

# Obstacles to Extension Education from the Perspective of Animal Science Teachers and Researchers

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## Abstract

The aim of the study was to examine the obstacles to extension education in Taiwan. Data were collected with structured and validated questionnaires from 125 teachers and researchers. Results showed that almost all respondents thought they did not have a sufficient research budget to support their research work. Due to heavy teaching loads, insufficient time to learn was the major obstacle for senior high school teachers (77%). Respondents thought the main problems for extensionists might be difficulty in arranging practical training, subjects irrelevant to farmers' needs, and farmers' having low learning motivation or insufficient time to learn. Respondents considered farmers had less professional knowledge, less time to learn, and less budget to repair animal houses or purchase new facilities. Researchers had fewer farm visits so fewer chances to meet farmers (39%). Strengthening the linkages between research-extension-farmer was required to improve extension education.

**Keywords:** *Research, Obstacle, Extension Education, Communication Channel, Linkage.*

## 1. Introduction

Han Yu (768 - 824 AD), one of the most famous philosophers in ancient China, defined a teacher as one who could propagate a doctrine, impart professional knowledge, and resolve doubts. This definition is also a suitable model for agricultural extension workers. Animal farmers are the base of development in animal production. In an era of rapid technological change, animal nutrition, feeding management, and related equipment in animal industry have also been updated. Once farmers are not well positioned to tackle new challenges, they will seek advice from other farmers, extensionists, researchers, and/or teachers. According to feedback from farmers, extensionists offer technical advice and supply them with necessary inputs and services to support their animal production. When problems still exist, then researchers can conduct related research to find solutions. Much of the technical advice is based upon research findings. In other words, a lot of research ideas originate from farm practices.

Extension is a process of working with farmers to increase productivity and improve livelihoods. Animal science extension is crucial to sustainable animal science development. In addition to transferring and disseminating appropriate agricultural technologies and good farm practices to farmers, extension needs to develop problem-solving and demand-driven programs. Research or extension cannot exclude active participation of farmers, especially where farming systems are highly variable and funding is limited [1]. At a field implementation level this has to be complemented by practicing various participatory approaches leading to an increased emphasis on "client ownership," in other words, a "demand-driven" innovation process [2].

Strengthening research-extension-farmer linkages is time-consuming but an effective strategy for marketing extension programs. It is a process, not a one-time event; there is no overnight success. These programs need to be constantly in touch with all three parties to reach efficiency; that is, researchers, extensionists, and farmers should cooperate closely. From our experience and literature reviews, there are many factors leading to ineffective extension, such as wrong or inconsistent policies, research results not applicable to farm practices, weak linkages among research-extension-farmer, insufficient extension funds, lack of extension equipment or skills, and a low willingness to learn [3, 4, 5, 6, 7, 8, 9].

Knowledge is a powerful source of enrichment and regulation of intelligence at any time in human life. When teachers or researchers spread their knowledge to other people, it is at the same time one kind of extension work. Being a teacher or a researcher in animal science is just like the locomotive of the industry, a driving force for improvement in animal production. We chose the academic research community as an entry point to address problems and/or issues of linkages among the three parties mentioned above. Therefore, this research focuses on the plight of animal science extension education from the perspective of animal science teachers and researchers, and hopes to serve as a reference for improving extension education and industrial competitiveness.

**2. Materials and Methods**

This study was an exploratory study, using a questionnaire approach. The purpose of the questionnaire was to examine the obstacles to extension education from the perspective of animal science teachers and researchers in Taiwan. The questionnaire was designed and reviewed by specialists in animal production before conducting the survey. Sixteen vocational senior high schools with departments of animal industry and healthcare, seven universities with departments of animal science, and one general animal research institute including eight branches in Taiwan were given the questionnaire. To encourage teachers and researchers to fill in the questionnaire, courteous invitation letters and return envelopes were sent out to the above-mentioned vocational senior high schools, universities, and research institutes by post. The survey responses were anonymous. All the completed questionnaires were recorded and calculated.

**3. Results and Discussion**

A total of 214 questionnaires were issued and 145 were returned, for a recovery rate of 67.75%, of which 20 were voided due to more than half of the questions being unanswered; therefore, 125 questionnaires were accepted with an adjusted response rate of 58.41%.

