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An overview of developments and prospects for e-commerce in the agricultural sector

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1. INTRODUCTION

Commerce in the European Union will total **\$19,060 billion** by 2005, representing a third of worldwide commerce (Goldman Sachs 2000). The Internet offers a new information resource as well as an expanding marketplace. It is estimated **online commerce** in the EU will have gross revenue of **\$2,527 billion** by 2005.

It is predicted there will be around **25,000 operational e-commerce sites by 2001** (Agra Europe 2000). Of these, it is estimated between **1000 and 1500 will be for agriculture and food sector**. In the US it is estimated that 14% of commerce in agriculture, forestry, and fishing industries will be online by 2005 (Goldman Sachs 2000).

These developments have the potential to bring change to *organisational* structures. However, given the diverse and fragmented nature of European agriculture, it may be difficult to gain insights from more advanced industries or from agricultural developments abroad. This is particularly the case when comparing European farm structures with those in the United States, which currently leads e-commerce developments.

This short report reviews current applications of the Internet in agriculture and the food industry and considers its prospects for the future. Developments are considered in a European context using English language examples of development.

2. GLOSSARY

B2B	Business to Business
B2C	Business to Consumer
e-Commerce	Buying and selling of goods and services, and the transfer of funds, through digital communications. However e-Commerce also includes all inter-company and intra-company functions (such as marketing, finance, manufacturing, selling, and negotiation) that enable commerce and use electronic mail, EDI, file transfer, fax, video conferencing, workflow, or interaction with a remote computer. Electronic Commerce also includes buying and selling over the World-Wide Web and the Internet, electronic funds transfer, smart cards, digital cash (e.g. Mondex), and all other ways of doing business over digital networks.
Network	A system of computers interconnected by telephone wires or other means in order to share information. Also called "Net".
Portal	A web site that aims to be a "doorway" to the World-Wide Web, typically offering a search engine and/or links to useful pages, and possibly news or other services. These services are usually provided free in the hope that users will make the site their default home page or at least visit it often. Most portals on the Internet exist to generate advertising income for their owners, others may be focused on a specific group of users and may be part of an intranet or extranet.
The Internet	Internet: World-Wide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange.
WWW	World-Wide Web - networking, hypertext> (WWW, W3, The Web) An Internet client-server hypertext distributed information retrieval system which originated from the CERN High-Energy Physics laboratories in Geneva, Switzerland.

3. INDUSTRY DEVELOPMENTS & PROSPECTS

3.1. Approach to e-Commerce

Internet technology and e-Commerce is developing rapidly. The range of applications developed for the agri-food sector, includes applications in the **market place** as well as **information resources** which are reviewed in section 5.0 below. Categorising individual sites based on development approaches provides an insight into trends in development, potential impacts and prospects. IDC (2000) and FOL Networks (2000) identify three categories based on the **primary drivers** in their development:

- (1) **E-Marketplaces / Neutral e-Hub** – are neutral to buyers and sellers, seeking to innovate in the core internet technology taking into account the interests of both buyers (characteristics and needs) and sellers (margin requirements);
- (2) **E-Distribution sites / Distributor model** - designed to serve sellers by removing and replacing existing distribution chain. Must ensure current sales are not alienated and ensure large producers are not creamed off leaving other channels to pick up the smaller and more expensive orders.
- (3) **E-Procurement sites / Aggregation model** - designed to serve the buyers by aggregating online buyers and using volume to force prices down - unattractive to distributors due to price transparency which could potentially erode margins below savings achieved by cheaper sales channel.

e-Marketplaces are expected to emerge as a dominant force in e-commerce, accounting for **56% of the value of all Business to Business (B2B)** transactions by 2004, compared to 7.5% in 2000 (IDC 2000). The advantage of an e-Marketplace is their ability to replicate offline behaviour online. This is achieved by offering a range of applications tailored to meet the needs of both target buyers and sellers.

Examples of e-Marketplaces include the UK's leading B2B site run by FOL Networks <http://www.farmline.com/folclub/fol.asp>, for all sectors of the agricultural industry, a recent initiative by Cargill <http://www.Rooster.com/> and <http://www.farms.com/>, which is a comprehensive site with numerous auctions, information and services.

