ICT – Its Potential as a Channel for Enhanced Extension Services

Liam Morrow,
Information Management Specialist,
Teagasc, Kildalton, Piltown, Co. Kilkenny, Ireland.
Fax number: 00 353 51 643446
E-mail address: lmorrow@kildalton.teagasc.ie

Dr. Tom Kelly,
Development Manager South,
Teagasc, Kildalton, Piltown, Co. Kilkenny, Ireland.
Fax number: 00 353 51 643446
E-mail address: tkelly@kildalton.teagasc.ie

Tom Kirley,
Head of Administration,
Teagasc, Oak Park, Carlow, Ireland
Fax number: 00 353 59 9142423
E-mail address: tkirley@hq.teagasc.ie

Abstract

This paper explores the use of ICT as a channel for delivery of extension services. It outlines the Irish Government Strategy for the development of an Information Society in Ireland. It analyses how Teagasc has followed the government’s three strand ICT development process to develop ICT systems that help to improve its extension service.

The paper looks at the uptake of ICT by Irish farmers to date. 21% of Irish farmers have access to the Internet. This figure is low when compared to other similar countries. Farmers are one of the groups most at risk of exclusion from the Information Society in Ireland. Some of the barriers to the uptake of ICT at farm level are discussed. Low ICT skills and poor appreciation of the benefits of ICT are found to be major barriers.

It concludes that the uptake of ICT is a gradual process and that a co-coordinated approach involving training, promotion, and provision of new ICT services that address user needs are key to increasing ICT uptake at farm level.
Introduction

Agriculture and the food industry play an important role in the Irish Economy. Primary agriculture accounts for 3.0% of Irish GDP at factor cost and 6.5% of employment. There are 136,500 farm holdings in the country. On 75% of farms, either the holder or spouse has some form of off-farm income.

Irish agriculture is currently going through a period of rapid change. The reforms introduced under the mid-term review of the Common Agricultural Policy will change the system of farm supports away from production-based payments to a single area-based payment each year. These changes will have far-reaching implications for all Irish farmers. Every farmer will be forced to fundamentally examine their production systems, and adapt their farming system to the new payment regime. To make the required adjustments farmers will need access to the most up-to-date relevant information and the support of an effective extension service.

Teagasc, the Irish Agriculture and Food Development Authority, is a non-profit organisation which provides integrated research, advisory and training services for the agriculture and food industry in Ireland. It is a client-based organisation with over 34,000 contracted clients and operates in partnership with all sectors of the agriculture and food industry and with rural development agencies.

Methodology

Teagasc has identified Information and Communications Technology (ICT) as one of the major opportunities available to increase the efficiency of internal Teagasc operations and also to improve the delivery of services to farmers. This paper looks at the background to ICT government policy in Ireland. It documents the approach taken by Teagasc in extending this ICT policy into the Irish agricultural extension service. The paper also reports on the conclusions drawn from an ICT workshop held to identify the barriers to uptake of ICT by farmers. It outlines the progress made to date in the area of ICT and analyses what lessons can be learned for future developments.

Background

ICT developments are changing the way we interact and do business. Computers and related technologies have now become part of our everyday lives. The Internet is the fastest growing communications medium in history. These new technologies have implications for all aspects of our society and economy; they are changing the way in which we work, how we learn and how we spend our leisure time. The Irish government has identified the potential rewards for Ireland of being at the forefront of the information revolution and is working towards the realization of an “Information Society” in Ireland. The government has set up the Information Society Commission (ISC) to help to lead this development. The ISC has defined an Information Society as

“A society and an economy that makes the best possible use of new information and communication technologies (ICT's). In an Information Society people will get the
full benefits of new technology in all aspects of their lives: at work, at home and at play” (Information Society Commission, 2004).

The government is committed to extending the benefits of the Information Society to all areas of Irish society, including agriculture and rural dwellers. For rural communities this will result in increased access to economic and social opportunities provided by these emerging technologies.

The government’s goal is to provide a wide range of government services to the public on-line through its provision of eGovernment services. In January 1999 its first Action Plan set out a three-stranded approach to online delivery of public services:

- **Strand 1 – information services**: ensuring all public service information is available online through websites of Departments and Agencies, and at the same time as it is delivered through traditional channels.
- **Strand 2 – interactive services**: delivery of public services online, enabling complete transactions to be conducted through electronic channels.
- **Strand 3 – integrated services**: rearrangement of information and service delivery around user needs, and available in an integrated manner through a single point of contact with the government. (Department of the Taoiseach, 2002)

An Information Society Fund was set up by Government in July 1999 to facilitate progression of initiatives set out in or consistent with the Government's 1999 Action Plan on the Information Society. Up to end 2002, over €154m was made available in the Fund to support Information Society related projects across or through a wide range of Departments and Agencies. The Fund has been an important catalyst in promoting the successful realisation of Information Society and eGovernment objectives in Ireland.

