出國報告（出國類別：開會）

出席 APEC「農業技術轉移與訓練於網路系統之應用」專題研討會議報告

服務機關：巨農有機農場、行政院農業委員會
姓名職稱：陳泰安先生、陳美月技正
派赴國家：印尼
報告日期：95 年 10 月 31 日
出國時間：95 年 9 月 17 日至 95 年 9 月 22 日

公務出國報告審核表

<table>
<tr><td colspan="3">出國報告名稱：參加 APEC「農業技術轉移與訓練於網路系統之應用」專題研討會議報告</td></tr>
<tr><td>出國人姓名（2 人以上，以 1 人為代表）</td><td>職稱</td><td>服務單位</td></tr>
<tr><td>陳美月</td><td>技正</td><td>行政院農業委員會</td></tr>
<tr><td colspan="2">出國期間：95 月 9 日至 17 月至 95 月 9 日 22 日</td><td>報告繳交日期：95 年 10 月 31 日</td></tr>
<tr><td>出國計畫主辦機關審核意見</td><td colspan="2">■1.依限繳交出國報告
■2.格式完整（ 本文必須具備「目的」、「過程」、「心得」、「建議事項」）
■3.內容充實完備
■4.建議具參考價值
■5.送本機關參考或研辦
■6.送上級機關參考
☐7.退回補正，原因： 不符原核定出國計畫 以外文撰寫或僅以所蒐集外文資料為內容 內容空洞簡略 電子檔案未依格式辦理 未於資訊網登錄提要資料及傳送出國報告電子檔
☐8本報告除上傳至出國報告資訊網外，將採行之公開發表： 辦理本機關出國報告座談會（ 說明會），與同仁進行知識分享。 於本機關業務會報提出報告
☐9.其他處理意見及方式：</td></tr>
<tr><td>層轉機關審核意見</td><td colspan="2">☐1.同意單位主管審核意見 ☐全部 ☐部分＿＿＿＿＿＿（填寫審核意見編號）
☐2.退回補正，原因：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿
☐3.其他處理意見：</td></tr>
</table>

說明：

一、出國計畫主辦機關即層轉機關時，不需填寫「層轉機關審核意見」。

二、各機關可依需要自行增列審核項目內容，出國報告審核完畢本表請自行保存。

三、審核作業應儘速完成，以不影響出國人員上傳出國報告至「出國報告資訊網」為原則。

系統識別號: XXXXXXXXX

行政院及所屬各機關出國報告提要

出國報告名稱：APEC「農業技術轉移與訓練於網路系統之應用」專題研討會議報告

頁數 49 含附件：是

出國計畫主辦機關/聯絡人/電話

行政院農業委員會/李蓮生/(02)23124054

出國人員姓名/服務機關單位/職稱/電話

陳泰安/巨農有機農場/主管/(06)2661368

陳美月/行政院農業委員會企劃處/技正/(02)23125815

出國類別：□ 1 考察□2 進修□3 研究□4 實習■5 其他

出國期間：中華民國 95 年 9 月 17 日至 95 年 9 月 22 日

出國地區：印尼棉蘭

報告日期：中華民國 95 年 10 月 31 日

分類號/目：

關鍵詞：資通訊技術(ICT)

內容摘要：

研討會主要目的是分享各會員國有效並創新的應用資通訊科技(ICT)於農業領域之經驗，希望透過資通訊技術的協助，加速農業推廣人員和機構達成農業技術轉移和訓練之預期成效，促使農業從業人員能創新與創造出新的生產與營運模式。

與會之會員國包含日本、越南、印尼和台灣，各會員國之農民年齡普

遍高，面對資通訊技術學習能力低、應用能力弱，雖會員國均試圖結合產、官、學、研各界之力量，辦理各項教育訓練，以進行技術轉移，提昇農民應用資通訊技術能力，雖示範農民資通訊技術能力漸漸提昇，但應用於自身之產品行銷上，除農民資通訊技術能力需提高外，外界大環境資通訊基礎建設亦需普及，而相關設備成本需降低，以及消費者使用資通訊技術需成熟後，農產品電子商務才有發展可能。

目　次

出席 APEC「農業技術轉移與訓練於網路系統之應用」專題研討會議報告

壹、 前言

一、 本研討會主題著重在以下三方面之知識、經驗和訓練分享：

（一）於網絡系統方面：使用 ATT&T 網絡系統過程上之知識、經驗和訓練分享，特別是系統的強化、障礙和體制的改善方面。

（二）農民透過 ATT&T 網絡系統存取資訊，特別是農民如何從該網路獲益。

（三）於訓練方面，如何為 ATT&T 網絡系統之使用者和管理者，開發和管理提供技術和技能知識之網站。

二、 本研討會目的：

期透過會員國間已實行且有效的 ATT&T 網絡系統，以及已發展之相關農業技術之知識、經驗和訓練交換，達到農民因這些農業技術和農企業知識的獲得，而提昇其收入，並成為能自立自助之農民。

貳、 會議時間：2006 年 9 月 18 日至 21 日

參、 會議地點：印尼棉蘭市 Tiara 旅館

肆、 台方代表成員

姓　　名	服　務　單　位
陳泰安先生	巨農有機農場
陳美月技正	行政院農業委員會企劃處

伍、 專題講座

一、電子商務在農業生產和銷售所扮演的角色概述(美國)

講者 Charles Nicholson 先生，服務於印尼 Agricultural Program Development，專題內容以印尼經驗為主，介紹手機簡訊於農產品交易之應用：

（一）此實驗性計畫，成立一個專責機關(Mobile Fresh)，處理會員買賣雙方之農產品交易。

（二）該系統架構下有三組成員，賣方(農民)、買方(消費者)、仲介(Mobile Fresh)處理交易。

（三）農產品買方透過手機簡訊，來傳遞農產品訂單內容或進行農產品價格查詢，資訊傳至 Mobile Fresh。

（四）Mobile Fresh 彙整買方訂單或價格查詢單，再透過簡訊傳給賣方，同時預付訂單金額給賣方。

（五）賣方根據 Mobile Fresh 訂單或價格查詢單，送貨或回覆查詢資料給 Mobile Fresh。

（六）Mobile Fresh 再轉送訂單產品或價格查詢結果給買方。

（七）當買方取得貨品後付款給 Mobile Fresh。

（八）Mobile Fresh 收到訂單貨款，即整筆交易完成。

該系統提供買賣雙方，運用隨身工具，可隨時隨地進行交易，極為方便，但於訓練使用者使用上，因消費者需熟悉各項產品代碼，和訂單或查價指令，才能使用手機簡訊執行查價或下訂單，所以推廣不易，僅適用於大型或長期合作的買賣雙方。

二、如何為農會、研究機構、農業推廣和民間機構建立和發展有效網絡系統（台灣）

講者陳美月小姐，服務於行政院農業委員會，專題內容概述：

（一）在台灣，農漁會扮演農業推廣者、經濟活動經營者角色，並提供財物、銀行借貸和農業保險等服務。

（二）農漁會除上述角色外，另擔負農業資訊傳播者角色，因此政府已於 2003 年，協助農漁會完成資訊網絡基礎建設。

（三）有了基礎建設，再協助農漁會開發網路資訊共用系統，並鼓勵農漁會使用共用系統，降低資訊系統開發及維護成本。

（四）另，政府亦協助農漁會電腦共用中心建立電子商務共用平台，鼓勵並協助農民於網路上行銷產品。

（五）政府於農業推廣及農村發展上，規劃建置各資訊網站及資訊

入口網，提供農民、農民團體或國人所需之農業資訊和服務。

（六）於安全農業推動上，未來農漁會更擔負協助農民落實產銷履歷制度之角色。

三、日本農民使用農業資訊網路系統之現況和未來展望(日本)

講者 Koichi Fukuda 先生，服務於 Japan Agricultural Development and Extension Association，專題內容概述：

（一）2005 年日本農民擁有電腦者占 61.2%，使用電腦上網路者 42.2%，所以農民應用電腦於自己事業者有限，約 20.7%，但有逐年提昇現象。

（二）2005 年日本農民擁有手機者占 70.9%，使用手機上網路者則占 31.5%。

（三）日本農民應用農業資訊網絡系統，改善農業管理之實例

1. Azemich 網絡系統是 1998 年為農民而建置，網頁由地方政府和農業推廣中心管理，由農民營運。主要提供電子討論區，鼓勵農民與農業推廣者加入自由討論，但該系統存在某些問題待克服。

A. 2005 年該系統有 2 位網站管理者、17 個提供線上諮詢服務者、400 個研究者，能快速回覆問題，但加入該系統討論者人數一直沒有明顯成長，且僅有少數農民實際使用該系統。

B. 該系統網頁更新非農業推廣中心每日例行之工作，所以更新不頻繁，內涵已不能滿足使用者需求，且無法提供特殊技術和知識。

2. 農民將創新經營理念導入網站，如宣傳農場管理，擴大行銷管道，已成為新的溝通和經營方式，並與消費者直接溝通，但仍存在某些問題待克服。

A. 網頁內涵需自行維運，所以難有新的內涵。

B. 產品無法需多樣化提供給消費者。

C. 不保證新消費者能取得這些網頁資訊，所以網路行銷難以吸引到新的消費者。

3. 目前該系統約有 2400 個網路直銷商店，農民可自訂產品價格，但訊息傳遞主要仍需搭配端點銷售系統、電話、手機、傳真機和手機電子郵件。

4. 結論是對先進農民只需給予少許的技術支援，而對一般農民仍需給予充足的支援，而要達成目標，不能單靠資訊網路系統，原有的農業行銷活動仍需存在。

陸、 農民經驗分享

一、印尼農民經驗分享

經驗分享者為來自印尼巴里島的農民團體，所分享之經驗簡述：

（一）透過資訊業者(微軟公司)和政府合作，進行農民團體資通訊技術應用示範性計畫。

（二）計畫內協助示範團體應用網路系統，並擬於虛擬網路世界，找尋可能的買方，再進一步運用電子郵件和買方交易(議價)。

（三）由於網路的便捷，縮短了買賣雙方距離，也不需再依賴中間商，少了中間商剝削。

二、日本農民經驗分享

經驗分享者為 Takatsuka 農場負責人 Koichi Fukuda 先生，是屬家族事業，農場從事稻米、水果和蔬菜生產，並有簡單加工處理，所分享之經驗簡述：

（一）委託資訊廠商所建置農場專屬網站，同時於網站公開農場日誌。

（二）農場員工積極參與農業推廣機關所辦理之電腦基礎訓練課程，提昇各種電腦軟體使用技能，讓農場成員有能力透過電腦及網路系統與世界各地溝通。

（三）以面對面方式進行農場成員 ICT 應用訓練和經驗分享。

（四）透過農產品網站市集，進行產品網路行銷。

三、越南農民經驗分享

經驗分享者 Vo Ngan Giang 小姐，服務於 National Agriculture Extension Center，分享越南農業推廣之經驗和成果

簡述：

（一）越南共有 64 個國家農業推廣中心，122 個研究機構(中心)、訓練學院、基金會和農企業等。

（二）1993 年起迄今國家農業推廣中心之工作績效

1. 進行資訊公共基礎建設,並每年為 5,000 名農業推廣人員和 10,000 名農民，辦理相關技術移轉課程。

2. 每月於農業推廣佈告欄發佈約 4500-5000 個文件、書籍等。

3. 每天更新農推網站訊息。

4. 與 40 個媒宣機構合作農業推廣，並透過廣播和電視節目進行農業推廣。

（三）越南農業推廣體系未來應肩負農業生產和鄉村發展，協助國際性、區域性的電子商務發展，並提供農民更多服務。

四、 台灣農民經驗分享

經驗分享者為巨農有機農場負責人陳泰安先生，種植有機蔬菜，所分享之經驗簡述：

（一）自建農場專屬網站，以展現農場所生產之有機蔬菜，買方透過網站，可明確知道當季農場可供應那些產品，同時自行維運網站內涵、網頁內容亦可隨時更新。

（二）應用電子郵件和買方溝通、向專家諮詢農業資材相關知識和問題、和農場員工及朋友交換訊息，可明確感受到透過電子信箱傳遞訊息和溝通上不僅省時，且省錢。

（三）應用政府所提供生產履歷登錄系統記錄農場日誌，除可供買方或消費者了解其產品生產過程各項活動外，日後問題產品可輕鬆回溯並區隔，所累積之歷史資料亦可做為農場經營未來分析之參考資料來源。