Another trend observed in e-commerce is in the **supply of information**. In contrast to traditional sales processes, a vast amount of information is provided on each site. One explanation for this could be that the Internet as a medium for trading is not sufficiently attractive in itself. An incentive may be required for customers to venture further, unlike a shop where products are all around you. In addition, due to the speed of viewing and options available, a buyer's attention must be caught quickly. Perhaps the evolution of more interactive media will make e-Commerce more attractive.

3.2. Agriculture: B2B or B2C?

The term “Business to Business” (B2B) implies similarities or equal partners in trade. By contrast “Business to Consumer” (B2C) suggests a difference between the two parties. This raises questions for agriculture because traditionally farmers have never been equal trading partners with either the upstream input suppliers or with the downstream retailers and distributors.

Across all industries, global B2B e-Commerce is valued at US\$356.7 billion in 2000, which represent around 60% of global e-Commerce (Goldman Sachs 2000). B2B is expected to represent close to 80% of global e-Commerce in the future (Franck 2000).

The contrast in the development of B2B e-Commerce as compared to B2C may be linked to the ease and cost effectiveness with which offline B2B processes can be replicated online compared to more complex B2C processes.

Another trend is the current domination of B2B developments by large and medium sized firms. According to www.emarketer.com although 98% of medium and large businesses will be online by the end of 2002, 82% of small businesses will also be online.

However, as with many concepts and trends, application to the agricultural industry raises questions. If we look at how e-commerce is evolving in agriculture there appears to be a distinct difference between “Farm Businesses” and “Up and Down Stream Businesses”:

- “Farm Businesses” – limited web presence - restricted to direct trade with final customer often in niche markets and not to retailers or processors.
- “Up and Down Stream Businesses” – significant developments - sites for buying or selling with a large number of individual businesses, farmers or customers.

Classical Farm businesses do not appear to have either the capacity (capital, labour, and expertise) or the necessity (output) to set up and maintain sites at the same level as for Up and Down Stream Businesses. Businesses upstream and downstream of the Farm Business are generally more consolidated and are more likely to have the capacity and necessity to set up and maintain a site. In essence, **farmers cannot replicate offline behaviour online**. In this respect it is perhaps more realistic to classify farmers as consumers in the context of e-Commerce.

3.3. Potential benefits of agriculture online?

- *E-Commerce may offer solutions for a large and fragmented market.*

The agricultural market is large (€213+ billion), fragmented (~7.0 million farm holdings, 10's of suppliers, 100's distributors, 1000's of dealers) and spatially dispersed. E-Commerce may offer solutions by integrating individual actors to improve organisational structures. Many aspects of business, even at the farm level, may be managed through the Internet.

- *The Internet may improve market reach with limited investment.*

Internet technology provides the opportunity (with limited infrastructure investment) to link individual actors in the food production chain together irrespective of geographic location. This has the potential to improve market access through online transactions, by reducing geographic obstacles to market reach, such as time and distance.

- *Physical obstacles remain for physical goods.*

The physical operation involved in delivering products of an acceptable standard to their destination remains. This is a particularly important consideration given the dynamic nature of agricultural products, many of which are **perishable and susceptible to spoilage**. In addition, producers and retailers are also faced with new challenges including: **food safety, traceability and quality standards; year around supply** programs; certification and guarantee programs; **price regulations** and stability; **sustainable agriculture and environmental issues**. E-commerce would facilitate the development of new **supply chains for differentiated products** involving **data rich** decision making processes.

- *E-commerce may encourage transport and logistical developments.*

Improvements in transport and logistics will inevitably develop in the agri-food sector in parallel with e-commerce. These will not be prohibitive in terms of cost and may result in **rationalisation** of the **multiple tiers** involved in the supply chain. Sites with strong links between producer's processors and retailers are likely to become more common, like the one run by British Sugar.

- *Further integration may lead to a decline in auction markets.*

Further integration could potentially lead to a **decline in auction markets** both online and offline. An integrated system with an online database would allow farmers to download data on crop specification, (for example pesticide applications) directly into the **buyer database**. This could potentially benefit all players. Producers would gain by having a secure market, buyers due to the guaranteed supply and consumers from the improved supply of information and quality control.

- *Farmers could benefit from marketing online.*

A more **integrated online marketplace** would benefit the farmer. For example instead of visiting a market or farm shop on a weekly basis, transportation costs could be restricted to when a sale or purchase is made and labour costs from **market visits limited to online time**. However, the potential decline of traditional auction markets and centralisation of buyers and processing plants may disadvantage producers in **outlying regions** due to relatively greater **haulage costs**. Haulage distance calculators are provided on some sites, allowing traders to balance between price, quality and haulage costs.

