the school provided class and programs according to interest and abilities of student which is part of the school's mission of producing and developing students. Level of study that students wanted to pursue after finishing grade 12 also affected learning styles since students will study in level appropriate to their capability in learning.

### Relationship between Factors and Plan after Graduation

Using the same factors, it was found out that only age of student and education of father affected plan after graduation. This is because most students, who are 17 years old, and are going to graduate from high school are old enough to decide whether to work or continue to study by themselves. Besides education of father, primary and secondary schooling, serve as inspiration to children to work or study to also support their family.

**Table 2. Kolb's learning stages and styles of students**

Item	Frequency (n=128)	%
Manifested Kolb's Learning Stages		
Abstract Conceptualization (AC)	27	21.1
Active Experimentation (AE)	35	27.3
Concrete Experience (CE)	31	24.2
Reflective Observation (RO)	25	19.5
Abstract Conceptualization & Concrete Experience (AC*CE)	1	.8
Abstract Conceptualization & Reflective Observation (AC*RO)	3	2.3
Active Experimentation & Concrete Experience (AE*CE)	2	1.6
Active Experimentation & Reflective Observation (AE*RO)	2	1.6
Concrete Experience & Reflective Observation (CE* RO)	1	.8
Abstract Conceptualization & Concrete Experience & Reflective Observation (AC*CE*RO)	1	.8
Kolb's Learning Styles		
Accommodator	15	11.7
Assimilator	21	16.4
Converger	10	7.8
Diverger	18	14.1
Accommodator-converger	17	13.3
Accommodator-diverger	12	9.4
Assimilator-converger	11	8.6
Assimilator-diverger	9	7.0
Well rounded learner	15	11.7

**Table 3. Relationship between factors and Kolb's learning style**

Factors	Sig.
Gender	.246
Age	.375
Education of father	.887
Education of mother	.909
Occupation of father	.243
Occupation of mother	.899
Class	.024**
Program	.005**
GPA	.273
Plan after graduation	.079
Level of study after graduation	.000**
Faculty to pursue	.110
Job after graduation	.173

\* Significant at level .05

\*\* Significant at level .01

**Table 4. Relationship between factors and plan after graduation**

Factors	Sig.
Gender	.246
Age	.000**
Education of father	.004**
Education of mother	.647
Occupation of father	.817
Occupation of mother	.739
Class	.558
Program	.489
GPA	.325

\* Significant at level .05

\*\* Significant at level .01

## CONCLUSIONS AND SUGGESTIONS

This study was conducted to find out learning styles of students using Kolb's learning model and to determine relationship between factors and plan after graduation of students. It has been found that there were diversity and distribution of learning style both single and mixed style; accommodating, assimilating, converging, diverging, accommodating-converging, accommodating-diverging, assimilating-converging, assimilating-diverging, and well rounded learning. There was significant relationship between class, program, and level of study after graduation and learning style. It was also found out that age and education of father relate to plan after graduation.

From the results of the study, it is suggested that teacher and administrator should include learning style of students in the formulation of appropriate instructional design to support and develop students. Hence, further study should be carried out to find out the relationship between teaching style of teachers and learning style of students.

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# **Effective Teaching Methods and Strategies for College of Agriculture and Life Sciences in Korea**

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## **INTRODUCTION**

### **Need for the study**

As the recent society is in transition to the more knowledge-based one, knowledge itself became the key source of power in every competition. Even in the agriculture field, using specific and proper knowledge to upgrade one's value is very much required. Given the treaties of WTO and FTA, the higher pressure of opening up the agricultural markets and the drastic decrease of the population in the agriculture have created both quantitative and qualitative problems in the agricultural field and working forces. To solve these issues, developing advanced agricultural workforce who takes the lead with new technology and knowledge is the most urgent task in agriculture, and higher agricultural education is the important point to be considered.

Colleges of agriculture and life sciences in Korea have played a leading role in agriculture development through cultivating talents and conducting studies as higher agricultural education institutions. Nevertheless, nowadays not so many people have enough understanding of agriculture, and several points are raised that colleges do not sufficiently correspond with the change in industrial structure and improvement in quality. Moreover, not only the increasing unemployment rate of college graduates but also the decreasing number of graduating students who look for jobs related with agriculture make these problems more serious (Lee & Na, 2005).

Then, colleges of agriculture and life sciences are now facing a turning point to focus on qualitative growth and strengthening internal capabilities, and this should prove to be an actualization of true teaching and learning, the essence of college education. To do this, cognitive, affective and motivated learning experiences well-connected with the workplace have to be systematically designed to raise highly educated professionals, and teaching methods and strategies according to learning objectives, contents and learner characteristics should be managed for learner-centered education and knowledge construction in the course

(Board on Agriculture National Research Council. 1992; Chickering & Gamson, 1987; Kang, 2003; Na, 2003, 2004).

Although the professors in colleges of agriculture and life sciences have profound and valuable knowledge, they do not know how to effectively deliver their knowledge to the students (Lee & Na, 2005; Na, 2007). Teaching and learning in college of agriculture and life sciences, accordingly, does not have any consideration for the systematic instructional design, teaching and learning methods, and strategies suited to education contents and learner characteristics, nor meet the needs of all students.

Therefore, the status of teaching and learning in colleges of agriculture and life sciences would be diagnosed on the multiple aspects in order to actively cope with radical changes of environment and social needs, and enhance inner capacity. Specifically, professors of core subject in college, have to be investigated in the areas of instructional design, teaching methods, and strategies in their lectures to promote effective teaching methods. By these results, meaningful implications for improving teaching competencies will be proposed.

### **Purpose and Objectives**

The purpose of this study was to inquire into the teaching methods and strategies in the courses of the professors in college of agriculture and life sciences, and explore some recommendation to improve them. For the purpose of this study, the following five objectives were addressed:

- First, to identify burden of lecture and the experience background in teaching of the professors
- Second, to look into the characteristics of courses taught by the professors
- Third, to determine the current level of instructional design elements of the professors
- Fourth, to examine the current use of teaching methods and strategies of the professors
- Fifth, to evaluate the teaching and learning process and identify areas for improvement

### **METHODS**

#### **Population and Sampling**

The population for this study consists of professors who are employed in colleges of agriculture and life science in Korea. The total of 1,471 professors in 47 colleges made up the population (Academy for Deans of Korea Agricultural College, 2006). With simple random sampling using the table of random numbers, 307 professors were chosen for the study. A sample size of 307 was considered adequate for the study according to Krejcie and Morgan's Formula-Table for Determining Sample Size from a Given Population (1970).

## **Instrumentation**

A survey questionnaire was developed for this study. The questionnaire consisted of six parts: personal characteristics, burden of lecture, characteristics of the course, use of instructional design, use of teaching methods and teaching strategies, course evaluation and efforts for improvement.

Personal characteristics consisted of gender, age, position, major and teaching experience. Burden of lecture scale included the number of course and credit, role of professor, experience in taking pedagogy, the number of attendance in teaching and learning programs or workshops, awarding system regarding professors' teaching ability and methods, and extent of applying teaching ability to appointment and promotion.

The professors were asked to choose one subject during the 1st-semester in 2007. The type, characteristics of the course, class size, and course objectives were also included in the questionnaire.

Instructional design scale consisted of 10 questions that could check for the factors in need of being taught in the course according to the Dick & Carey model, ADDIE model, instructional design factors of Na et al. (2001). The 2 choices were "1= following", and "2= not following".

There are 14 questions which were asked of the professors if they are aware of 14 teaching methods suggested in Na et al. (2001) and if they are using it, how often they have used it. From out of 10 lectures, the choices were "1=not used it at all (0 times), 2=rarely used (1-2 times), 3=sometimes used (4-6 times), 4=frequently used (7-9 times), and 5=always used (10 times)".

Nine strategy factors were asked based on the nine methods and conditions of teaching and instructional events that Gagne (1977) offered and checked how often they are using the methods. The choices were "1=not used it at all (0 times), 2=rarely used (1-2 times), 3=sometimes used (4-6 times), 4=frequently used(7-9 times), and 5=always used(10 times)".

Course evaluation scale consisted of enforcement of course evaluation and the use of it, student satisfaction of the professors, and difficulties in lectures and ways for improvement.

Each questionnaire was carefully examined by the professors and graduate school students for content validity. The alpha coefficient for the instruments included in the questionnaire was calculated to be .751 for instructional design, .859 for teaching strategies, .852 for student satisfaction of professors.

## **Data collection and analysis**

Collecting the data was performed from September 17 to 28, 2007 by email and visitation. First, the information of the survey and its purpose was sent to the professors via email and the professors chose which one of the two modes, i.e. email or visitation was convenient for them. Through either email or visitation, respondents received the survey questionnaire and cover letter that explain the purpose and the end date of the survey. After that, the researchers continuously reminded them of the survey and the deadline by phone calls. In the end, 207 out of 307 questionnaires were returned (a response rate of 67.4%). Both descriptive and inferential statistics were employed with an alpha level of 0.05 to establish significance. All data analysis was accomplished using the SPSS 12.0 statistical package.

## **Findings**

### **General Characteristics of the Respondents**

The general characteristics of the respondent professors are shown in Table 1. The professors are mainly male (95.1%) and their major area include biotechnology (19.7%), forestry (16.7%) and horticulture (12.1%). A large percentage of the professors are between 40 and 49 years old (44.7%), while the least are those over 60 years old (10.7%). As to their positions, most are full professors (55.1%), and only few are instructors (2.5%). All (100%) of the professors had doctorate degree. A significant number of respondents had 6 to 10 years of experience (21.3%) and less than 5 years of experience (20.8%).

### **Burden of Lecture, Training Experience and Support Given by College**

#### *Burden of Lecture and Training Experience*

The burden of lecture and training experience of the professors in College of Agriculture and Life Sciences are shown in Table 2. On the average, one professor takes in charge of three courses (47.2%) and the number of credits is about 7 to 9 (45.7%). One third of the professors who are responsible for more than four courses (35.7%) with more than 10 credits (36.6%) have shown that they are under pressure with the heavy work load. On the role of the professors, the number of professors who put more value on research (53.3%) was higher than those who put more emphasis on teaching (46.7%). This result indicates that research is valued more by the professors than teaching. Surprisingly, high percentage of professors (70.5%) did not have any experience in taking pedagogy class and after employment, 28.2% of the professors have not attended any kind of workshop or seminar about teaching and learning. This result implies that training programs on teaching and learning must also be offered to professors.



**Table 1. General Characteristics of the Respondents**

Characteristics		n	%	Characteristics		n	%
Gender	Male	194	95.1	Age	less than 39	26	12.6
	Female	10	4.9		40 - 49	92	44.7
Major	Crop	9	4.5		50 - 59	66	32.0
	Forestry	33	16.7		over 60	22	10.7
	Livestock	12	6.1	Position	Full-Time Instructor	5	2.5
	Veterinary	1	0.5		Assistant Professor	49	23.9
	Agricultural Engineering	11	5.6		Associate Professor	38	18.5
	Agricultural Chemistry	14	7.1		Full Professor	113	55.1
	Agricultural Biology	21	10.6	Teaching Experience	less than 5years	43	20.8
	Agricultural Economics	12	6.1		6 - 10 years	44	21.3
	Biotechnology	39	19.7		11 - 15 years	33	15.9
	Agricultural Education	3	1.5		16 - 20 years	41	19.8
Horticulture	24	12.1	21 - 25 years		21	10.1	
Food	12	6.1	26 - 30 years		14	6.8	
Landscape	7	3.5	Over 31 years		11	5.3	

*Support about teaching and learning given by college*

The result of support about teaching and learning given by the College of Agriculture is shown in Table 3. The number of colleges that has award system regarding professors' abilities in teaching (66.5%) is higher than that of colleges that do not have any award system. It indicates that colleges are trying to improve the professors' teaching ability. Also, during the process of one's appointment and promotion, 40.7% of the professors think that their abilities to teach have influence on their careers in the college. On the contrary, 40.2% of the professors think that their teaching skills have nothing to do with their appointment and promotion in the school. Therefore, teaching abilities need to become a bigger part in decision of one's appointment and promotion in careers.

**Table 2. Burden of lecture and training experience of professors**

Item		n	%	Item		n	%
Number of Courses	less than 2	34	17.1	Experience in Taking Pedagogy	No Experience	146	70.5
	3	94	47.2		Some of Courses	42	20.3
	over 4	71	35.7		Teacher Training Course	19	9.2
Number of Credit	less than 6	35	17.8	Number of Attendance in Teaching and Learning Program	not available	51	28.2
	7 - 9	90	45.7		1	39	21.5
	over 10	77	36.6		2	49	27.1
Role of Professor	Teaching	93	46.7		3	23	12.7
	Research	106	53.3		over 4	19	10.7
	Social Service	0	0.0		Total	207	100.0

**Table 3. Support about Teaching and Learning Given by College**

Item		n	%
Awarding System Regarding Professors' Teaching Ability	Not Available	67	33.5
	Available	133	66.5
Extent to Apply Teaching Ability in Their Appointment and Promotion	Not Applicable	11	5.4
	Hardly Applicable	18	8.8
	Somewhat Applicable	53	26.0
	Applicable	83	40.7
	Very Applicable	39	19.1

### Characteristics of the course

The professors were asked to choose one subject (during 1st-semester in 2007) and its characteristics are shown in Table 4. Most of the courses that were chosen are mainly their major course (97.1%), theory and practice related courses (62.8%) and only theory-oriented courses (35.1%).