柒、 結論

經由本次研討會活動，了解各會員國均試圖應用資通訊技術，來提昇農業推廣成效，改變農民行銷模式，增加農民收益，然而各會員國所面臨問題和結論歸類如下：

一、 農民年齡普遍高，資通訊技術能力不足，吸收資通訊技術新知能力亦弱，因此在技術的訓練和移轉緩慢、困難，故農業推廣機關需投入較多的人力和經費來協助、訓練農民，以提昇資通訊技術能力。

二、 各會員均有農業資通訊技術應用之可行性計畫(示範計畫)研究，但其計畫內之農民(團體)，通常是以傑出農民(優良團體)為對象，而計畫內大部環境變數又為計畫所事先安排，以印尼巴里島之電子商務示範計畫為例，其買賣雙方是經由計畫事先規劃設計，當計畫結束後，不再有專家協助時，示範之農民(團體)表示，無能力持續電子商務之進行，因此示範計畫日後要推廣或複製至其他農民(團體)仍相當困難。

三、 地廣人稀之國家(如印尼)，有線網路基礎建設成本高，難以推廣寬頻網路之使用，故目前網路用戶仍多數停留在使用電話系統和數據機上下傳輸資訊，不僅頻寬不足，且速度緩慢，而因無線網路基礎建設成本相較於有線網路為低，所以地廣人稀之國家適宜發展無線網路。

四、 手機簡訊應用於產品查價和交易上故然方便，但使用該系統需熟悉系統指令，對一般消費者而言，可行性不高，故僅適於服務特定的會員，系統無法普及。

五、 透過網站提供網站會員技術交流討論區、農業技術諮詢、以及農業技術和知識擷取等服務，但最近已漸被一般檢索系統(如Google、Yahoo 等)所取代，造成該類系統使用率愈來愈低，而後結束服務。

六、 資通訊技術使得農業技術和知識取得更為容易，但在交易應用上仍需搭配傳統的交易和溝通方式，無法全面被資通訊技術所取代。

捌、 附錄

一、 會議照片


WORKSHOP ON THE UTILIZATION OF THE ATT&T
NETWORKING SYSTEMS
2006
NETWORKING SY
Indonesia,
SPEAKER
MODERATOR
Economic Cooperation
MEDAN

二、 專題講座報告(美國)

A Brief Essay of Issues Related to E-commerce, the Internet and Developing Countries

Charles F. Nicholson, Ph.D.
Director of Agricultural Program Development
REI-Indonesia
P.O. Box 6965 BDDG
Bandung, INDONESIA 40135

This paper was prepared for the Fifth Seminar on Agricultural Technology Transfer and Training, September 18-22, 2006, Medan, Indonesia.

Introduction

Some have speculated that the industrial age is coming to a close and that a new age is dawning. This new age of economic development is referred to as the digital age and has, as its backbone, e-commerce. E-commerce represents a new way of transacting between sellers and buyers. By utilizing information and communication technologies (ICT), transaction costs between buyers and sellers can be greatly reduced. However, the form and nature of those technologies are still under development. Some applications of information and communication technology have been helpful, while others have failed miserably. Through the crash of "dot com" enterprises the world learned more about what applications were relevant to the digital age and what applications could not reduce transaction costs. In general, with the advent of the Internet huge advantages in efficiency are possible although numerous obstacles still exist. This paper briefly highlights some general issues related to the development of e-commerce in the U.S. However, the paper will also highlight some of the potential pitfalls and put forth a general strategy that utilizes an existing infrastructure that is much different than the infrastructure that exists in developed countries. It is the author's hope that this paper might stimulate discussions that could ultimately lead developing countries to capitalize on ICTs and to begin a process of innovation that could lead to reduced transaction costs and enhanced economic efficiency.

A. Definitions and notions

In the United States the commerce has reached a point where virtually any commodity can be purchased by virtually anyone in the United States. The only exceptions to this are very specialized products whose owners do not have access to the Internet. A person with Internet access in America can purchase any good with only a few minutes of searching

on the web. In other words, a person, sitting in his own home and wishing to make any purchase, needs only to turn on his computer, search the web and within moments can place an order for that good to be delivered to his home. A personal computer in America represents a portal through which he or she can purchase any good or commodity of his or her choosing. Never before in the history of the world has it been possible to make transactions as quickly and effortlessly as it is in developed countries where Internet access abounds and where financial institutions are equipped to make secure financial transfers.

When commercial transactions are facilitated between willing buyers and existing sellers, then transaction costs are lowered and efficiency is enhanced. There are at least two ways in which efficiency is enhanced through the Internet. First, through the Internet sellers who have products that need to go to market cannot only advertise but can also devise means and mechanisms by which seeking buyers can purchase directly from them. For instance, on two occasions when I have had to purchase a personal computer, I simply went to the website of the manufacture of my choice. On the website, I could purchase a computer that was ready-made or I could purchase one that had special features that would take a weak longer. After making the choice, I provided my credit card number and elected to have the computer delivered by parcel post to my door. Within minutes of turning on my computer, getting on the web, looking through their web site, making some selections, I had ordered a personal computer to be delivered to my door. This sort of scenario happens a million times a day in developed countries. Thus, the Internet is now a powerful tool in the hands of everyday consumers to purchase within minutes any commodity of their choosing directly from the manufacturer.

Secondly, through the Internet a market environment can be created by which multiple sellers can meet multiple buyers and pass messages to one another in such a way that real time matches between sellers and buyers can be made such that both buyer and seller mutually benefit. In essence the Internet has created an open cry auction environment in a way that literally, encompasses the entire globe. Not only can any individual buy any good on the Internet, it is also true that any individual can sell any good on the Internet. The website called Ebay has created an environment where anyone with a commodity to sell can post the commodity along with many other individuals who are trying to sell the same type of commodity. In this way, high levels of market efficiency can be obtained because multiple sellers and buyers can congregate in the same location in cyberspace.

Using the Internet as a means to conduct commercial transactions is only the narrowest view of e-commerce. A broader view of e-commerce includes the provision of all sorts of business information through the Internet. Web sites are now designed and created by businesses to promote products, announce prices, provide product support and customer service. Because business activity is not limited only to transactions, the Internet is a tool that is used for more than just transactions. Information that is readily available on the Internet used to costs thousands, even millions, of dollars to obtain by an individual from the previous generation. For instance, product information from France, America and China can be readily compared. With proper product information the appropriate supplier can be identified and a business relationship can begin through email correspondence. In

the past the search for business partners was a complicated search procedure that involved extensive networking. With the Internet the search process can be greatly simplified and suitable business partners can be identified at a fraction of the costs that was required in previous generations.

B. Facts about US e-commerce

E-commerce in the United States greatly depends on the availability of Internet services. E-commerce has made noteworthy gains in recent years as U.S. Internet service has expanded in reach, increased in quality, and lowered in price. Indeed, the rapid increase of household usage of Internet services represents a fundamental social shift that makes the growth of e-commerce possible in the U.S. Figure 1 shows the exponential growth of household Internet use. The trend shows no signs of reversing in the near future. Clearly, in a society where using the Internet is as common as reading the newspaper, the prospects are very good that e-commerce will continue to grow.

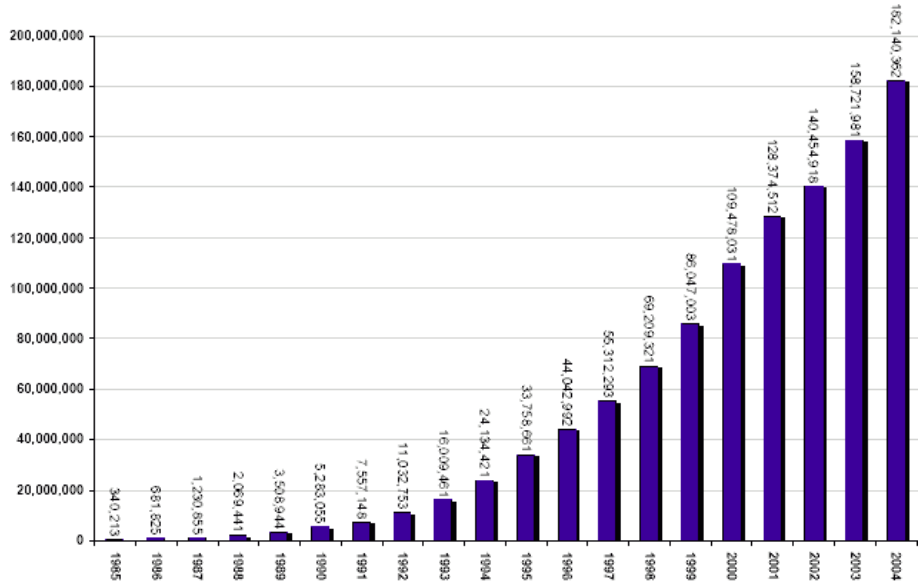

Figure 1. Household Internet use in the U.S. (taken from the CTIA survey report)

C. Experience in US agriculture

The trend of increased Internet use in the U.S. is also apparent in the agricultural sector. Although rural areas were among the last regions to obtain reliable Internet service, the extensive range of Internet services into even remote areas is allowing farmers to access the Internet as well. Table one shows that farmers in the United States have made rapid advances in Internet use. By the year 2001 nearly half of farmers in the United States had access to the Internet. Currently, the proportion is much higher.

Table 1. Internet access in rural U.S.

	1997	1999	2001
Farm households with Internet access	13%	29%	43%

Source: McFarlane, et al. (2003) and Henderson, et al. (2000)

Within the agricultural sector in the U.S., the growth of e-commerce has resulted in strengthening relationships in the supply chain. It does not appear that existing supplier relationships have been disturbed by the growth of the Internet. Rather than creating increased competition among farmers, e-commerce has instead increased competition among supply chains. That is, it may be the case that the existing relationships in the supply chain now compete with another set of existing relationships in the supply chain in a way that has not happened before (Leroux, et al. (2001)).

D. Limitations and weaknesses

E-commerce in America did not have a smooth start, nor did the growth of e-commerce experience a smooth upward trend. Rather, e-commerce experienced various fits and starts that exposed the limitations and weaknesses of conducting commercial transactions using the Internet. One of the early limitations of e-commerce was the absence of a formal legal framework by which claims of fraud could be prosecuted. Without clear laws dictating who is liable for a breach in a contractual agreement established via the Internet, it was impossible to stimulate public confidence in the use of e-commerce as a normal way of conducting business. Gradually, the necessary legal framework began to emerge in the U.S. and proper liabilities were assigned when fraudulent activity occurred. Now, very specific laws dictate various aspects of conducting commercial transactions by the Internet. In addition, an effective legal system is available to process nearly all allegations of fraudulent activity.

In addition to a legal framework, it was necessary also for the U.S. to develop new perceptions regarding the purchase a products. The traditional view of purchasing products involved traveling to a retail outlet, making the transaction with an acceptable financial instrument and then bringing the product home. The notion of buying a product that is not first examined represented an obstacle for many consumers in the U.S. In addition, the notion of going to a computer to make a purchase instead of going to your car to make a purchase was similarly an obstacle for many consumers. The transition to e-commerce in the U.S. has been made a bit smoother because U.S. consumers had already experienced transactions by phone. Using a product catalog, telephone orders can be made by the consumer with the seller, who would ship the product directly to the consumer's home. Nevertheless, using a keyboard to make a transaction is much different than using a telephone to make a transaction. Unlike in developing countries, U.S. consumers have grown accustomed to multiple methods of making purchases, which assists the effort of exposing U.S. consumers to e-commerce. Nevertheless, purchasing notions embodied in e-commerce are not readily embraced by U.S. consumers. Rather, a shift in perception about purchasing products is necessary if U.S. consumers are to

transition into more and more e-commerce. Transacting over the Internet requires perceptions that take time to develop.