- ***Price transparency may improve online.***

Online access to product and price information will allow **comparison of products** and increase **price transparency**. **Price differentials** resulting from geographic location are also likely to diminish because of **increased competition**. This may benefit farmers with regard to input prices but may reduce the price received for their produce. This may be particularly true where many existing products are not differentiated, are required on a regular basis and where there is a heavy reliance on input supplier expertise in choice of product. However, in **concentrated industries** like the fertiliser industry, there may be few or no opportunities for electronic intermediaries compared to other sectors where there is more competition.

- ***Opportunities may arise for online co-operatives.***

There may be opportunities for furthering the concept of **co-operatives**. From the farmers perspective e-Co-operatives could provide a solution for small businesses to **increase critical mass**. For example Lavouras (2000) suggests that growers groups can obtain **30% + savings** on chemical purchases through e-Marketplaces and buyers report **savings of 25-50%** on orders with XSAg.com. In addition savings can be made on freight costs with group purchases.

- ***Resource allocation may improve with improved sales monitoring.***

Online marketing also provides the opportunity to **allocate resources** more efficiently. For example, input suppliers may be able to **track sales real time** down to the farm business level, providing the opportunity to limit **inventory** levels to **50% of their current level** (Morgan Stanley Dean Witter 1999). Excess inventory could be auctioned off for quick liquidation, freeing inventory capital.

- ***Accessibility will be key to acceptance.***

For Internet technology to be adopted it must not only offer benefits it must also be accessible to the farmer. Agriculture production systems do offer the benefit that regular supplies are required. This will ensure familiarity with online processes and offer an opportunity for **sustained competitive advantage** when a particular system or process has been adopted.

- ***Centralised systems will improve accessibility.***

In the same respect, it will be important for regulatory bodies offering **regulatory issues** and **electronic forms** online to ensure they can be used effectively. E-Commerce may offer the opportunity in financial services to **rationalise transaction information** to the extent that farmers or businesses could be provided with a **single bill** for all their inputs and services. This may be facilitated through specialist **vendor management software**. However, caution may be required if this leads to anti-competitive conditions. Similar developments in the retail field may lead to rapid consolidation and alliances between retailers.

3.4. Is Agriculture online?

According to the Computer industry Almanac report, (2000) (<http://www.c-i-a.com/>) there are currently about **108 million Internet users in Europe**, with a penetration rate of 34%. That figure varies from **65.2% in Sweden** to 45.6% in the UK, 31.6% in France and **11.4% in Portugal**. This compares with a penetration rate of **49.2% in North America** and **0.8% in the Middle East and Africa**.

Predictions suggest that between **1000 to 1500** of the 25,000 e-Commerce sites expected to be operational by 2001 will be **for food and agriculture** (Agra Europe 2000).

In the US, about **90,000 farmers** have registered with www.Farmbid.com, and 10% of the traffic is international. Another US example is "www.XSAg.com" signed up **10,000 farmers** in their first year. Research by XSAg.com found that 75% of US farmers who bring in a revenue of >\$250,000 use the Internet. Another survey by Farm Progress reported in www.AgEx.com, revealed that most of the US farmers using the Web are young and only about **one third of farmers web surfing confine themselves to agricultural sites**. The research also reports that farmers spend an average of **5 hours a week surfing the web** with Wednesday night as the preferred time to be online. "**Farmer's Prime Time**" on the web is between **7 and 8pm**.

In Europe "FOL Agriculture", a UK site dedicated to the agricultural sector has a registered user base of nearly **18,000 farmers** (<http://www.farmline.com/>). On **average 60-70% of their members access the site at least once a day** and on average spend at least 7-8 minutes on the system. Furthermore, **95% stay within the FOL portal** (for Personal Communication). FOL receives on averages over **1.5 million page downloads** a month. Another similar site "@griculture Online" receives some **3 million page-views** per month (Irish Farming Online 2000).

Whilst the above indicates a growing knowledge of the Internet for use in agriculture, it does not guarantee its use for business purposes. In addition to getting online, education is required for individual business applications to be carried out. It is anticipated that a **minimum of 50% of Irish farmers** will use **computers as a tool for business** in the next decade (Irish farming Online 2000).