In times of technological change and knowledge innovation, academic people usually face important choices about what research topics to explore. From this survey, respondents from 52 teachers of vocational senior high school, 24 university teachers, and 49 researchers from research institutes, showed that most of their research subjects or ideas came from professional journals or magazines, and other teachers or researchers (Table 1). Due to academic freedom as a fundamental right and instructing students to do necessary research in university, university teachers had more opportunities to explore many more research topics from professional journals or magazines (79%). However, Vandenbroucke and Pearce [10] suggested that if people were setting up a new research project in a new area, they should not start by reading too much. Instead they suggested reading a few general reviews that identified unanswered problems. Looking back at the researchers from research institutes, they were required to follow agricultural policies, so a lot of research subjects originated from government policies or leaders (59%). As for research ideas from extensionists, all respondents gave them low percentages (8% - 10%). This meant the linkage between research and extension was weak. This might be because teachers and researchers were too busy to participate in extension activities, or thought that extension programs were not worth attending; extensionists lacked opportunities to meet with teachers and researchers, or lacked sufficient information to provide them with further research. Fortunately, respondents were willing to visit farms. Through this field work they discovered new research topics (53% - 54%).

Table 1: Teachers’ or researchers’ research subjects or ideas were from

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Other teachers or researchers	37 (71%)	14 (58%)	30 (61%)
Professional journals or magazines	37 (71%)	19 (79%)	31 (63%)
Agriculture and livestock exhibition	14 (27%)	5 (21%)	16 (33%)
Extensionists	4 (8%)	2 (8%)	5 (10%)
Farm visits	28 (54%)	13 (54%)	26 (53%)
Farmers	10 (19%)	8 (33%)	21 (43%)
Policies or leaders	5 (10%)	6 (25%)	29 (59%)
Others	3 (6%)	0	3 (6%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

As regards to sources of research funds (Table 2), there is no doubt that research institutes are under the supervision of government policies so gain the most from government agencies. More than 30% of teachers from vocational senior high schools and universities self-financed their research work. This might be due to limited government budget, or project applications were too trivial. As a result, they preferred to cover the research funds by themselves. Besides, university teachers cooperate actively with private institutions or companies to gain research budgets (38%). This might be due to

collaboration between industry and university was encouraged to conduct practical research and promote the industry’s development.

Table 2: Teachers’ or researchers’ research budgets were from

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Government agencies	31 (60%)	19 (79%)	47 (96%)
Private institutes	4 (8%)	9 (38%)	5 (10%)
Self-sponsored	19 (37%)	8 (33%)	1 (2%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

Results about respondents’ viewpoints on obstacles in teaching or research work are given in Table 3. Almost all respondents thought they did not have sufficient research funds to support their research work. It was surprising that just over half of the researchers (51%) considered their research budget was insufficient. This was unusual, because all research funds directly came from government agencies. This might be because the budget was concentrated on some special topics resulting in small amounts of budget leftover, or was too evenly distributed to cause large-scale experimentation lack of funds. University teachers should compete project proposals first with others or luckily to be included on a special subject team to share the research budget. As a result, 42% of university teachers considered the method of submitting to projects a problem for them. Perhaps it was a good time to let researchers seek outside sources of funding, such as cooperating with private institutions or companies. More than one-third of researchers (39%) thought they lacked professional knowledge, and did not have enough time to learn (e.g., attending conferences, training courses, or international exhibitions). This might be because they were engaged in research work and found it difficult to officially attend the above-mentioned activities. Having insufficient time to learn was the major obstacle for senior high school teachers (77%). This might be due to their teaching load being too heavy, so they had little time left to learn. As for the research results not being useful in their field, no respondents thought it was a problem for them. It seemed they conducted field-oriented research so that their results could be put into practice.

Table 3: Obstacles in teaching or research work would be

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Insufficient professional knowledge	14 (27%)	1 (4%)	19 (39%)
Insufficient time to learn (e.g., attending conferences, training courses, or international exhibitions)	40 (77%)	3 (13%)	18 (37%)
Insufficient research budgets	33 (63%)	16 (67%)	25 (51%)
Method of submission projects	8 (15%)	10 (42%)	13 (27%)
Lack of experience in practice	14 (27%)	1 (4%)	7 (14%)
Research results not useful in field	2 (4%)	1 (4%)	4 (8%)
Others	0	0	2 (4%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