**Teagasc and the Information Society**

The Information Society government policy meant that Teagasc could now more effectively exploit ICT as a channel for delivering its extension services. Conventional communication channels could now be integrated with new ICTs in the communication of agricultural information. Information could be made available to farmers online, 24 hours a day, 7 days per week. Farm management systems could be developed to provide farmers with more accurate information on which to base their decisions. Integrated information services could reduce paper work and data duplication.

By following the government’s eGovernment Strategy Teagasc could now lead the way for farmers and rural dwellers to participate in the “Information Society”. The availability of Information Society funding meant new development opportunities were opened up and investment in key projects that were not feasible in the past were now possible.

A comprehensive review of ICT within Teagasc was carried out in 2002. The following are some of the key principles decided upon:
• The ICT strategy will be aligned with the business strategy
• All ICT investments must be business driven, justified by a business case.
• Business units will be responsible for delivering the benefits from ICT investments. Business units will take ownership of ICT projects and make adequate preparations prior to the implementation of ICT solutions to ensure benefits are maximized.
• ICT solutions will be developed with a primary focus on delivering better services to the organisation’s clients. (Teagasc, 2003)

Teagasc has followed the three stranded approach outlined above in the development of ICT systems that meet our business goals while at the same time delivering on the eGovernment objectives. Phase one is the starting point and introduces users to ICT through information services that enable them get real benefits with low-level ICT skills. Phase two progresses users to interact with interactive services for the completion of day-to-day transactions. Phase three integrates services with the ultimate goal of rearranging information and service delivery around user needs.

The following is an outline of some of the systems developed in each category to date.

Strand 1

**Internal Information Services**

Extension workers occupy a strategic position in the agricultural production cycle. Thus, one of the first areas focused on was equipping extension advisers with the information and ICT support systems they required for their day-to-day work. All extension advisers now have a computer and have access to email and Internet. An internal Teagasc website (intranet) was developed where advisers can access a large database of technical information. The intranet site is updated daily by specialist advisers with technical information and support materials and allows an efficient flow of information to the advisers in the field. A number of software tools were developed catering for all enterprise areas. A Client Information Management System (CIMS) was developed to help to manage information stored on clients.

**External Information Services**

Teagasc has maintained a public information website for over ten years aimed at promoting Teagasc nationally and internationally (www.teagasc.ie). In line with Phase 1 of the Government’s action plan Teagasc launched a new technical information website for its clients in 2002, called ClientNet (www.client.teagasc.ie). The site is a resource site of technical and farm management information. It also has a range of farm management tools and on-line calculators. An on-line discussion forum is available to allow clients to post questions/discussions.

ClientNet is a closed extranet only available to Teagasc client farmers. Farmers who pay Teagasc an annual extension contract can access the site for free. The fact that the extension
contract is credited to the local adviser helps to allay concerns of some advisers that ICT systems are competing with them in the delivery of extensions services.

Another website dedicated to food assurance and traceability was launched in February 2004, called Food Assurance Online (www.foodassurance.teagasc.ie). This site is open to all farmers and covers all areas of food assurance from farm to fork. As well as a wide database of information, the site includes a number of online learning modules. The modules allow farmers to complete short training courses on food assurance over the web from the comfort of their own home. At the end of each training module they can complete a short test to see if they fully understand what they have learned.

Teagasc developed curriculum and training materials for two computer training courses in 2000 to help farmers to better utilize the technology and services now available. The courses are 25 hours in duration and usually take place in the evenings to accommodate part-time farmers. The level one course is a basic course for users who are complete beginners. The level two course is more advanced and covers topics such as use of Teagasc ICT systems, farm management software and E-commerce applications.

Strand 2

The second strand of the eGovernment policy is the development of interactive services where complete transactions can be conducted through electronic channels. Teagasc have to date developed three key online applications and are also evaluating online learning as a means of delivering farmer training. These developments are as follows:

Dairy Herd Monitor

This is a farm management application that allows dairy farmers to record physical management data monthly online. The data is analysed by the system and the reports are produced on-line showing monthly and cumulative efficiency factors. The application replaces a similar stand-alone pc based system but has a number of significant advantages. Since the data is recorded online it is available to both the farmer and adviser in real-time and so reduces the time delay in responding to problems and also the amount of paper flow between the two. Every farmer’s data is stored centrally, and so cross-farm comparative analysis can be carried out between farmers. This is an especially useful comparison for members of farmer discussion groups. The central collection of timely data is also very useful for specialist advisers in identifying trends in farming practices at farm level. Finally, since the application is browser based, additional software does not have to be purchased and the system does not have to be installed on the farmer’s computer. Updates to the system can be made to the system centrally and do not have to be propagated across individual farmer computers.

eProfit Monitor

This application allows farmers from all the main enterprises to carry out a full year-end financial analysis of their farming system. Again the system replaces a previous stand-alone
pc based spreadsheet application, with similar advantages as those outlined for the Dairy Herd Monitor application above.