The number of students who take the course was from 21 to 40(69.7%). According to OECD in 2004, about 15 students were learning from one professor. Also, many professors (85.0%) set up the course objective to foster students' major knowledge, but a smaller number of professors set up another course objective. Consequently, the professors need to define various course objectives for students to achieve different abilities.

The course objective by course type and characteristics are shown in Table 5. On the average, 66.7% of the professors think that the objective of liberal courses is to cultivate liberal knowledge. On the other hand, 87.4% think that the objective of major courses is to foster major knowledge. It concluded that the result may vary depending on the type of courses. On

the contrary, both theory-oriented courses and theory-practice combined courses share a common objective of fostering major knowledge. The result also showed that only 30% of the professors answered that their course objectives are either to foster creativity or to promote problem solving ability.

**Table 4. Characteristics of the Course**

Characteristics of the course		n	%	Characteristics of the course		n	%
Type of Course	Liberal Course	6	2.9	Course Objective <sup>1)</sup>	Foster Liberal Knowledge	15	7.3
	Major Elective Course	115	56.1		Foster Major Knowledge	176	85.0
	Major Required Course	84	41.0		Foster Practice Ability Related Major	55	26.7
Characteristic of Course	Theory	72	35.1		Foster Experiment Ability Related Major	44	21.3
	Practice	3	1.4		Roster Job Performance Ability	65	31.4
	Theory+Practice	130	62.8		Foster Self-Directed Learning Ability	36	17.4
Number of Student	less than 20	29	14.2		Foster Creativity	43	20.8
	21 - 30	78	38.0		Foster Problem Solving Ability	63	30.4
	31 - 40	65	31.7				
	over 41	33	16.1				

<sup>1)</sup> may choose more than 2 items

**Table 5. Course Objective upon the Course Type and Characteristics**

Course Objective <sup>1)</sup>	Type of Course				Characteristic of Course			
	Liberal Course		Major Course		Theory		Theory +Practice	
	n	%	n	%	n	%	n	%
Foster Liberal Knowledge	4	66.7	11	5.5	7	9.7	8	6.2
Foster Major Knowledge	2	33.3	174	87.4	65	90.3	109	83.8
Foster Practice Ability Related Major	2	33.3	53	26.6	5	6.9	48	36.9
Foster Experiment Ability Related Major	2	33.3	42	21.1	4	5.6	39	30.0
Foster Job Performance Ability	1	16.7	64	32.2	15	20.8	49	37.7
Foster Self-Directed Learning Ability	1	16.7	35	17.6	14	19.4	22	16.9
Foster Creativity	1	16.7	42	21.1	11	15.3	32	24.6
Foster Problem Solving Ability	2	33.3	61	30.7	25	34.7	38	29.2

<sup>1)</sup> may choose more than 2 items

On the other hand, the perceived relevance between the courses and on-the-site agriculture are shown in Table 6. Only 46.8% of the professors think that the two factors co-exist. A large number of them (52.6%) answered that they are less related than the average. This result implies that it is necessary for the professors in lectures and classes to mention realistic problems that could foster students' independent thinking and their application of knowledge to the real problems in the field.

**Table 6. Professors' Perceptions Regarding the Extent of Relevance Between the Courses and On-The-Site it Agriculture**

Item	Not Related		Of Little Related		Somewhat Related		Related		Very Related	
	n	%	n	%	n	%	n	%	n	%
Relevance between the Courses and On-The-Site Agriculture	6	2.9	31	15.1	71	34.6	70	33.8	27	13.0

### The Use of Instructional Design and Syllabus

#### *The use of instructional design*

The elements included in the instructional design such as identifying the instructional goal(100%), making instructional materials(98.1%), establishing learning objective(96.1%) and choosing teaching methods(89.9%) are all being performed by most of the professors (Table 7). Analysis of learners (75.8%), establishment of evaluation plan(75.2%), analysis of instructional contents(70.5%), and inspection of instructional environment(68.6%) are instructional elements that are likewise, accomplished by many professors. However, making lesson plan (54.6%) and preparation of supplement instructional materials (44.0%) are not being accurately followed as elements of instructional design. It implies that the professors think about simple lecture plan ahead of time but they rarely establish a realistic lesson plan.

**Table 7. Extent on Use of Instructional Design**

Element of Instructional Design	n	%	Element of Instructional Design	n	%
Identification of Instructional Goal	207	100.0	Analysis of Instructional Contents	146	70.5
Analysis of Learners	157	75.8	Make the Instructional Materials	203	98.1
Establishment of Learning Objective	198	96.1	Preparation of Supplement or Advancement Instructional Materials	91	44.0
Establishment of Evaluation Plan	155	75.2	Inspection of Instructional Environment	142	68.6
Choice of Teaching Methods	186	89.9	Make the Lesson Llan	113	54.6

### *Use of syllabus*

All the professors who responded to the survey use syllabus and distribute them to the students. About 62.3% of the professors provide this information both online and in printed handout (Table 8). This is because universities require that this information be made available to the students when they need it. However, further investigation is considered necessary to see if the information contained in the syllabus is substantial.

**Table 8. Extent on Use of Syllabus**

Item	n	%
Not Using Syllabus	0	0.0
Providing Syllabus Through Online	78	37.7
Providing Syllabus Through Online and in Print	129	62.3

### **The Use of Teaching Methods and Strategies**

#### *Use of teaching method*

For topics that require channeling knowledge and are theory-based, 51.9% of professors use the lecture method frequently and 27.8% of them use this method always. It implies that most agricultural lectures put importance on delivering information and theories. A significant number of the professors (68.7%) sometimes use discussion as one of the teaching methods. Discussion classes, however, should happen more often because it is a good way for students to interact with each other and to give them opportunities to freely speak up about what they have learned in the lectures. Finally, 31.5% of professors sometimes use experiments and practice methods. This finding indicates that the materials that are used during the lectures are applied to hands-on practices and trainings. As to the other teaching methods, 28.3% of professors sometimes use simulation, but 28.3% of them do not use it at all; 36.5% of them sometimes use field-trip and 31.8% sometimes use demonstration method. This implies that agricultural education requires students to have some hands-on experiences in addition to merely knowledge acquisition. Therefore, going on field trips to inspect agriculture in today's society will help students enhance their ability to apply what they have learned in classes. Therefore, the professors find it important for classes to experience an agricultural excursion.

About 46.5% of the professors do not use role playing at all and 24.5% of the professors do not use team learning at all. Problem solving method is used sometimes by 31.2% of the professors and 29.1% used rarely project method. To fit the society's requirements- this is the ability to cope with any kind of situational problems, all of these teaching techniques and strategies need to be used as much as possible. Team teaching (42.9%), colloquia (28.6%), and online-learning (53.9%) are methods that some of the professors hardly use.

Overall, lecture (4.04) is the most admired teaching method. Other than lecture, other methods are rarely or sometimes used. Of these methods, theory-oriented practice (2.93), demonstration (2.72) and assigning projects to certain individual or group of students (2.72) are more favorable teaching method. These are used 4-6 times out of 10 lessons. On the contrary, online-learning (1.83), classes operated by 2 or more professors (1.98), and role playing (2.01) are the methods that professors rarely used. These are only used for 1-3 times out of 10 lessons.

**Table 9. Professors' Perceptions Regarding the Extent to Use of Teaching Method**

(unit : persons, %)

Teaching Method	Not	Rarely	Sometimes	Frequently	Always	Mean <sup>1)</sup>	SD
Lecture	0(0.0)	6(2.9)	37(18.0)	105(51.2)	57(27.8)	4.04	0.76
Discussion	28(13.7)	65(31.9)	75(36.8)	28(13.7)	8(3.9)	2.62	1.01
Experiment	49(24.5)	50(25.0)	63(31.5)	25(12.5)	13(6.5)	2.52	1.18
Practice	24(11.8)	50(24.6)	64(31.5)	46(22.7)	19(9.4)	2.93	1.15
Simulation	56(28.3)	52(26.3)	56(28.3)	31(15.7)	3(1.5)	2.36	1.10
Field Trip	33(16.3)	74(36.5)	47(23.2)	41(20.2)	8(3.9)	2.59	1.10
Demonstration	30(14.9)	56(27.9)	64(31.8)	42(20.9)	9(4.5)	2.72	1.09
Role Playing	93(46.5)	44(22.0)	39(19.5)	17(8.5)	7(3.5)	2.01	1.15
Team Learning	50(24.5)	50(24.5)	47(23.0)	45(22.1)	12(5.9)	2.60	1.24
Problem Solving	40(19.8)	52(25.7)	63(31.2)	30(14.9)	17(8.4)	2.66	1.20
Project Method	37(18.2)	59(29.1)	45(22.2)	47(23.2)	15(7.4)	2.72	1.22
Team Teaching	87(42.9)	59(29.1)	34(16.7)	21(10.3)	2(1.0)	1.98	1.05
Colloquia	58(28.6)	82(40.4)	45(22.2)	16(7.9)	2(1.0)	2.12	0.95
Online-Learning	103(53.9)	45(23.6)	25(13.1)	8(4.2)	10(5.2)	1.83	1.14

<sup>1)</sup> not used=1, rarely used=2, sometimes used=3, frequently used=4, always used=5

### *Difference in teaching methods by course*

There are significant differences in teaching method used by course characteristic. Specifically, lecture method was used more in subjects that require knowledge and theory (Table 10). On the other hand, experiment, practice, simulation, field trip, demonstration, team learning, project, online learning are frequently used in courses that require both theory and practice. On the other hand, there is no significant difference in the method used by type of courses.

The result for professors using the methods to fit the course objective is shown in Table 11. Lectures (4.04) are more used for fostering job performance ability, major knowledge and problem solving ability purposes. Discussion (2.62) is more used to foster problem solving ability, self-directed learning ability, liberal knowledge purposes. Experiment (2.52) is mainly used for fostering experiment ability related major, self-directed learning ability and problem solving ability purposes. Practice (2.93) is much used on most

**Table 10. Difference in the Use of Teaching Method upon Course**

Teaching Method	Type of Courses			Characteristic of Courses		
	Liberal	Major	t	Theory	Theory+Practice	t
Lecture	4.17	4.04	0.39	4.24	3.94	2.71*
Discussion	2.67	2.62	0.90	2.44	2.72	-1.80
Experiment	1.83	2.54	-1.29	2.10	2.76	-3.77*
Practice	2.33	2.93	-0.97	2.26	3.29	-6.39*
Simulation	3.00	2.33	1.05	2.10	2.50	-2.52*
Field Trip	3.50	2.57	2.13	2.19	2.83	-3.98*
Demonstration	3.17	2.70	1.03	2.47	2.85	-2.31*
Role Playing	2.33	2.01	0.53	1.72	2.19	-2.76*
Team Learning	2.50	2.60	-1.69	2.22	2.80	-3.27*
Problem Solving	2.50	2.69	-0.28	2.47	2.80	-1.84
Project Method	2.50	2.72	-0.38	2.44	2.87	-2.35*
Team Teaching	1.67	1.99	-0.96	1.96	2.00	-0.26
Colloquia	2.00	2.13	-0.28	2.01	2.18	-1.20
Online-Learning	1.83	1.82	0.04	1.60	1.94	-2.14*

1) not used=1, rarely used=2, sometimes used=3, frequently used=4, always used=5

\*p<.05

**Table 11. Extent to use of teaching method upon the course objectives**

Subject Objective Teaching Method	A	B	C	D	E	F	G	H	Average
lecture	3.93	4.05	3.96	4.00	4.14	3.83	3.86	4.05	4.04
discussion	2.73	2.59	2.59	2.51	2.52	2.81	2.60	2.82	2.62
experiment	2.33	2.52	2.53	3.02	2.35	2.64	2.49	2.56	2.52
practice	2.47	2.94	3.54	3.53	3.06	3.03	3.00	2.90	2.93
simulation	2.71	2.29	2.54	2.36	2.31	2.71	2.48	2.50	2.36
field trip	3.00	2.51	2.81	2.70	2.84	2.64	2.64	2.61	2.53
demonstration	3.21	2.66	3.06	2.90	2.58	3.03	3.00	2.80	2.72
role playing	2.40	1.95	2.15	2.14	2.16	2.39	2.02	2.10	2.01
team learning	2.53	2.56	2.83	2.61	2.68	3.14	2.79	2.87	2.60
problem solving	2.60	2.63	2.79	2.72	2.67	3.31	2.86	2.98	2.66
project method	2.33	2.69	2.89	2.68	2.64	3.22	2.86	2.80	2.72
team teaching	2.07	1.97	1.94	1.93	1.98	2.08	1.80	1.92	1.98
Colloquia	2.07	2.11	2.04	2.11	2.03	2.33	2.02	2.15	2.12
online-learning	2.33	1.78	1.80	1.66	2.00	2.06	1.61	1.88	1.83

1) not used=1, rarely used=2, sometimes used=3, frequently used=4, always used=5

A) foster liberal knowledge, B) foster major knowledge, C) foster practice ability related major,

D) foster experiment ability related major, E) foster job performance ability,

F) foster self-directed learning ability, G) foster creativity, H) foster problem solving ability

purposes except for fostering liberal knowledge and problem solving ability. Simulation (2.36) is more used for fostering liberal knowledge, self-directed learning ability, practice ability related major, problem solving ability and creativity purposes. Demonstration (2.72) is more used for other purposes than to foster major knowledge and job performance ability. Role playing (2.01) is more used for many purposes other than to foster major knowledge. Team learning (2.60) is usually used in the purposes except for cultivation of liberal knowledge and major knowledge. Problem solving method (2.66) is more used for purposes other than foster liberal knowledge and major knowledge. Project methods (2.72) are more used to foster self-directed learning ability, practice ability related major, creativity and problem solving ability purposes. Team-teaching (1.98) is more used for fostering self-directed learning ability and liberal knowledge purposes. Colloquia (2.12) are more used to foster self-directed learning ability and problem solving ability purposes. Finally, online learning (1.83) is more used to foster liberal knowledge, self-directed learning ability, job performance ability and problem solving ability purposes.

