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eunita

European Network for Information Technology in Agriculture

Final Report

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Preface

This report is the final report concerning the concerted action EUNITA - European Network for Information Technology in Agriculture (AIR3-CT94-1654) 1 December 1994 to 30 November 1997.

EUNITA was organised in 10 Working Groups, which are thoroughly described in Chapters 1 through 10, and the Co-ordination function, which is described in Chapter 11. All details concerning EUNITA, i.e. specific Working Group objectives, participants, meetings, methodology and results of the work, dissemination and publications, are given in the respective Working Group chapters.

An overall evaluation of the concerted action is provided in the Summary and Recommendations sections. These concentrated sections do, however, not describe the full benefits of the work carried out in the Working Groups and it is recommended to read the individual chapters of interest.

Most of the publications produced by the concerted action is online available at www.efita.org, the web site of European Federation for Information Technology in Agriculture.

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Summary

EUNITA (European Network for Information Technology in Agriculture) was a concerted action with participants from 13 European countries. EUNITA started 1 Dec 1994 and ended 30 Nov 1997.

The objective of the concerted action was an improvement of quality in European agricultural research and farm management by exchange of information technology and its applications among researchers, developers and users in the EC countries on the precompetitive level.

The start of EUNITA coincided with a growing public awareness of the Internet, actually the beginning of the Information Society. This was not foreseen in the proposal for EUNITA. Nevertheless, the Internet was used extensively from the beginning of the concerted action, as the new medium provided excellent new ways of achieving the goals of the concerted action. The Internet was thus used to create an open network for individuals and organisations working with research on and applications of IT in agriculture, an information database concerning IT in European agriculture, and a database of researchers, developers and users within this field.

The use of the Internet by EUNITA was a stimulating factor for the adoption of the electronic communication by researchers and developers in agricultural IT, and EUNITA's World Wide Web homepage and mailing list were an inspiration for organisations and institutes to apply similar methods. Within the framework of the concerted action, a review of registers and catalogues of agricultural software was extended to include an Internet-based database concerning agricultural software on the basis of a standard for describing IT applications in agriculture.

The EUNITA homepage and mailing list were at the completion of the concerted action transferred to the homepage (www.efita.org) of EFITA (European Federation for Information Technology in Agriculture).

The concerted action's 10 Working Groups reviewed several issues of significant importance for IT in agriculture. The results of the reviews, which are described in details in chapters 1 through 10 of this report, have been published either as self-contained reports, or as proceedings from workshops, seminars or conferences. The subjects included

- Registers and catalogues of agricultural software
- Knowledge intensive agricultural software
- Standardization within agricultural software
- Dissemination of agricultural software
- Application of IT in agriculture in Southern Europe and transfer from other countries
- Use of IT in agriculture in Eastern Europe and possible transfer from other countries
- Modeling of grazing livestock systems in Europe
- Risk management in agriculture

A very important goal of the concerted action was to support the foundation of an European association concerning IT in agriculture. This goal was fulfilled by the inauguration of the European Federation for Information Technology in Agriculture (EFITA) in February 1996 and the formal foundation in June 1996. EFITA had from the beginning seven member

countries, which by the completion of the concerted action had grown to 11 member countries. It is worth noting that EUNITA and the foundation of EFITA stimulated the creation of new national associations for IT in agriculture in eight countries. EFITA held its first conference in Copenhagen in June 1997; the conference agenda included a large number of high quality presentations concerning IT in agriculture and was very well attended.

In conclusion, EUNITA was very successful in achieving its objective and specific goals, in particular concerning

- The facilitation of improved interactions between researchers and developers within information technology in European agriculture, resulting in the foundation of several national associations for information technology in agriculture and the European Federation for Information Technology in Agriculture (EFITA).
- The establishment of a network for individuals and organisations working with R&D in agricultural IT, and the continuation of this network within the framework of EFITA.
- The stimulation of the adoption of the Internet and of electronic communication in agricultural IT, the use of the Internet for dissemination of information and data, and the continuation of these results within the framework of EFITA.
- The transfer of knowledge on the application of IT in agriculture between different regions and countries in the European Union.
- The production of a series of reviews concerning significant topics within agricultural IT.

Recommendations

1. The Internet applications, the EUNITA homepage including the underlying pages and the EUNITA mailing list, should be transferred to EFITA at the completion of the concerted action.
2. The datamodel for describing agricultural software, which is developed by the concerted action, should be used in the development of new registers and catalogues of agricultural software in the European Union member states.
3. The online database for agricultural software software, which is developed by the concerted action, should be transferred to EFITA, and implemented and maintained in EFITA's web site.
4. Knowledge intensive software (expert systems) in agriculture should be applied when frequent decisions are to be made, and should be developed in close contact with the users and with substantial effort in promoting the software.
5. Standards concerning data exchange in agriculture should be promoted by making information about the standards available in online information databases, including information about the standards and information about successful implementation of standards.
6. The introduction of EU regulations should be used to set new standards for data exchange in agriculture and to promote the use of standards.
7. The dissemination and adoption of agricultural software should be further studied; the methodology developed and applied in the concerted action provides a valuable starting point, which should be used in new studies.
8. The review of the application of agricultural software in Southern Europe revealed great potential benefits from exchanging experiences and software between extension services in all European countries, which should be exploited by annual meetings on this subject.
9. Collective platforms for the co-operation between Western and Eastern countries on IT in agriculture must be founded, initially by the adoption of all European countries as members of EFITA.
10. The framework for modelling the production and environmental impact of European grazing livestock farms should be used and further developed by researchers working on this subject.
11. The studies on decision support under risk should be followed by new initiatives for collecting information from European researchers in this area.
12. The network for individuals and organisations working with R&D in agricultural IT, which has been developed by EUNITA, should be maintained and further developed within the framework of EFITA.
13. The series of conferences initiated by the First European Conference for Information Technology in Agriculture, Copenhagen, 15-18 June 1997, should be continued by EFITA.

1 Electronic communication and information databases

Working Group A

Summary

The overall goal of EUNITA Working Group A relates to the organisation of an open network for individuals and organisations working with research on, and applications of, information technology in agriculture. In the pursuit of this goal, the following results important were achieved:

- The implementation and operation of the EUNITA World Wide Web server with 10 news items. The technical implementation was accomplished by using the fast growing number of available standards and solutions; most of the functionality and outcomes can be continued and exploited after the termination of EUNITA by the EFITA entity which arose from EUNITA Working Group J.
- The EUNITA-L mailing list has by November 1997 nearly 300 subscribers, and is thus an efficient instrument for distributing messages from individuals to the agricultural IT society; furthermore, it has encouraged similar developments in national organisations, which promote the use of IT.
- The European index of agricultural web sites provided a strong stimulus to the development of linked national indexes; the index was also a good mechanism to monitor web site developments in the different countries.
- Much has been learned from the problems associated with the creation and usage of a database of professional agricultural IT-workers; the conclusion after this exercise is that this kind of database depends strongly on national efforts for the maintenance and use of the data; the future management and maintenance of such databases depends largely on the provision of support organisations.
- Concerning the news and the news items on the EUNITA web server, it was observed that the news on software and on agricultural indexes was the most consulted. The other news items suffered from the lack of regular and professional news gathering.

Specific objectives

1. Communication links between major electronic networks, computer platforms and modems
2. Database of individuals in agricultural IT with names, address, interests, etc.
3. News database for agricultural IT
4. Guidelines for interest groups on electronic communication
5. Maintenance of communication links including manual entrance

Members

Waksman G., ACTA, FR	Houseman I., ADAS, GB
Bertanzon G., Trento University, IT	Offer A., ADAS, GB
Friedrich F., ZADI, DE	Thysen I., Dina, DK
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Meetings

Paris	20-21 February 1995	Paris	17-18 October 1996
Oxford	20 November 1995	Paris	5-6 November 1997
Bonn	24 May 1996		

Objective 1. Communication links between major electronic networks, computer platforms and modems

Introduction

At the time of the proposal presentation, the problem of communication links between major electronic networks, computer platforms and modems was complex and difficult. However, by the time of the project started, the emergence of the Internet and the convergence of technologies around this medium obviated the necessity to pursue this objective in terms of creating specific communication links between major electronic networks, computer platforms and modems.