It is estimated that European Union **commerce** will **total \$19,060 billion** by 2005, representing a third of world-wide commerce (Goldman Sachs 2000) while **online commerce in the EU will have gross revenue of \$2,527 billion** by 2005. These forecasts are based on growth observed in the United States. It is assumed Europe will undergo a similar rate of growth, where e-commerce is expected to account for **14% of Agriculture, Forestry and Fishing commerce by 2005**.

4. ISSUES & ACTION

The rapid development of Internet technology in the field of agricultural production has the potential to impact on **production structures** and the **viability of individual businesses**. This inevitably raises issues of **regional, national and international** interest, for example in the field of **rural development**, and may prompt intervention by **governing bodies**. Policy issues relating specifically to e-Commerce in the agri-food sector have not been considered in the scope of this

report but require further consideration. However, many of the key general issues are highlighted in “**A European Initiative in Electronic Commerce**” and are reviewed below along with recent European Action.

4.1. Interoperable technical solutions

The Internet has developed on open standards that allow both inter-operability and competition. This is particularly important for hardware and software applications, which could potentially be used to control access and electronic commerce transactions. In the agri-food sector this may apply if for example vendor management software is developed, through which trade must be undertaken.

4.2. Market access and competition

E-Commerce is reinforcing the trend towards globalisation. A transatlantic telephone call now costs just 1.5% of what it did 60 years ago. However, further agreements are required to ensure telecommunication costs are not an obstacle for advanced communication service development. This is particularly relevant, for example, when comparing charges in Italy compared to Portugal where charges are considerably higher. This may have implications for rural development in these areas.

A recent price comparison for Internet access by the OECD (www.oecd.org), indicates that the average cost to users to access the Internet, for 20hrs per month, fell by 15% between October 1999 and March 2000, and 17% for 40hrs. The OECD also indicated unannounced plans for unmetered access options in several countries. This would facilitate the development of e-commerce.

4.3. A Consistent Legal Framework

E-Commerce developments are encouraging international efforts to develop more consistent and predictable legal regimes. Some of the areas which come into conflict in the online marketplace are described below:

- **Value Added Tax** – goods delivered online (i.e Music) can pass from a supplier in one country to a consumer in another without being subject to customs controls. Suppliers may be obliged to add VAT to all sales or under a modified regime tax could be charged according to customer location.
- **Jurisdiction** – legal violations in the network environment may be subject to the jurisdiction of the countries in which information is viewed. A firm may be forced to defend a law suit in a foreign country if information displayed on their web-site is considered misleading.
- **Labour law** – the “virtual” mobility of human resources have implications with regard to the applicable law for labour related issues. For example, a tele-worker may be resident in one country and work for a company established in another.
- **Copyright** – technology allows intellectual property to be copied and transmitted world-wide with relative ease. As a result, different levels of legal protection in different countries become more relevant for right-holders and users.

- **Data protection** – differences or absence of data protection regulations provided at regional and national levels may hinder cross-border electronic trade and deter citizens' use of communications services.
- **Trade Marks** – conflicts may arise when advertising online with national or supranational trademarks in the absence of agreed principles. For example, two Franco-phone companies trading under the same trademarks in two separate countries may both wish to trade internationally under the same domain name.
- **Authentication and security**- legal security and trust is required in the medium and in order to prevent the appearance of “weak links in the chain” in countries where security guarantees are insufficient.
- **Consumer Protection** – laws and mechanisms providing protection to consumers also require clarification. In particular, locating the origin of products, establishing liabilities where these products fall short of the advertised quality standards or prove to be unfit for the intended use.
- **Terms and conditions of contract** – the validity of contracts entered into over the Internet is also uncertain due to the differences between countries and restrictions in understanding conditions while being online.
- **Harmful and illegal content** – The wide accessibility of content of all kinds also raises issues of public interest with numerous social and cultural, as well as economic implications. Differences in national or regional cultures and moral and ethical codes also give rise to divergent national laws.