By reviewing these results, purposes for each course are fulfilled by the professors but still with some problems. For example, lectures and colloquia are methods that are found effective in providing helpful information to students. However, the frequency of using these methods is insufficient to fulfill the purposes of providing specialized and liberal knowledge. Also, to enhance adaptation ability in any situations, to enhance creativity and to challenge one's potential, simulation method and project method would seem to be useful. But these methods are not actually being used by the professors.

### *Use of teaching strategies*

More than one-third (35.7%) of the professors say that they frequently come up with strategy to motivate learner's interest (Table 12). A number of them (20.7%) also said that it is rare that they use strategy to motivate learner's interest. About 35.3% of the professors say that they sometimes use a teaching strategy to present learning objective clearly. Many of professors also use the following strategies frequently: 1) check prerequisite learning contents, 2) use of various teaching material, 3) organize and structure of subject matter, and 4) answer learner's questions. But providing opportunities to summarize the learning contents, providing supplementary lesson, and giving generalization to apply the learned contents to real life are strategies that are not used very often.

Looking at the extent of use of these teaching strategies, overall use is above average (3.62). Out of all the strategies mentioned, use of various teaching material (3.92), organize and structure of subject matter (3.89) and answer learner's questions (3.88) were keenly used by most professors. But strategies such as providing opportunities to summarize the learning



contents (3.22), giving generalization to apply the learned contents to real life (3.26) and motivating learner's interest (3.41) are not used sufficiently. It implies that while professors are putting efforts into implementation of instruction, they also need to put efforts into the presentation and closing of instruction.

**Table 12. Extent to use teaching strategy**

Teaching Strategy	not	rarely	sometimes	frequently	always	Mean <sup>1)</sup>	SD
motivate learner's interest	3(1.4)	42(20.3)	59(28.5)	74(35.7)	29(14.0)	3.41	1.01
present learning objective	2(1.0)	26(12.6)	73(35.3)	71(34.3)	35(16.9)	3.54	0.95
check prerequisite learning contents	3(1.4)	20(9.7)	53(25.6)	88(42.5)	43(20.8)	3.71	0.95
use of various teaching material	4(1.9)	18(8.7)	33(16.0)	86(41.7)	65(31.6)	3.92	1.00
organize and structure of subject matter	2(1.0)	12(5.8)	37(17.9)	111(53.6)	45(21.7)	3.89	0.84
provide opportunities to summarize the learning contents	5(2.4)	39(18.8)	87(42.0)	57(27.5)	19(9.2)	3.22	0.94
provide supplementary lesson	2(1.0)	13(6.3)	59(28.5)	99(47.8)	34(16.4)	3.72	0.85
answer learner's questions	2(1.0)	14(6.8)	47(22.7)	87(42.0)	57(27.5)	3.88	0.92
give generalization chances to apply the learned contents to real life	7(3.4)	30(14.5)	90(43.5)	63(30.4)	17(8.2)	3.26	0.92

<sup>1)</sup> not used=1, rarely used=2, sometimes used=3, frequently used=4, always used=5

Total Mean=3.62, SD=0.64

Professors were also asked whether they had any experience in taking any pedagogy course or attending training program related to teaching and learning. The professors who attended those training programs use teaching strategies a little more than those who have no experience of attending such course (Table 13). The difference however was not significant.

### **Course Evaluation and efforts for improvement**

#### *Enforcement of course evaluation and the use of it*

Except for one professor, all professors are administering course evaluation either by obligation (59.5%) or through collective effort made by colleges (38.5%). Of this number, very few (1.5%) actually make their own evaluation form. On the other hand, only 31.2% of the professors take the results of the course evaluation seriously and 61.9% of them know the results, but do not think of it as very useful. This shows that even though every professor implements course evaluations, the results are not used to create helpful learning environment for the students. Therefore, there is a

need to have substantial methods and tools to make the results of the evaluations more helpful and useful.

*Satisfaction of professors on students*

Overall, the professors are strongly satisfied with their students, given an overall mean of 3.83. However, teachers are not so pleased about student's learning readiness and learning achievement. They are satisfied with students showing their interests, participating in classes and completing assignments and homework. As a whole, the professors are satisfied especially about the students' course participation and eagerness (3.97). But they were less satisfied with the students' level of preparation for the class (3.63) and completion of assignment (3.79). Therefore, professors need to incorporate various teaching strategies regarding class preparation as well as course evaluation in order to improve students' learning readiness and learning achievement.

**Table 13. Difference in the use of teaching strategy by experience in taking pedagogy course or attending training program related to teaching and learning**

Teaching Strategy <sup>1)</sup>	experience in taking pedagogy			experience of attendance in teaching and learning program		
	not available	available	t	not available	available	t
motivate learner's interest	3.43	3.34	0.61	3.39	3.38	0.44
present the clear learning objective	3.51	3.59	-0.53	3.37	3.57	-1.21
check prerequisite learning contents	3.70	3.75	-0.38	3.53	3.76	-1.43
use of various teaching material	3.90	3.98	-0.56	3.86	3.95	-0.46
organize and structure of subject matter	3.88	3.92	-0.27	3.78	3.91	-0.88
provide opportunities to summarize the learning contents	3.23	3.21	0.90	3.06	3.23	-1.06
provide supplementary lesson	3.75	3.67	0.58	3.75	3.73	0.10
answer learner's questions	3.91	3.82	0.65	3.86	3.90	-0.23
give generalization chances to apply the learned contents to real life	3.30	3.15	1.16	3.14	3.29	-0.98
Total	3.62	3.62	0.07	3.53	3.64	-1.07

<sup>1)</sup> not used=1, rarely used=2, sometimes used=3, frequently used=4, always used=5

\*p<.05

Difference in the satisfaction of professor by characteristics of the course was also analyzed. There are significant statistical differences in some category depending on type and characteristics of the course. For example, professors who teach liberal course are satisfied about students' interest more than professors who teach major course (t=2.19, p<0.05). Also depending on characteristics of the course, professor who teach theory

**Table 14. Enforcement of course evaluation and the use of it**

Item		n	%
enforcement of course evaluation	make their own evaluation form	3	1.5
	execute course evaluation by collective purpose of colleges	79	38.5
	execute course evaluation by obligation	122	59.5
	not execute course evaluation	1	0.5
use of course evaluation result	actively use	63	31.2
	not useful information	125	61.9
	not receiving the result	9	4.5
	not using at all	5	2.5

**Table 15. Extent to satisfaction of professors upon students**

Item	strongly unsatisfy	unsatisfy	uncertain	satisfy	strongly satisfy	Mean <sup>1)</sup>	SD
learning readiness	3(1.5)	15(7.4)	60(29.6)	101(49.8)	24(11.8)	3.63	0.84
students' interest	1(0.5)	5(2.5)	46(22.8)	118(58.4)	32(15.8)	3.87	0.72
course participation and eagerness	1(0.5)	4(2.0)	42(20.8)	109(54.0)	46(22.8)	3.97	0.75
completion of assignment	2(1.0)	6(3.0)	42(20.9)	113(56.2)	38(18.9)	3.89	0.77
learning achievement	0(0.0)	11(5.5)	44(21.9)	123(61.2)	23(11.4)	3.79	0.71

<sup>1)</sup> strongly unsatisfy=1, unsatisfy=2, uncertain=3, satisfy=4, strongly satisfy=5

Total Mean=3.83, SD=0.60

and practice-related courses are satisfied about students' readiness ( $t=2.10$ ,  $p<0.05$ ) and learning achievement ( $t=2.08$ ,  $p<0.05$ ) more than professors who teach only theory-oriented course.

#### *Difficulties in lectures and ways for improvement*

Professors think that lack of students' learning ability (28.2%), time shortage for preparing lectures (22.1%), and lack of facilities and materials (19.5%) are the difficulties they experience in preparing lectures (Table 16). A few professors also, think that lack of teaching ability (1.0%), scarcity of materials or estimated budget (5.1%), and lack of technical skills (5.6%) are some complications in giving lectures.

In terms of ways to address these difficulties, sharing information among professors (30.6%) and making references to the teaching strategy guide books (29.9%) were some of the suggested methods. There are only very few teachers who visit other professors' lectures (5.2%) and record and

analyze one's lectures(6.8%) in order to improve their strategy. This implies that while professors are individually trying their best to find ways to improve their lecturing skills, self-evaluating system has not been supported enough by the colleges as a way to improve one's teaching strategy.

**Table 16. Difficulties in lectures and ways for improvement**

	Item	n	%
difficulties in lecture	lack of major knowledge	24	12.3
	lack of technical skill	11	5.6
	lack of students' learning ability	55	28.2
	lack of facilities and materials	38	19.5
	time shortage for preparing lectures	43	22.1
	lack of teaching ability	2	1.0
	scarcity of materials or estimated budget	10	5.1
	lack of field experience	12	6.2
ways for improvement	recording and analyzing one's lectures	22	6.8
	sharing information among other professors	99	30.6
	visiting other professors' lectures	17	5.2
	making references to the teaching strategy guide books	97	29.9
	attending training program related teaching method	46	14.2
	using teaching portfolio	43	13.3

## **Conclusions and Recommendations**

### **Conclusions**

First, professors of colleges of agriculture and life sciences do not have many opportunities to further develop or improve their own abilities for teaching because of researches, burden of lecture, and other duties. Also, they do not have many training experiences in taking pedagogy class and attending seminars and workshops related to teaching. Although some colleges are enforcing award systems to strengthen teaching and learning, teaching ability of the professors is not considered so much in employment and promotion screening.

Second, most of the courses taught by professors are theory-oriented and specialized major area. The course objectives of fostering problem solving abilities, creativity, and practical abilities related major are not addressed well, so professors need to define the course objectives according to classifications and characteristics of each course. Likewise, because the course contents are not thoroughly related with on-the-site agriculture, the professors need to teach more realistic issues and problems.

Third, professors are doing well in identifying instructional goal, establishing learning objectives, and developing instructional materials as part of their instructional design. However, they adopt less of making lesson plan to set lecture schedules and preparing supplement or advanced instructional materials. Therefore, after considering all the elements of instructional design, professors have to develop realistic lecture schedules through making lesson plan.

Fourth, professors frequently use lecture as a teaching method. According to characteristics of the course, lecture method is mainly used in theory-oriented courses. On the other hand, experiment, practice, simulation, field trip, demonstration, role playing, team learning, project and online learning methods are frequently used in courses requiring theory and practice together. Moreover, professors perform well on activities related to instructing, but not on strategies that encourage learners' interests and motivation and those that organize subject matters and provide summary of lessons. The professors who attended some teaching and learning training programs used teaching strategies more than those who had no experience of attending.

Lastly, professors execute course evaluation, but the results of these evaluations are not being used to improve of teaching and learning. More so, they are not contented with learning readiness and achievement of the students. They also encounter difficulties in guiding students because of lack of students' learning abilities and not enough time to prepare lectures. For more effective teaching and learning, professors are making their individual efforts and initiatives rather than receiving support for the colleges. Specifically, they share information with other professors and refer to technical books of teaching methods.

## Recommendations

First, professors in college of agriculture and life sciences should relate the contents of their lesson to agricultural industry and related fields. Colleges of agriculture and life sciences should not only be based on the concept and theory of life science department, but also develop the abilities of students to explore and apply on-spot experiments. Thus, professors must select and develop educational contents, teaching methods, and strategies based on understanding the changes of labor forces in agriculture and life science industry, and should also analyze the needs of this sector.

Second, professors should design their instruction and perform teaching activities in accordance with educational objectives. For effective instruction, they should get rid of traditional teaching style, and make efforts to adopt new strategies to achieve educational objectives. Thus, systematic instructional design should be employed to various teaching activities.

Third, professors must be able to recognize the importance of teaching methods and strategies. They need to emphasize methods for effective teaching because they are responsible for both research and teaching in the academic field. Therefore, colleges should put heavier weight on teaching abilities with regard to making decision on employment, re-hiring, and promotion of teachers.

Fourth, professors need to use learner-centered teaching methods. It is good that they give lectures with confidence by means of using skilled methods, but it would be better that they consider lecture that will provide the best learning environment for students. To do this, they should provide opportunities to listen to students' ideas and opinions. They should also improve their teaching skill by putting to practical use the various teaching methods while considering educational objectives and learner characteristics.

Fifth, colleges should put less pressure upon the professors on the lecture classes and try to relieve their burden in class. To let the professors teach their lectures more effectively, the colleges should reduce the burden of lecture by diminishing the number of students per professor, recruiting more professors, and separating the burden of research function.