E. Information and communication technology (ICT)

A closer examination of e-commerce reveals two fundamental elements, including information and communication. The Internet provides advanced technologies of both information and communication. Business information is available on the web. Communication is possible through the web. Bringing those two elements together- information and communication, the Internet has made it possible for transactions to occur. However, the Internet is not the only way to utilize information and communication technologies. ICT is the more general notion that encompasses the Internet as only one specific technology.

It is possible for the growth of ICT to take many paths of development. In the U.S. the Internet has emerged as the primary technology of ICT. A vast telecommunications system that utilizes an extensive cable network made it possible for the Internet to emerge as the primary application of ICT in the U.S. Later, as the demand for Internet services increased, usage of the Internet depended on the pre-existing cable networks of entertainment providers, specifically cable television, who could provide users with broadband Internet. Because of the cable infrastructures in the U.S., provided first by the telecommunications industry and then by cable television providers, Internet use has now become a fundamental part of life in America. In other words, the cable infrastructure made it possible for the U.S. to manifest the shift toward widespread Internet use.

How might ICT develop in developing countries where there is not a preexisting cable infrastructure? Is it necessary for developing countries to make heavy investments in the cable infrastructure so that Internet services can be made available to the entire population at low cost? Is there existing communication infrastructure that might provide both information and communication in a way that can make commercial transactions possible? What should we call such transactions? Should we call it e-commerce? Or should we call it ICT-commerce?

In most developing countries it is far less expensive to construct towers of cellular service than it is to lay cable for telecommunications. Consequently, even in some of the poorest cities of the world cellular service is available. In fact, remote rural areas often have fairly reliable cellular service. Because the preexisting infrastructure consists of a network of cellular towers and not a network of telecommunications cable, ICT in developing countries will develop in a different way than what happened in the U.S. In particular, ICT in developing countries should utilize wireless, not cable, infrastructures.

F. ICT in Indonesia

The situation in Indonesia is worth considering. In Indonesia only a fraction of the population has access to Internet services. The underlying infrastructure in Indonesia

does not adequately support the growth of Internet use. Telephone lines service only a portion of the total population. Cable-based entertainment providers are also rare and exist only in urban areas. So, a cable infrastructure that can support widespread Internet use does not exist in Indonesia. It is not surprising then, that Internet use in Indonesia is low[1] and that e-commerce in Indonesia is virtually nonexistent.

Suppose Internet access was widely available in Indonesia. In order to enable the development of e-commerce a legal framework needs to be constructed to secure the rights of both buyers and sellers. Without clarity about prosecutable contract breaches, legislation that dictates commercial transactions via the Internet, and the enforcement of relevant legislation, e-commerce in Indonesia will never develop significantly. The possibility of cyberfraud will scare people away from e-commerce. Consequently, because of the absence of both a cable infrastructure and an appropriate body of laws, Internet-based commercial transactions, i.e. e-commerce, cannot develop in any meaningful way.

Although a cable infrastructure does not exist in Indonesia, a cellular infrastructure does. Hand phone use is widespread in Indonesia. Multiple providers of cellular service compete for market share in Indonesia. Telkomsel, as the nation's largest provider of cellular services, provides service into nearly every location in Indonesia. Because cellular services can also provide both information and communication, it is possible for transactions to be facilitated through the existing infrastructure in Indonesia. By developing the appropriate ICT applications it is possible to facilitate ICT-commerce in Indonesia.

REI-Indonesia has developed an ICT application that utilizes a GSM modem to send and receive text messages as a means for buyers and sellers to communicate with one another, using the existing infrastructure. Although still in its infancy, the technology has already produced enhanced revenues for participating farmers. REI-Indonesia expects that several more years of development are necessary before an application is ready for widespread deployment that would result in community-wide efficiency improvements. It is the author's hope that such applications might prepare the way for more sophisticated applications of ICT-commerce. Only as developing countries experiment with ICT and innovate new applications of ICT-commerce, which utilize the existing wireless communication infrastructure, can they hope to keep pace with the global move into the digital age.

[1] As of the year 2002, household internet use in Indonesia reached only one million, representing about 0.5% of the population (see "Suram, Pertumbuhan Internet Indonesia 2003" by Donny B.U.). Although that statistic has undoubtedly risen, it remains a very low number compared to neighboring countries.

Bibliography

Abate, Gretachew and Colletta Moser; E-commerce and Internet use in small businesses: trends and issues. Staff Paper 2003-04. Michigan State University. January 2003.

Bourgeois, Robin, ed.; A Preliminary Assessment of the Potential Role of Information and Communication Technology in Support of Poverty Alleviation Policies for Rural Populations, AGRI-ICT Project Report, UNESCAP-CAPSA, Centre for Alleviation of Poverty through Secondary Crops' Development in Asia and the Pacific, 2003

Chowdhury, Nuimuddin; "Information and Communication Technologies" in Appropriate Technology for Sustainable Food Security. International Food Policy Research Institute. Washington, D.C. August 2001.

"Digital Divide Gombal!" by Donny B.U., in Djakarta!, April 2004

Henderson, Jason; Frank Dooley and Jay Akridge; "Adoption of e-commerce strategies for agribusiness firms". Selected paper at the American Agricultural Economics Association Annual Meeting, July 30-August 1, 2000.

Leroux, Nicole, Max S. Wortman Jr. and Eric D. Mathias; "Dominant factors impacting the development of business-to-business (B2B) e-commerce in agriculture". International Food and Agribusiness Management Review. Vol. 4, 2001, pp. 205-218

McFarlane, Dionne, Duncan Chembezi and Joseph Befecadu; "Internet adoption and use of e-commerce strategies by agribusiness firms in Alabama". Selected paper at the Southern Agricultural Economics Association Annual Meeting, February 1-5, 2003.

Reiner Doluschitz, Markus Emmel, Fabian Kaiser, Jens Pape and Michael Roth; "The emerging role of e-agribusiness- state of the art and perspectives in Germany". 15th Congress: Developing Entrepreneurship Abilities to Feed the World in a Sustainable Way. August 2005.

"Suram, Pertumbuhan Internet Indonesia 2003" by Donny B.U. , in Kompas, 16 January 2003

Wheatley, W. Parker, Brian Buhr and Dennis DiPietre; E-commerce in Agriculture: Development, Strategy, and Market Implications. Staff Paper Series. Dept of Applied Economics, University of Minnesota, July 2001

World Bank and infoDev; The Network Revolution and the Developing World, Analysys Report # 00-216, 17 August 2000

三、 專題講座報告(台灣)

Country Report of Taiwan

1. Background

Along with the continued development of the economy, the cost of land and labor has risen swiftly. Taiwan's agricultural products usually lack competitiveness on the market; thus the investment of 833,000 hectares (roughly 23.1% of the nation's land) and 591,000 employed personnel (about 6.0% of the entire working population) comprise only 1.70% of the nation's GDP(Table1). Because Taiwan's agricultural economy is a small-scale agribusiness model based on the family farm, it lacks economy of scale and there is no way to optimize technical efficiency. In addition, Agriculture agencies have always placed more value on production-oriented technological innovation rather than consumer-based agricultural production and marketing events. It also aims for lower value-added manufacturing and processing efficiency in the industry value chain, and overlooks high value-added items such as innovation, R&D, marketing and services. Thus, it feels pressure in the face of internationalization and free competition.

Year	Total nation's land area (1000 hectare)	Cultivated Land Area (1000 hectare)	National working population (per 1,000 people)	Number of employed agricultural workers (per 1,000 people)	Gross Domestic Product (GDP) (billion US$)	Agriculture Product share in GDP (%)
2000	3,600	851	9,491	740	321,230	1.98
2001	3,600	849	9,383	706	291,694	1.85
2002	3,600	847	9,454	709	294,803	1.75
2003	3,600	844	9,572	696	299,785	1.69
2004	3,600	836	9,786	642	322,179	1.68
2005	3,600	833	9,942	591	345,862	1.70

Table 1 Cultivated land, working population and output

In a small agribusiness economy, the transmission of agricultural information requires a large amount of manpower and time. The central government has established seven district agricultural improvement stations and various experimental agriculture stations. Besides conducting regional or industry-specific agricultural experimentation and research, it also offers complete promotional services so that the results of research

and development are realized in agricultural production. In addition, the town farmers' and fishermen's association that usually exists (Table 2) offers not only financial support, resources and materials for production, operations and sales services, but also performs the important task of the transmission of agricultural information.

Year	Number of Farmers' Associations	Membership	Number of Fishermen's Associations	Membership
2000	304	1917938	40	339590
2001	304	1930171	40	359449
2002	304	1959427	40	372052
2003	304	1950321	40	383893
2004	304	1925550	40	385124
2005	303	1930222	40	389164

Table 2 Farmers' and Fishermen's Associations

However, recent years have seen the quick development and widespread utilization of information technology and the World Wide Web. The agricultural department has risen to meet these developmental trends by transferring the traditional agricultural information and exchange model to a new management environment based on the World Wide Web. It has also employed information technology to construct an information system that connects the agricultural industry value chain to improve manufacturing and processing efficiency as well as stimulate the research, development and design of new products, and provide new kinds of services and marketing. Information technology has also inspired new creative insights, new product development, new services, new sales channels, and even new organizations, thus causing agriculture to develop new value (Figure 1).

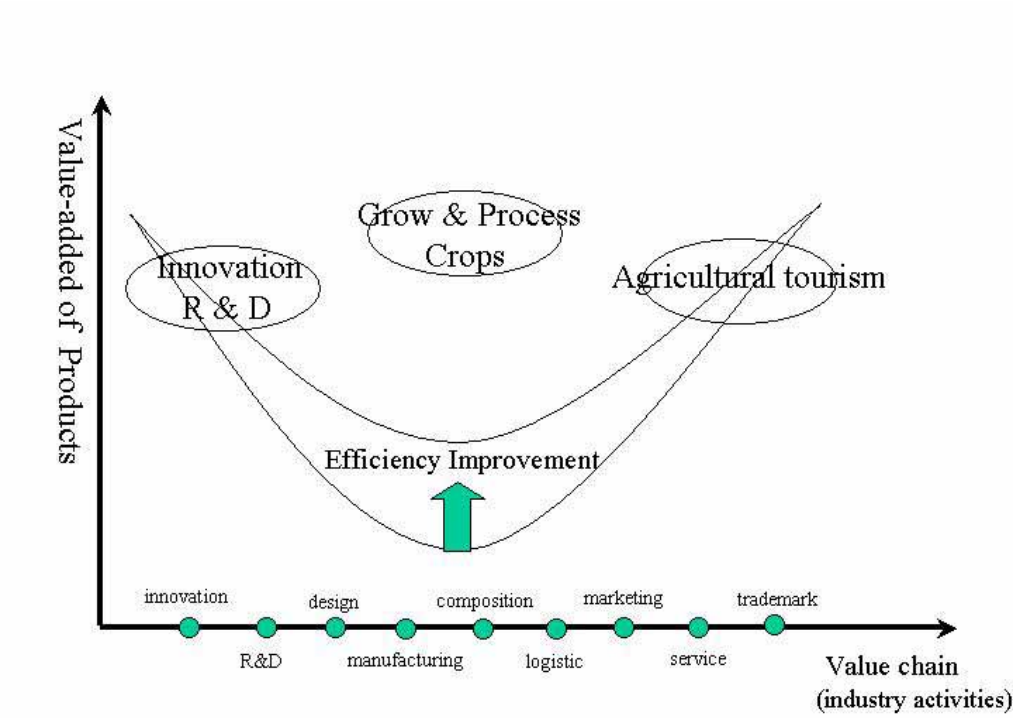

Figure 1 Agricultural Activity Value Chain

First, initiation of the construction of a network infrastructure for agricultural information, enabling the quick execution of agricultural R&D, promotion, manufacturing, marketing and other activities over the Information Superhighway, and the construction of agriculture-related user groups. Next, the promotion of information-centered agricultural services, encouraging various agricultural associations to jointly use a system of credit transaction information and links to the financial networks of various banks nationwide, enabling rural agricultural workers to enjoy financial services of the same quality as that found in urban areas. In addition, integration of related agricultural production technology, production and sales pricing information, and personnel education information. Furthermore, the development of an agricultural information management system, construction and promotion of a marketing system for the creation of a system for agricultural information, and through the World Wide Web, create a direct connection between the network for users from the agricultural sector and the lives of the public, to achieve a modernized agricultural economy that is the integration of production, ecology, and life, and establishing a firm basis for the sustainable management of the national agricultural system.