4.4. European Union Action

European Union policy aims to stimulate the development of an internal market for e-Commerce services whilst safeguarding public interests. **Traditional policies** must be adapted and clarified for the “on-line” economy, taking into account technological developments and both national and international regulatory action and co-operation. A number of steps have been taken recently to address these issues:

“Electronic Commerce Directive (2000/31/EC)”

The “Electronic Commerce Directive” outlining a legal framework for an Information Society was approved by the European Parliament on the 4th May 2000. Under the Directive, services may be established and provided throughout the European Union if they comply with the law in their home Member State. Harmonised rules are only provided in specific areas where strictly necessary to ensure that business and citizens can supply and receive Information Society services throughout the EU, irrespective of frontiers. These areas include definition of where operators are established, transparency obligations for operators, transparency requirements for commercial communications, conclusion and validity of electronic contracts, liability of Internet intermediaries, on-line dispute settlement and the role of national authorities. In other areas the Directive builds on existing EU instruments which provide for harmonisation or mutual recognition of national laws.

“eEurope Action Plan”

The eEurope Action Plan is designed to make a significant impact on the speed of uptake of the Information Society in Europe. eEurope will have an impact in a number of areas.

- The Internet will be part of **every child’s education** – All school children will use the Internet as part of their daily learning. The Internet will be brought into the classroom for all subjects, with effective training for teachers and the right tools made available to fully exploit its potential.
- An end to prohibitively expensive **Internet access costs** – Increased competition on local networks, together with the growing number of access devices means that the market price for Internet access is falling steadily, enabling people from all sectors of the population to afford access.
- European **students and researchers** will be able to work and learn collaboratively over the Internet – The World Wide Web was born in Europe. It has enabled extensive international electronic collaboration, but it has its limits. Simultaneous collaboration, or video-linking require very high bandwidths. eEurope will support the development of a new concept – the World Wide Grid – which will facilitate new methods of collaboration.
- Multifunctional **smart cards for easy, secure access** to services – eEurope aims to ensure that a single smart card can serve a variety of purposes and can move around Europe as easily as its owner.
- **Faster Internet for all** – Through setting the framework to encourage massive private investments, deploying new Internet technology and exploiting the Structural Funds where possible to ensure that peripheral regions are assured higher quality access.
- **Greater confidence in on-line shopping** – Consumers will have guarantees that their virtual retailer is genuine and has agreed to fundamental principles that protect the consumer against fraud while providing an agreed level of service and redress.
- **Access to government services in ‘Internet time’**. Citizens will have the ability to interact with their administration in ‘Internet time’ not in ‘opening times’. New technologies will enable people to avoid frustration queuing and give them the opportunity to interact with the public service at a time that suits them.

Source:

http://europa.eu.int/comm/information_society/eeurope/actionplan/index_en.htm

5. INTERNET APPLICATIONS IN AGRIBUSINESS

The Internet provides a new resource for the agri-food sector, both as a new **market place** and as an **information resource**. Numerous applications have been developed by different interest groups. Some of these are reviewed below.

Applications in the **market place** can be categorised under three broad themes from a farmer's viewpoint including; **factors of production and inputs, services and outputs**. Inputs and services are generally purchased via the Internet at a fixed price, whereas outputs are generally traded through an auction. This is perhaps because many of the outputs are perishable and therefore the market price is more sensitive to supply and demand.

The Internet has a major function as an **information resource** including the **information** itself, **management tools** and **links to regulatory bodies**. Information and management tools are provided either free as a public service or in the market place. In the market place they may be employed as marketing tools, as an incentive to explore the web site further or sold as services or inputs either on a one off basis or by subscription. Difficulties exist in differentiating between services provided free and those requiring payment. This prevents categorisation on this basis in the descriptions below. Many sites also have links to regulatory bodies, which may encourage the target audience to the particular site.

5.1. Factors of Production and Inputs

The marketplace, or rather, advertising of **land** has been extended to the Internet. For example <http://www.LandAndFarm.com/> provides a brochure of farms and land internationally, from a ranch in Texas to thousands of hectares in Brazil or an Olive Grove in Tuscany. Clearly the significance and complexity of a land purchase inhibits online transactions.

Agricultural Chemicals can be purchased from numerous sites. For example direct bulk chemical purchases can be made from <http://www.eharvest.com/agchemical/> at Farmbid.com.

There are also a number of **Veterinary suppliers** for example <http://www.directag.com/directag/buydirect/animal/0,1568,,00>, which also offer online purchases of products not requiring veterinary certification. Others, <http://www.americanlivestock.com>, simply provide online mail order catalogues.