Lastly, professors should be given opportunities and support to enhance their teaching specialty. In particular, colleges, government sector and research institutes must look deeper and determine educational needs of teachers specifically on improving teaching skill by offering seminars, institutional programs and workshops on teaching methods and strategies. Development of guidebooks for teaching methods and handbooks of instruction, instruction models and teaching materials should also be supported.

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# **Enhancement of Education in Farm and Food Industry with Adoption of Computer Based Information Systems**

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## **INTRODUCTION**

An adequate information supply together with land, labour, capital, and management is required for a successful agricultural business. Studies showed that information management may become easier, timelier, and generally provide greater value through computerised information system use (Mac Rae, 1984/1985; Lazarus and Smith, 1988; Putler and Zilberman, 1988; Batte et al., 1990; Iddings and Apps, 1990; Jarvis, 1990; Gibbon and Warren, 1992; Nuthall and Bishop-Hurley, 1994; Ortmann et al., 1994; Schmidt et al., 1994; Woodburn et al., 1994; Amponsah, 1995; Warren et al., 1996, 2000; Stubbs et al., 1998; Bryant, 1999; Hoag et al., 1999; Nuthall and Benbow, 1999; Walburger and Davidson, 1999; Lacroix et al., 2001). However, encouraging farmers to change their information management has not been as straightforward and as easy as expected. For instance, farmers have shown a low rate of management software adoption and its effective use relative to farmers' adoption behaviour of technical innovations (Morris et al., 1995; Preve, 1999).

Since the farmer is usually an essential component of the farm information system, the choice of information technology is an individualistic process that is usually governed by the farmer's characteristics, such as personality, experience, age, education, and goals. These features are highly personal features, so there may be a considerable variation in the choice of the information technology and system configuration among farmers.

Past researches have identified factors believed to operate as software adoption barriers. In these studies, some refer to management information systems in a broad sense (King et al., 1990; Beers, 1996; Huirne et al., 1996), while other papers focus on decision support systems (DSS) (Cox, 1996; van der Putten et al., 1992; Parker and Champion, 1997). The main barrier is the failure of developers to address the real problem. This issue was summarised by the saying "technology looking for a solution" (Parker, 1999). Closely related to this issue are barriers reported that refer to



the usability of the new technology, and that the systems seem to be unsuitable for farmer's standard patterns of work. Furthermore, farmers often prefer physical work relative to office time. Similarly, software developers have often produced applications that require inputs that are either unfamiliar or unavailable to the farmers.

Other problems include the complexity in design and presentation of DSS, and the difficulty in assessing the largely intangible benefits of information system improvements. If a clear perception of the economic benefit derived from software were available, this would be a major contributor to encouraging farmers' adoption (Gelb et al., 2001).

The lack of integration among the different components of many information systems is another problem. Precomputer information systems were usually automatically integrated within the farmer's mind. Finally, it is obvious that for the use of computerised information systems, a certain level of computer literacy is required (Taylor et al., 1991). While this restriction appeared to be significant at the beginning of the 1990s, it is now less relevant given the current trend in computer usage and uptake. However, especially for developing agricultures, this barrier still exists. Parker (1999) commented that the threat to advisers, the time commitment, and the lack of software updating could also have been factors in the slow uptake. On the more positive side, the factors identified as being associated with on-farm computer adoption have been business size, education, and age. A positive correlation between farm size and computer uptake was found in almost all reviewed studies. Similarly, a positive correlation between the farmer's education level and computer adoption was also found in the majority of reviewed studies. Farmer age was the third factor reported to be correlated with computer uptake. The younger the farmer, the more likely was computer adoption. That is, young, better educated farmers operating larger farms are likely to represent the future expansion of the industry, and these are the farmers most likely to adopt computers. It has also been found that farmers who owned an off-farm business were more likely to use computer (Putler and Zilberman, 1988). Other studies have also found increased computer use if farmers have off-farm employment (Woodburn et al., 1994; Warren et al., 1996). Off-farm employment is thought to expose farmers to new technologies, to broaden their perspective on management, and to increase their willingness to adopt computers.

In addition, those farmers who previously applied formal approaches to record keeping and who used off-farm services were more likely to adopt a computer (Batte et al., 1990; Ortmann et al., 1994; Woodburn et al., 1994). Ohlmer (1992) noted that farmers using on-farm computers carried out the same management tasks as they were previously hired from service organisations. Also, off-farm employment may expose farmers to new technologies and broaden their management perspectives resulting in greater adoption and use.

While computer uptake is a pre-condition, an important issue is whether farmers using computer believe that they have improved their information management. Several of the reviewed studies addressed this issue (Batte et al., 1990; Ortmann et al., 1994; Woodburn et al., 1994; Amponsah, 1995; Nuthall and Benbow, 1999). Previous research concluded that managers' perceptions of system performance (system usefulness) were significantly correlated with actual information system use, and presumably, with system value (Alter, 1976). These studies have tested associations between farmers' opinions of system usefulness and similar factors used to explain computer uptake, such as farm and farmers' characteristics (Batte et al., 1990; Amponsah, 1995; Nuthall and Benbow, 1999). However, other factors that may be related to system development were not included. Such factors may explain why Nuthall (2004) found mixed economic benefits to computer use. Undoubtedly, the studies reviewed have helped in understanding farmers' computer behaviour.

Competition between different interests for the same land should be resolved through selection of the most appropriate land-use. There are three main aspects that need to be taken into account when planning for sustainable use of land resources: environmental, economic and societal (Miranda, 2001; van Noordwijk et al., 2001). In difficult scenarios where there are complex decision-making considerations and a variety of goals that are sometimes conflicting, the use of a multi-criteria analytical approach can be beneficial (Center for International Forestry Research, 1999; Antoine et al., 2000; Phua and Minowa, 2005). Multi-criteria analysis is a methodology by which the relative merits of different options can be compared using a range of quantitative and qualitative criteria (Center for International Forestry Research, 1999). The approach thus can help evaluate transparently a variety of land-use options according to a variety of criteria that are measurable and form a valid basis for decision-making. When planning occurs from the standpoint of a multi-criteria analytical approach seeking the sustainable use of land resources in an agricultural landscape, the objective is to identify land uses that are ecologically friendly, efficient and profitable, are accepted by society, and meet social needs.

### **e-Based Real Time Quality Control Information System**

In this section, the e-based real time quality control information system for food industry product has been provided. According to the widespread domain of e-based information system, the model could manage the cycle of final food industry product from farm to customers in market. In this model, three interfaces were designed, namely: 1) for the farmers in their farm, 2) for the food industries in their industry and 3) for the customers of the market. Based on the domain of implementation, global or local network can be used. The farmers interface includes the new knack of the farmers and agriculture researchers, the standard of raw products and personal page for each farm. In the personal page, each type of

product and some attributes for each of them are provided and that the farmers should fill the specifications of their raw products and the quality value of each attribute on products. The information transfers to the data base and stored for analysis and compared with other farms.

One of the most important parts of the system is to gather information from customers. The customers could propose their idea about food products by connecting to the network. Customer interface has been designed to gather the quality value of the attributes proposed by the consumers and saved in the corresponding data base. E-based real time quality control information system model is shown in Figure 1.



Figure 1. e -Based Real Time Quality Control Information System model

## Notations

$QV_{ij}^l$  : Quality value of raw material  $j$  from location  $l$  on attributes  $i$

$P_j^l$  : Raw material  $j$  from location  $l$

$m$  : The number of attributes

$P_p$  : The number of raw material of farm  $p$

$\overrightarrow{QV_j^l} = (QV_{1j}^l, QV_{2j}^l, \dots, QV_{mj}^l)$

$IEQ_p^v(i)$  : Food industry ( $v$ ) expect quality attribute  $i$  of product  $p$

$MEQ_p(i)$  : Market expect quality attribute  $i$  of product  $p$

## Model definition

The computer based information system has been designed to evaluate and to improve the quality of the raw material which has been produced in distributed land against the global market and food industries expectation. Thereby, an integrated data base with real time controller could help the farmers at 3 stages such as a) producing qualified raw materials, b) preparing the raw materials in food industries and c) the customers needs in global market.

In the proposed approach  $L$  lands have been considered, wherein each of the  $p$  raw material has been produced.  $P_j^l$  Means, raw material  $j$  is produced in location  $l$ . For each raw material  $m$  attribute was considered.  $QV_j^l(m)$  means that the quality value of the raw material  $j$  from location  $l$  on attribute  $m$ . In each location vector  $\overrightarrow{QV_j^l} = (QV_j^l(1), QV_j^l(2), \dots, QV_j^l(m))$  has been defined which consists of the quality value of  $m$  attribute on each. All the information has been collected from different locations and are transferred to the central data base.

To provide the food industry expectation and needs, the system gathers similar information from each plant. Generally in the food industries the raw material is tested from special quality stand point before going to the cycle of production. The food specialists investigate the raw material and announce the quality of the raw material and their accepted quality level which has been called industries expected quality (IEQ).  $IEQ_p^v(i)$  means that food industry ( $v$ ) expects quality on attribute  $i$  and for each product vector IEQ has been defined as  $\overrightarrow{IEQ_p^v} = (IEQ_p^v(1), IEQ_p^v(2), \dots, IEQ_p^v(m))$ . This value of

quality on each attribute  $i$  of raw material  $p$  is also collected and transferred to the designed information system.

Moreover, after completing the food production, the final products will be transferred to the global market by the designed user interface based on the web application hyper text markup language (HTML), the insight of the customers about each product is collected. In the user interface, some information about raw materials and procedure of food production are provided. After recognizing the whole procedure of preparing final product for the customers, they would propose their idea about raw material and production methodology. The customer's idea is transferred to the data base as a vector  $\overline{MEQ}_p(i) = (MEQ_p^1(i), MEQ_p^2(i), \dots, MEQ_p^G(i))$ .

### Quality attributes control for each attribute of raw materials all over the Farms

After collecting the quality value from the sources, the means of quality value (control limit of the quality value) for each attribute of the raw material will be calculated by equation 1.

$$CL_p(i) = \frac{\sum_{l=1}^L QV_p^l(i)}{L} \quad \forall p, i \quad (1)$$

From equation 1 the lower and upper control limits will be obtained as equation 2 and 3.

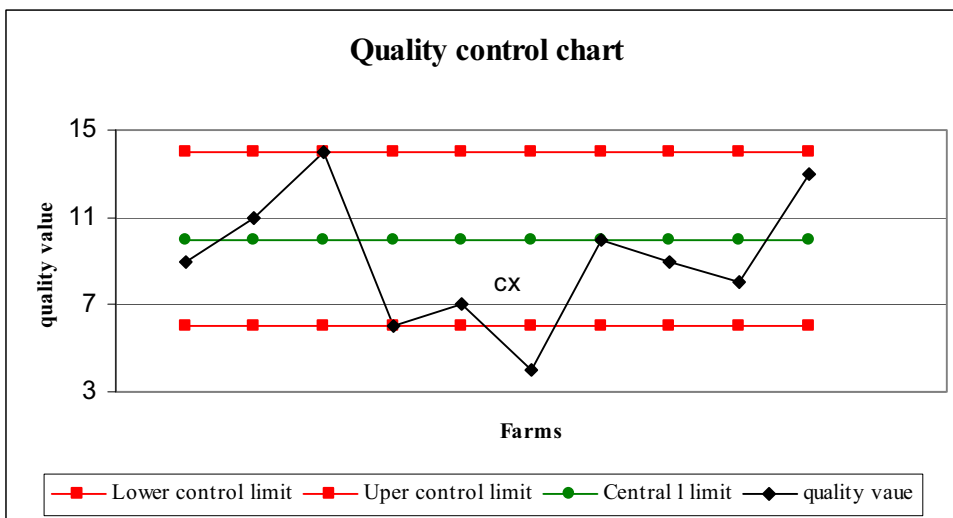
$$UCL_p(i) = CL_p(i) + \sigma_p(i) \quad (2)$$

$$LCL_p(i) = CL_p(i) - \sigma_p(i) \quad (3)$$

Where  $\sigma_p(i)$  are derived from process standard deviation for all over of the locations (estimated according to sample data).

After obtaining the quality control limit  $[LCL_p(i), CL_p(i), UCL_p(i)]$ , in the inference section of the designed system it is comprised with quality value  $QV_j^l(i)$  of each farm. We expect that the amount of the  $QV_j^l(i)$  is between lower and upper bound of the control limits for each location, otherwise the attribute system of the product which is out of the control limits will be specified and it would be announced to that location that its product quality is not as same as the producer in other places from the attribute view point. The quality control chart is shown in Figure 2. The farmers can refer to this system and identify the innovations in other places to achieve better quality of the products. After investigating the quality of the products among the primary farmers, it is compared with the qualitative requirements of the farmers and the customers that consume the products in different places.