Methodology

It was decided that the available Internet protocols and standards (E-mail, FTP, TCP/IP, WWW) should be employed in the EUNITA project. These were widely published and well documented.

Results

The use of the Internet technologies met the requirements of creating communications links between major electronic networks, computer platforms and modems and simplified the exchange of information and data.

Discussion and recommendations

For the construction and the maintenance of the EUNITA server a provider contract was established with the University of Trento. For performance reasons the server was later moved to a commercial provider (Eclipse).

The co-ordination of the operation and the content of the server was carried out by Iver Thysen. The execution of the updates by G. Bertanzon. There has been two major releases of the server.

Dissemination

This was undertaken by utilising the Internet technologies (WWW; E-mail; Shareware) and through various meetings.

Objective 2. Database of individuals in agricultural IT with names, address, interests, etc.

Introduction

The creation of this database was to facilitate working relationships between users and to provide a mechanism for matching users having similar interests by searching user profiles.

Methodology

A questionnaire was constructed to collect user profile information: contact information, type of organisation, role/occupation, agricultural sector and IT interest areas. This questionnaire was produced in both hard copy and electronic format, and distributed to potential users by post, by e-mail and by publishing on the Web.

A form-handling programme was developed to capture and manipulate the data into a database structure. A further programme was then developed to permit users to search the database for contacts selected by different criteria: name, type of organisation, role/occupation, agricultural sector and IT interest areas. A facility for inputting free-text information was implemented.

Results

The following functions were implemented and made available on the EUNITA web server:

- electronic registration form
- electronic search
- electronic list of all records
- administration tools

Discussion and recommendations

There was limited operational use of the database. A major reason was lack of promotion of the database as a practical tool for partnership seeking in scientific collaboration, e.g. proposal making.

It is recommended that EFITA should consider adoption of the database as an application to promote to its memberships in order to accommodate co-operative working in fields of common interest.

Dissemination

This was carried out on the Internet and the via EUNITA newsletters.

Objective 3. News database for Agricultural IT

Introduction

The goal of this activity was to create a concentration point for news on agricultural IT. The news focused on new and existing software, publications, events, activities and developments. The news database also contained a linkage system giving comprehensive access to new and existing agricultural web sites in Europe.

Methodology

The group developed a special web server for EUNITA, which presented all the news items and linkages to other agricultural web sites in Europe (Fig. 1.1). Initially it was difficult to maintain the complete index of agricultural sites on a European level (the number of new sites is still growing quickly and a complete overview was difficult). The group changed to a decentralised model for updating and maintenance; this contained a number of national indexes linked with the European index. At the end of the project there were 20 national indexes related to the European index.



Figure 1.1 EUNITA homepage

Results

An European index with links to the national databases was created. For each national database there is an update commitment with each national editor. There is also a link to the most important indexes outside Europe.

Statistics concerning the use of the EUNITA news database in the last year (number of consultations and the origin of the users) are presented below:

Table 1.1 Number of visitors per month:

Month	Visitors	Month	Visitors
Nov 96	656	Apr 97	919
Dec 96	631	May 97	957
Jan 97	986	Jun 97	865
Feb 97	921	Jul 97	766
Mar 97	944	Aug 97	626

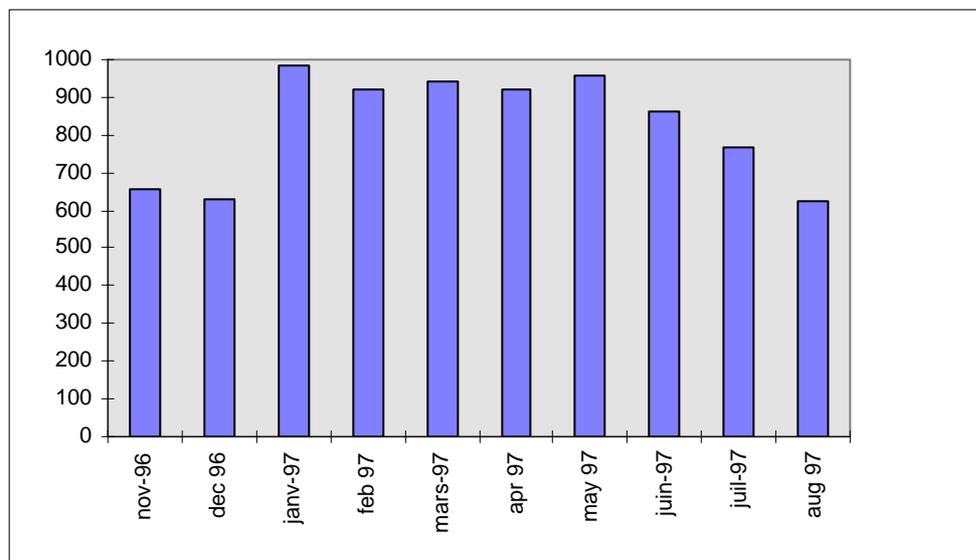


Figure 1.2 Number of visitors per month

Table 1.2 Number of Transfers by Client Domain (*Note: a number of connections are unresolved.*):

Member State	Number of Transfers by Client Domain	Member State	Number of Transfers by Client Domain
Austria	175	Italy	2732
Belgium	506	Luxembourg	96
Denmark	1071	Netherlands	942
Finland	1465	Portugal	301
France	3649	Spain	4000
Germany	1189	Sweden	924
Greece	524	United Kingdom	2229
Ireland	378		

Discussion and recommendations

With exception of the agricultural indexes it was difficult to maintain a high volume of new messages and updates because there was no professional news gathering involved in the project. The updates depended mostly on a few enthusiastic members. The number of visits to the web server site corresponded directly with the update frequency.

The working group recommends moving eight of the 10 news items to the EFITA server (i.e. all items except the EUNITA news and the EUNITA working group data).

Dissemination

The news database was promoted at IT conferences: AFIA meeting in Paris (October 1996) and the Wageningen meeting (May 1997). The news database objective was also discussed by Waksman G. and Harkin M. (1997).

Objective 4. Guidelines for interest groups based on electronic communications

Introduction

At the time of proposal presentation, electronic communication among individuals having common interests had been in use for some time in universities and research institutes. The intention was to implement such facilities on a pilot scale for people with common interests in agricultural IT.

Methodology

At the start of the project, mailing lists were a well-established technology on the Internet: a mail server holds the e-mail addresses of the subscribers and distributes messages sent to the mail server to all subscribers. One such mailing list, EUNITA-L, was created for an interest group on the use of IT in agriculture. The list was implemented in the free ware programme "Majordomo". The guidelines for using this specific list was included in a Welcome Mail sent to new subscribers, and more general guidelines on using mailing lists were provided by Majordomo's help facilities. All mails distributed with EUNITA-L were stored in an on-line archive, which can be accessed from the EUNITA web.

Results

EUNITA-L was initialised in April 1995 with about 75 subscribers collected from contacts prior to the start of the project. At the end of the project there were 286 subscribers. Up to 16 e-mails were submitted to the mailing list each month. Most of these messages contained some information which the sender of the E-mail wished to share with others. However, only in a very few cases did messages sent to the EUNITA-L list generate a discussion.

Discussion and recommendations

The EUNITA-L has been efficient for disseminating information on upcoming events to the agricultural IT society in Europe and world-wide, as the subscribers represent most of the important research and development groups. The intended use of the list for exchange of experiences and know-how among the participants was very limited.

Dissemination

Knowledge about EUNITA-L was made available in the EUNITA web site, in the EUNITA newsletters and in a number of articles about EUNITA.