2. Agricultural Information Network Infrastructure

As mentioned earlier, farmers' and fishermen's associations are the most important agricultural associations in Taiwan, as well as the ones with the longest history. Having long assisted the government by initiating various agricultural and fishing policies, they play a significant role in the promotion of agriculture and the improvement of benefits for agricultural workers. However, an inability to react quickly to meet changes in the social environment and other factors has led to the generation of a large gap between the management effectiveness of these associations, the quality of services offered to workers in the agricultural and fishing industries, and social development. Thus, the initiation of network and information-based processes of farmers' and fishermen's associations can be considered a starting point for the establishment of a network infrastructure for agricultural information. With the assistance of the government, the construction of 344 local area networks for farmers' and fishermen's associations was completed in the three-year time period starting from 2001. ADSL was also employed to create a system for integrating the World Wide Web (Figure 2), enabling farmers' and fishermen's associations that directly serve agricultural workers to become connected to the Internet.

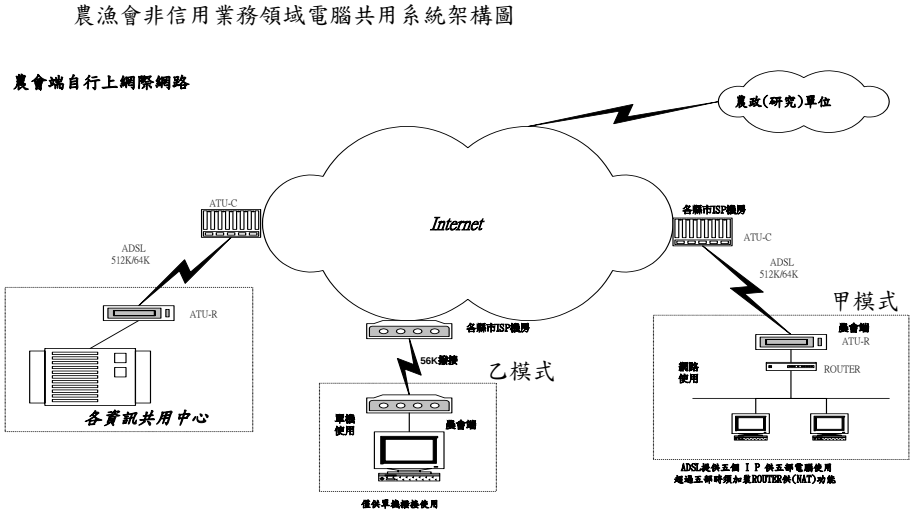

Figure 2　Network Structure of Farmers' and fishermen's Associations

Information technology can be used to elevate the operational effectiveness of farmers' and fishermen's associations, accumulate intellectual capital, improve organizational image, and lastly, develop

such that each farmers' and fishermen's association employee can quickly access new information through the Internet, be full of confidence, and be more capable of adapting to changes in the social environment. Farmers' and fishermen's associations can thus become modern corporations with a solid Internet and information base. At the same time, the government also assists in the planning of a production and marketing group with a management philosophy, the acquisition and installation of computers and Broadband Internet, and the construction of a network infrastructure for agriculture agencies' users, including agriculture-related government units, farmers' and fishermen's associations, and users in production and marketing groups.

3. Helping Farmers' and Fishermen's Associations to Develop Information-Based Processes

Developing web-based personnel systems, membership management systems, financial management systems, sales and inventory systems, joint transportation and marketing systems, accounting systems, farmers' insurance systems and so on, enables farmers' associations to become information-oriented. What requires attention, however, is that government agricultural departments also promote the automation exchange of document at farmers' and fishermen's associations (Figure 3), so that all farmers' associations and government agricultural agency can enjoy rapid and paperless transmission of official documents. This would be of tremendous benefit for the transmission of agricultural information.

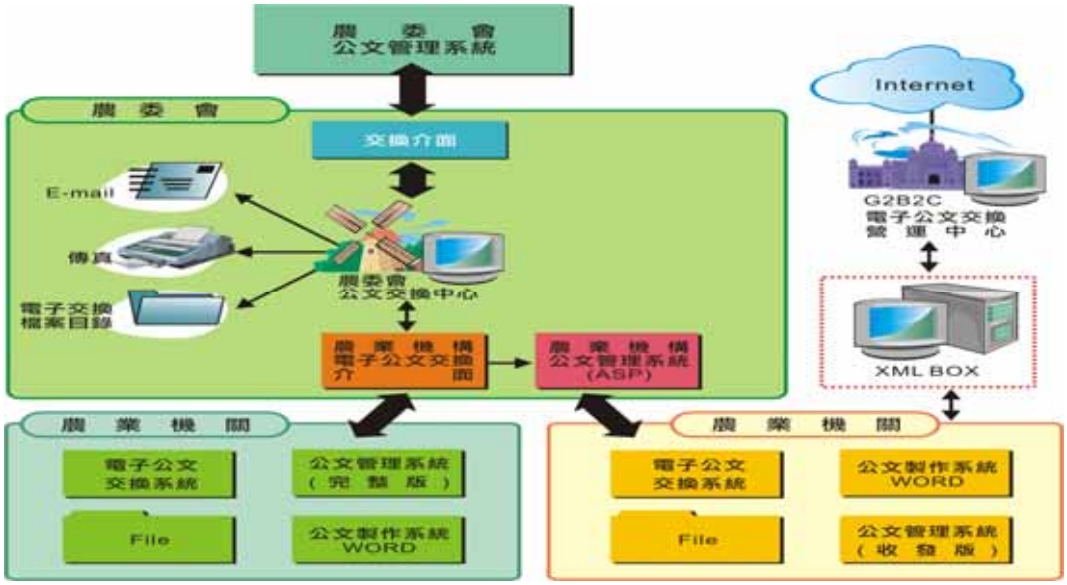

Figure 3 The Farmers' and fishermen's Associations electronic document exchange system

4. Strengthening the Information Content of the Agricultural Information System

The development of Taiwan's agriculture can be divided into three dimensions: production, life and ecology. With regard to production, the important thing is to utilize funds, land, labor and technology to produce agricultural products, keeping in mind manufacturing output value and the profit of farmers. With regard to life, the focus is placed on whether or not it is possible to produce a complete and high quality agricultural product or service that satisfies the public need. This also includes safety, public health and recreational farming information. On the ecological front, the most important considerations are natural resources and environmental protection. Because agricultural production is a production method which directly utilizes and depends heavily on natural resources, it is important to consider resource utilization, the preservation of the natural environment, and the harmony of the rural community while promoting the development of agriculture. In general, Taiwanese agricultural information services can be divided into three main categories: production and marketing information services which provide production technology and market information reports; life information services which provide safety information about fruits and vegetables as well as product propaganda; and the service of providing information about ecological resource preservation.

A. With regards to market transaction information, many of the major wholesale markets in Taiwan have gradually integrated market information. "Agriculture Production and Marketing Group's Information Service Networking" (http://farm.coa.gov.tw) (Figure 4) and "Agricultural Product Transaction and Market Site" (http://163.29.73.197) (Figure 5) are both linked to auction markets and offer seven categories of wholesale market information updated daily: vegetables, fruits, cut flowers, lamb, pork, poultry and fish. Aside from product prices, market comparisons by season, month, and year are also available for reference; farmers' and fishermen's association staff may find them of use when planning product shipments or making other adjustments. In the future, it should be possible to extend market information about agricultural products to retail operators and develop a system for aggregating transaction information from large wholesale markets and fresh specialty (bulk sale) stores. Thus, information can be used to connect all sales

activities, wholesale and retail, of an agricultural product. This not only makes transaction information transparent, it also acts as an effective deterrent to unlawful acts of price manipulation.

Figure 4 Agriculture Production and Marketing Group's Information Service Networking

Figure 5 Agricultural Product Market Information Website

B. In terms of marketing services, due to the rapid development of the World Wide Web and the daily increase in the number of Internet users, Internet transactions have become a commercial opportunity with virtually unlimited possibilities. However, various characteristics of agricultural products such as low price, perishable nature, lack of a uniform set of product standards and high shipping cost, always functioned as barriers to the creation of an actual "agricultural e-marketplace." With the exception of some seasonal, high-priced products such as peaches, lychees, pomelos, pears and cut flowers which are sold directly to consumers over the Internet, agricultural products such as one's daily vegetable supply, rice and fresh farm products are all difficult to sell over the Internet. The establishment of the experimental website, "Commercial websites of agricultural products" (http://www.efarm.org.tw) (Table 6) was an unprecedented first step that could be considered the vanguard in the Internet marketing of agricultural products. In the year 2002, extensive efforts to promote sales and group purchases led to a turnover of NT$491,665. In the year 2005, its sales had reached NT$3,664,760 demonstrating that there is a bright future for the sale of high-value agricultural products over the Internet.

Figure 6 Commercial websites of agricultural products

However, agricultural Internet marketing by no means stops with B2B or B2C marketing of actual agricultural products. An even more important function is to assist the agricultural sector to develop new operational scopes. Aside from agricultural products produced in the field, the Internet can also be used to market the beautiful landscape of farming villages and farming culture and knowledge. The marketing of these precious farm stay experiences facilitates the crossover of agriculture from a primary industry to a tertiary industry which provides services. “recreational farming information website”(http://ezgo.coa.gov.tw) (Figure 7) integrate agricultural tourism information from each city and county, offering both prepackaged tours and DIY features that enable you to custom-build your own tours. By providing a variety of tourism information, this site makes it more convenient for the public to take recreational agricultural tours, thereby doing their part to facilitate the transition of the agricultural sector.

Figure 7　recreational farming information website

With regards to providing food product safety information, the

promotion of organic agricultural products and the production and dissemination of the Good Manufacturing Practices(GMP) symbol denoting safe agricultural products are both important government policies. Thus the “Organic Agriculture Information Center” (http://organic.niu.edu.tw/default800.htm) (Figure 8) provides organic agriculture technology and consumer information, organic agricultural producer search functionality, Internet publications, and other overview information, enabling users to search for information on topics related to organic agriculture.

Figure 8 Organic Agriculture Information Center

Pesticide residues have long been a source of concern for consumers. At present, though compliance with regulations governing the use of pesticides has reached 98%, the “GMP” safe fruit and vegetable seal has been designed because the consumer cannot recognize pesticide residue with the naked eye. This seal represents the quality and safety of products and the honor of farm operators. Consumers can rest assured that products bearing the seal can be bought and used. For a list of agricultural products fulfilling GMP safety requirements, one can search “GMP Announcement,

Advisement and Service Web”
(http://www.tactri.gov.tw/htdocs/notes/gapweb/) (Figure 9)
established by the Taiwan Agricultural Chemicals and Toxic
Substances Research Institute, which provides the public with
information about the safety of fruits and vegetables.