Figure 2. Quality control chart of farms



**Quality attributes control for each attribute between farmers, industries and food markets**

In this section another aspect of the proposed system is considered. After smoothing the quality of raw material between farmers, the difference between  $IEQ_p(i)$ ,  $MEQ_p(i)$  and  $CL_p(i)$  should be minimized. We expect these values to be equal or near equal. Using ANOVA test approach, the equality of the parameters is investigated. We find the expected quality value of the food industry and the markets by considering equations 4 and 5, respectively.

$$IEQ_p(i) = \frac{\sum_{v=1}^V IEQ_p^v(i)}{V} \quad \forall p,i \quad (4)$$

$$MEQ_p(i) = \frac{\sum_{g=1}^G MEQ_p^g(i)}{G} \quad \forall p,i \quad (5)$$

By applying ANOVA test to consider the equivalency of the quality value between farm, food industry and market as formula (6) by  $F$  statistic in formula (7)

$$\begin{cases} H_0 : CL_p(i) = IEQ_p(i) = MEQ_p(i) \\ H_1 : CL_p(i), IEQ_p(i), MEQ_p(i) \text{ Not equal} \end{cases} \quad \forall p,i \quad (6)$$

$$F = \frac{SST / 2}{SSE / 3(n-1)} \quad (7)$$

where  $SST$  is sum of squared treatment and  $SSE$  is sum of squared error with each parameters while  $F$  statistic is the Fisher distribution with safety interval of  $\alpha$ , and 2 and  $3(n-1)$  degree of freedom ( $F_{\alpha,2,3(n-1)}$ ) and  $n$  is the sample size considered. If  $F \geq F_{\alpha,2,3(n-1)}$ , then  $H_0$  is rejected and there is significant difference between the obtained quality values of the farm, food industry and market; otherwise  $H_0$  is accepted.

## Conclusions

The advantages of the proposed approach are as follows:

1. To assist the food industries to choose the better supplier (farmers) which has produced more qualified raw materials.
2. To enhance the e- knowledge of the farmers.
3. To recognize the market needs.
4. To integrate the supply chain information flow.
5. To achieve the productivity and create educational aspects to improve the role of the IT in real time quality control.

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# The Environment, Entrepreneurship Education and Mentoring in the Philippine Educational System

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## INTRODUCTION

Climate change is undeniable. In the internationally respected *Scientific American*, Collins et al. (2007) write that climatologists are “so highly confident that human activities are dangerously warming the earth.” The National Science Teacher’s Association of the US has come out with a website dedicated to providing teaching materials on climate change in general and global warming in particular (Hassol 2002). Yet, the policymakers of the Philippines have largely been silent on this.

The Philippine education system was patterned after the United States; in fact, the University of the Philippines itself was conceived by David P. Barrows, General Superintendent of Education, in 1904 (Bernardo 2007). As such, our educational system dates back to the time of the Industrial Revolution when the economy needed workers in factories and assembly lines (Strauss 2006). So our schools have been designed to produce graduates who will then seek employment, not create jobs for themselves and others.

What is needed is an educational system that teaches not only math and science and other subjects including philosophy, but also “stresses creativity, initiative, risk analysis, and thoroughness” that are in fact traits of a good entrepreneur (Strauss cited). He reports that his employer, USA Today, has teamed up with the Kauffman Foundation to help children learn entrepreneurship in school.

In Europe, entrepreneurship was considered as a new basic skill in 2000 (EU 2007). Today, education for entrepreneurship is high in the agenda of most EU member states; the European Commission (EC) is committed to promoting entrepreneurship through education at all levels.

Next year, on February 23-March 1, the US will celebrate the 2<sup>nd</sup> Annual National Entrepreneurship Week, according to the Consortium for Entrepreneurship Education (CEE 2007). This means that even the United States has just awakened from the centuries-old sleep of education being only for employment, not entrepreneurship.

Entrepreneurship being taught in school is something new and in fact unknown in Philippine schools. Any course that does not lead to a college degree we call *vocational*. The problem in the Philippines is that technical jobs are looked down upon as inferior, because they essentially involve the hands and not the head. This is our legacy from the Spanish conquerors, who impressed on the Filipinos that they belonged to an inferior race, and which the Filipinos came to believe as true, an intellectual attitude which Jose Rizal spent his short life combating.

It is relevant at this point to answer the question: What is entrepreneurship? According to Timmons (2007), it is "the ability to create and build something from practically nothing." It is characterized, according to Timmons, as follows:

- (a) Entrepreneurship is initiating, doing, achieving and building an organization. You cannot have an enterprise without an organization, no matter how small.
- (b) Entrepreneurship is the knack of sensing a business opportunity where no one else does. MacDonald started with one man with a new recipe for fried chicken.
- (c) Entrepreneurship is the ability to build a team to complement one's talent(s). An enterprise can be a two-man team, but not a one-man band.
- (d) Entrepreneurship is the know-how to access resources and manage them well. The entrepreneur must have access to credit and know how to manage his company in order to succeed.
- (e) Entrepreneurship is the willingness to take risk. While he studies the risks, he can make a decision because a good manager is not afraid to make mistakes.

Entrepreneurship education starts from the elementary grades and continues beyond college. According to the CEE (2007), there are five entrepreneurial processes; the CEE does not provide any description of the processes, thus the notes below are by the author of this paper:

1. Discovery – getting a flash of intuition or insight, "the bright idea"
2. Concept development – translating the insight into a workable model, up to and including proof of concept
3. Resourcing – accessing resources: financial, managerial, manual (labor)
4. Actualization – piloting up to franchising (if desired)
5. Harvesting – income generation

## **The American Model of Entrepreneurship Education**

So it is that the American and European systems of education are changing, both systems realizing the necessity of education not only for employment but more so for entrepreneurship. It is imperative that we learn this time not only from the Americans but also from the Europeans.

In this regard, the American Consortium for Entrepreneurship Education (CEE) has generated what it calls the National Standards of Practice for Entrepreneurship Education (NSPEE) (CEE 2007). The NSPEE has a four-fold aim:

- (1) Facilitate student motivation – With the concept of entrepreneurship, the students who are not keen on the pursuit of a college-based career have an intelligent alternative and will be motivated to move on with their education.
- (2) Enhance opportunities for work and life – The learning will not be on only one enterprise but rather on how generate one's own and nurture it from idea to income generation.
- (3) Increase invention and innovation – With entrepreneurship in high schools and colleges, not to mention elementary grades, there would be a tremendous increase in bright ideas that can be turned into technologies that can generate not only income and job for the entrepreneur but also jobs and incomes for his staff.
- (4) Strengthen economies – Consider the multiplier effect of new technologies, new enterprises. With more enterprises, the economy grows more robust.

Thus, the US national standards for entrepreneurship education looks at entrepreneurship as an economic force (CEE 2007), that the appropriate curriculum is able to “demonstrate the place for entrepreneurship in school-to-career transition, community service, and economic development strategies, as students become involved in for-profit, not-for-profit and public sectors of the economy.” Entrepreneurship education thus points to the need to work within and for local communities and national society as well.

Since entrepreneurship education is technique-oriented, the approach to teaching is different from that for employment education. The approach to entrepreneurship education is characterized mainly by facilitating and coaching; according to CEE (2007):

*Instructors should position themselves, not as the providers of knowledge but as facilitators of learning, whose role is to build knowledge in their students; facilitate the discovery process and provide coaching to guide students to solutions; and allow them to choose their own paths and to learn from their own mistakes and successes.*

The problem with the American entrepreneurship education model is that it is aimed solely or mainly at producing entrepreneurs out of students. That implies special schools and not the regular schools.

The author of this paper advocates that the regular schools, from primary to college, be used to teach both education for employment and education for entrepreneurship.

Entrepreneurship education, according to CELCEE (2006), is “the process of providing individuals with concepts and skills to recognize opportunities that others have overlooked, and to have the insight, self-esteem and knowledge to act where others have hesitated.”

In the United States, the Kauffman Foundation (2007) is dedicated to entrepreneurship education along three fronts:

- (a) advance entrepreneurship education & training
- (b) promote entrepreneurship-friendly policies in government
- (c) facilitate the commercialization of new technologies by entrepreneurs.

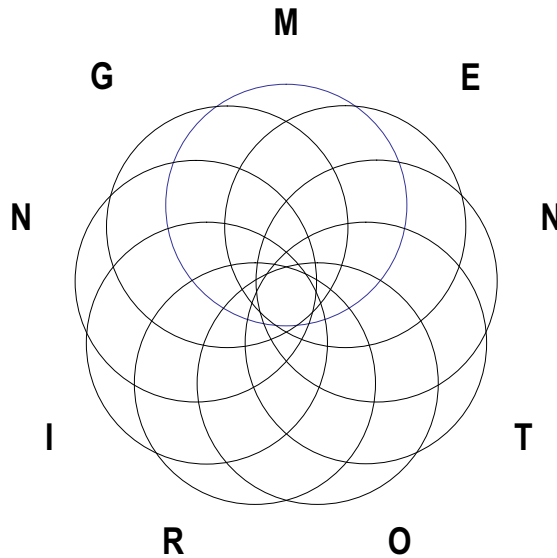
The Kauffman Foundation even funds entrepreneurship research in the academe.

### **The Role of Mentoring in Both Environmental and Entrepreneurship Education**

Once the curriculum has been revised to include both environmentalism and entrepreneurship, it becomes the job of the school counselor to monitor the teaching of these two concepts in different classes and courses, as well as monitor the results. As earlier cited (CEE 2007), the approach to entrepreneurship education is characterized mainly by facilitating and coaching – in other words, mentoring. This author has already proposed a mentoring model that can be used for teaching in regular schools as well as those engaged in entrepreneurship education (Gabriel 2005), which consists of 10 duties of the mentor: Model, Empathize, Nurture, Teach, Organize, Respond, Inspire, Network and Goal-set, which is called the MENTORING Model using its acronym. This is shown below (Figure 1).

That is where guidance and counseling comes in. While it is true that the modern concept is for the professor or instructor to assume the role of facilitator and not dictator of learning, teachers in the elementary grades, high school and college still assume the role of all-knowing and consider the students as all ignorant until proven otherwise. This is the ancient idea of education. The Mentoring Model assures the educational system that it will produce entrepreneurs and not simply robots. The mentor facilitates the education of the student through experiential learning methods, not simply memory work. Experiential learning is knowledge, skills and feelings acquired

in some relevant setting, or learning gained through sense experiences (Smith 1996). Environmentalism and entrepreneurship can only be learned through experiential learning. Thus, the school counselor has her job cut out for her.



**Figure 1. A Mentoring Model asserting nine concurrent roles of the mentor in relation to the student or learner (RL Gabriel 2005)**

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# **The NAFES: An Agrifishery Modernization or Mediocrization Solution in an Environment of Change**

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## **A Crisis in Education for Agriculture**

The Philippines and perhaps some countries in the Asia-Pacific regions as well as in Europe are experiencing dilemmas in Agriculture Education. In the recent past, the Philippines is also experiencing crisis in education for agriculture.

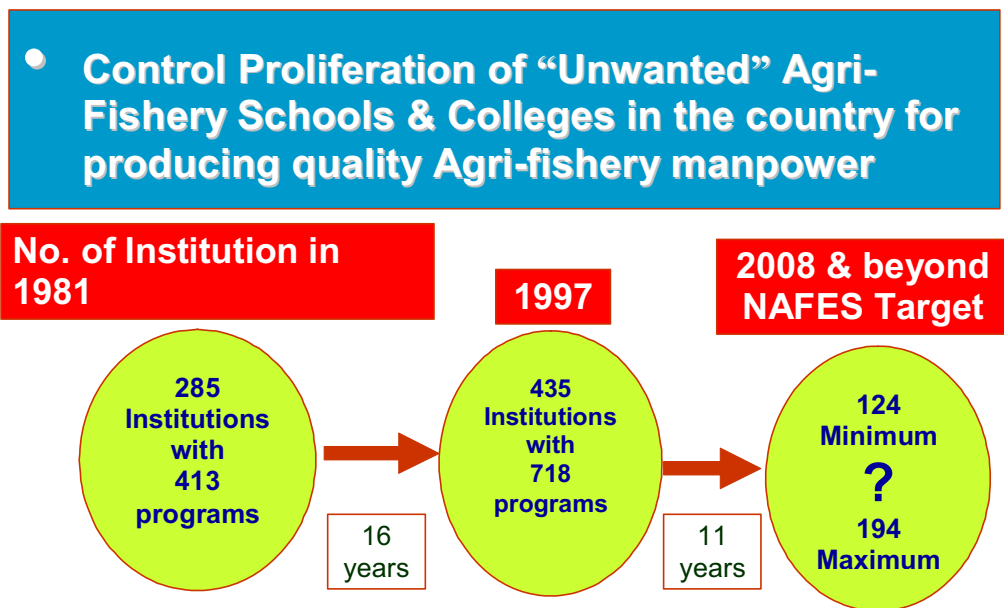
The kind and multifunctionality of agriculture and fishery, which has not been clearly defined would depend on the kind of environment and the changes engulfing it. Some of the issues that are contributing to this crisis are as follows:

- On Global Warming: Scientists the world over have recorded their observations of a dramatic climate and environmental changes. These changes affect the long-term productivity of agriculture and fisheries. If left alone, what kind of agriculture and fisheries including their breeds and varieties should be developed to cope with such changes?
- On Policy Change: This is affected by the national macroeconomic and trade policies to improve rural welfare such as the area of functional agrarian reform, rural credits and vital rural industries at the macro level. The dilemma to decide whether it shall emphasize food self-sufficiency first then followed by food security, rather than by embracing food security alone is ever present.
- On Attitudinal change: There is an emerging indifference among young people on brawn agriculture by moving towards brain agriculture and “air-conditioned” workplaces. These are also

influenced by the lack and unstable employability of agriculture graduates.

