IRISH FARMERS' USE OF ICTS AND THEIR PREFERENCES FOR ENGAGEMENT WITH EXTENSION

Pádraig WIMS and Colman BYRNE, University College Dublin
UCD School of Agriculture and Food Science, University College Dublin, Belfield, Dublin 4, IRELAND. Tel: + 353 1 716 7784 E-Mail: P.Wims@ucd.ie

ABSTRACT
This research investigated the potential for extension organisations to use information and communications technologies (ICTs) in the provision of advice to farmers. A questionnaire was administered to 286 extension clients (farmers) in Ireland. It was found that 94% of respondents used computers, all used mobile phones and one third of these had Smartphones. Despite having access to ICTs, the majority did not use these to their potential. In relation to maintaining extension contact, farmers still prefer to use the traditional interpersonal communication methods when looking for specific and detailed advice on farming issues but they are content to use ICTs for more routine contact with extension.

Keywords : ICT adoption; Extension-farmer contact; Information seeking preferences.

INTRODUCTION
This paper presents the usage of information and communications technologies (ICTs) by Irish farmers who are clients of Teagasc, the public extension service in Ireland. The overall goal was to investigate the potential for Teagasc to use ICT to a greater extent in its provision of advice to its clients. The research is intended to increase understanding of the current position that ICTs have within the Irish farming community and to identify the obstacles currently preventing their usage.

Ireland has lower levels of computer and internet access and uptake than many other European countries. Surveys by Eurostat in 2011 showed, for instance, that 90% of Danish households owned computers and had internet access compared with 78% in Ireland. Within Ireland, there is evidence that rural areas have lower levels of computer ownership and internet access than urban areas (Nolan
and Maitre, 2008). However, there has been very limited research on ICT uptake in Irish farming, unlike the many reviews and studies carried out in Developing Countries by, for example, the World Bank (2011).

Teagasc, in its mission to support Irish agriculture, has outlined that ICT will play a key role in driving innovation in the sector in terms of logistics and distribution, productivity, food health and safety, traceability and services (Teagasc, 2008). ICT advancement in agriculture and generally within society has been documented in various reports (Eurostat, 2011; Shivarama. & Malhan, 2008; World Bank, 2011). These reports place great importance on the role of communications in the advancement of agriculture and agricultural advisory services. European policy on ICT adoption places a lot of attention on the change from offline to online information in order to meet the demand for future enhancement of agriculture as well as ensuring the economic benefits of a more competitive Europe and employment created through ICT adoption. The EU's Digital Agenda aims to get the most out of digital technologies, creating employment and increasing broadband capacity (EC, 2012). In a similar vein the Irish government promotes access to and use of ICTs through its eGovernment Initiative.

Global pressure on natural resources and the demand for food for a rapidly expanding global population mean that agricultural development has to meet this demand in a way that is environmentally and socially sustainable. The environment in which farmers operate therefore is changing and this means that agricultural extension services also have to change and adapt the services they provide and the manner in which they provide those services. Traditional advisory approaches in Ireland include farm visits, discussion groups, office and phone consultations and training courses (Teagasc, 2012). Macken-Walsh et al (2011) argue that the role of advisory services for knowledge transfer is changing in a broader context where knowledge is debated rather than merely transferred from advisors to farmers. The introduction of ICTs into advisory services and rural development is seen as important in providing access to education and market information. ICTs can be used for distance learning, aiding the accumulation of
human capital. They also can provide information on weather, prices and profitable income diversification possibilities (Chapman and Slaymaker, 2002). Teagasc, as a public advisory service provider, continues to change to meet the increasing demands for its stakeholders - farmers, the public, the government. Dethier and Effenberger (2012) argue that “with mobile phones, agricultural services can be supplied at a lower cost and higher quality of information can be provided”. Dethier and Effenberger (2012) further argue that increased mobile phone coverage has led to increased local market efficiency. Therefore potential exists in developing ICT services through mobile phones for the improvement of Irish extension service. The Irish National Farm Survey of 2011 shows that just less than two-thirds of farmers with access to ICT use it for farming purposes (Hennessy et al, 2013). Wims (2007) found that farming households with off-farm employment were more likely to have adopted ICT than full-time farmers while farmers engaged in specialist enterprises as well as those with medium-sizes farms were more likely to have adopted ICT.

A variety of factors influence the use of information. Several researchers have attempted to uncover relationships between managerial and farm characteristics and the use of information. Prokopy et al (2008) show that education levels, capital, income, farm size, access to information, positive environmental attitudes, environmental awareness and utilization of social networks are more often positively, than negatively, associated with the adoption of best management practices. Education should also influence the usefulness of the most sophisticated information available. A study by Kilpatrick (2008) found the most innovative, efficient and progressive farmers in Australia tended to be younger, had higher levels of education, were open to new ideas and ways of implementing them, were better at planning and management in general and were more likely to participate in learning groups.