Objective 5. Maintenance of communication links and databases including manual entry

Introduction

This goal had been an area of major concern to practitioners in the field of communication and databases and represented a considerable barrier to the achievement of rapid progress in the utilisation of the technology. Again the emergence of Internet technology provided the tools and protocols to achieve the maintenance of communication links and databases in an efficient and cost effective manner. These tools and protocols are freely available and well understood and are now in common use all over the EU (and the rest of the world).

Methodology

The EUNITA web site and the associated server was maintained by the University of Trento and the database was regularly updated with items of interest from the members of the EUNITA project and other interested organisations. The communication links were maintained through the TCP/IP protocols providing ready access to the services and data available on the EUNITA server and web site. The management of the web site was co-ordinated by the Co-ordinator via e-mail which ensured the operation of the web site in an timely and efficient way.

Results

The server system and EUNITA web site were maintained to a high standard resulting a very high level of availability of the service. Unfortunately the band width available for communication via the University of Trento's computing centre was insufficient to provide the speed of service expected by Internet users. Consequently the server was moved to the site of a commercial Internet Provider to enhance the connectivity available and reduce the level of contention. This resulted in much improved communications' speed and performance. In addition two successive improvements were made to the EUNITA index and the subject menu resulting in more user friendly versions of the system.

Discussion and recommendations

The web site and EUNITA-L mailing list proved to be a considerable success (see the usage statistics under objective 3); it was operational in excess of 95% of the time and was highly reliable. The Internet tools, techniques and protocols provided the levels of resilience required when operating such a system and its associated services.

2 Registers of agricultural software

Working group B

Summary

The need for information on the agricultural software is growing due the more open market and the high investments in software development compared to national market size. Based on the experiences with the production of 2 international software catalogues (Farmsoft 1990 and Farmsoft 1994) working group B has improved the methodology to collect, select and disseminate data on the software market developments and software availability. Also attention was paid to the necessary organizational structure in which a international experts group of national contact points play a central role.

As a result of the working group a standard datamodel for an agricultural software database was developed and implemented on the Internet. The international software market was reviewed and a survey was done to collect descriptions of internationally interesting software in agriculture.

The working group recommends to copy the results of this working group for the establishment of national systems for software market survey and information dissemination.

The network of experts created through EUNITA is very suitable for similar surveys in other areas within ICT (e.g. databases, telematic services, scientific software).

Specific objectives

1. To operate a common format and classification for software descriptions
2. To merge the methodologies for the constituting surveys and for measuring systems dissemination
3. To follow the establishment of electronic implementation of national databases of software in order to specify the European level of a future network of electronic data

Members

Belgium	Mr. J.J. Claustriaux	University of Gembloux
	Mr. G. Spoiden	Ministry of Agriculture Wallonne
	Mr. P. Vandermosten	University of Louvain-la-Neuve
France	Mr. V. Wahl / J. Nicol	Ministry of Agriculture
	Mr. M. Raschas	CXP
Germany	Mrs. S. Lehnert	FCL (1995-1996)
	Mr. P. Jürgens	FCL (till spring 1997)
	Mrs. N. Roux	FCL (after spring 1997)
Israel	Mr. E. Gelb	Ministry of Agriculture
Italy	Mr. G. Bonati	INEA
	Mr. A. Fais	INEA
the Netherlands	Mr. J. Kamp	ATC
	Mr. P.C. de Jong	ATC
Portugal	Mrs. A.M. Mourao	Ministry of Agriculture
Spain	Mr. J.A. Nunez Butragueno	M.A.P.A.

Meetings

Paris	June 1995	Paris	March 1997
Gembloux (Belgium)	February 1996	Copenhagen	June 1997
Wageningen	June 1996	Firenze	November 1997
Rome	November 1996		

Objective 1 To operate a common format and classification for software description

Introduction

Information technology is becoming increasingly important in today agriculture. Farmers use software for farm management, decision support in crop management, data exchange for chain management and on farm quality management. The market driven production forces the farmer to change his attitude and make more use of management information.

The software market has been a national issue for a long time. Due to small size of these national markets, investments in new software were small as well. Only a few companies successfully crossed borders. With the current open market, software houses tend to be open for marketing their products in other countries and search for cooperation with partners.

To stimulate this open market, a group of independent experts has reviewed the European market a few times since 1990 and developed an international software catalogue to help companies to find potential interesting partners. It is this same group of people that formed working B of the EUNITA concerted action, bringing in their experiences.

Methodology

In the period of 1990 – 1994 an international working group developed a common format and classification system. The first one was improved when preparing the Farmsoft 94 catalogue.

The working group experienced a high level of interest for these national reviews by several target groups. It gives a quick and good impression of the state of the art in a country.

The working group has evaluated its content and decided to structure the part related to new developments by identifying areas of interest. During the data model development (see objective 3), the classification and common format were again thoroughly reviewed.

Results

The common format consists of 2 parts:

1. a description of the national situation in agriculture and of the national IT-market, containing:
 - some key figures about the national agriculture
 - an overview of the software inventory (number of software applications in different fields incl. the number of installations)
 - a descriptive overview of the IT situation in the country and its main developments (e.g. development in communication technology, GIS, expert systems, multimedia etc.)
 - national policies affecting IT dissemination
 - role of different organizations (incl. developments in organizational structures which affect IT dissemination).
 - a national contact person.a layout for software description, containing:
 - Name of the software product and its classification (sector, functions, user group)

- General description of the software functionality
- Information about the developer and distributor(s)
- Some technical information of the program (multi user, developing software etc.)

The classification system developed in the year 1990-1994 has been reviewed and improved by producing better definitions. This enables better classification in practice.

Discussions and recommendations

The layout was improved during the project. Most of the discussions however were related to the implementation on the Internet (see also objective 3). When implementing an on-line database system on the Internet, it is important to ensure easy user accessibility to the requested information. A very detailed classification will often lead to a very narrow list of output, with the risk of missing other interesting data. This of course is related to the expected number of software descriptions in the system. With a potential of 1100 software products but starting with about 200 descriptions, the Internet interface was simplified to ensure successful data mining.

Dissemination

During the Copenhagen congress on ICT in agriculture, the results were presented. The working group members, who all have a coordinating position in their country related to ICT dissemination, actively distributed this information on a national level.

Objective 2 To merge the methodologies for the constituting surveys and for measuring systems dissemination.

Introduction

Experiences with earlier software catalogues and an analysis of national response to these catalogues show the need for information on internationally available product. In many European countries, national catalogues are available. The collection of data is mostly done through personal networking and the contents of the catalogues is based on ideas of a few experts. Cooperation on an international level enable these experts to share experiences and their ideas and to take potential needs of other target groups into consideration.

Methodology

Based on the experiences with developing two international catalogues, the following issues were discussed:

1. Usefulness of the national reviews and possibilities for improvement.
See objective 1.
2. The added value of an international software catalogue.
Software descriptions are a good medium to give information about specific products, especially to support a more open market for software. From an analysis of the national reviews, the working group has concluded that developments in the software market can benefit from more cooperation across borders.

Results

To merge methodologies in different countries, the common format and classification as discussed in objective 1 is considered to be an essential basis. The experiences of collecting

the elementary data were shared. Personal networking is a crucial basis, combined with objective criteria for acceptance of a product in a catalogue, and a concrete format to collect the descriptions. For this purpose, a special inquiry form was created.

A two year sequence in market data collection is considered to be an acceptable interval, sufficient to meet the demand.

In 1997 an inventory was made on a national level of software product interesting for publication in an international software catalogue. Because of the choice to create a software catalogue on the Internet (see objective 3), it was decided first to focus on the implementation of updated software description which were already available in the Farmsoft 94 catalogue.

The following criteria for selection of software products were defined:

- the product has to be really on the market for at least 12 month
- a “fair” number of copies sold.
- reputation and track record of the software companies
- acceptability in the originating countries and abroad
- product usefulness and originality (to ensure that innovative and potentially useful product get a chance to prove themselves).