- On control of proliferation: In spite of low demand for agriculture graduates, there is still an on-going emergence of “unwanted” agri-fishery schools, colleges & programs which turn out a surplus of mediocre human resources as shown in the performance during the Agriculture Board Examination.
- Given such issues, can we resolve the crisis we are now facing on agriculture education? The Philippines answer is YES through the enactment of Agriculture & Fisheries Modernization Act (R.A. 8534) which among others has created the National Agri-Fisheries Education System (NAFES) in 1997. However, 10 years have passed and lethargic attempts to operationalize the NAFES have been experienced.

Figure1. Reduction of number of institutions under the NAFES structure



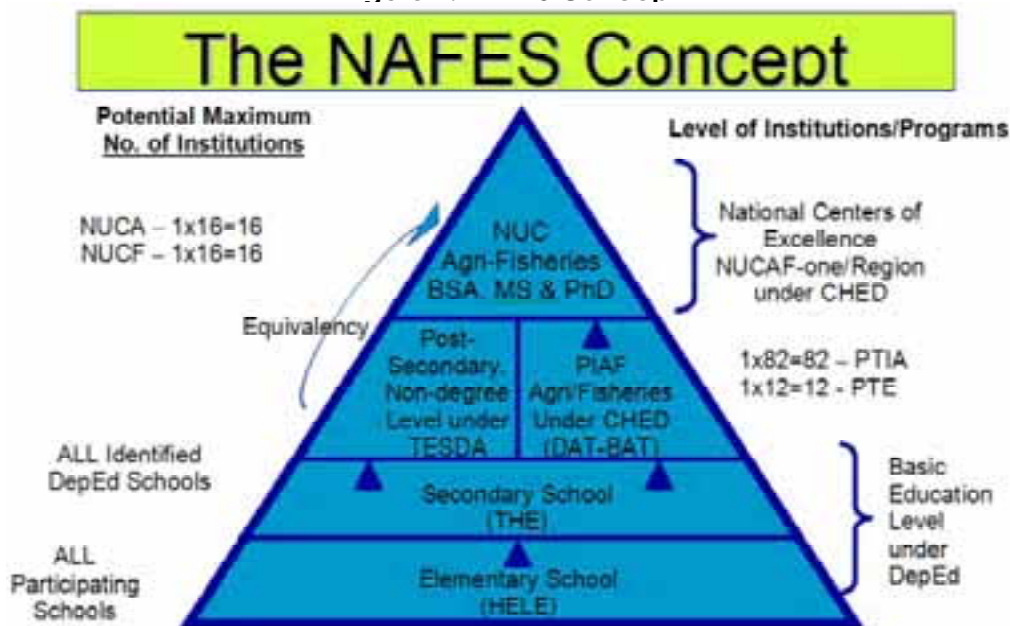
### The NAFES Solution

NAFES means National Agriculture and Fisheries Education System (R.A.8534). It is composed of the rationalized and would be modernized institutions from elementary up to the higher education levels. The potential coverage of the system is shown in Figure 2.

The spirit of the law is to reduce the member of institutions in order to improve institutional quality and identity.



Figure 2. NAFES Concept



In post-secondary and tertiary levels, the approximate number of institutions that will become a part of the system will be about 200 schools and colleges representing each region and province. The final institutions that will be selected will partly be supported by the national, provincial and other external funds. This will help improve the institution in delivering their mandate.

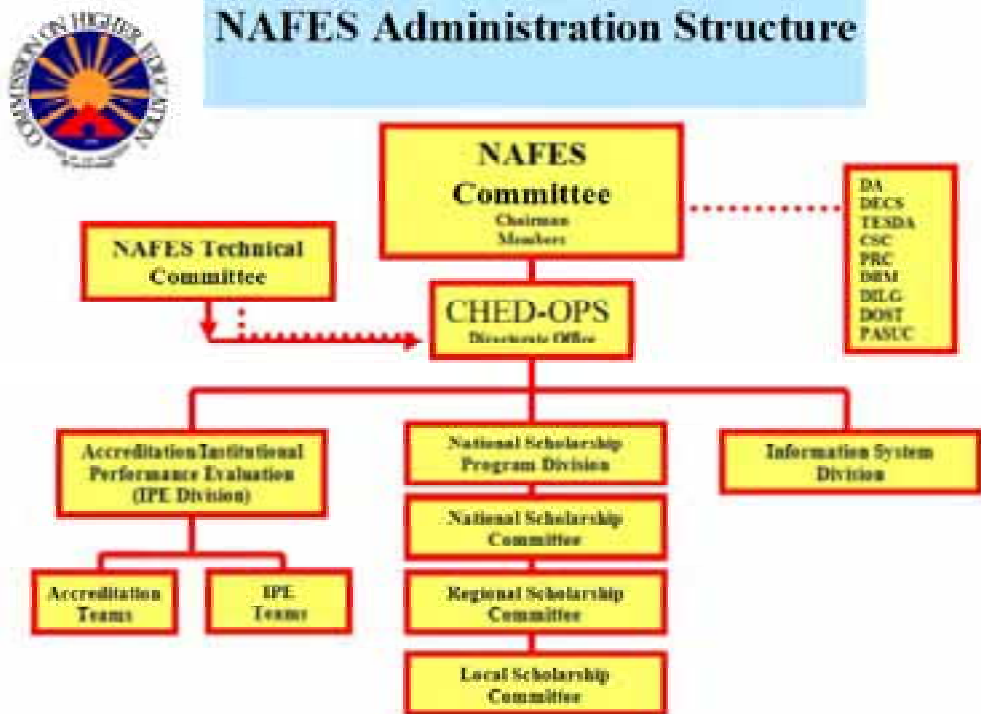
The governance of these institutions will be either from CHED at the college level, or TESDA if under the technical school category (Figure 3). However, the overall policy direction for the NAFES program will be coordinated by an inter-agency national committee through the CHED as the Secretariat. A NAFES technical committee shall coordinate with CHED – Office of Program and Standards (OPS) who will serve as the Secretariat of the various functions mandated to the NAFES committee.

### The scenario of the basic trends to be addressed by NAFES

While NAFES is already a law, the turtle pace of planning and operationalization is overshadowed by some scenarios on the future of agriculture that need to be addressed. These are as follows:

1. Philippine Agriculture will consist of small farms tilled by the owners themselves.
2. The predominance of small farms will predetermine the nature of technologies invented, products produced, and both learning & business institution formed.
3. Modification of the education system, production & processing units and its delivery mechanism will take place.

Figure 3. NAFES Administration Function



4. Future Filipino farmers will be professionals and will depend on higher productivity and innovative marketing.
5. As the economy develops, the Agriculture Gross Domestic Product will shrink compared with that of the industry.
6. The proportion of work and people dependent on agriculture will also decline but will be supporting the increasing number of mouths to feed from decreasing arable land.
7. The exhaustion of natural resources base & deterioration of the bodies of water will have a diverse consequence on the long term productivity of agriculture and fisheries.

### Concluding Statement

The challenge to NAFES of improving Philippine Agriculture is a real wake-up call to all, especially those in agriculture education. The challenge must be met, not postponed for any other reason.

The congressional report made on the enactment of Agriculture and Fisheries Modernization Act (AFMA) stated that the competitiveness of Philippine Agriculture will be determined by whether or not farmers are EQUIPPED WITH THE NECESSARY KNOWLEDGE, SKILLS & TECHNIQUES.

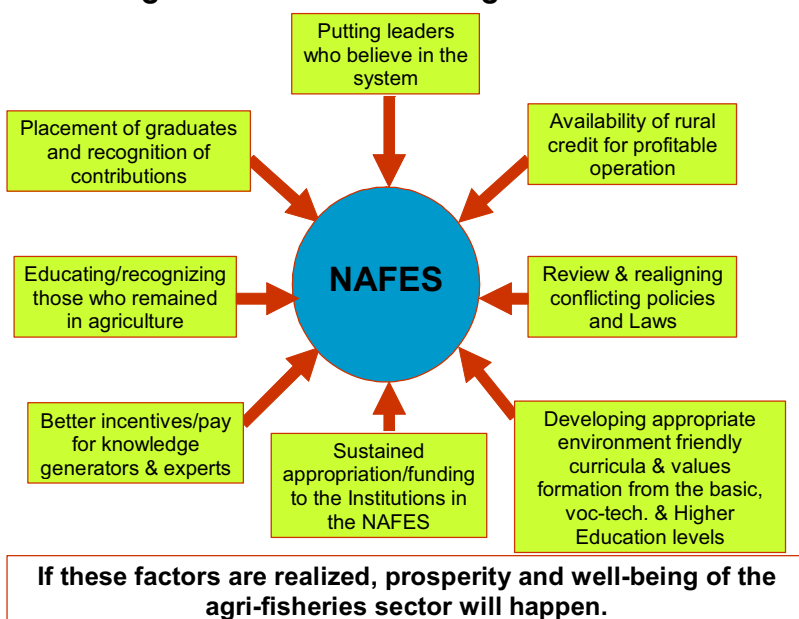
In the 21st century, the competitive edge of nations will not lie in factors such as land and natural resources within their borders but in the

technological capacity of their citizenry (Porter1990). Therefore, a modern agrifisheries sector cannot be attained without educating the farmers properly. Education plays important role in making farmers' decisions efficient, and their ability to appreciate or adopt new technology hinges on their level of comprehension.

Hence, the NAFES as a system or solution emerged to respond to these scenarios presented in figure 4.

The **BIG BUT**, however, is that if NAFES is not given priority attention, it will turn out institutional mediocrities whose nobility of intentions are only found written in the pages of history.

**Fig.4. Scenarios as challenges to the NAFES**



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# Where Have All the Graduates Gone?: The Case of 2000 to 2005 BSA Graduates of the Philippines at Los Baños

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## INTRODUCTION

The Philippines is an agricultural country, where 35% of the labor sector is dependent on agriculture (Labor Force Survey, 2007). High-level manpower is a vital component of labor, thus where the BSA graduates are heading after graduation has significant impact on the agricultural sector.

The goal of every educational institution is to make its graduate contribute to nation building. According to Taylor (1999), one major problem of agricultural institution is that the curricula they use are rigid and inflexible, not only in structure and content, but in the way it is developed. Ideally, the curriculum must reflect educational objectives that will equip graduates to respond to present need of a society. Hence, it is imperative that there should be continuous curriculum reform in response to the growing needs of a developing country.

This study aimed to determine the present trend of manpower placement of 2000 to 2005 UPLB-BSA graduates, and to identify job performance factors BSA graduates considered important in their present employment. The most recent study on BSA placement was that of Mancebo *et al* in 1985. Hence, the present study can fill in an information gap that spans 24 years. Findings from this study can be the basis for the formulation of policies and changes that will make the agriculture sector more responsive to the social and economic challenges in the country.

## METHODOLOGY

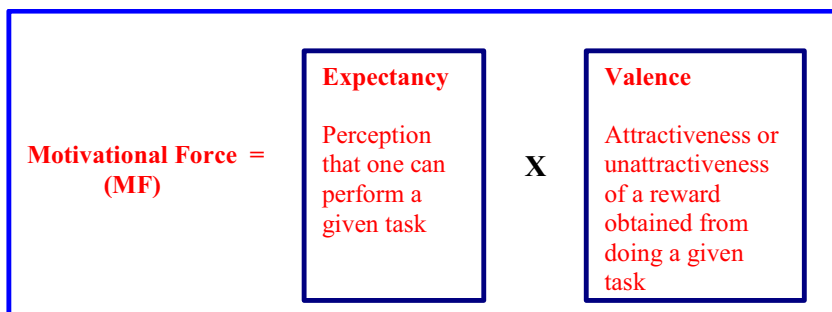
The population of the study comprised 819 Bachelor of Science in Agriculture (BSA) graduates of University of the Philippines at Los Banos (UPLB) from year 2000 to 2005. A survey design was employed where survey questionnaires were sent to all graduates who had complete addresses. A return rate of 28% was achieved or 219 respondents. These respondents were categorized into those employed in agriculture jobs (AJ), non-agricultural jobs (NAJ), overall employed graduates, and unemployed graduates (UG). The Student Version 14 of the Statistical Package for the Social Sciences (SPSS ) was used for the statistical analyses. Descriptive statistics were used (frequency count, percentage, mean, standard deviation and range) to answer all the research questions. For further analysis, t-test was employed to determine whether there were significant differences in the expectancy factors between variables chosen by graduates in AJ and NAJ.

### Theoretical and Conceptual Framework

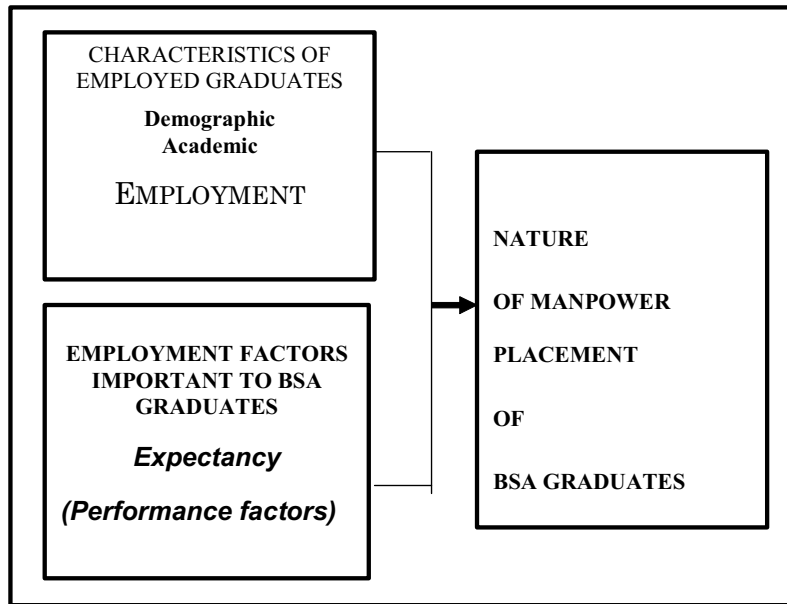
The Theory of Expectancy states that the motivational force of a person in performing a certain task is a function of Expectancy and Valence (**Figure 1**). Expectancy is defined as the person's perception that he/she is capable of doing a particular job, while valence is the degree of attraction of rewards that a person gets from performing a task. For this paper, only expectancy factors were discussed.