Table 4 shows the problems extensionists might have when doing extension work. Interestingly, opinions from both senior high school and university teachers shared a similar response. They thought it was not easy to arrange practical training, subjects did not meet farmers’ needs, and farmers’ learning motivation was low or they had insufficient time to learn. These were the main problems encountered by extensionists. There was only one practical animal production training center at National Pingtung University of Science and Technology (NPUST) in southern Taiwan. Though it is equipped and functions well, it cannot digest all the practical training offered about animal farmers. Other universities and senior high schools had animal farms, but the farm scale was too small for real practical training. If practical training is arranged at

commercial farms, it might cause economic loss with small or even no compensation. No farms would accept this. Sometimes subjects did not meet farmers’ needs. This might be due to extension officers lacking relevant and specific agricultural knowledge, so that important information does not reach most farmers [11]. As for farmers’ learning motivation, Lee and Hsia [12] indicated that respondents of longer working hours, more work experience, and older-aged farmers had a much higher desire to learn. It might also be that subjects of extension programs did not meet farmers’ needs so their learning motivation was low. Other than farmers’ low learning motivation or insufficient time to learn, and extension subjects not meeting farmers’ needs, just over half of the researchers (51%) thought extensionists might encounter insufficient funding to do extension work.

Table 4: Obstacles that extensionists might have

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Insufficient budgets	20 (38%)	8 (33%)	25 (51%)
Without suitable teachers	17 (33%)	5 (21%)	10 (20%)
Low farmers’ learning motivation or insufficient time to learn	23 (44%)	10 (42%)	32 (65%)
Non-productive subjects (e.g., waste management, animal welfare)	16 (31%)	5 (21%)	17 (35%)
Subjects do not meet farmers’ needs	23 (44%)	10 (42%)	19 (39%)
Difficulty in arranging practice training	30 (58%)	11 (46%)	14 (29%)
Too many government policy announcements	15 (29%)	5 (21%)	8 (16%)
Others	1 (2%)	0	3 (6%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

Both teachers and researchers considered farmers had less professional knowledge, less time to learn, and less budget to repair animal houses or purchase new facilities (Table 5). Sources of knowledge would be from reading books or journals, interaction with local or foreign experts. Compared with academics, farmers could not find first-hand information due to foreign language barriers or comprehension problems. Lee and Hsia [12] demonstrated that animal farmers in Taiwan showed being less agreeable to search for information through the Internet in English to resolve problems. Lans et al. [13] also mentioned that entrepreneurs in the agri-food sector had relatively low skills with regard to foreign languages. Gaining knowledge and skills will rely on easy access to extension education, non-formal or informal learning. Implementation of decentralization by devolution contributing to increased availability and distribution of agricultural extension staff at the village level enhanced farmers’ access to agricultural extension services in Tanzania [14]. Furthermore, daily trivial farm work resulted in less time to attend conferences, training courses, or international exhibitions, thereby hindering learning opportunities. As for shortage of money to repair animal houses or buy new facilities, low-interest agricultural loans should be provided. More than one-third of teachers and researchers also thought farmers had problems hiring workers as well as not being able to use computers or internet. These ultimately also led to a lack of professional knowledge.

In terms of teachers’ or researchers’ communication channels with farmers, the best ways would be in the activities of conferences or training courses, their direct contact with farmers, and through farm visits (Table 6). Indian research on communication linkages used by researchers for the generation of poultry production technology also revealed that training was the most frequently used media by researchers to communicate with farmers [15]. In this study, university teachers might especially be often invited to make presentations in conferences or training courses, so they have the opportunity to meet farmers (75%). Through these events, university teachers and researchers communicate with farmers; however, those are only short or temporary contacts. They should be encouraged to smooth communication channels to explore the gap between existing and desired conditions for farmers and extensionists, especially the gap between the existing level of knowledge/skill and desired level of knowledge/skill. Senior high school teachers are occupied in teaching students, so only 35% of them use the channel of conferences or training courses to communicate with farmers. Compared with teachers, researchers had fewer farm visits so less chance to meet farmers (39%). In Ghana, inadequate interaction with researchers and extension agents was the most pressing constraint of agricultural information [6]. Table 6 indicated that other farmers,

salespersons, agriculture and livestock exhibitions, and extensionists were least used as communication channels with farmers. As for agriculture and livestock exhibitions, this might be due to teachers and researchers not being willing to participate, or farmers were absent at these events, so this channel was less used. Salespersons marketing their products, act like extensionists promoting their extension programs. Though the former are commercial, teachers and researchers should be encouraged to get in touch with them more often to collect more information and explore the gaps existing between farmer-extension, extension-research, and farmer-research.