Discussion and recommendations

In 1997 an inventory was made on a national level of software product interesting for publication in an international software catalogue. Because of the choice to create a software catalogue on the Internet (see objective 3), it was decided first to focus on the implementation of updated software description which were already available in the Farmsoft 94 catalogue.

It is recommended, for maintenance reasons, to make the software companies themselves responsible for updating the contents of the software description. By introducing a structure of objective control by national representatives before descriptions are updated for open access, the quality of the contents can be ensured.

Dissemination

The basic structure for how to work towards an international catalogue consists of the inquiry form, the defined criteria and the datamodel (see objective 1). These results are presented on the Internet and through this report. The national representatives have actively communicated with the software sector in their country.

The results were also presented on the Copenhagen ICT congress in June 1997 (Gelb et al. 1997). The collected information in the national reviews was also used to prepare a paper for a EUNITA workshop (workgroup G) in Keszthely, Hungary (Kamp, 1996). Also, the data model is put on the Internet including the national reviews.

Due to quick developments in the different countries, an update of the national reviews was produced by November '97. Also other European countries were invited to bring in their national reviews. Invitations were sent to Austria, Sweden, Denmark, Great Britain, Ireland, Greece.

Objective 3 To follow the establishment of electronic implementation of national databases of software in order to specify the European level of a future network of electronic data

Introduction

In many European countries some kind of national catalogue on agricultural software is available. All countries represented in the working group have exchanged their catalogues. Most of the countries with only a paper version were discussing to the establishment of an electronic version. As part of objective 3, international experiences with defining and building these databases were collected and used to define an international standard in terms of a standard datamodel. The basic discussion was how to proceed for the near future, taking into account the new technologies available and market needs.

Methodology

The way to present the software descriptions for the future was a point of discussion. As a basis for this discussion, a paper was written.

- As potential media paper, CD ROM and Internet were reviewed. In 1995, the Internet was already existing but less prominent available is nowadays. It was decided that creating a database system connected to the Internet would be a very flexible solution and well accessible by the target groups in the near future. Some financial problems related to the maintenance of national databases were identified, since international catalogues may have a negative effect on the use of paid use of the national software database (e.g. France) – (see Results ad 1)
- a standard datamodel was defined (see Results ad 2).
- maintainability of the data is considered to be very important. This calls for both a effective technical and organizational structure. The EFITA organization was identified as a serious potential organizers (see Results ad 3).
- a planning for developing a database structure (see Results ad 2).
- creation of a good basis for EFITA to continue the catalogue as an EFITA product.
The working group has decided that a new developed database should have an updated content. The companies who participated in the Farmsoft 94 catalogue were invited to come up with an updated description (see ad 2).

Results

Ad 1 Choice in infrastructure.

It was decided that creating a database system connected to the Internet would be a very flexible solution and well accessible by the target groups in the near future. It could also be a good promotion tool for national software databases. The potential link from the central software databases to the company's websites was also considered to be a big advantage.

Ad 2 Definition of standards for an international structure for agricultural software descriptions.

It was decided first to define a standardized datamodel for software description. From this model, a database system connected to the Internet could easily be built. A working group with data modeling experts from The Netherlands, France and Belgium analyzed available database systems and the Farmsoft catalogue. A preliminary model was discussed in each country and made final in the meeting of Rome (November '96). The product was published

by Gelb et al. (1996). The product has also been available on the web of INEA (<http://www.inea.it/eunitab/wgb.htm>) and linked to the EUNITA website.

A programmer from the department of Biometrics of Foulum (Denmark) started building the database in spring 1997. The first prototype was discussed in Copenhagen (June 1997) and a second prototype was reviewed in Florence (November '97).

Meanwhile, a inquiry form was developed, based on the same datamodel. Each national representative has sent this form to companies who participated in the Farmsoft 94 catalogue. From a total of 88 companies in the Farmsoft catalogue almost 60 companies sent in updates for software descriptions. The further implementation of these updates were discussed in workgroup meeting in November '97.

Ad 3 Maintainability

EFITA, the European Federation for Information Technology in Agriculture, is considered to be the best option (together with the national member organizations) for organizing the updating of the database. To EFITA the working group advised to create a structure based on a national focus point, a contact person who evaluates the software description sent in by companies applying for presentation in the international catalogue. This organizational structure is in discussion within the EFITA organization.

Discussion and recommendations

The high speed in technical development creates on one side a need for market information on agricultural software, on the other hand creates new options for dissemination of this information. The Internet plays a central role for the near future.

Working group B has identified a need for standards and a need for a good organizational structure for creation and maintenance of an international software database. The national contact point has a crucial role in this structure. This international structure of national contact points can very well be used to perform similar surveys in other fields of ICT (e.g. databases, telematic services, scientific software).

On a national basis, the working group recommends to use the described structure as well, both for developing a national database systems and for the organization required.

Dissemination

The end results of this part of the work of working group B will be presented on the Internet, as well as in the project's end report. The Copenhagen congress (June 1996) was used to present the preliminary results.

Publications

Gelb, E., G. Bonati, J.L. Carel, J.J. Clautriaux, P. Jurgens, S. Lehnert, P. Pasher, J.A.L.M. Kamp, A.M. Mourao, V. Wahl, J. Nicol, J.A. Nunez Butragueno, F. Costa, G. Spoiden & M. Raschas 1996: Agricultural Software Descriptions. Datamodel Guidelines; National Software Reviews. EUNITA Working Group B, 47 pp.

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3 Descriptions of knowledge intensive software

Working Group C

Summary

This final report of Workshop C -Expert Systems and K.B.S. in Agriculture- within the EUNITA concerted action is a summary of opinions and statements collected at several workshops.

The dissemination of information is always an unfinished task in the agricultural sector. Information Technology is spreading at different rates in the European Union. The administration of companies is carried on personal computers, in most cases, and this is a first step in the introduction of I.T. in this sector. The use of 'intelligent' software is coming up slowly, and is seldom used outside the academic community.

The development of expert systems has slowed down in the last decade, in Europe. Several well know packages are used in the United States and in China, but the construction of E.S. is not an easy task, as so many factors can influence the output, the decisions, or the outcomes in agricultural field that the inclusion of all these in a computer program that can simulate the reality is a difficult task. Nowadays, the multimedia possibilities of personal computers are a new factor for the general use of modern software for technological and economic decision making. Many new developments are taking place with several purposes: information about plant care, economic alternatives, preservation of the environment, etc.

The Internet growing use is reaching the end users in agricultural companies, and thus the information only available until not so long ago to the researchers and academics, is at reach to an increasing number of farmers, and will be able to help them in running and improving their methods and companies.

Specific objectives

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| 1. A review of knowledge intensive agricultural software with particular respect of description of the knowledge base and inference methods |
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Members

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Meetings

Rome 27 November 1996	Paris 4 March 1997
Copenhagen 14-15 June 1997	

Objective 1. A review of knowledge intensive agricultural software with particular respect of description of the knowledge base and inference methods

Introduction

Artificial intelligence began its development in the 1950s pursuing the goal of making computers simulate some aspects of human reasoning in situations where structured programming algorithms are not easily constructed. Expert systems are computer programs that aim to reproduce the behaviour of a human expert in some particular field of knowledge, and to modify its output and behaviour as it accumulates experience and so increase its efficiency as it is used, in the same way as a human expert.

There are several difficulties in the development of expert systems; the main one is to elicit experience and knowledge, since it is the human expert who has both and has to express it in a form that can be embedded in a computer program. The knowledge engineer is usually in charge of this interface with the human expert. Both human experts and specialists in expert systems development are scarce resources, which limits the construction of this kind of computer program. The result is that expert systems are expensive and work-intensive to build, and most of all, to test and refine, often the most difficult and time-consuming process. There are many programs labelled as expert systems but which do not include all the elements necessary to be considered as such.

Expert systems were first applied in agriculture in the mid-1980s, and in the intervening years there have been a wide range of applications developed. Here we review some of the major developments to date.