The conceptual framework (**Figure 2**) shows the relationship of independent and dependent variables in the study. Independent variables include socio-demographic, academic and employment characteristics of graduates, and ten expectancy or job performance such as: application of the degree to the job, communication skills, experience and knowledge of the job, relationship with employer, working condition, relationship with co-workers, travel time to workplace, nature of job, opinion of the family regarding the job, and nature of the company or agency one will work for. The dependent variable is the nature of BSA manpower placement.

**Figure 1. Theory of Expectancy (Vroom, 1965)**



**Figure 2. Conceptual Framework describing the relationship of variables in the study**



## RESULTS AND DISCUSSION

For the 219 graduates, overall employment was 86% (N=188), and unemployment was 14% (N=31). Of the employed graduates, 45% (n=98) were in AJ and 41 % (n=90) were in NAJ (**Figure 3**). More than three-fourths (77%) of employed BSA graduates were working in private institutions and nearly one-fifth (19%) were working in the government. Self-employment was 4%. Heavy employment in private institutions was observed, both in NAJ (89%) and AJ (65%) (Figure 4).

**Figure 3. BSA graduate respondents in three categories: those employed in agricultural job (AJ), non-agricultural job (NAJ), and unemployed graduates (UG)**

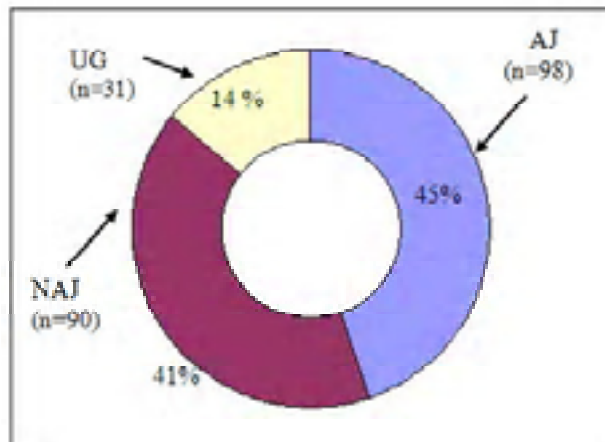
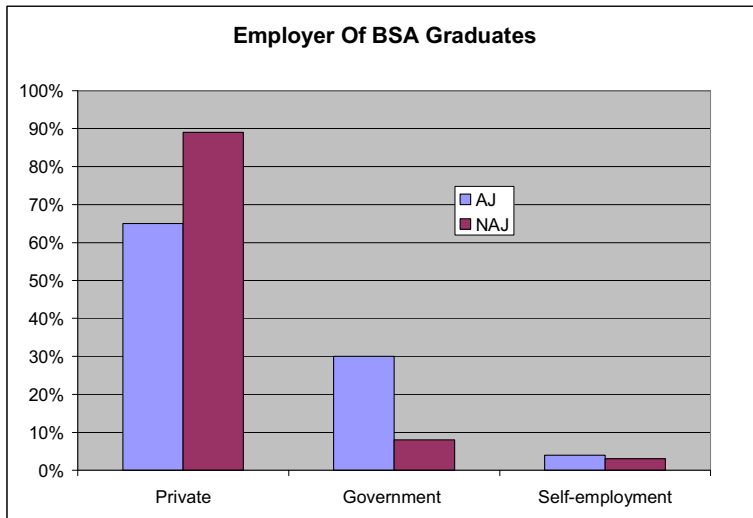


Figure 4. Employers of BSA graduates



The grade weighted averages (GWA) of BSA graduates of ranged from 1.47 to 3.33 with a weighted mean of 2.46. Majority of graduate respondents (63%) got grades ranging from 2.75 to 2.01. AJ got the upper hand in absorbing graduates with higher academic standing. Nineteen percent (19%) of graduates with grades ranging from 1.47 - 2.00 were in AJ with only 5% in NAJ. Furthermore, 14% of graduates with the lowest grades of 3.01 - 3.33 were in NAJ compared with only 6% in the AJ (Figure 5). T-test showed that the difference in grades for those in AJ and NAJ is moderately significant at 0.05 level.

Figure 5. Comparison of grades between BSA graduates in AJ and NAJ

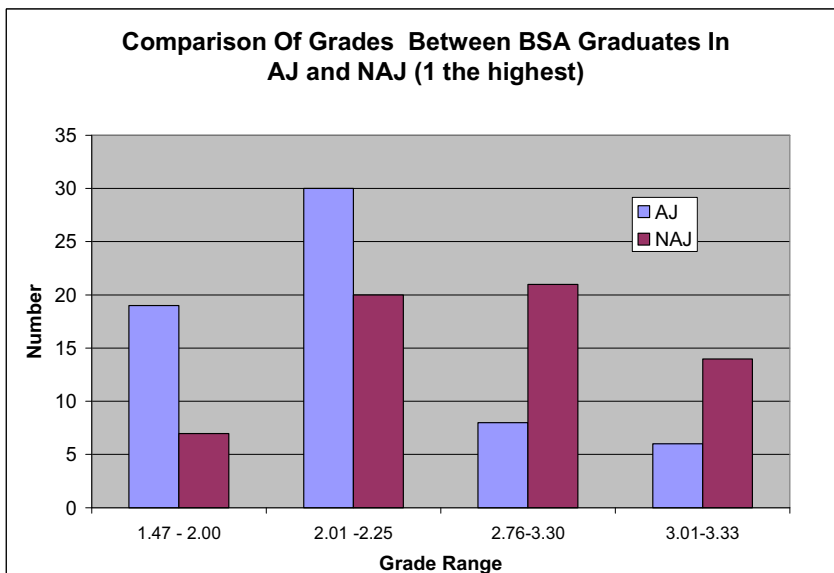


Figure 6. Comparison of salary between BSA graduates in AJ and NAJ

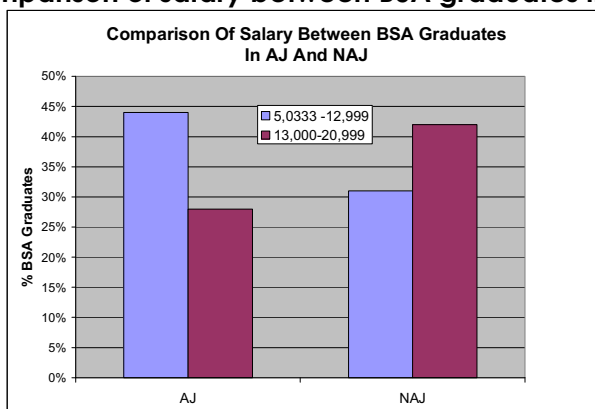


Table 1. Employment characteristics of BSA graduate respondents.

CHARACTERISTICS	NATURE OF EMPLOYMENT				OVERALL EMPLOYED GRADUATES (N=188)	
	Agriculture (n=98)		Non-Agriculture-Related (n=90)			
	Freq	%	Freq	%	Freq	%
LENGTH OF EMPLOYMENT (YR & MO)						
Below one year	24	24.5	36	40.0	60	31.9
One year - Two years	19	19.4	17	18.9	36	19.2
Two years & 1 month - Three years	11	11.2	6	6.7	17	9.0
Three years & 1 month – Four years	5	5.1			5	2.7
Four years & 1 month – Five years	1	1.0			1	0.5
Five years & 1 month and above	5	5.1	1	1.1	6	3.2
No answer	33	33.7	30	33.3	63	33.5
<b>N</b>	<b>98</b>		<b>90</b>		<b>188</b>	
	<b>100.0</b>		<b>100.0</b>		<b>100.0</b>	
Mean	1.7375		1.0250		1.381	
Std. Deviation	1.4101		.9566		1.1834	
Range	<1 - 6		<1 - 6		<1 - 6	
WAITING TIME FOR EMPLOYMENT (MO)						
0	4	4.1	6	6.7	10	5.3
1 - 12	46	46.9	47	52.2	93	49.4
13 - 24	14	14.3	13	14.4	27	14.4
25 - 36	4	4.1	2	2.2	6	3.2
37 - 48	1	1.0	2	2.2	3	1.6
No answer	29	29.6	20	22.2	49	26.1
<b>N</b>	<b>98</b>	<b>100.0</b>	<b>90</b>	<b>100.0</b>	<b>188</b>	<b>100.0</b>
Mean	9.13		9.27		9.20	
Std. Deviation	9.175		8.970		9.072	
Range	0 - 40		0 - 41		0 - 41	



In terms of salary, more than one-third (38%) were receiving salaries ranging from PHP 5,033 to 12,999, while almost the same proportion (35%) were earning a higher salary range of PHP 13,000 to PHP 20,999. Statistical analysis (T-test) showed that the difference in salary between AJ and NAJ was moderately significant at 0.05 level, with salaries in NAJ having a slightly higher T value (13.361) than AJ salaries (10.561) (Figure 6).

Length of service in present employment for overall employed graduates ranged from >1 year to 6 years, with a weighted mean of 1.7. Nearly one-third (32%) were working for less than a year, reflecting a high turnover in employment. For those in NAJ, 40% were working for less than a year and only 25% among those in AJ. Those who had been working for 3 years to 5+ years were higher in AJ (11%) than in NAJ (1%). This means that graduates tended to stay longer in AJ than in NAJ.

Waiting time for initial employment for all employed graduates, ranged from > 1 month to 48 months, with weighted mean score of 9.20. (Table 1). With regards to place of employment, 34% were employed in National Capital Region (NCR) and 35% were in Region IV. However, greater concentration (46%) of NAJ were in NCR, compared with only 26% in AJ. It seems that graduates took advantage of NAJ in NCR, where such jobs are more available than AJs (Table 2).

**Table 2. Employment characteristics of BSA graduate respondents.**

CHARACTERISTICS	NATURE OF EMPLOYMENT				OVERALL EMPLOYED GRADUATES (N=188)	
	Agriculture (n=98)		Non-Agriculture-Related (n=90)		Freq	%
	Freq	%	Freq	%		
PLACE OF EMPLOYMENT						
Region 1 (Ilocos Norte, Pangasinan)	4	4.1	2	2.2	6	3.2
Region 2 (Isabela)	-	-	-	-	-	-
Region 3 (Bulacan, Nueva Ecija, Pampanga, Bataan)	8	8.2	3	3.3	11	5.9
Region 4 (R-4A & B - CALABARZON & Mindoro)	41	41.8	23	25.6	64	34.1
Region 5 (Bicol)	1	1.0	1	1.1	2	1.1
Region 6 (Eastern Visayas)	1	1.0			1	0.5
Region 7 (Cebu)			1	1.1	1	0.5
Region 8	-	-	-	-	-	-
Region 9 (Zamboanga)	1	1.0			1	0.5
Region 10 (Bukidnon, Misamis Oriental)	1	1.0	1	1.1	2	1.1
Region 11	4	4.1	2	2.2	6	3.2
Region 12 (Soccskasargen)	1	1.0			1	0.5
Region NCR (Quezon City, Metro Manila)	25	25.5	41	45.6	66	35.1
Region CAR	1	1.0	-	-	1	0.5
Region CARAGA	-	-	-	-	-	-
Abroad	3	3.1	1	1.1	4	2.1
No answer	7	7.1	15	16.7	22	11.7
<b>N</b>	<b>98</b>	<b>100.0</b>	<b>90</b>	<b>100.0</b>	<b>188</b>	<b>100.0</b>

### Occupations of BSA Graduates

The leading occupational area of graduates was in support services, (23%) **(Table 3)**. Research still retained its attraction to graduates employing 20%. Sales was slightly close at 17%. Those in education (all levels) and extension got the least share of graduates at 6% and 2% respectively. In terms of specific jobs, 20% of employed graduates were researchers, 16% were managers and supervisors, and 12% were telemarketers. For those in agriculture sector, job in research was the most preferred occupation (30%), followed by technical and professional services (26%), and sales and marketing (15%). Extension and education employed the least number of graduates at 4% and 3% respectively. The leading specific jobs in AJ included: researcher (30%), administrative officer and supervisor (18%), and sales manager (15%) **(Table 4)**.

For those in non-agriculture sector, heavy concentrations of graduates were found in support services (44%), followed by sales (19%) and managerial and supervisory jobs (13%). Research still obtained a 9% share of employed graduates. Technical jobs were the least preferred occupation (6%) or it could be that they were also least qualified for this kind of job. Leading jobs in NAJ were telemarketer (26%), manager and supervisor (13%) and sales manager (12%) **(Table 5)**.