In the **machinery** and **equipment** marketplace online catalogues are now available, offering information and contact details for purchase of machinery www.tractorsonline.com, equipment and **parts** www.Agri-Supply.com. Online auctions have also developed including <http://www.farmequipmentauctions.com/> generally offering second hand machinery.

Market applications for **feed** and **fertiliser** sectors appear to be developing relatively slowly. This may be attributed to the consolidated nature of these sectors and the heavy reliance of farmers on input supplier expertise, which limits competition.

Feed and fertiliser supplier sites, for example <http://www.IFL.ie> and <http://www.bibbyireland.co.uk/> are generally restricted to product information and contact details. There are exceptions in the more differentiated or specialist input-markets such as <http://www.gold-dust.com/> which sells specialist mineral supplements online.

Developments in the fuel market have also been limited, although there are a few companies such as <http://www.dennispetroleum.com/petroleum.cfm>, which offer

online ordering for distribution world-wide. Large Corporation web presence is restricted to global environmental initiatives and business information. They do however offer customers the opportunity to buy model cars online!

5.2. Services

Online **logistical, transport and storage** services are now available. Developments include a Cargill initiative <http://www.Levelseas.com>, which deals with bulk cargoes and ocean transportation of commodities.

Online financial services are also developing. **Banking** facilities such as <http://www.barclays.com> provide transaction services online. This may prove useful in rural communities where banking facilities are limited. The Agricultural Mortgage Corporations <http://www.amconline.co.uk/>, which provides **loans**, has restricted web access to information and an online information request area. Similarly, agricultural **insurance** providers such as www.Rcis.com (Rural Community Insurance Services) have restricted web access to information and contact details, although some US sites now provide the option of on-line insurance (Irish Farming Online 2000).

Many of the large **legal** service firms offer information online. However, advice services specific to agriculture is limited. Some sites such as www.foodtrader.com do provide links to “Trade Attorneys”.

Perhaps one of the most innovative examples of how the Internet can be used in the sector is a new site www.Milkquota.com launched for trading **milk quotas**. It is thought online trading will considerably reduce transaction costs. Another interesting development is **British Sugar’s** specialist producer services. The corporate web site <http://www.britishsugar.co.uk> provides links to FOL Networks site. From here producers can access up to date information on the current harvest including sugar levels, which allows management changes to be made for the crops remaining in the field.

5.3. Outputs

Applications on the output side are generally in the form of online auctions. This may relate to inconsistency or the wide range of producers.

In the US online **cattle** auction sites are available, for example <http://www.Breednet.com> and <http://www.Cattleofferings.com>. Trade on these sites is restricted to frozen semen and embryos to comply with stringent US Department of Agriculture rules (Irish Farming Online 2000). Details are provided for each lot, including visual graphics of the livestock, breeding and ancestry. Another site <http://www.Farms.com> offers auctions for live cattle and also **swine, feed and grain**.

Online auctions have also developed in place of other traditional auctions. An example is the **hay** marketplace <http://www.Homefarm.com/hfg> whose auction and quality standards are enforced by the Internet Auction Service Hay Market (Irish Farming Online 2000). Fish auction sites have also developed to facilitate **fish and fish product** sales. The “Pan European Fish Auctions” <http://www.pefa.com> is a

European Network of fish auctions offering real time on-line trading. There are platforms for seafood, farmed fish, frozen fish and processed fish.

Exchanges for a wide range of speciality market products are also available. For example <http://www.agex.com/> currently provides the opportunity for trading **almonds and walnuts** and will introduce a site for **rice** trading in the near future. There is also an exchange for wine and related items at <http://www.wineryexchange.com/jsp/index.jsp> and for a range of fruit products at <http://www.efruitinternational.com/>.

Further down the food supply chain retail exchanges have developed for the exchange of **products** and **ingredients**. For example <http://www.Global-netXchange.com> recently launched by Sears and Carrefour, two of the world's largest retailers in partnership with US software group Oracle and <http://www.foodtrader.com>, which provides the world's largest online selection including 3,000 product lots from 170 countries, 5000 registered contacts and database of 70,000 food-industry contacts.

There are also some examples where farmers are selling directly to the consumer. For example <http://www.farmfreshflowers.com> offers delivery of **farm fresh flowers** to the consumer. However, this is an already advanced market dominated by international organisations like Teleflora, who offer services through a network of suppliers such as <http://www.onlink.net/~discount/discount.htm>.