Methodology

It was decided to produce 1) an extensive literature review of published Expert Systems in agriculture, 2) a directory of researchers in K.B.S. in Europe and 3) a browser for managing scientific references on E.S.

The information was retrieved from searches in literature databases for agriculture, and the browser was used to manage and analyse these data.

Results

The review identified more than 100 publications on Expert Systems in agriculture. The E.S. were classified according to the application area and briefly described. The Expert Systems were also classified using A.I. criteria, which are outlined in some details; the criteria were knowledge representation, programming tools and system characteristics. An evaluation of the future for Expert Systems in agriculture was produced from the evidence included in the review.

Nearly 100 researchers being active in construction of Expert Systems in agriculture were identified and listed in the directory with name and address.

The main objective of the browser developed by the Working Group was to generate a package to be used in the management of references to published works in international databases in E.S. and K.B.S. in Agriculture, and of self-gathered reference information, with the purpose of future searches, generating statistics, locating authors or institutions, producing reports and bibliography with international format and provide a user-friendly environment for the manipulation of this information.

Discussion and recommendations

The review demonstrates the diverse ways in which expert systems technology has been applied in agriculture. However, despite the development of many prototype applications, the use of expert systems technology for decision support is low compared with initial expectations and the technology's perceived potential. Some authors suggest that the discrepancies between the large number of system prototypes and the limited number of successful implementations may be due to problems in expert system development or implementation.

Some of the difficulties experienced in implementing decision support systems is not restricted to expert systems. For example, only limited success can be attributed to mathematical programming models in routine decision support at the farm level. So we need to look beyond expert systems technology itself to understand some of the reasons for the gap between the potential and the achievements.

The classical guidelines for successful expert systems include the prescriptions that they should be applied to problem areas which are : well understood; not too broad , i.e. they should require a relatively limited knowledge base; and the users should be able to understand the rationale behind the recommendation.

These points are supported by the results of a review into the adoption and use of knowledge-based systems in the Netherlands. The authors found a low penetration of such systems in agriculture and suggested some of the factors determining success or failure were : the systems which are most likely to be useful are those which support day-to-day decisions at a farm level ; systems most acceptable to users have a clear functionality and be shown to be both reliable and adding value ; projects driven by the interests of researchers rather than focusing on the needs of the user have little prospect of success..

Such arguments are further supported from other fields of application. The originators of one of the most successful expert systems, DENDRAL, used in hypothesising organic molecular structure from mass spectral data, admit that they seriously underestimated the problems of technology transfer and the nature of the barriers to technology diffusion. Their belief is that a major barrier to the embryonic artificial intelligence and software applications industry throughout the past decade has been developers lack of understanding of the social, psychological and business aspects of society's reluctance to try new tools.

We may deduce from the above some of the circumstances where expert systems technology is likely to provide the greatest benefits to agriculture in the future:

- expert systems will be most effective when there are frequent decisions to be made and where it does not matter that individual recommendations are sub-optimal as long as it can be shown that better decisions are taken in the longer term using an expert system than without it ;
- at the development stage expert system designers should work closely with users to deepen the developers' understanding of the decision-making processes which they aim to support.
- substantial effort must go into promoting the uptake of the technology , as well as in designing simple systems and in planning long-term support and development.

These features are likely to become even more important with the increasing impact of telecommunications in agriculture e.g. in precision farming and in monitoring systems, perhaps involving links between weather data and management operations

Dissemination

The review on Expert Systems in Agriculture was presented at Paper presented in Wageningen Congress WTTA'97 and published in the proceedings from the Congress. The browser for managing scientific references on E.S. is described in Annex 3.1; a copy of the package is available from the authors. The directory of researchers in K.B.S. in Europe is available at www.efita.org

Publications

Caridad y Ocerin, J.M. & Talbot, M. 1996. Expert system in agriculture. Proceedings of Information and Communication Technology applications in Agriculture. Wageningen, The Netherlands, 16-19 June 1996.

Annex 3.1

A BROWSER FOR MANAGING REFERENCES IN K.B.S. IN AGRICULTURE.

MANAGEMENT SYSTEMS OF REFERENCES. APPLICATION TO A DATA BASE OF REFERENCES OF K.B.S.

The main objective is to generate a package to be used in the management of references to published works in international databases in E.S. and K.B.S. in Agriculture, and of self-gathered reference information, with the purpose of futures searches, generating statistics, locating authors or institutions, producing reports and bibliography with international format and provide a user-friendly environment for the manipulation of this information.

INFORMATION TO BE TREATED

The information sources are in different databases used by scientists, engineers, and professionals in their daily work. These data bases are accessible trough networks, on CD-ROM, or directly taking the information from papers, books, and others documents.

The heterogeneity of these informations require an analysis of text files gathered directly from these data base and that are structured not always in the same way, but that contain more or less the same information.

The first module of the application to be developed is an interface with these data bases: we should consider that the input data have already been retrieved and put into a text file that has to be analysed and extracted the main information from it, in a structured way. In the first stage a prototype of this module will be developed with a search in CAB abstract data base. Later on new modules will be included for different data bases.

The information about this data bases and their structure should be obtained through searches in reference data bases in Seville. Also, an access using Internet to gather information should be considered.

A file obtained from CAB about Expert Systems in Agriculture is provided, and additional information should be obtained in different data bases.

MAIN PROCESSES

Selecting a type of text file.

The text file is obtained from a list of data bases: CAB, AGRIS, SCI,, or from a text file generated with an editor.

Input from a text file and including information in the master file (MF) of the package.

This input can be repeated with different text files, and on the process of input in the MF, it should be structured according to the fields of the MF. When reading the original text file, the information is not in the same format as it should be in the MF, so an analysis should be performed automatically in the text file, with the extraction of the information needed. It could happen that some records could be transferred without problems to the MF and that some records could not fit into it. With these records an additional text file should be formed, and a report file of the problems encountered, to facilitate that the user could modify this new text file (outside the application, with an editor) and submit later on the input process to this file, in the same fashion, generating the corresponding text file with the records not included in the MF.

Detection of records that are duplicated.

This can be done in several processes: one that detects exact records in the MF (although this process can be included in the input process); another detection of records with some fields that are equal (for example, the authors, or the title of the paper); finally, it can be build a process that detect records that are 'similar', that is that have attributes that can be considered that refers to the same type of information. The two last options can be executed independently, and after presenting the 2 'similar' records (each pair found) on the screen, the user can take one of the three following decisions: keep both records as they are, deleting one, or editing one.

Edition of a record.

This edition is oriented towards each field, that could be updated or modified, or codes added to the fields needed of modification. Also the edition of a record should include the possibility of deleting it.

Index generation.

There should be several types of index to be generated to facilitate searches and retrieval of information in the MF. In each record there are descriptors that should be included in the descriptor index file (DIF); there should not be duplications, and there is an additional difficulty as some are one word descriptors, while others are sentences. Also there should be a main index file (MIF) generated automatically with all the descriptors, and all the words of the title field (except the words contained in the anti-thesaurus file (ATF), that includes words not suitable for indexation (for example articles, prepositions, and so on); this ATF is constructed externally from the input process, and can be updated at any time, with effect on the already MIF. The MIF file should contain the descriptors and keywords to be used in most of the searches; this has to be decided after an examination of the example file of a search provided.

Search of a record or a group of records.

The search process is done using keywords, that could be a word or a sentence. That means that one or several index files have to be build, and it could be done in two stages: one when a record is included in the MF, but another process of rebuilding all the index files should be

considered as a way of coping with the problem of corruption of index files, or even as a way of simplifying the editing and modification of records, without the need to update at the same moment the index files that needs to be constructed with a program not included in the data base. Each search will be done using a condition: for example, *keyword = expert systems*, or *date >= 1990*.

Combination of searches.