**Table 3. Occupations of BSA graduates**

Occupational Group	NATURE OF EMPLOYMENT				OVERALL	
	Agriculture		Non-Agriculture			
	Freq	%	Freq	%	Freq	%
Support Services	4	4.1	40	44.4	44	23.4
Research and development	29	29.6	8	8.9	37	19.7
Sales and Marketing	15	15.3	17	18.9	32	17.0
Specialized Technical Services	25	25.5	5	5.6	30	16.0
Managerial	18	18.4	12	13.3	30	16.0
Education	3	3.1	8	8.9	11	5.8
Extension	4	4.1	-	-	4	2.1
<b>N</b>	<b>98</b>	<b>100.0</b>	<b>90</b>	<b>100</b>	<b>188</b>	<b>100.0</b>

### Expectancy Factors Important to BSA Employed Graduates

Expectancy is defined as the degree by which an individual knows that he is capable of performing a given task **(Green, 2000)**. Expectancy as operationalized in the study was determined by ten factors that are commonly associated with good work performance. For those in AJ, the graduates considered the following as highly important in their jobs:

**Table 4. Top ten occupation of BSA graduates in AJ**

OCCUPATION	FREQ	%
Researcher	29	29.6
Manager/Supervisor	18	18.4
Agriculturist	9	9.2
Sales Manager	8	8.2
Sales Agent	7	7.1
Animal Nutritionist	5	5.1
Livestock/Poultry Inspector/Producer	5	5.1
Horticulturist	4	4.1
Extension Worker	4	4.1
Clerk	3	3.1

**Table 5. Top ten occupation of BSA graduates in NAJ**

OCCUPATION	FREQ	%
Telemarketer	23	25.6
Manager/Supervisor	12	13.3
Sales Manager	11	12.2
Finance Officer	8	8.9
Researcher	8	8.9
Sales Agent	6	6.7
Clerk	6	6.7
Instructor	4	4.4
IT Analyst	3	3.3
Waiter /police/jail warden	3	3.3

application of their BSA degree (5.29), nature of job (4.95), experience / knowledge of the job (4.81), communication skills (4.72), nature of company (4.65), relationship with co worker (4.24) and working condition (4.22). The rest were considered moderately important with proximity to the workplace getting the lowest mean score (3.50). Overall weighted mean score (4.39) indicates that all ten factors were considered highly important by graduates when they decided to take their present jobs (**Table 6**).

Highly important expectancy factors were almost the same for those in NAJ, which differed only in ranking. These were: communication skills (4.93), nature of company (4.53), relationship with co-workers (4.47), nature of job (4.46), working condition (4.38), relationship with employer (4.10) and experience and knowledge of the job (4.04). The rest of the factors were moderately important. Ironically, the graduates' BSA training had the lowest mean score of 2.91 (**Table 7**).

Table 6. Level of importance of expectancy factors to employed BSA graduates in AJ

FACTORS	IMPORTANCE OF EXPECTANCY FACTORS (N=88)														W- MEAN	ADJECTIVE RATING
	A		B		C		D		E		F		G			
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Application of BSA degree in the job	1	1.0			1	1.0	4	4.1	8	8.2	32	32.7	52	53.1	5.29	HI
Nature of job.	1	1.0			4	4.1	7	7.1	14	14.3	32	32.7	40	40.8	4.95	HI
Experience and Knowledge of the job	1	1.0			3	3.1	8	8.2	19	19.4	37	37.8	30	30.6	4.81	HI
Communication skills	1	1.0	2	2.0	1	1.0	3	3.1	31	31.6	34	34.7	26	26.5	4.72	HI
Nature of company / agency / institution	1	1.0	3	3.1	1	1.0	5	5.1	30	30.8	32	32.7	26	26.5	4.65	HI
Relationship with co-worker	1	1.0	2	2.0	5	5.1	17	17.3	30	30.8	25	25.5	18	18.4	4.24	HI
Working condition	1	1.0	3	3.1	6	6.2	15	15.3	27	27.5	22	22.4	22	22.4	4.22	HI
Manager/employer relationship	1	1.0	8	8.2	10	10.2	13	13.3	25	25.5	27	27.6	14	14.3	3.94	M
Opinion of the family regarding the job	1	1.0	12	12.2	11	11.2	20	20.4	20	20.4	15	15.3	11	11.2	3.54	M
Proximity of work to place of residence	1	1.0	14	14.3	14	14.3	21	21.4	20	20.4	10	10.2	18	18.4	3.50	M
<b>Overall</b>	10	1.0	44	4.5	56	6.0	113	11.6	224	23.1	266	27.4	257	26.4	4.30	Highly important

Legend:

- A - No answer
- B - Not worth important
- C - Rarely important
- D - Sometimes important

- E - Usually important
- F - Highly important
- G - Very highly important

Rating:

- 1.00 - 2.00 = Least important (LI)
- 2.01 - 4.00 = moderately important (M)
- 4.01 - 5.00 = highly important (HI)

Table 7. Level of importance of expectancy factors to employed graduates in NAJ

FACTORS	IMPORTANCE OF EXPECTANCY FACTORS (n=50)																					W. MEAN	ADJECTIVE RATING
	A			B			C			D			E			F			G				
	Freq	%		Freq	%		Freq	%		Freq	%		Freq	%		Freq	%		Freq	%			
Communication skills				1	3.3		6	6.7		16	20.0		30	33.3		33	36.7					4.50	HI
Nature of company / agency/institution				1	1.1		14	15.6		23	25.6		35	38.9		16	17.8					4.53	HI
Relationship with co-worker				4	4.4		11	12.2		23	25.6		31	34.4		19	21.1					4.47	HI
Nature of job				4	4.4		4	4.4		27	30.0		25	27.8		23	25.6					4.46	HI
Working condition	1	1.1		3	3.3		10	11.1		23	25.6		33	36.7		16	17.8					4.38	HI
Manager/employer relationship				4	4.4		15	16.7		26	28.9		22	24.4		15	16.7					4.10	HI
Experience and knowledge on the job				1	1.1		19	21.1		27	30.0		24	26.7		10	11.1					4.04	HI
Opinion of the family regarding the job				12	13.3		17	18.9		15	16.1		22	24.4		9	10.0					3.61	MI
Proximity of work to place of residence				11	12.2		16	17.8		14	15.6		12	13.3		19	21.1					3.61	MI
Application of BSA degree in the job				22	24.4		16	17.8		15	16.7		10	11.1		7	7.8					2.91	MI
Overall	1	0.1		62	6.9		126	14.3		215	24.0		244	27.2		167	18.6				4.10	Highly Important	

Rating

- E - Usually important
- F - Highly important
- G - Very Highly important
- 1.00 - 2.00 = Least important (LI)
- 2.01 - 4.00 = Moderately important (MI)
- 4.01 - 6.00 = Highly important (HI)

- A - No answer
- B - Not worth important
- C - Rarely important
- D - Sometimes important

T-test of independent means between agriculture and non-agriculture jobs showed a low significant difference at 0.05 level in expectancy factors.

### **Implications of Findings on Expectancy Factors in BSA Employment**

**1) The application of BSA degree in present jobs.** BSA graduates working in the agriculture sector considered their BSA degree as highly important in their present job, giving it the highest ranking. This group is fortunate to experience the matching of job and training. However, those in NAJ have given it the lowest mean score, signifying how they felt about their training to be underutilized in their present jobs, most of them, being in support services, managerial, and sales.

Heavy concentration of employed graduates in NAJ calls for a re-examination of BSA curriculum. According to Taylor, (1999), one major problem of agricultural institution is that the curricula they use are rigid and inflexible, not only in structure and content, but in the way it is developed. Ideally, the curriculum must reflect educational objectives. Since educational objectives must be attuned to societal changes, it is imperative that there should be continual curriculum reform as a response to a developing society.

**2) The primacy of communication skills in the workplace.** To employed graduates in non-agriculture sector, communication skills were the most important factor. Job concentration in NAJ was in sales, support services and managerial jobs, which all require good communication skills. A study by Maes, *et al* (1997) established that oral communication is the most important competency for college graduates entering the workforce and is ranked first among qualities sought by employers. With the number of graduates that landed in managerial, sales, and call center jobs, it can be inferred that UPLB has provided its graduates with excellent communication skills. The graduates easily landed jobs in call centers where only 3% of applicants are taken in (Dalisyay, 2007). Nonetheless, the findings underscore the necessity of strengthening communication skills in the BSA curriculum. Moreover, relationship with co-workers from NAJ yielded higher mean score than that of AJ. This implies that the nature of work in NAJ requires more people skills and interpersonal interaction.

**3) Role of family in employment.** The opinion of the family ranked 9th overall, contradicting the findings of Contado (1965) more than four decades ago, showing a very close relationship between the parent's occupational aspirations and the choice of vocation of the son. The low regard for family opinion seems to be a normal attitude of a young graduate entering the workforce today. Bartolome and Evans (1984) explained that early in one's career, a person considers work as more significant than any other, while family and private life become the more salient later in life. This

is particularly true to younger, highly motivated and ambitious people who are just beginning to establish their career. As a caveat, the data should not be misconstrued as slackening of family ties in general. The desire for employment could in fact signify one's concern for the family. Being aware of the sacrifices of the family for one's education, getting a gainful employment could be a way of returning the favor given to them.

**4) Job interest and employment.** The BSA graduate's interest in the nature of work was an important factor both for those in AJ and NAJ. For those in AJ, this interest is enhanced by the matching of their BSA training and agricultural employment. According to Bartolome and Evans (1984), the ability to apply a person's abilities and skills enhances interest in one's work. For those in NAJ, interest appears to have replaced BSA training as motivating factor in the workplace. In other words, they found something that is of great interest even though the job is not related to their training in agriculture.

The importance of "nature of work and company" to BSA graduates suggests that they are concerned with the kind of work they will be doing. On the other hand, the relatively low importance of "distance to the workplace" is probably because people are used to traveling long distances, made possible by improved transportation services.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **1) BSA curriculum revision**

The aim of every educational institution is to make its graduates contribute to nation building. It is imperative that curriculum, which is the core of any educational program, be useful to the graduates in the workplace. The study presents a new trend in BSA employment, where there is a rise in the employment in support services, sales and managerial jobs both for agriculture and non agriculture employment. To adapt to this new trend in agricultural employment, BSA curriculum must be re-structured to equip BSA graduates with entry-level competencies, and make them responsive to the present demand in the labor market. According to Taylor (1999) any agricultural education and training programme is set within a particular social context which is constantly changing. It is imperative that the context can influence the development of the curriculum.

Communication skills must be strengthened since it emerged as the most important expectancy factor considered by graduates as most useful for employment. BSA curriculum must also address development of skills in managerial, marketing, and resource management. A good grounding in these skills will make BSA graduates more skillfull in agricultural jobs of this nature. On the other hand, if they didn't get employed in AJ, they will have a fighting chance for these kinds of jobs in non agricultural sector.

The proposal of the Technical Panel for Agriculture under National Agriculture and Fisheries Educational System (NAFES) to strengthen general education courses in BSA curriculum, and add 12 units of specialization in areas of interest in agriculture as elective subjects, will hopefully help in addressing the problem of employability of BSA graduates. (CHED Memorandum Order, Series 2005). This proposal must be fast-tracked since this could be the answer to the problem if employability of BSA graduates.

## **2) Intensify entrepreneurship skills of BSA students**

The old BSA curriculum is highly specialized particularly in areas of horticulture, agronomy, animal science and soil science. Presently, there is a proposal to revise the minimum standards for BSA program that will focus on entrepreneurship leading to agribusiness. This is to encourage BSA graduates to become self-employed and be entrepreneurs (CMO, 2005).

According to Concepcion (2007), there is a need to develop e-factor in entrepreneurship, which is the proper blending of theory and experience. According to him, having a solid academic background is an advantage, but is not enough. The right attitude, character, and values of successful entrepreneurship are learned outside the school system, basically from mentors, experiences, and exposure to actual business projects.

The value of experiential learning can't be over emphasized here. It is also recommended that BSA curriculum must have a way of coming up with actual experience in entrepreneurship, like what is being done in other schools. For instance, a management school in Manila has tied up with various malls for their students to have their own stalls to sell their products, as part of their curriculum.

But the primary problem in entrepreneurship is capital. UPLB-CA can tie up with the UPLB cooperative to give loans to former students who would like to engage in agricultural entrepreneurship.

## **3) More stringent screening program for BSA enrollees.**

The University should have a more stringent screening system for students applying for admission to the BSA program. This system should help identify students who have real interest in agriculture. This calls for a strengthening of the recruitment program of the University.

## **4) Beefing up the job placement assistance program of UPLB**

The job placement arm of the University is the UP Counseling and Testing Center. A personal interview with Dr. Vernon Dy, a guidance counseling specialist and placement officer of the Center, revealed that UPLB is actively engaged in seeking employment for graduates of various



Colleges of the University. Their office usually sends the list of graduates to legitimate and reputable companies and agencies. Employers, on the other hand, are seeking their facilitation in hiring UPLB graduates.

For this year alone, 30 companies sought their help in hiring fresh graduates. However, their problem is lack of manpower, with only four people attending to many concerns aside from job placement of graduates. He said that they are able to cope with the demands of the office by the help of volunteers. They also have problems with the database of graduates in different colleges. The College of Agriculture was mentioned as one of those Colleges who did not have a good database pertaining to its graduates. The implication of this is that they can't contact graduates when there are job openings that require their skills and training. Addressing these problems will help the office perform its function better, which will ultimately benefit the graduates.

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