Figure 9 GMP Announcement, Advisement and Service Web

C. Because agricultural production is a production method which directly utilizes and depends heavily on natural resources, it is important to consider the utilization of these resources and the preservation of the natural environment. Today, the mission of Taiwan’s agricultural development should not only be food production, but also the preservation of the natural environment and our common natural resources. The website of the Taiwan Endemic Species Research Institute (http://nature.tesri.gov.tw/tesriusr/index.htm) (Figure 10) provides information about Taiwanese biological resources, endemic species preservation, and ecologically protected areas. Through the website, researchers and the general public can all quickly access the information that they are looking for.

Figure 10　Taiwan Endemic Species Research Institute website

D. Because farmers and agricultural workers usually stay in rural areas on weekdays and are busy with farming tasks, they lack opportunities for continued study. However, the Internet allows them to exchange educational information without the constraints of time and space. The main purpose of the “Agricultural Industry Extension Network” (http://agrext.coa.gov.tw/) (Figure 11) and the “Agriculture Education Website” (http://agredu.coa.gov.tw/) (Figure 12) is to provide a forum for farmers and agricultural workers to learn and share experiences.

Figure 11　Agricultural Industry Extension Network

Figure 12　Agriculture Education Website

5. Future Developmental Directions

Though farmers' and fishermen's associations have not been as quick as other industries to become information-oriented, in recent years, having received encouragement from the government and facing the pressures of competition in a social environment, farmers' and fishermen's associations have met the challenge head-on. Managers of these associations and workers are all able to recognize the new life that information technology can bring them the strength for competition.

At present, the government agriculture department is in the process of establishing an "Agriculture and Food Traceability System," which makes it possible to trace the food supply chain. This work is carried out under the supervision of farmers' and fishermen's associations and includes producing and harvesting as well as sale and transport. Detailed records are kept regarding the application of pesticides, fertilizer and other production materials. After harvest, a production seal is affixed to the paper harvesting container, the container is shipped to the container treatment plant to be cleaned, and a shipping label is affixed. The Agriculture and Food Traceability System strengthens field management and enables consumers to rest assured about the safety of the products they use. Because in recent years, the processes of farmers' and fishermen's associations have become increasingly information-based, instructing agricultural workers to use the Agriculture and Food Traceability System will not be that difficult. At the same time, the government hopes that information technology can continue to increase the management and operational efficiency of farmers' and fishermen's associations and lower their costs, even allowing them to accumulate intellectual capital and improve organizational image. Ultimately, they can become educational organizations that are able to meet environmental challenges at any time.

四、 專題講座報告(日本)

CURRENT SITUATIONS AND FUTURE FIGURE OF AGRICULTURAL INFORMATION NETWORK SYSTEM FOR FARMERS' USE IN JAPAN

Koichi Fukuda
Japan Agricultural Development and Extension Association (JADEA)

INTRODUCTION

It is said that the ratio of farmers who possess personal computers and use the Internet is around 60 percent and over 40 percent respectively (surveyed in 2005 by the Ministry of Agriculture, Forestry and Fisheries (MAFF)). However, the number of farmers, who use the information network systems for their own business, is limited. This is because the advantages of using information network systems are not obvious.

Under the situations above, I studied the future figures of the use of agricultural information network systems, which will contribute to the improvement of farm management in Japan.

The methods of the studies are as follows.

Firstly, I will make clear the general situations of usage of the agricultural information network systems including the Internet from the results of the surveys conducted by MAFF and myself.

Secondly, I will analyze the cases of farmers' usage of information network systems. The details on how to examine them are; I will make clear the problems, etc. of the agricultural information network systems by analyzing the current situations of (1) the "Azemichi Network System", which is the unique network system for farmers and is managed by the Japan Agricultural Development and Extension Association (JADEA for short), (2) the homepages managed by prefecture government and agriculture extension centers, and (3) the homepages operated by farmers themselves.

Thirdly, I will consider the current situations and the problems of those network systems mentioned above.

Finally, I will propose the future figures of the information network systems for farmers including the involvement in the agriculture extension services in Japan.

THE CURRENT SITUATIONS AND PROBLEMS OF FARMERS' USE OF INFORMATION NETWORK SYSTEMS

General situations of farmers' use of information network systems

The ratio of the farmers who possess personal computers and use the Internet is shown in Table 1. The ratio of farmers, who possess personal computers and use the Internet, among all farmers, is around 60 percent, and over 40 percent respectively. However, the ratio of farmers, who use the information network systems for their own business, is only 20 percent of all farmers.

According to the details of the survey conducted by MAFF, the ratio of farmers, whose purpose for possessing personal computers is "farm management such as bookkeeping, etc.", is about 60 percent of the farmers. However, the ratio of farmers, whose purpose is "acquiring information on marketing, weather, etc." by the use of information network

systems, is about 40 percent.

Moreover, the ratio of the farmers, who use the Internet with mobile phones, is around 30 percent.

In short, the ratio of "Farm houses where farmers use personal computers for their own business" in 2005, is two times as many as that in 2001. However the other situations of farmers' usage of personal computers and the Internet hadn't changed so much between 2001 and 2005.

On the other hand, I conducted questionnaires and field surveys on the content and methods of extension activities aimed at the farmers in both Asparagus production area in Yamagata Prefecture, a northern part of Japan, and sweet potato production area in Chiba prefecture, near Tokyo, from December 2005 to March 2006 (see table 2).

Table 1. Results of Surveys on Farmers' Usage of Personal computers and the Internet

(Unit:%)

Usage of personal computers and The Internet	Ratio	
	2001	2005
Farm houses possessing personal computers	53.1	61.2
Farm houses where farmers use personal computers for their own businesses	9.7	20.7
Farm houses where approved farmers use personal computers for their own businesses	36.2	36.5
Farm houses where farmers use the Internet with personal computers	32.8	42.2
Farm houses where farmers possess mobile phones	74.3	70.9
Farm houses where farmers use the Internet with mobile phones	42.0	31.5

Source: "The survey on farmers' usage of personal computers and the Internet", MAFF, 2002 and 2005

Table 2. Outline of production areas

	Asparagus production area in Yamagata Prefecture	Sweet potato production area in Chiba prefecture
Number of Farm houses	65	78
Cultivated areas per farm household	About 150 a	About 250 a
Farmers over 50 years old	80 percent	70 percent

Source: made by author based on the questionnaires

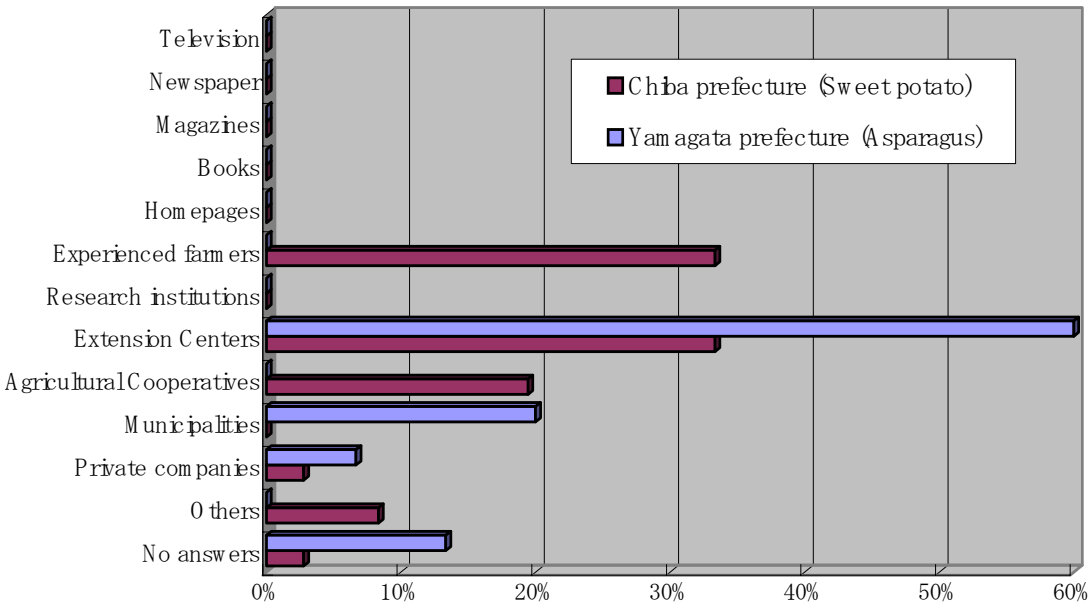

Figure 1. Sources of acquirement of new technical information

Source: Made by author based on questionnaires

Notes: Farmers have to choose two as information sources.

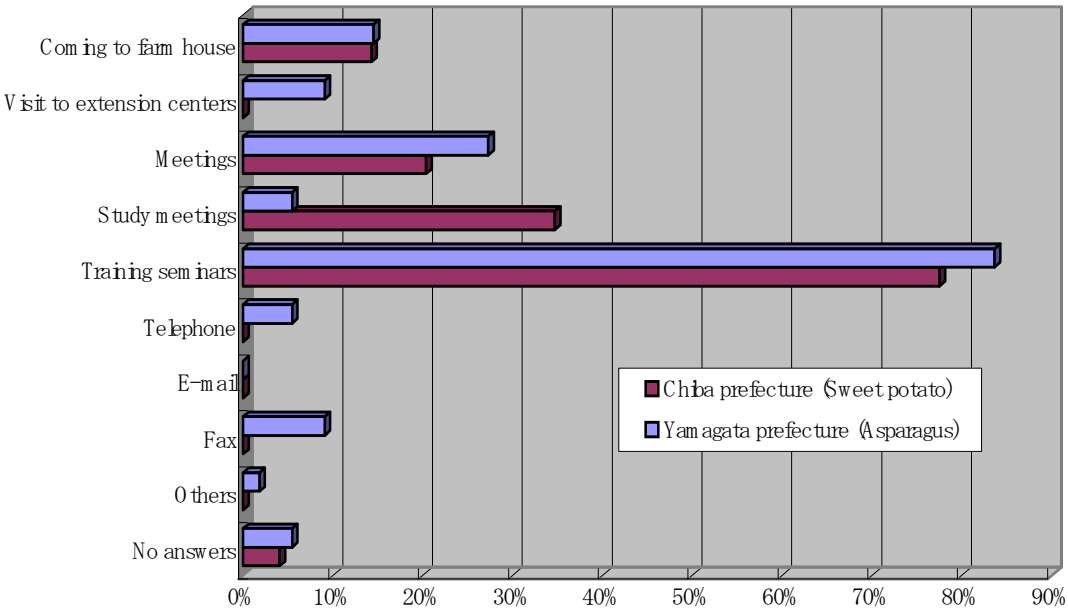

Figure 2. Methods for supporting farmers by extension advisors

Source: Made by author based on questionnaires

Notes: Farmers have to choose two as the methods.

The results of the surveys show that 70 percent of the farmers in both areas are over fifty years old (see Figure 1). The farmers in both areas seldom use homepages for receiving new technical information. The farmers don't use E-mail as a method, either, when the farmers receive advice from extension advisors (see Figure 2).

It is said that the ratio of farmers among all farmers in Yamagata prefecture, who use the Internet with personal computers, is from 20 to 30 percent, according to questioning from extension advisors. This is the similar tendency to the previous survey conducted in 2005 by the MAFF. The extension advisors said that the ratio of the farmers, who possess personal computers and use the Internet with personal computers in the area of Chiba prefecture, is approximately 70 percent and below 50 percent respectively, both of which surpass the ratio of the farmers in the area in Yamagata prefecture. This is because the area in Chiba prefecture is located near Narita Airport and closer to the urban areas.

To sum up the explanations above, farmers don't often use personal computers for farm management despite possessing personal computers. Most farmers also seldom use the Internet for their own management, even if they can connect to the Internet anytime.

On the other hand, fax is more popular among farmers and more often used for farm management. In the area of Yamagata prefecture, 10 percent of farmers use fax, when the farmers receive advice from extension advisors.