Once a search is done, the set of records included in the search forms a set that can be identified with a number. Different search sets can be combined with Boolean operators that will generate a new set of records (it could be empty) with the records that fulfils the condition established by the Boolean operators. At least the following operators should be included: + union of two sets (without the common records, if any), * intersection of sets, with only the common records. For example *combine = 1*2* should generate a new set, with the intersection of the records from searches 1 and 2. After the searching process is over, the sets selected could be saved in different data bases with the MF structure, and with the subset of records of each search. Also an additional file reproducing the search process should be generated, in case a new search similar to the one obtained is needed, it could be used as a macroinstruction for the search in a new or updated MF.

Producing a bibliography.

This could be a process following a search, with the records previously selected and stored in a search MF subset file. The format should be similar to the usual standards.

Selecting information from the data base.

This is a similar procedure that the search procedures, but in this case the selection is based on a subset of fields, instead of the records. It could be combined with a search of a subset of records selected through search conditions. For example, one search could be the list of authors included in the MF (without duplications), or the list of authors and their address and e-mail, or the papers on a certain topic, and so on. This kind of processes can be parametrized so it could be personalised on each occasion. The information can be directed to the screen, and/or to a file, or even to a data base to be later processed.

Statistics.

The production of statistics could be done directly on the MF or in a subset-MF of records and/or fields selected using search and/or selecting procedures. Examples off information could be: Statistics of papers by countries, by year, by year and country, by topics, by journals, by an author (or several), by function, by type of user, etc.

Letters.

One task used often is to produce a letter in form of a card asking for a copy of a scientific paper. This need to include the name of the author, address, and so on, and to produce a text file that will originate the letter. Another type could be a list of letters with the e-mail address, to be sended by this way.

Maintenance.

In the MF data base there are information that could be extracted in auxiliary data bases: scientific journals, publishers, descriptors, synonymous, and so on; for each of these external data base there should be an editing process that allouds to modify or correct the data, and update the MF. For example one of the purposes should be that the MF is maintained homogenous.

4 IMPACTS OF STANDARDIZATION ON DEVELOPMENT AND USE OF AGRICULTURAL SOFTWARE

Working Group D

Summary

Work group D is concerned with the impact of standardisation on development and use of information and communication technology (ICT) in agriculture. Questions that are addressed:

- What are standards?
- Which standards are available? Where can these be found?
- Is there a (financial) need for further standardisation?
- What are the critical success factors for standards and standardisation processes?
- Is the level of ICT-standardisation comparable between EU members?
- Is there a need for further dissemination of existing standards?
- Who organises standardisation processes on national and international level?

The approach to the work item is first to give an overview of IT-standards in use in the field of animal and arable farming. Further, to analyse the dissemination and impact of standards, come up with guidelines for the development and explore needs for standards

Specific objectives

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| 1. A review of standardization projects within agricultural IT with respect to the impacts on development and use of agricultural software |
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Members

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Meetings

Wageningen 30-31 January 1997	Copenhagen 13-14 June 1997
Cremona 16-17 October 1997	

Objective 1. A review of standardization projects within agricultural IT with respect to the impacts on development and use of agricultural software

Introduction

Work group D is concerned with the impact of standardisation on development and use of information and communication technology (ICT) in agriculture. Questions that are addressed:

- What are standards?
- Which standards are available? Where can these be found?
- Is there a (financial) need for further standardisation?
- What are the critical success factors for standards and standardisation processes?
- Is the level of ICT-standardisation comparable between EU members?
- Is there a need for further dissemination of existing standards?
- Who organises standardisation processes on national and international level?

Methodology

The approach to the work item is first to give an overview of IT-standards in use in the field of animal and arable farming. Further, to analyse the dissemination and impact of standards, come up with guidelines for the development and explore needs for standards..

Results

STANDARDS IN ICT

Standards are documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose. (<http://www.iso.ch/infoe/intro.html>)

The documented agreements may be classified as:

Standard A standard is a document that is published by a standardisation institute, e.g. ISO. A standard is the result of a democratic process.

De facto standard/industry standard A de facto standard is a widely used agreement, without any involvement of a standardisation institute. The agreement is available to the public. It is not a proprietary/patented standard.

Standards may not be (widely) implemented, de facto standards are, by definition, implemented on a wide scale. This report covers both standards and de facto standards.

Classification of standards

A well-known classification of standards for the integration of information systems is the OSI-model (open system interconnection model). This model distinguishes 7 layers of standardisation: physical, datalink, network, transport, session, presentation and application layer. The Eunita D-work group only focuses on standards used in the application/presentation layer.

SCOPE

ICT standardisation covers a broad area of disciplines and applications, for instance the specification of a virtual terminal for on-board computers, the CAN-bus protocol for exchanging data between an on-board computer and an implement, the structure of the radio-frequency identification code for animals, the technical structure for the transceiver, the specification of standard messages to exchange data, standards for linking hardware components, etc.

For the work group it was impossible to cover all these areas in great detail. The work item was therefore restricted to two case studies that are of interest for a number of organisations in ICT in agriculture. The standards used in these case studies are described. From these cases, and from other projects the WG D-members have participated to, conclusions are drawn and recommendations are given for the standardisation process and for the dissemination of standards.

The cases that have been worked out are:

Standards in animal data As an example the exchange of data in dairy farming will be used. The (international) transfer of products and animals and the national and international regulations concerning milk production, premiums, etc. bring about a lot of registration and exchange of data.

Standards in field data The use of electronic equipment in arable farming is increasing. Especially for precision farming new methods of data recording and exchange are required.

The use of and need for standards in this area are reported.

USE OF STANDARDS

The scope and contents of standards used in data exchange in animal and arable farming are described for the countries that were represented in the Work group D. The standards that are used concern the syntax and the data dictionary, and the standards may be international, national or de facto standards.

In an overview the main data exchanges in animal production and arable production are described. Every data exchange is described in terms of: sender, receiver, name of message, frequency, total number of messages per year and contents (see Annexes III and IV). From these overviews conclusions are drawn regarding the (lack of) use of standards and the factors that promote the use of standards.

Case 1: exchange of animal data.

Looking at the exchange of data in animal production, many different types of organisations are involved, e.g. the farmer, the breeding organisation, the veterinarian, the animal identification organisation, the dairy herd institute.

In Annexe III a diagram is drawn of organisations involved in exchange of animal data, with the possible information flows between them. The information flows per country are described in the tables in this Annex. This chapter summarises the main characteristics of the exchange of animal data in each country. These characteristics are: (de)centralised, use of standards, organisations involved, need for standardisation.

Denmark:

The National Committee on Danish Cattle Husbandry is responsible for a Central Cattle database. This database stores relevant data concerning: breeding, health control and production

management for all cattle in Denmark. Organisations can enter and withdraw information that is relevant for their purpose.

- Data can be entered and withdrawn from the central database through terminal or through a PC-program. The PC-program is referred to as the IFMS (Integrated Farm Management). The IFMS is used by approximately 5.000 farmers and the major part of the Danish Advisers. The program can be used for both economic and production management of farms. Data can be exchanged with the central cattle database and other mainframe systems through EDI.
- National standards for communication of information with the central database are set by the National Committee, where relevant organisations are represented.
- In the future the communication to and from process computers such as computers in feeding systems, milking systems and tractors will be implemented, using the standards developed within the committee ISO/TC 23/SC 19 (see Annexe I).

France:

- The system in France for exchanging animal data is quite complicated. France is a large country divided into numerous regions. Each region runs its own system for collecting animal data.
- From the local databases, breeding data are collected in a national database for calculating cow indexes.
- For the purpose of national and EU funding, local data are sent to a national premium database.
- For data communication at the local and national level a large variety of media (e.g. paper, disks, telecom lines, tapes) and formats are used.
- No international standards for electronic data exchange have been used yet in the data exchange with farmers, but for the data exchange between slaughterhouses and retailers, the standard Edifact is used.
- Data exchange in France (local and national level) are mainly by point to point exchanges, there is no mailbox system or network used. For this type of exchange only a bilateral agreement is necessary.
- In France, a national syntax standard, called VSI, is in many cases used for data exchange.
- In France about 400 of the most important data are standardised in a data dictionary of the dairy herd institute. This can be considered as a national standard.
- Until now, there have been no real bottlenecks in data exchange at the local and national level, but the system is costly and not very robust. Many point-to-point exchanges have to be maintained. When extensions are necessary in the future, the need for standards will become stronger.
- Effort is put into the development of a central database for cattle identification and registration (there are approximately 60 different databases now) and the development of automatic data transfer between identification databases.
- Animal data are exchanged between countries (e.g. the ANIMO-system). There is a need for standardising farm, animal, sender and receiver ID's at an international level.