To establish the factors that affect the adoption of ICT, barriers to adoption were reviewed. Lack of motivation amongst farmers is considered to be a barrier to adopting new techniques, as based on motivational theories available such as Maslow et al (1970) and Amabile (1997). Butler and Sellbom (2002) and Hall and Kahn (2003) identified cost as the most important organisational barrier
to adoption of a new technology. Additionally, Hall and Kahn identified the perceived lack of benefits as factors for non-adoption of new technologies. Koutsoris (2010) stated that “constraints relating to physical access, such as poor infrastructure and high costs, are quite common, aggravated by the lack of skills and the dissemination of inappropriate (i.e. provider-driven) information to farmers”. Similar constraints were found in developing countries by several researchers (Akpabio, et al., 2007; Annor-Frempong et al., 2006).

METHODOLOGY
This research focussed on ICT uptake by farmers in the Irish midlands who were members of Teagasc discussion groups. A total of 400 farmers from 25 discussion groups were requested to complete a questionnaire that examined knowledge, attitudes and practices (KAP) in relation to ICT. KAP surveys are an established methodology in social science research to test awareness and adoption of behaviours (Donati et al, 2000; Nguyen et al, 2013). The questionnaire consisted of 60 questions, primarily closed questions that required ticked and numbered responses. The questionnaire was developed through consultation with a focus group of experienced Teagasc extension workers.

All Teagasc extension workers in the North East and Midland regions of Ireland were contacted to obtain up to date information on their groups in terms of size, production type, location and length of establishment. This information produced a fair representation of the variety of farm types within Ireland. The collated information was refined resulting in the selection of 25 groups. Farmers involved in these discussion groups were pre-informed about the questionnaire and the utilisation of the collected data by their group adviser. The surveys were then carried out at a later date, at Teagasc meetings that included a discussion on the survey and what it could contribute to developing the future role of ICT in agriculture. This resulted in 286 completed questionnaires from farmers who were engaged in dairy, beef, suckler cow, tillage, sheep, pigs, equine and forestry enterprises.

PROFILE OF STUDY RESPONDENTS
The study respondents were predominately male (96%). Their average age was 46 years with 34% over 50 years and 14% less than
35 years. This age profile compares favourably with the profile of Irish farmers in general. The majority (83%) of respondents were married and 69% had two to three children.

The majority (88%) of respondents were full time farmers, with 70% of them having over 20 years’ experience of farming. In terms of the operational running of the farm, 93% of those surveyed indicated themselves as the 'Main Operator' with a small number indicating they were the 'Joint Operator', 'Employee', 'Farm Manager', and 'Child of Operator' and 'Spouse/Partner'. The size of farms ranged from 1 hectare to 800 hectares, with the majority under 120 ha. Just under a fifth of respondents farmed over 360 ha placing them among some of the larger farmers in Ireland.

The highest level of formal education attained by most of the group was the Junior/Inter Certificate, with less than a third having studied further than this level of education. The majority had attended part-time agricultural certificate courses.

**STUDY FINDINGS**

The findings analyse how extension can engage with new ICT to better communicate with clients. The current level of uptake and usage of ICTs by respondents are presented, together with their information seeking preferences and behaviour.

**Current levels of ICT ownership and access**

All 100% of respondents used mobile phones on a daily basis, mostly to make phone calls, with SMS text messaging, internet and use of email being of lesser importance and on a less frequent basis. Only a quarter of the respondents used the internet on their phones. The majority of respondents had computers (94%) while 11% indicated they had both a laptop and desktop computer. Farm use was the primary reason for purchasing computers.

These findings are in agreement with the findings of Hennessy et al (2013) which showed a 20% increase in access to computers by Irish farmers in the 2011 National Farm Survey from a value of 40% in 2004 to 60% in 2011. This study also showed that computer usage among farmers was positively associated with the frequency of usage of mobile phones, possession of a Smartphone and having an internet connection in the home.
Some 91% of respondents had an internet connection at home. The most common types of connections were wireless based on landline connections. Some 27% used a device that picked up a 3G signal, 5% used satellite signals and 7% used a mast signal. Internet speeds were generally not known by the respondents.

A third of respondents had Smartphones. This group was significantly younger with a five year gap in age on average, than their counterparts who did not have Smartphones. Respondents with larger farms were more likely to have Smartphones with an average of 125 ha in comparison to those farming 77 ha who did not own Smartphones. The use of a computer and the possession of a household internet connection both were positively correlated with Smartphone ownership.

**Current usage patterns of ICTs by the study respondents**

Half of the respondents indicated that they used the internet daily. Within respondents' households some 60% of respondents' spouses used the internet on a daily basis, while 45% of children used the internet in the home also on a daily basis.

The adoption and usage of ICT applications used by the respondents was analysed. It emerged that 68% of respondents used Email, 35% used You Tube, 26% used Facebook, 23% used Skype, and 7% used Twitter.