Actual cases of using information network system

1. "Azemichi" Network System

The "Azemichi Network System" (Azemichi: a Japanese word which means a footpath between rice paddies) includes electronic forums such as "Free discussion forum", "Technical forum", etc. The Azemichi Network System was started in 1998. Its main purpose is to encourage communications among farmers, extension advisors, etc. participating in the "Local Network System" (the Closed network system for members in the jurisdictions of extension centers or prefecture governments) that had been subsidized by MAFF for four years. Prefecture governments have managed the Local Network Systems, while the Azemichi Network System has been managed by JADEA so far. The participation in the Azemichi network system is free of charge.

Since 1998, the members of the Azemichi Network System have been increasing. At present, over 4,000 farmers, most of who are the experienced farmers, are registered. According to Figure 3, the number of registered farmers varies from prefecture to prefecture. The number of registered farmers is large in the prefectures which conduct the Local Network System, so that the ratio of farmers' living in only 6 prefectures such as Aichi, Niigata, Kagawa, Gifu, Kumamoto, and Shizuoka, accounts for 80 percent of the total participants all over Japan.

The details of usage of the Azemichi Network System show that the number of farmers, who access the system more than one time, is 525 and 425, in 2004 and 2005 fiscal year respectively among about 4000 farmers (see Table 3). On the other hand, the number of farmers, who access the system more than ten times, is 127 and 125 in 2004 and 2005 fiscal year respectively. The ratio of farmers who had accessed the system is only about 10 percent of the 4000 participants in 2005. It can be said that the participants are small portions of all participants. However, the number of participants, who used the system more than one time in fiscal 2005, dropped by 20 percent compared to that of fiscal 2004.

On the other hand, the number of participants, who registered more than one article in

the electronic forums, is 54 and 44 in 2004 and 2005 fiscal year respectively. The ratio of members, who register articles, accounts for only one percent of all members. This means very few people registered articles into electronic forums. The number of articles registered in fiscal 2005, also decreased by 20 percent compared to that of fiscal 2004.

In short, although the number of participants has increased, the connection to the system, references to the forums, and article registration have decreased even during last four years (see Figure 4).

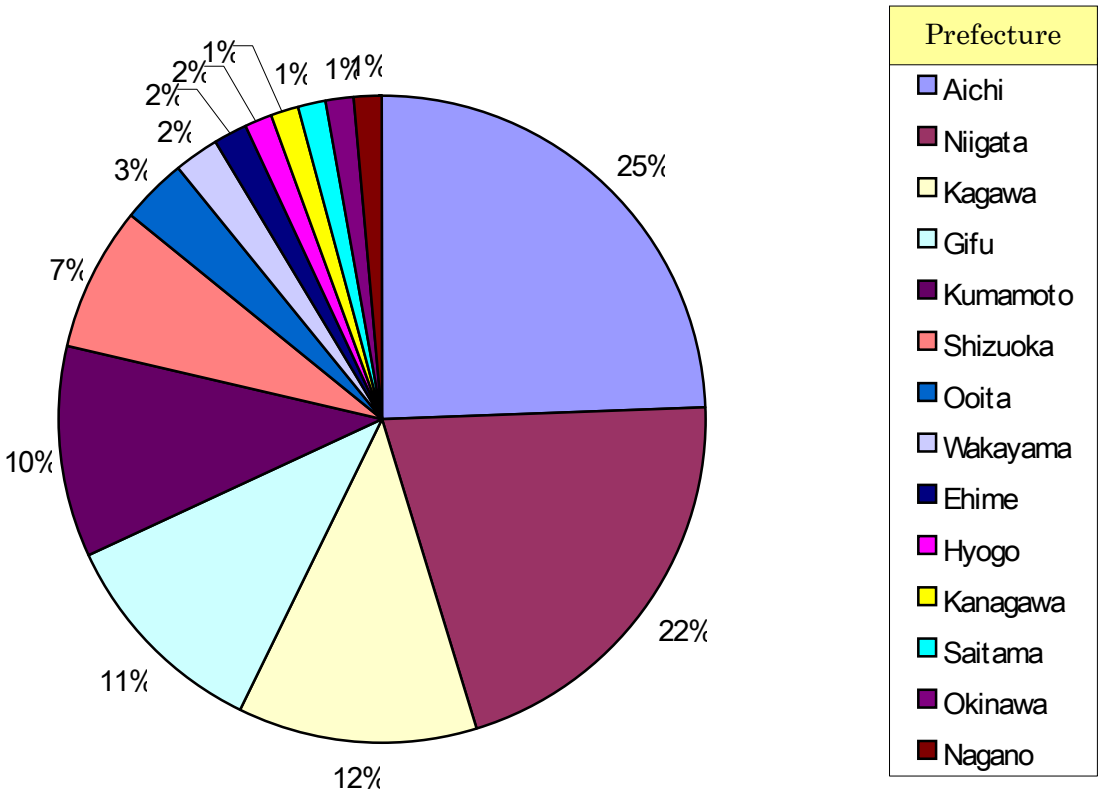

Figure 3. Ratio of farmers' participants of some prefectures in all prefectures

Source: Made by author

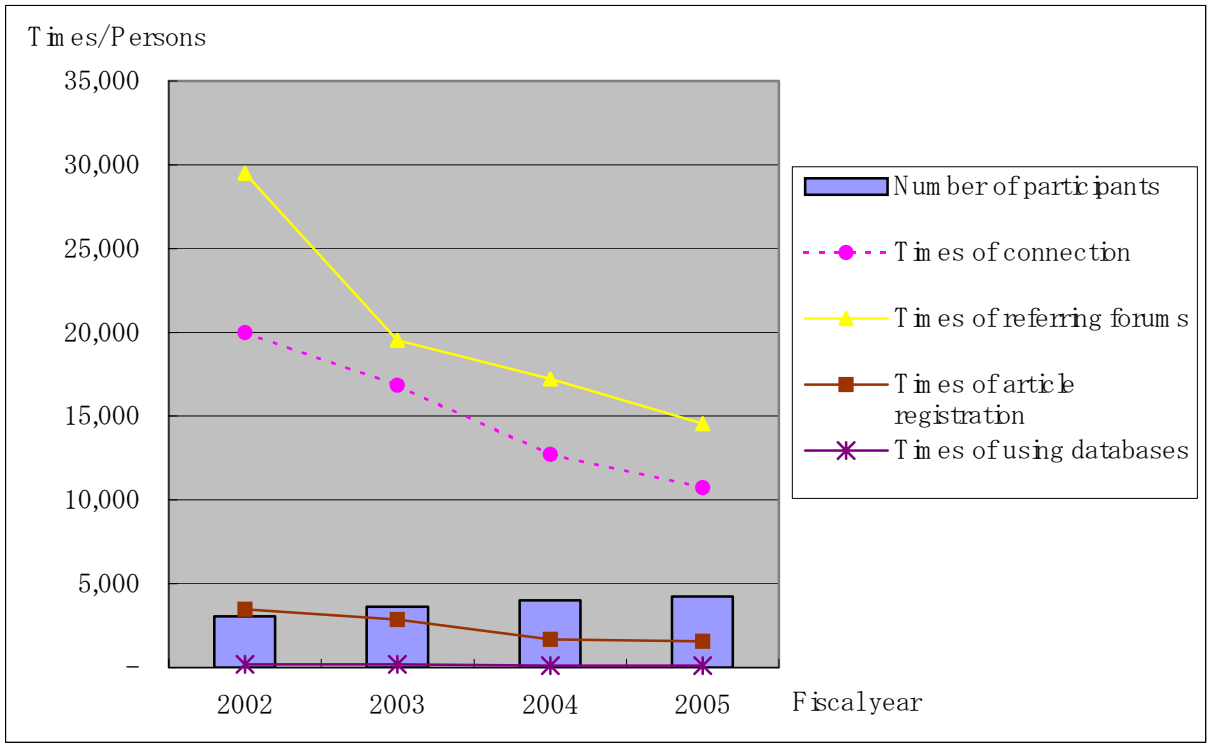

Figure 4. Trends of number of participants, and usage of the Azemichi Network system

Source: Made by author

Table 3. Usage of the Azemichi Network system

	More than 1 connection	More than 10 time connections	More than 1 article registration
2004 fiscal year (Persons)	525	127	54
2005 fiscal year (Persons)	425	125	44
Rate against 2004 (%)	80	98	81

Source: Made by author

Under the situations mentioned above, JADEA has been taking some measures in order to encourage the usage of the Azemichi network system since the middle of fiscal 2005. These measures are as follows.

a. We have asked two young farmers (one is in his twenties, and the other is in his thirties) as board operators to facilitate the communications among members.
b. We have asked 17 online consultants (former researchers, etc.) and 400 researchers belonging to the institutes of national level (National Agriculture and Food Research Organization, NARO for short) to quickly answer the questions asked by farmers (see Figure 5).

According to these measures, the usage of the "Free discussions forum" has improved since April 2006 as shown in Figure 6.

After ten years of operation of the Azemichi Network system, I can point out some problems as follows.

a. The number of participants hasn't increased as much as our expectations.
b. Among about 4,000 registered participants, only a few farmers are actually using the system.

Question: How shall I conduct the management of rice?	A farmer from Niigata prefecture
As a result of the continuous rainfall, the rice has not had sufficient sunshine. The rice hasn't grown enough, so that the leaves remain dark color (SPAD(Soil & Plant Analyzer Development): 38 degrees) and young panicles haven't grown enough. Under the conditions above, what should I do? Please give me advice.	
Answer: About the management of rice	Dr. Sasaki (Online consultant)
We are worried about the inadequate growth of the rice, because of low temperature and continuous rainfall. I think that topdressing should be applied until the meiosis stage. In Tohoku areas where I live, blast has often appeared, so that some control measures should be taken. In Niigata prefecture, however, "Koshihikari BL (Blast resistance Lines)" has been introduced; therefore I think that the control measures for "Koshihikari BL" may be different from those for the other varieties. I recommend you ask extension advisors, officers of a plant protection office, etc. about what you should do.	

Figure 5. Example of the question by a farmer and the answer from an online consultant at the "The technical forum"

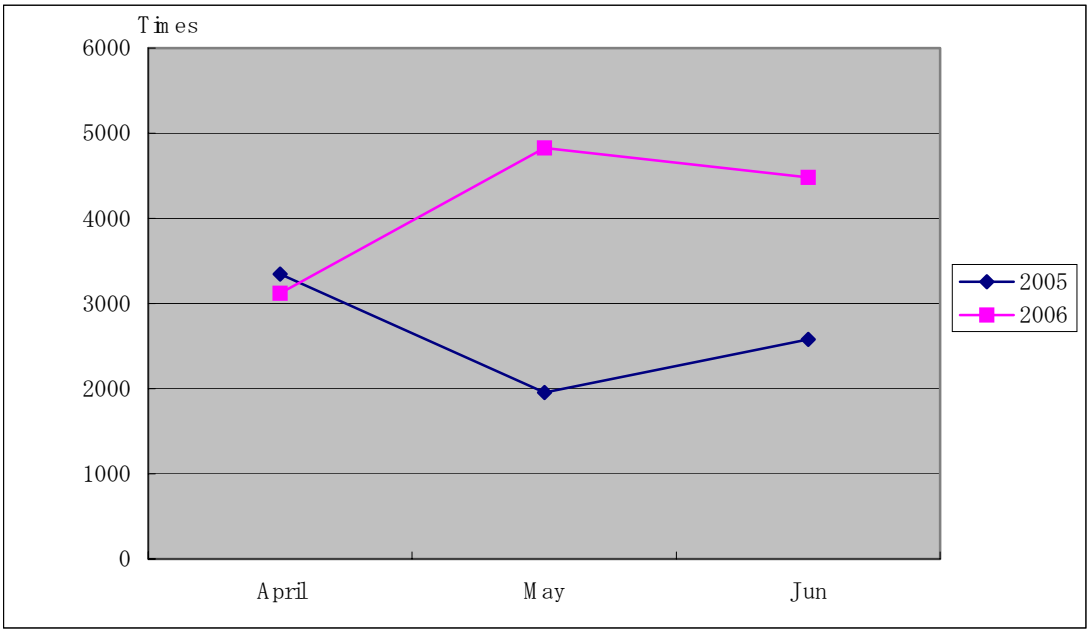

Figure 6. Times of reference of the "Free discussion forum"

Source: Made by author

2. Homepages operated by prefecture governments and agricultural extension centers

JADEA conducted the questionnaires in about 100 extension centers and the surveys by accessing all homepages of agricultural extension centers in 2005 in order to study the current situations of homepages of extension centers.