**Soil Analysis Online**

An On-line Soil Analysis Results Service has been developed and will be available to farmers by mid 2004. Farmers will be able to access results of soil samples submitted to our laboratories on-line as soon as they are available. This will be a major advance given the limited opportunities for fertiliser application often available in Irish weather conditions. The system will store nutrient information for each field sampled based on the field’s unique IACS number and so a nutrient profile for the field will be built up over time. The system will also allow users to get updated fertiliser recommendations if they change the target crop for the soil sample tested.

**Online Learning**

In 2003 Teagasc ran two on-line pilot training courses for farmers. The courses were targeted at young part-time farmers who needed an agricultural qualification to avail of certain EU/Government subsidies but were unable to attend formal classes due to off-farm work commitments. Course participants downloaded all training resources off the Internet, submitted assignments and tasks through the Internet, and interacted with their ‘etutor’ through an online discussion forum and email. Due to the success of the pilot further online courses are now planned for delivery in 2004.

**Strand 3**

The third strand of the eGovernment policy is the integration of services with the rearrangement of information and service delivery around user needs. Teagasc has not yet embarked on this strand of the Information Society project. However, integration of ICT services offers great opportunities for the extension service. Significant amounts of data are now being recorded electronically by a number of organisations including the Department of Agriculture and Food, the agricultural co-ops, farming organisations, farm software suppliers, food processors, food retail outlets etc. There is significant duplication of data across all of these organisations. McCarthy (2003) in a survey of Teagasc beef farmers found that data duplication was a problem with 60% of respondents feeling that the same information is being asked for occasionally by different agencies.

Integration of services and sharing of information across organisations is a must for ICT uptake among farmers to progress further. This integration will not be a simple process as all of the organisations are coming from different perspectives and have different roles in the agricultural sector. However, according to McCarthy, farmers are willing to share information so long as confidentiality of data can be maintained and will result in the farmer becoming more competitive and better able to secure his/her future.
Results and Discussion

The uptake of ICT by Irish farmers has been slow despite the efforts made to date to develop new applications and promote ICT uptake. Recent figures from the December 2002 CSO livestock survey confirm this.

- 77% of the 22,813 farmers surveyed answered the question on Internet Access. Of those that responded, only 21% of respondents said they had Internet Access on the farm.
- 68% of the 22,813 farmers surveyed answered the question on farm management system. Of those that responded, only 9.5% said they use a Farm Management System. (CSO, 2002)

These figures show that farmers in Ireland are lagging behind the 2003 national average of 34% of homes with Internet connections (CSO, 2003).

Surveys of Internet access and use by the general public in Ireland carried out by the Market Research Bureau of Ireland (MRBI) in late 2002 show farmers as one of the most marginalized sectors in the Information Society. The surveys showed that 85% of workers in the agriculture, forestry and fishing sector are late adopters – defined as “adults without Internet access or using it less than once a month”. This sector is second only to retired people who are 90% late adopters. The average for all Irish adults was 55% (Information Society Commission, 2003).

When compared to other countries our rate of farmer Internet access is low. Figures from the U.S show that 48% of U.S. farmers are now connected to the Internet (NASS, 2003). In the UK between half and two thirds of all farmers have computers. About 70% of those with a computer are connected to the Internet (MAAF, 2002). Figures in Switzerland show that 47% of farmers are connected to the Internet (EFITA, 2004).

Uptake of Teagasc ICT systems by farmers has also been slow. Approximately 2,000 clients have registered for the ClientNet website, which is only 6% of total clients. While all farmers have the option of communicating with their adviser via email, this medium of communication is the exception rather than the norm.

Uptake of ICT by extension workers in Teagasc however has been much more positive with all advisers now having a computer and being connected to the Internet. All advisory technical resources are posted on the Teagasc intranet for staff to download, with very little paper in circulation. A high proportion of internal communication is via email. Staff also communicate electronically with other agencies such as the Department of Agriculture and the agricultural co-ops. This has resulted in front-line extension workers having faster access to the up-to-date information they need for their day-to-day activities. It has also resulted in higher efficiency of staff and lower administration costs.
Why is the rate of ICT and Internet uptake slow among Irish Farmers?

Morris (2002) in a sample survey of 162 ICMSA members found that the lack of appropriate training (28%) was perceived to be the most common barrier inhibiting present/future Internet use. Second was the cost of the internet connection (28%), third was the cost of the computer (14%), fourth was finding time to use (13%), fifth was privacy (12%), sixth was security (4%) and last was other (1%).