Germany:

- Like in other countries there is an intensive exchange of breeding, insemination, and milking data. Data exchange with the farmer is mostly on paper. Data exchange between organisations and firms is mainly by file transfer.
- In Germany, not all animals are recorded in a national database. Each Bundesland has its own database.

- ISO-standards like ADIS and Edifact are used. Also the data dictionary that has been developed within ISO/TC 23/SC 19 is used as part of a national data dictionary developed by the ADR (Arbeitsgemeinschaft Deutscher Rinderzüchter).

Italy:

- In Italy there are local databases for breeding data, veterinary data and milk data. At a national level there is a central breeding database and a herd book, a database for supporting market intervention and a centralised veterinarian database.
- Like in France a lot of data is exchanged between these databases and numerous media and formats are used. There is no standardisation of data-exchange.
- Because of the lack of standards, the same data have to be entered into several organisational databases by hand.
- There is no standardisation of farm-ID's and animal-ID's at a national level. This makes it very hard to exchange or compare information from different databases.
- Another problem is that similar figures are often calculated in different ways and are not comparable.
- The lack of standards makes it difficult for software developers to come up with a program that can be used on a broad scale. This slows down innovation and the introduction of ICT in agriculture.
- Costly efforts are made to maintain all the different interfaces.
- Although great amounts of money could be saved, little effort is undertaken to change the way data are collected and exchanged.
- Italy is a big importer of animals. All trade has to be recorded in the ANIMO database. The exporting country enters the number of animals and the destination. The receiving country (mostly Italy) never uses this database as there is no information on the sender (farm-id) and the animal-id's.

The Netherlands:

- In the Netherlands there is a relatively large use of standardised EDI-messages in agriculture, for example in exchanging breeding, milking, veterinarian and feedstuff data.
- Like Denmark, Holland is a relatively small country with one centralised database for identification and recording of animal data. This makes it easier to introduce standards for data exchange.
- In the Netherlands there is a specialised standardisation organisation, the Agricultural Telematics Centre (ATC) that is funded by farmers and agribusiness. The core business of the ATC is to stimulate information exchange between organisations in the agricultural sector. Many EDI-messages have been defined, most of these in the ADIS (Agricultural Data Interchange Syntax) format, but Edifact is also used.
- The ATC maintains the Dutch agricultural data dictionary (ADED) that contains (among others) the descriptions of the data elements that are used in data exchange.

Case 2: exchange of field data

Standardisation in the field of precision farming is technological. The market consists of multinationals. For these big manufacturers it is important that their tractors and implements are able to communicate. These manufacturers are working within ISO on several standards for integrating sub-systems.

France:

- ENITA de Bordeaux and the software company Isagri are working on a standard for data exchange between the management information system of the farmer and on-board computers.
- In France, like in other countries, special interest is paid to using D..Global Positioning System (DGPS) and Geographical Information Systems (GIS) in precision farming. The standards that are worked on by ISO/TC 23/SC 19/WG 1 (Mobile equipment) are followed as much as possible.
- In France precision farming techniques will first be used by major contractors. They will do the yield mapping with their combines and apply fertilisers, pesticides and herbicides using GIS-DGPS-equipment. Computing yield maps into for instance fertiliser application maps will be done by specialised service agencies (e.g. advisory services). Because the field operations and the field data processing are carried out by different organisations, it is very important to standardise the field data sets that have to be exchanged.
- Standardised crop and field data are also needed in the exchange from agricultural cooperatives to advisory services like UNCAA (Crop management advisory service).
- In France there is a growing interest for standards to exchange local climate data that can be used for crop management.
- There is also a need for a data dictionary with standardised definitions of field, crop and fieldwork data.

Germany:

- For the exchange of delivery notes, orders and invoices Edifact is introduced as a standard.
- For the communication between management information systems and on-board computers ADIS is used.

The Netherlands:

- In the late eighties a national standard was developed for exchanging data between on-board computers and management information systems of contractors and farmers. ADIS was used as the syntax for data exchange. The standard was implemented by several companies in the Netherlands.
- The standard never had a great success. The main reason was that it came too early, there had not yet been a serious demand by contractors and farmers at that time.
- A few years later this subject became a work item of ISO/TC 23/SC 19/WG 1. Parts of the Dutch standard were used in the international document.
- As soon as the Dutch manufactures knew about the ISO standardisation, they became reluctant in implementing the Dutch standard and decided to wait for the ISO-standard.

Elaboration on case studies

Concerning the exchange of animal data:

- In data exchange in animal farming, the use of international standards like ADIS and Edifact differs strongly between countries. In the Netherlands these standards are used on a broad scale. Also Germany and France are starting to use these. Overall there is still a big potential for standardising data exchanges.
- Throughout Europe, on a national level, there already are *quite a few* ADIS/Edifact messages defined to exchange information. It is recommended to organise a Web-index that gives an overview of existing messages and information about persons to contact for details. In case of the development of new applications, the index should be consulted to see if comparable messages have already been defined. And if so, what the level of standardisation of this message is (ISO, Edifact, national standard).

- For an efficient data-exchange at a national level there is not always a direct need to use international standards.
- From an international point of view there is a necessity for standardisation of the exchange of identification and registration (I&R) data of animals that are traded between member states. (referred is to the EC Regulation 820/97 concerning the establishment of a system for the identification and registration of bovine animals).
- A paper animal passport has been specified meeting the criteria of this regulation. It is recommended to specify also the electronic version of this animal passport.
- EU-regulations could/should be an effective trigger for standardisation. Whenever a new set of regulations is being developed that involves the exchange of information between member states or administrations, there should be a special paragraph that pays attention to the standardisation of this data exchange (e.g. Edifact as standard syntax, data-elements that are described in a data dictionary).
- From the survey it became clear that there are some initiatives/projects that concern the exchange of animal data (e.g. Animo, Eurovet, ICAR, Interbull). There is little tuning between these initiatives concerning the standardisation of data and electronic messages. It is recommended that an international data dictionary should be made available in which the most important data-elements, that are exchanged on an international level, are defined. This data-dictionary should be public and easy to address. To start with, the data dictionary should contain the data involved in the initiatives mentioned above.
- Also in EC-projects little attention is paid to standardisation of data and data-exchange, while especially in this kind of projects the European Commission has the opportunity to demand the use of international standards. It is recommended to oblige the use of international standards in EC-projects and make this a condition for allocating EC-funds.
- The overall goal should not be to push EDI from a technology point of view, but to use standardisation and EDI, where possible, to increase efficiency.
- For the exchange of animal data, standardisation of animal and farm id's is very important. The code structure of animal id's is standardised by ISO. Per country further arrangements are made for the animal id. There is not yet a standard for farm id's.
- Not all countries have yet a national database for the identification of individual animals. This has to be realised in the coming years to live up to the demands of EC-regulation 820/97. Until now, there is little coordination within and between countries to make this work.
- Not all countries have a system for unique identification of farms. For instance, in Italy farms can have more then one farm id, and the farm id's used are not always based on the same specifications.
- The EU-regulation 820/97 states that access to the data of the bovine animals has to be ensured to all parties concerned. This means that a clearly defined structure and description of the data are needed. The information has to be transparant.