According to the surveys above, most extension centers (97%) provide information at their own homepages or the homepages of other organizations. The ratio of extension centers possessing their own homepages is about 50 percent. On the contrary, half of the extension centers in Japan don't have their own homepages. Therefore, about 50 percent of extension centers use the portions of the homepages managed by prefecture governments or homepages managed by agriculture development offices, which include extension centers and the other agriculture sections. Some extension centers are using only one page in those homepages for providing information. This means there are the big gaps among extension centers according to the policies of each prefecture government on how to operate the homepages (see Figure 7).

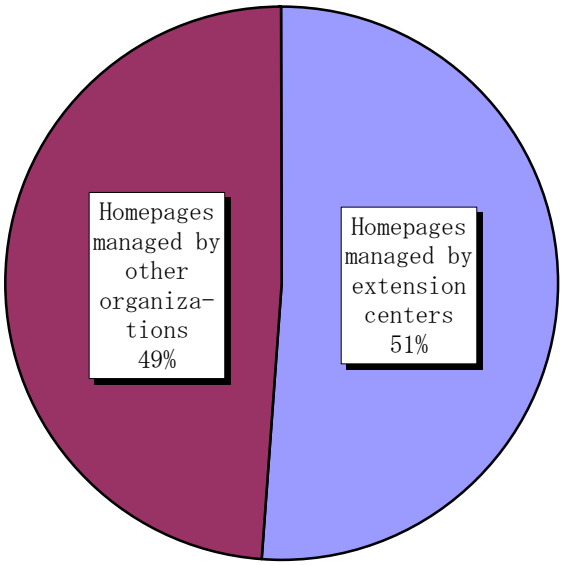

Figure 7. The type of management for homepages of extension centers

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

Main targets of homepages managed by extension centers are the farmers in the jurisdiction and consumers in general as shown in Figure 8. This tendency hasn't changed between 2003 and 2005.

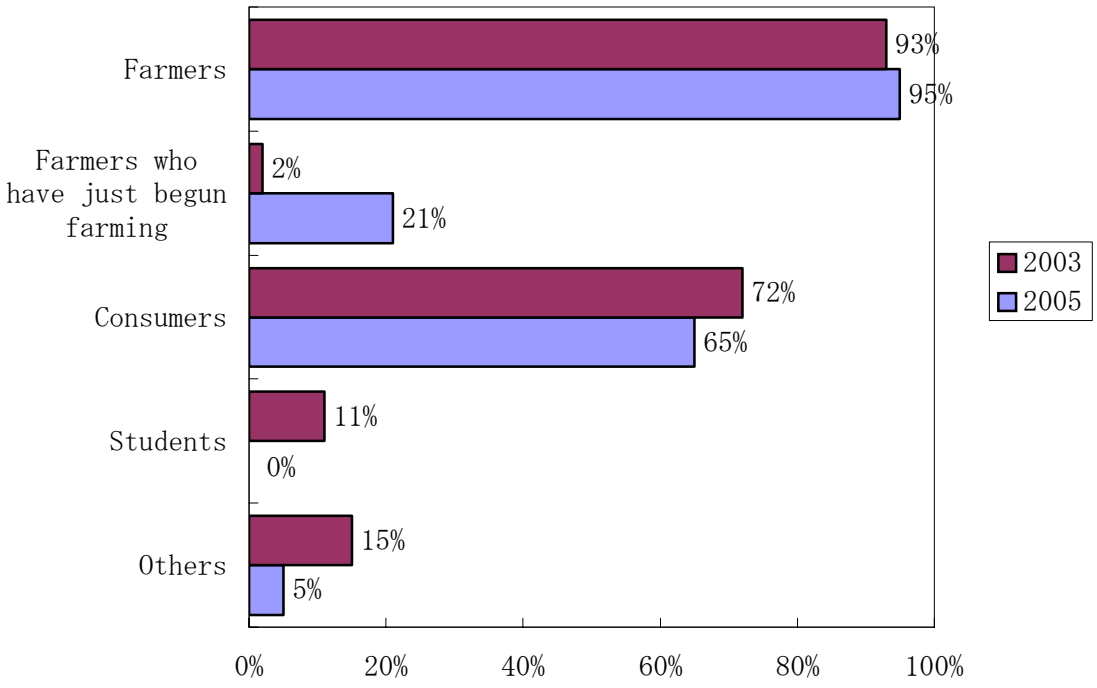

Figure 8. Targets of the homepages of extension centers

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

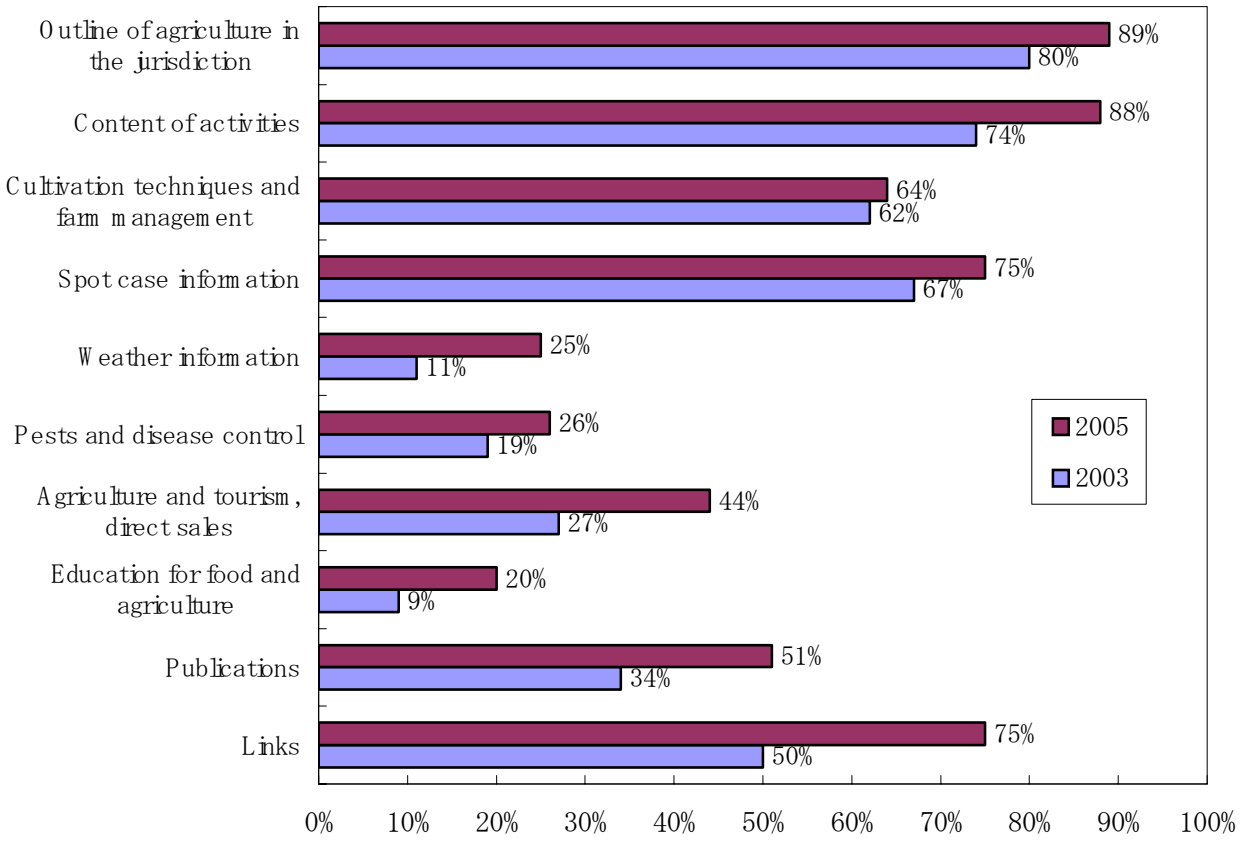

Figure 9. Cover pages of the homepages of extension centers

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

On the other hand, the kinds of cover pages of extension centers are "Outline of agriculture in the jurisdiction", "Content of activities", "Spot case information", "Links", and "Cultivation techniques and farm management", which over 60 percent of extension centers have as cover pages. The details of content of each menu are shown in Table 4. The main targets of "Outline of agriculture in the jurisdiction" and "Content of activities" are consumers, while those of "Spot case information", "Links", and "Cultivation techniques and farm management" are farmers. It can be said that the homepages of extension centers are targeting both consumers and farmers. The menus, which dramatically increased in 2005 compared to 2003, are "Agriculture and tourism, and direct sales" and "Links". That is why, these days, agriculture and tourism and direct sales have been increasingly popular all over Japan, and extension centers are involved in those activities. Also, prefecture governments and extension centers try to increase more kinds of useful information by linking the homepages of the other organizations. Compared to 2003, the ratio of extension centers, which increase the number of cover pages, increased in 2005. It shows that most extension centers have been actively dealing with the homepages by enriching the menus for two years.

As mentioned above, each extension center is positively conducting the management of homepages, however, some problems are pointed out according to the results of the questionnaires as follows.

a. The management of homepages is not definitely considered as a daily job at extension centers.
b. The management of homepages is not considered important in extension activities. As a result, the content is not frequently updated.
c. The special techniques and knowledge are needed for establishing and maintaining homepages, so that the number of extension advisors, who have both skills, is limited.
d. The content has not been made based on acquiring the users' needs.

On the other hand, the main targets for operating homepages are farmers. After asking farmers, however, it becomes obvious that farmers in the jurisdiction of extension centers, who can use the Internet, don't access the homepages of extension centers so often.

Menus	Content
Outline of agriculture in the jurisdiction	Characteristics of agriculture in the areas and introduction of products
Content of activities	Content of activities of extension centers, extension program, introduction of advisors in charge, and structure of extension centers
Cultivation techniques and farm management	Material on cultivation techniques and farm management, research findings and results of surveys
Spot case information	Results and process of extension activities
Weather information	Weather information in the areas, statistics of weather information, etc.
Information on pests and disease, information on chemicals	Forecasts of pests and disease, information on chemicals, etc.

Agriculture and tourism, direct sales	Agriculture and tourism, and the maps, business hours, etc. of direct sales shops in the jurisdiction
Education for food and agriculture	Education for food and agriculture, trial of farming, farm fields of schools, etc.
Publications	Introduction on the publications made by extension centers, etc.

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

3. Homepages managed by farmers themselves

Some farmers, mainly in their thirties and forties have been setting up their own homepages. They are using the homepages for promotion of direct sales and communication with consumers. These days, some farmers are providing the records of their daily activities to the public by using blog[1)].

The results of surveys, conducted in 2005 by Hokuriku region including four prefectures, show the farmers' ideas for their own homepages as follows.

a. **Publicity of farm management**: to convey the current situations and opinions for the philosophy of farm management to the public
b. **Expansion of channels for sales**: chances for making the new contracts and business, and methods for expansion of channels for selling own products
c. **Communication with consumers**: methods for communications with consumers (by mainly using mail)

Half of the farmers surveyed, sell less than 20 percent of the total sales volume by Internet sales. It means that Internet sales are not the main method of selling products for most farmers (shown in Figure 10). The farmers also point out some problems on the management of homepages as follows.

a. It is difficult to make new content in order to compete with an increasing number of attractive homepages made by other farmers.
b. Preparations are needed to provide the attractive products, which consumers want to buy, although the price of products includes postage.
c. The establishment of homepages does not guarantee that new customers will be acquired.