5.4. Information

Traditionally **magazines and newspapers** have provided agricultural producers with news on industry, product and management developments. Many existing farm magazines are now online including Farmers Weekly <http://www.fwi.co.uk> the UK's most popular farming magazine and Hoard's Dairyman <http://www.hoards.com/>, which provides updates on milk and feed prices, production and other news related to dairy cows and farming.

Many sites, particularly those offering an auction service also provide up to date **market information**. For example <http://www.AgCentralOnline> reports movements in commodity markets and <http://www.agex.com/> offers reports on the market for nuts and rice. **Market analysis** sites are also available. For example, <http://www.forester.com> provides subscribers with reports on e-commerce market developments and <http://www.seafoodreport.com/> provides free information and analysis of the seafood market.

Online **weather reports** are also available. For example US site <http://progressivefarmer.com/weather/default.asp> provides local forecasts for farmers with regional radar and satellite maps of current conditions. Other **Management information** can also be found online. For example the Livestock Improvement Corporation <http://www.lic.co.nz/index.html> provides up to date information on New Zealand dairy genetics, artificial breeding, herd testing, research and farm management. **Specialist advice** sites have also developed, for example <http://www.Agrihelp.com>, which provides expert advice facilitating the exchange of information and opinions. Other sites, <http://www.directag.com/directag/expert/> provide an interactive service with an online **virtual agronomist, livestock advisor and dairy expert**. Support for

computerised farm management software is available at <http://www.AgrNet.ie>. Some sites also <http://www.agcentralonline.com/> offer the opportunity chat rooms for informal exchange of information with other individuals with similar interests.

5.5. Management Tools

Management tools provided online include calculators, databases, information tracking and analysis tools and electronic forms.

Examples of **calculators** include a beef management **profitability calculator** <http://www.fwi.co.uk/live/markets/mlcfront.html> a **milk quota calculator** <http://www.AgrNet.ie>, which assists with **quota management** to reduce super levy costs and a **loan calculator** offered by the Agricultural Mortgage Corporation <http://www.amconline.co.uk/amc/html/home/frameset.html>. Also an NPK Calculator offered by <http://www.AgrNet.ie>, which estimates **soil nutrient levels** based on crop removal (as measured by a yield monitor or by field average yield) and nutrients added either by fertiliser/manure applications or by legume crops.

There are also opportunities for **information tracking and analysis**. On the financial side online **accountancy packages** available at <http://www.AgrNet.ie> have developed for recording lodgements, payments and transactions with suppliers and monitoring and reconciling bank balances.

In the field, <http://www.AgCentralOnline> offer fertiliser monitoring applications and yield filtering options for analysis and interpretation in conjunction with an online **database**. Online database access prevents the need to carry a disk or computers from one location to another.

There have also been developments directly related to regulatory bodies. For example <http://www.AgrNet.ie> offers a tool enabling farmers to identify the appropriate animals and the timing of **claims for extensification premia** and other EU schemes. Also all UK Ministry of Agriculture, Fisheries and Food <http://www.maff.gov.uk> **forms** will be **online** by the end of 2000, and farmers will be able to submit claims for IACS in 2001 and all **subsidy claims** online by 2002.

There are also initiatives relating to traceability. NFU Services and ADAS have developed a joint service <http://www.cattlemail.com/> allowing the **electronic submission of cattle movements and passport applications** to the British Cattle Movement Service. The system is designed for use by anyone involved in the movement of animals, including Farmers, Markets, Agents and Abattoirs.

5.6. Links to Regulatory Bodies

In addition to the wide range of **industry links** available on sites, for example those offered by <http://www.farm.ie/links/>, many sites provide links to **regulatory bodies** for supply of official publications, reports, press releases and the tools mentioned above. At a **National Level** examples from the UK include the National Farmers Union <http://www.nfu.org.uk/>, the Home Grown Cereals Authority <http://www.hgca.co.uk/> and the Ministry of Agriculture, Fisheries and Food <http://www.maff.gov.uk>. Many agricultural ministries now provide extensive news services and a vast amount of information, statistics and reports. On an **International Level** examples include the European Commission, Agriculture

Directorate-General http://www.europa/comm/dgs/agriculture/index_en.htm, the Organisation for Economic Co-operation and Development <http://www.oecd.org> and the World Trade Organisation <http://www.wto.org>.