With regard to managing farm data, respondents were found to rely on manual paperwork over electronic device data entry with 46% relying solely on written notes made into a notepad, workbook or a diary taken down while out on their farms. Only 9% solely utilised herd registers or crop management books to record new information. In contrast, 18% relied completely on electronic devices while 23% relied on a mix of electronic and written notes.

Some 75% of respondents used their computers for farm tasks. The proportions using computers for various tasks are presented in Table 1.
<table>
<thead>
<tr>
<th>Task performed</th>
<th>% respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browsing the internet for technical agricultural information</td>
<td>55%</td>
</tr>
<tr>
<td>Pricing stock/machinery on internet sites</td>
<td>55%</td>
</tr>
<tr>
<td>Register calves online</td>
<td>49%</td>
</tr>
<tr>
<td>Research information and prices on inputs e.g. fertiliser, feed, machinery, vehicles</td>
<td>46%</td>
</tr>
<tr>
<td>View own production/financial information from co-op/ bank etc.</td>
<td>46%</td>
</tr>
<tr>
<td>Apply for/view Single Farm Payment online</td>
<td>41%</td>
</tr>
<tr>
<td>Apply for movement/ cross-compliance certificates</td>
<td>40%</td>
</tr>
<tr>
<td>Interact with other farmers on online chat/discussion forums</td>
<td>11%</td>
</tr>
</tbody>
</table>

It emerged that only a third of respondents made online purchases for their farms. The use of mobile phones, possession of a Smartphone, usage of Smartphone applications, usage of farm software and access to household internet connection all were positively associated with respondents making online farm purchases. The top three applications (“apps”) utilised by Smartphone users were weather apps, business information apps such as banking apps; and agricultural information apps to a smaller extent. A low response was found for the usage of the Teagasc organisation website among Teagasc clients while over half did not even know about the website while a further fifth did not know how to access it.

Donna Deegan et al (2014), however, found Tablet-PC most useful in leadership development, Applied cathe Breeding, and Agricultural Mechanics. They further reported that there is no difference between Traditional Media and Modern Tablet-PC effective uses in Agricultural Education.

**Information seeking preferences and behaviour of respondents**

It was found that respondents had different preferences for sourcing information depending on the type of information they sought. For updates on agricultural policies, respondents indicated a preference to be informed through newspapers. For specific advice and
information on farm related subjects, the first preference of respondents was individual visits by the extension worker to their farms/homes, followed by attending farm walks and participating in group discussions/meetings.

SMS text messaging was the most preferred method for receiving general information while phone calls were the most frequently utilised option for respondents to contact extension workers and other farmers. Face to face contact was the second most frequently used type of contact with other farmers and third most frequent with extension workers. SMS messaging was the second most frequently used type of contact with extension workers and the third most frequently used with other farmers.

For discussion group meetings, respondents were happy to receive SMS text messaging, or alternatively phone calls when being contacted by extension workers to organise meetings.

This is what Agbelemejoge and Orowole (2014) have also reported that Personal farm visit is still the "Best Media" in disseminating informations on horticultural innovations among Nigerian farmers. They also found "Result Demonstration" equally effective communication method especially in dissemination of information on Agricultural cropping systems.

CONCLUSIONS AND RECOMMENDATIONS
The data from this research indicate that Irish farmers are familiar with mobile phones but are not using them to their potential by not utilising email or the Internet. However, younger farmers are more likely to have Smartphones and more likely to use them for a range of services including email, internet and various applications. The computer has become commonplace on Irish farms and the younger generation is making the most use of new technology. However, Broadband speeds remain a constraint for many people.

Phone calls, face to face contact and SMS text messaging communications were the most popular method for respondents to contact extension workers and other farmers. When it comes to specific and detailed advice on farming issues, there is still a strong preference for the more traditional interpersonal communication methods that are face to face i.e. farm visits, farm walks and
discussion groups. Nonetheless, for general information and contact, farmers prefer to receive SMS text messages over postal communications or accessing websites.

With increasing emphasis in the future on extension organisational efficiency, frequent visits to farms by extension workers will be curtailed. The usage of ICT will have to be increased by extension and farmers at a pace suited to both being conscious of the digital divide that can occur through the various levels of adoption. Farmers' uptake and usage of technology will be driven by personal requirements and ease of use. Consequently, extension must recognise that there will continue to be a requirement for farm walks, farm visits, office consultations and face to face communication but ensure that these are used to maximum efficiency and not for the transfer of information that can easily be accessed through ICT. Smartphones present an excellent opportunity for increasing use of on-line resources. However, the need for support training for both extension staff and clients in the usage and access paths to on-line information for the farm must be recognised and delivered.

REFERENCES


Shivarama, R. Malhan, I.V. (2008). Transforming Indian farmers to reach the next level of the green revolution through communication of strategic knowledge and increased use of ICTs. The International Information and Library Review. 40, 171-178.