McCarthy (2003) in a sample survey of 35 Teagasc beef farmers also found that lack of computer skills is still a major problem for farmers. 37% of respondents identified lack of computer skills as the most significant problem with using a computer on the farm. 23% felt the major problem was that too much work was involved to get a benefit, followed by 20% who identified security fears as being the major problem.

Research on ICT diffusion in rural areas also points to the importance of building skills and competencies with ICT rather than simply building the infrastructure: “Attempts to date to diffuse the new technology to rural areas and indeed throughout the indigenous sector generally, illustrates the fact that the associated investment, skills requirement and the level of enterprise required for a significant uptake of ICT services are still lacking in many rural areas” (Grimes, 2002).

Limited availability of affordable high-speed broadband and always-on Internet connections is also a problem for Irish farmers. In a recent survey of Irish businesses only 22% of survey respondents said that their company was now accessing the Internet via a high-speed connection (tecencentral.ie, 2004). For the farming community the broadband penetration is negligible.

The 2003 ISITA workshop, ‘Identification of the obstacles to IT uptake on farms and the strategic way forward’, was attended by the main players in the Irish agricultural ICT sector: the Department of Agriculture and Food; Teagasc; Agricultural Co-ops; farm software suppliers; rural development organisations; farm organisations; farming media, and agricultural educators. The workshop concluded that technology is not the problem. High speed computers and networks have never been more affordable and software systems are more user friendly than ever. A number of key issues were identified:

- Farmers need education about ICT and its benefits - not just training in ICT skills. Farmers, like all other users, need to be able to see real business benefits by investing time and money in new technology.
- Training must be relevant: irrelevant training can turn a farmer off ICT. There is a need for all ICT training to have a strong agricultural perspective and to include elements that the farmer can go home and use.
- Government is a key driver to ICT uptake. There is a need to get more online services up and running so as the farmer can see real benefits of interacting with government using ICT.
- Increasing regulatory requirements in the agriculture sector will drive more farmers to adopt ICT systems to manage the data requirements.
Improved direction is required from the institutions that farmers respect – Department of Agriculture, Teagasc, the farmer co-operatives and farming organisations. Data input into ICT systems by farmers is still a major obstacle. Greater data sharing between all the related agencies would help to reduce this. End-users should be more involved in designing systems. What farmers perceive as valuable for their business may not be the same as what an IT professional thinks is valuable to the farm business. The uptake of ICT technologies at farm level is a slow cycle. Farmers are conservative, and there is no "killer application" that will encourage farmers to computerise overnight. Patience is needed. (ISITA, 2003)

Conclusions

In the current changing farming environment access to accurate, relevant and timely information will be the key to farmers gaining a competitive advantage and surviving in the sector. Farmers will need access to an efficient extension service to help them adapt to the changes. ICT systems have the potential to deliver an improved channel for delivery of this extension service.

However, the realization of an Information Society in farming where ICT can be a core channel for delivery of extension services is not easily achieved. Farmers are slow to take up new technologies, in the area of ICT this seems to be especially true. While technology has advanced, other issues such as low ICT skills and lack of appreciation of ICT benefits continue to be barriers to farmers taking up the new technologies.

The extension service needs to be at the forefront of facing the challenge of removing existing barriers and achieving the goal of an Information Society in farming:

- Irish farming is still at an early stage in the adoption cycle for ICT. The extension service must lead ICT uptake across all areas of farming.
- New developments must be focused on addressing user needs and achieving real business benefits to farmers.
- Awareness campaigns are needed to inform farmers of the potential benefits of ICTs. Young farmers who have completed agricultural training should be especially targeted as these are the farmers of the future.
- Focused training is needed to help users reach the competency level required to adopt new technologies.
- Integration of ICT across the agricultural sector needs to be achieved to reduce data duplication. Better use should be made of the large amounts of data already being recorded by public and private sector organisations.
- Teagasc, along with other state and private sector organisations, must continue to develop a critical mass of ICT systems for use by farmers. As more services are provided online, the adoption of ICT will become more essential as a support in managing the farm business.
References

CSO (2004). “December 2002 Livestock Survey” Communication with Gregg Patrick, Agriculture Division, CSO*


Web Address: http://www.taoiseach.gov.ie

Web Address: http://www.efita.net


MAAF (2002). “MAFF’s role in e-Business - Executive Summary”
Web Address: http://www.defra.gov.uk/ebus/maffrole/execsumm.htm


Web Address: http://www.iol.ie/~harkin/2002paplizzy.htm

Web Address: http://usda.mannlib.cornell.edu/reports/nassr/other/computer/fmpe0703.txt


*Note these figures are the results of a one-off question set in the annual CSO December livestock survey and cannot be validated against previous CSO data. Thus the figures should be treated as indicative rather than representative. The sample population may also be slightly biased towards larger farmers.