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ANNEX 1. APPLICATIONS

APPLICATION	ADDRESS
Marketplace	
Retail exchanges	http://www.Global-netXchange.com , http://www.Novapoint.com , http://www.foodtrader.com , http://www.Freemarkets.com , http://www.Suppliermarket.com
Logistics and Transport	http://www.Levelseas.com , http://www.GoCargo.com , http://www.QuoteShip.com
Livestock Auctions	http://www.Cattleofferings.com , http://www.Breednet.com , http://www.Farms.com
Fertiliser	http://www.IFI.ie , http://www.gouldings.ie/
Feed	http://www.bibbyireland.co.uk/ , http://www.gpfeeds.co.uk/ http://www.bocmpauls.co.uk/feedsecure/index.htm http://www.Homefarm.com/hfg
Flower Market	http://www.farmfreshflowers.com , http://www.onlink.net/~discount/discount.htm
Producer Sites	http://www.britishsugar.co.uk
Fish Auctions	http://www.pefa.com , http://www.seafoodreport.com/
Nut and rice & wine, fruit	http://www.agex.com/ , http://www.wineryexchange.com/jsp/index.jsp , http://www.efruitinternational.com/
Veterinary Supplies	http://www.americanlivestock.com , http://www.directag.com/directag/buydirect/animal/0,1568,,00.html
Agricultural Chemicals	http://www.eharvest.com/agchemical/
Fuel	http://www.dennispetroleum.com/petroleum.cfm
Machinery	www.tractorsonline.com
Equipment	www.Agri-Supply.com , http://www.farmequipmentauctions.com/
Land	http://www.LandAndFarm.com/
Insurance	www.Rcis.com
Loans	http://www.amconline.co.uk/
Quota Auction	www.Milkquota.com

Legal services	www.foodtrader.com
Banking	http://www.Barclays
Information Services	
Official Publications	http://www.nfu.org.uk/ http://www.hgca.co.uk/ , http://www.maff.gov.uk , http://www.oecd.org , http://www.wto.org
<i>Magazines</i>	http://www.fwi.co.uk , http://www.hoards.com/ , http://www.Agrihelp.com , http://www.Farmline.com
Market information / research	http://www.AgCentralOnline , http://www.agex.com/ , http://www.forester.com
Weather information	http://www.rpl.com.au/farming/ , http://progressivefarmer.com/weather/default.asp
Library, Links & Chat	http://www.AgCentralOnline , http://www.cannylink.com/agriculture.htm , http://www.cattleauctionsusa.com/links.htm , http://www.e-envoy.gov.uk/2000/links.htm , Http://www.agcentralonline.com/ , http://www.rural.org/Farmers_Guide/Agriculture/Ag_Companies.htm
Advice / Research	http://www.lic.co.nz/index.html , http://www.AgrNet.ie , http://www.directag.com/directag/expert/
Farm Management Tool	http://www.fwi.co.uk/live/markets/mlcfront.html , http://www.cattlemail.com/ , http://www.AgrNet.ie , http://www.maff.gov.uk , http://www.AgrNet.ie , http://www.AgrNet.ie , http://www.AgCentralOnline , http://www.amconline.co.uk/amc/html/home/frameset.html
e-marketplaces	http://www.farms.com/ , http://www.farmline.com/folclub/fol.asp , http://www.Foodtrader.com , http://www.agex.com/ , http://www.123Ag.com , http://www.Rooster.com/ , http://www.Agrinet.com , http://www.rpl.com.au/farming/ , http://www.@gricultureOnline , http://www.XSAg.com , http://www.Farmbid.com , http://www.DirectAg.com , http://www.Agribuys.com , http://www.sleeping-giant.ie/agriweb/index.html
JRC workshop	http://dsa-isis.jrc.it - enhancing consumer confidence
Other Addresses	http://europa.eu.int/comm/dgs/press_communication/feira.htm (Lisbon) http://www.agforum.org/presentations.html (Ag forum) http://dsa-isis.jrc.it/ECF/index.html (eConfidence Forum) http://www.gbd.org/ (Global business dialogue) http://www.bain.com/capabilities/eiu.html (Company Report) http://barn.ccta.gov.uk/eforum/e-envoy.nsf (e-forum)