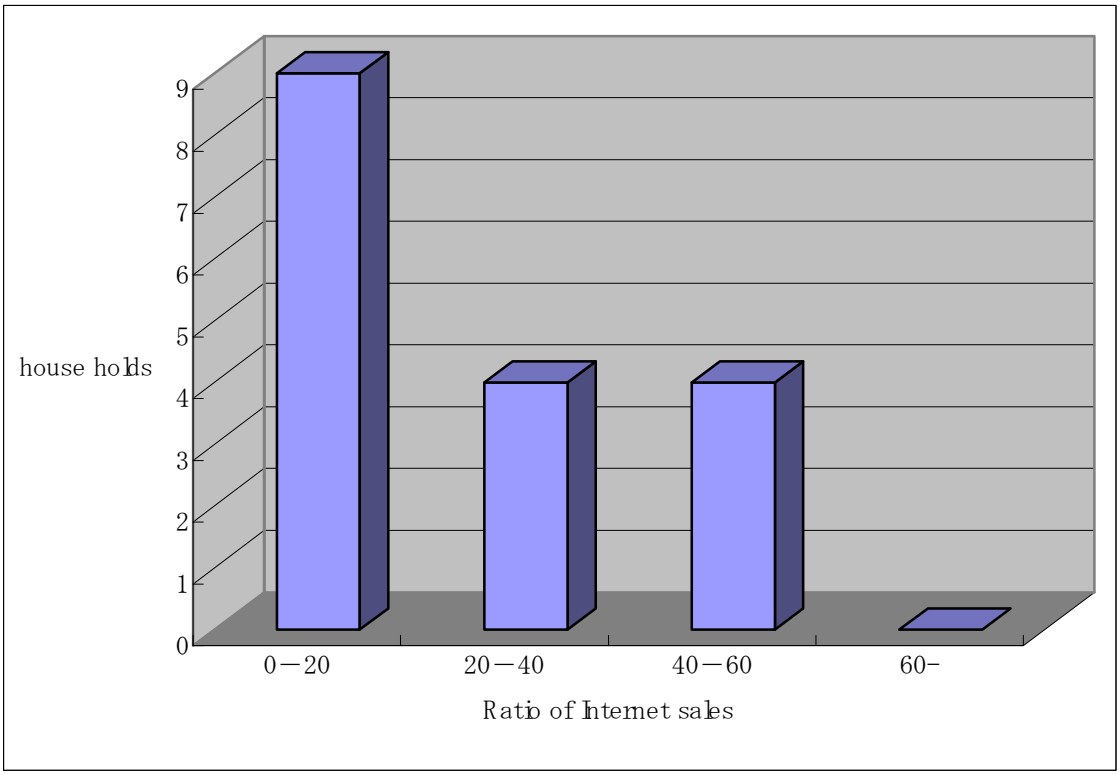

Figure 10. The number of farmers classified by the ratio of Internet sales (17 cases in Hokuriku region)

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

4. Use of information network system at direct sales shops

These days, direct sales shops are supported by computer systems that have been dramatically increasing in Japan. According to the surveys conducted by MAFF in 2004, the number of direct sales shops, managed by municipalities, agriculture cooperatives, etc., accounts for approximately 2,400 all over Japan (see Picture 1). Apart from those kinds of shops, there are a lot of direct sales shops managed by individual farmers.

Farmers can decide the price of their own products by themselves at direct sales shops, so that small-scale farmers can sell their products there. This point is different from market shipment. In recent years, direct sales shops have been rapidly increasing under the sentiment that consumers are more interested in the "community production and community consumption" and "safe and secure foods".

The information network systems by using mobile phones, fax, and personal computers, support the POS (Point of Sale) systems, which have been diffusing in the agriculture sector all over Japan (see Picture 2). In order to know the situations of their own products sales, however, information network systems using computers are not so often used among farmers for the POS systems. Telephones, mobile phones, E-mail by mobile phones, and fax are mainly used.

In urban areas, some farmers sell most of their products through direct sales shops owned by them. For example, some strawberries farmers set up direct sales shops, and the sales have been smoothly expanding so far. This is because strawberries at the direct sales shops are fresh and consumers can directly meet with the farmers (it enables face-to-face

contact) despite the higher price than in supermarkets (see Picture 3). Also, some of the strawberries farmers sell their products by using homepages. In this case, the farmers directly send strawberries to consumers by home delivery services after receiving orders by E-mail.

Picture 1. The inside of a direct sales shop

Picture 2. A farmer can easily input the information of her products into the POS system by using a touch panel

Picture 3. A strawberries direct sales shop managed by an individual farmer

5. Delivery of information to mobile phones

In Nagasaki Prefecture, extension advisors at Shimabara extension center have been sending technical information to mobile phones of about 90 strawberries farmers since August in 2004. The advisors have been providing information once every week or two by mailing list. As of August third in 2006, the total amount of information sent had reached 89. The content of information for provision is the timely information such as cultivation techniques of strawberries, weather information, research findings conducted by extension centers and so on (see Picture 4). The farmers pay 300 Yen (approximately 3 US dollars) a month, because the mail delivery service is one of the services provided by "Agriculture and Forestry Information System of Nagasaki Prefecture" that is a membership system. When a farmer wants to receive the E-mail service, he or she has to become a member of the system and pay a membership fee.

Despite the charge, members receiving the E-mail delivery service have been increasing, thanks to the good evaluation from member farmers. Most of the evaluation by the member farmers are positive, e.g. "I am happy, when the E-mail comes"," It is helpful that I can solve the problems by the delivered E-mail".

Picture 4. An example of the E-mail received with mobile phones

In Toyama prefecture, extension advisors at Toyama extension center, conduct quick

information provision to 63 "Nashi" pear farmers and 49 rice farmers by sending E-mail to their mobile phones in order to urge them to conduct appropriate tasks (see Picture 5). As a result, the interactive communication system has been established between extension advisors and farmers with an increasing number of questions and opinions from farmers. In Kumamoto prefecture, information on the conditions inside greenhouses is sent to farmers by introducing a security system used with mobile phones. Thanks to this system, the farmers can relax even if they stay at their house.

Picture 5. A "Nashi" pear farmer receiving information with mobile phone

There are an increasing number of Information network systems focusing on the use of mobile phones possessed by most farmers in Japan. Most farmers don't access the Internet, but some farmers are happy to use the information network system on their mobile phones.

CONSIDERATION

Around ten years ago, personal communication network systems, whose purpose was to encourage the communications between farmers, had rapidly spread among some farmers. It can be said that administrative organizations had contributed to the spread of the personal communication network systems to some extent, by providing IT training courses hosted by JADEA, etc. for farmers and having established Local Network Systems.

However, the information network systems have not prevailed so much so far, among the majority of farmers, because of the aging of farmers. On the contrary, some experienced farmers have been setting up their own homepages. In a last decade, most of the personal communication network systems, especially based on local communities, have been closed. One of the reasons is because of high-performance search engines such as "Google" and "Yahoo" that have become popular. Therefore, farmers can easily receive information by using these search engines. As a result, information network systems based on local areas, are not so attractive for farmers any longer. Using the situations mentioned above, I can point out the negative impact of globalization.

The information networks, however, have brought about some advantages for farmers. It is very significant that farmers, who used to be mainly the receivers of information, positively deliver their own information to others. Farmers begin to use their homepages for direct sales shops, because Internet shopping has become very popular among consumers. At the same time, it is necessary that farmers have been open to the public about the traceability of their own farm products and the conditions of their farm management, etc. through information network systems under the sentiment of

consumers' increasing interests for secure and safe foods.

On the other hand, the information network systems of both supporting the management of jobs, and sending technical information to mobile phones, have been become popular despite the stagnant diffusion of the communication network systems used with personal computers. POS systems enable farmers to grasp the real time information of sales of their own products. Therefore, the rapid increase of direct sales shops would not have been achieved without the POS systems that have been introduced with cheaper prices of personal computers these days. Telephones and mobile phones are mainly used to send the data of the sales to farmers. As a result, information network systems using personal computers are not so popular among farmers. An increasing number of farmers use mobile phones, which are more user-friendly than personal computers, when they receive technical information from extension centers, etc.

As mentioned above, the information network systems using personal computers may not prevail among farmers because the majority of farmers are aging. On the contrary, the information network systems, based on the use of mobile phones, show the signs of more diffusion.

CONCLUSION - FUTURE FIGURE OF AGRICULTURAL INFORMATION NETWORK SYSTEMS AND PROPOSAL ON SUPPORT BY EXTENSION CENTERS, ETC. -

Concerning the use of the Internet, the farmers are divided into two groups in Japan. One is a small number of farmers who conduct Internet sales, etc. by using their own homepages. The other is the majority of farmers who can't use the Internet for his or her farm management.

Therefore, extension advisors should conduct the advice for the promotion of information technology using computers towards the two groups of farmers separately. For the experienced farmers, extension advisors should conduct the minimum support such as holding training courses on how to make homepages, and setting up meetings for exchanging information among farmers. On the contrary, for the majority of farmers, the support by research institutes and extension centers, etc. will be indispensable. Especially for older farmers, it will be necessary to conduct training on how to use the Internet, and develop a user interface, which is friendly even for older farmers. In this case, it will be also necessary to consider mobile phones, which are more user-friendly to older farmers (see Figure 11).

Figure 11. Future figure of agricultural information network systems and supports by extension centers, etc

Purposes	Targets and supported content	Supports from **Extension advisors & researchers**
"Urging self-reliance for farmers"	Advance farmers <- a) how to make homepages b) Facilitating communication among farmers	Minimum supports

"Development of market of farm products" "Acquirement of needs of consumers"	Ordinary farmers <- a) friendlier user interface b) Use of mobile phones for terminals	Sufficient supports

Source: made by author

It is unnecessary and impossible to accomplish everything by using only an information network system in Japan, if "urging self-reliance for farmers (no reliance on administration, etc.)", "development of marketing of farm products", and "acquirement of needs of consumers" are the ultimate goals for operating information network systems. For example, in order to achieve these goals, the establishment and management of the direct sales shops should be playing an important role in urban areas, as follows.

a. The system, which makes farmers decide the price of their own products, urges the self-reliance of farmers.
b. By shipping farm products to direct sales shops, farmers can develop new markets by selling the products such as "curved cucumber" that cannot be sold at the markets.
c. It is very useful that farmers can know the needs of consumers by carefully observing the behaviors of consumers at the direct sales shops.

In short, the computer systems and information network systems help the management of direct sales shops efficiency.

On the other hand, the technical information network system is not only a supplementary method for meeting with farmers, but also an alternative method for contacting farmers by telephone. Internet sales are not the main methods for the majority of farmers, because most farmers mainly sell farm products at the markets and direct sales shops.

In Japan, we shouldn't achieve all objectives by using only information network systems. Therefore, it is very important to make clear the objectives of management of information network systems such as homepages operated by extension centers. We must think that the information network system is one of the methods for achieving the goal. To sum up, information network systems should be considered as one of the methods for urging self-reliance and the supplementary method for combining the other methods. If this point is made clear, the information network system will contribute to the farmers' self-reliance, the increase of farmers' incomes, and so on, for the majority of farmers.

Notes

1)It is a shortened form of "web log", which is a term used to describe an online journal. Most blogs are run by a single person or group of persons who post their thoughts on subjects or daily happenings. http://www.answerbag.com/q_view.php/5962

REFERENCES

Koichi Fukuda (2004), "A study on the Characteristics and Usage of the New Extension Methods in Agricultural Extension Activities: Focusing on the "New Communication

Technology" Based on Computer Systems, *Journal of Rural Community Studies*, The Agricultural Economics Society of Tokyo University of Agriculture [in Japanese with English summary].

Koichi Fukuda (2005), "Current Situations and Future Direction of Agricultural Extension Information Network System in Japan – Focusing on the Nationwide Extension Information Network System, *Seminar on Networking of the Agricultural Technology Transfer and Training*, APEC –Agricultural Technical Cooperation Working Group Agricultural Technology Transfer and Training (ATT&T)