Table 5: Obstacles that farmers might have

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Insufficient professional knowledge	27 (52%)	13 (54%)	29 (59%)
Insufficient time to learn (e.g., attending conferences, training courses, or international exhibitions)	34 (65%)	17 (71%)	25 (51%)
Insufficient budgets (e.g., repairing animal houses, purchasing new facilities)	31 (60%)	14 (58%)	26 (53%)
Difficulty in hiring workers	24 (46%)	10 (42%)	19 (39%)
Inability to use computers or internet	19 (37%)	11 (46%)	21 (43%)
Others	0	0	0

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

Table 6: Teachers' or researchers' communication channels with farmers were

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Contact in person	25 (48%)	12 (50%)	25 (51%)
Through other teachers or researchers	19 (37%)	6 (42%)	10 (20%)
Through extensionists	12 (23%)	5 (21%)	12 (24%)
Through other farmers	9 (17%)	1 (4%)	5 (10%)
In conferences or training courses	18 (35%)	18 (75%)	28 (57%)
Through salespersons	7 (13%)	4 (17%)	4 (8%)
Through farm visits	26 (50%)	13 (54%)	19 (39%)
Through agriculture and livestock exhibitions	6 (12%)	2 (8%)	11 (22%)
Farmers personally contact	7 (13%)	9 (38%)	18 (37%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

The most used communication channel with extensionists by teachers and researchers was in conferences or training courses followed by the channel through other teachers or researchers (Table 7). Research conducted by Shaikh et al. [15] also observed that the researchers used to communicate with extension personnel through seminars followed by training and telephone calls. The use of mass media (posters, leaflets, and letters) and interpersonal channels (such as meetings, mobile phone calls, seminars, workshops) to communicate extension information, led to a high adoption of agricultural innovations [16]. In this study, other communication channels, such as through farmers, salespersons, agriculture and livestock exhibitions, and farm visits were rarely used. This demonstrated that interaction between research and extension should be improved. Animal science innovation systems require strong linkages between research and extension organizations in particular, and among the various actors engaged in the animal science sector in general. Extensionists were one of the most important sources to evaluate whether research results were applicable to farms, and to obtain information to stimulate research ideas. The utilization and effectiveness of the various communication channels in animal production services should be provided to disseminate innovative and advanced messages to farmers.

Table 7. Teachers’ or researchers’ communication channels with extensionists were

Items	Number of frequency (%)		
	Senior high school <sup>1</sup> (N=52)	University <sup>2</sup> (N=24)	Research institute <sup>3</sup> (N=49)
Contact in person	16 (31%)	5 (21%)	16 (33%)
Through other teachers or researchers	24 (46%)	8 (33%)	16 (33%)
Through other extensionists	11 (21%)	7 (29%)	7 (14%)
Through farmers	8 (15%)	1 (4%)	3 (6%)
In conferences or training courses	27 (52%)	16 (37%)	31 (63%)
Through salespersons	9 (17%)	5 (21%)	4 (8%)
Through farm visits	9 (17%)	4 (17%)	13 (27%)
Through agriculture and livestock exhibitions	6 (12%)	3 (13%)	11 (22%)
Extensionists personally contact	6 (12%)	7 (29%)	14 (29%)

<sup>1</sup>Respondents from vocational senior high schools with departments of animal industry and healthcare.

<sup>2</sup>Respondents from universities with departments of animal science.

<sup>3</sup>Respondents from animal science research institutes.

#### 4. Conclusions

Respondents showed that most of their research subjects or ideas came from professional journals or magazines, and other teachers or researchers, while very low percentages were from extensionists. Compared with teachers, 59% of researchers’ subjects originated from government policies or their leaders. More than half of the respondents were willing to visit farms and through the visits to find new research topics. Almost all respondents thought they did not have sufficient research budget to support their research work. Besides, insufficient time to learn was the major obstacle for senior high school teachers. Respondents thought the main problems for extensionists might be difficulty in arranging practical training, subjects not meeting farmers’ needs, and farmers’ low learning motivation or insufficient time to learn. Just over half of the researchers (51%) indicated that extensionists did not have enough funding to do extension work. Respondents considered farmers had less professional knowledge, less time to learn, and fewer funds to repair animal houses or purchase new facilities. In terms of respondents’ communication channels with farmers, the best ways would be through the activities of conferences or training courses, their direct contact with farmers, and through farm visits. Compared with teachers, researchers had fewer farm visits so less chance to meet farmers (39%). The most frequently used communication channel with extensionists by respondents was in conferences or training courses followed by means of other teachers or researchers. Findings of this study also revealed that communication channels between research and extension as well as between research and farmer were weak. Strengthening the linkages of research-extension-farmer is required to improve extension education.

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