Concerning field data:

- There is a big push for standardisation in mobile equipment for precision farming (ISO/TC 23/SC 19/WG 1-activities). This push is caused by a few major manufacturers of agricultural equipment who concluded that connectivity is very important for a successful market introduction.
- Several standards are used or in development: US..., DIN9184.
- If manufacturers have the feeling that they can set a de facto standard they will try to do so. From the point of view of competition it can be very interesting to offer equipment that can only be linked to equipment of that same manufacturer, so customers are more or less forced to purchase the equipment from the same manufacturer. The manufacturer will

choose for this strategy when he can offer, with partners, a complete line of products. As soon as equipment has to link with equipment that is not their core business, standardisation of interfaces becomes important to them.

- Customers, on the other hand, want standards. They want to be free in their choice of equipment and implements and do not want to be restricted to a certain supplier.
- In arable farming, there is a growing demand for the exchange of crop production data between farmers and food process industry. The data concern the amounts of pesticides/herbicides and fertiliser used, as well as more technical information concerning the variety used, day of planting, days of harvesting, general crop condition, etc. In France, Germany, Denmark and the Netherlands similar applications are being developed to exchange this information. It is recommended to tune the development of these messages.
- Several countries are developing EDI-messages for exchanging laboratory data (etc. for the analyses of soil, milk, animal health). It is recommended to tune the developments of these messages.

In general:

- International standards are important in dairy farming because of the international data exchange related to trade.
- International standards are important for arable farming, because of the international market of tractors with on-board computers and implements.
- There is little awareness of the financial benefits that could be achieved by further standardisation of data exchange.
- Standardisation is a matter of cost/benefit-analysis, taking into account long term goals (IT infrastructure, international developments): what are the cost and benefits of developing and maintaining own solutions vs. standards, what does changing the system (now or later) cost?
- This awareness can be achieved by carrying out feasibility studies, including all organisations that exchange the data.
- In most cases organisations are not aware of standards they can use. More attention should be paid to the promotion of standards by the standardisation bodies.
- In most countries there is a growing use of EDI. For data exchange Edifact should be promoted as the most important standard, as well on a national as on an international level. Looking at other branches (trading, transportation, banking, insurances) there are international committees under the flag of Cefact (the international Edifact organisation) to develop new Edifact messages and to exchange information about existing Edifact messages. It is recommended to take the initiative to organise an Edifact committee for agriculture. This platform should be used to tune Edifact developments in agriculture.

DISSEMINATION OF STANDARDS

One of the critical success factors for a standard is dissemination. Industry standards/de facto standards are widely used, so everybody knows about these. For the standards developed within international standardisation bodies, only a group of experts is involved in the standardisation process. When, after a democratic voting process, the document becomes an international standard, the standard is not automatically known to the world, unless it is an important standard for economic reasons (e.g. ISO 11784/11785 Animal identification). An important trigger for the use of a standard is knowing that other people use it.

In data exchange, the international standards UN/EDIFACT & TDID and ISO/ADIS & ADED apply. In the tables in Annexes III and IV an overview is given of the use of these international standards as well as the use of national standards. This overview

only includes a few European countries. An overall view on the use of the standards in the world would be very interesting. Internet is an interesting medium for dissemination of existence of standards and their use.

Throughout Europe, on a national level, there already are quite a few ADIS/Edifact messages defined to exchange information. It is recommended to organise a Web-index that gives an overview of existing messages and information about persons to contact for details. In case of the development of new applications, the index should be consulted to see if sort like messages have already been defined. And if so, what the level of standardisation of this message is (ISO, Edifact, national standard).

Conclusions

- Still a lot of money could be saved by standardising data exchange. But these standardisation processes are not started because of a lack of awareness or political reasons.
- When new regulations, for instance concerning animal data, are introduced little attention is paid to how the data concerned should be exchanged.
- For exchanging animal data, there is a great demand for farm and animal ID's;
- For providing product information, concerning product integrity and safety, to the end consumers, there also is a need for standardised data.
- IT is very common. Capacity problems no longer exist. You can not do without electronic data exchange any more. Sometimes it is even mandatory to achieve efficiency of input, like fertiliser.

Recommendations

- To promote the use of standards, information on the use has to be made available. This can be done by making an overview of standards in the area of data exchange and linking a standard to the names of users/user groups/maintenance agency of this standard.
- A promoting factor for electronic data exchange in agriculture is a centralised database or a centralised data dictionary. The existence of an organisation that coordinates projects for electronic data exchange and finds opportunities for EDI-projects through feasibility studies is a success factor for EDI.
- Successful standardisation processes start by creating awareness for situations that can be improved by standardisation. This means that someone has to take initiative. National authorities should stimulate that such a task is performed. If it can't be added to the responsibilities of an existing organisation then a special organisation should be created to carry out these tasks.
- The introduction of new EU or national regulations offers great opportunity to set new standards. So each time a new regulation is developed, initiatives should automatically be taken to produce an annexe with the specifications of e.g. the data exchange.
- It is recommended to start an international initiative to develop standards for the exchange of animal data, especially concerning the trading of animals between member states.
- The development of agricultural software should not be standardised, in terms of standard user interfaces, standard use of function keys and buttons. Standardisation on the level of data dictionaries, parameters etc. on the other hand is requested.
- Try to standardise on an international level rather than on a national or regional level.
- In the EC-regulation 820/97 it is specified what animal data should be exchanged between countries in case of the transportation between countries. It is strongly recommended to specify the electronic version of the animal passport. Deliverables of this project should be: a standard data dictionary, a set of standard Edifact messages, specifications of the

electronic network to be used, standard Edifact conversion software, procedures for exchanging the data and organising the administrative handling of the data.

Publications

Graumans, C. 1997. Impacts of standardization on development and use of agricultural software. Final report of EUNITA Working Group D, 20 pp.

5 DISSEMINATION OF INFORMATION TECHNOLOGY IN AGRICULTURE

Working Group E

Summary

Seven Critical Success Factors (CSFs) were identified as follows (in no particular order);

- High level of User involvement
- Support from outside the project
- The existence of a Product champion
- Good product marketing
- Support of intermediaries
- Addressing an identified need
- Matching product with end-user expectations and competence

The following conclusions were drawn;

1. All the identified CSFs for the dissemination of a project were recognised in at least one of the cases studied which implies that the study data and the general experience of the group members were broadly in line.
2. The most important factors were different in each project. This is critical and suggests that it is impossible to describe a 'standard' set of requirements for a successful project.
3. The role of end-users is commonly viewed as essential but the study could not precisely define their role during all the stages of a project.
4. The evaluation suggested that the existence of a product champion was decisive during the course of some projects.
5. Focusing the project to address a clear, concise and well recognised need was decisive in most projects but interestingly, not in all.
6. The quality of the marketing was a CSF where there was competing product or an alternative way of meeting the project's defined needs.
7. The unique significance of the use of intermediaries as distinct from marketing was identified for both commercial and non-commercial projects.

Specific objectives

- | |
|--|
| 2. A review of success and failure in transferring agricultural software beyond the region or country it was originally designed to, with respect to identifying optimal conditions for dissemination of software in agriculture |
|--|

Members

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Meetings

Paris 5-6 March 1997	Copenhagen 13-14 June 1997
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Objective 1. A review of success and failure in transferring agricultural software beyond the region or country it was originally designed to, with respect to identifying optimal conditions for dissemination of software in agriculture

Introduction

The main idea underpinning this group was the notion there is a considerable amount of material available on this subject but that this knowledge is very diffuse. Therefore, the main objective of group E was to create a forum where existing knowledge in the different countries could be compared in order to classify and to synthesise this expertise.

The general goal was not to produce new information, but to gather and articulate existing theoretical knowledge and hands-on experience on IT dissemination in Agriculture in the different countries. In order to achieve this general aim, Group E organised meetings and working groups. The main products of the study are:

1. A comparison of different ideas originating from people with very different experiences in the area of Information Technology.
2. The creation of a descriptive methodology of IT.
3. A report summarising existing knowledge in the area dissemination of IT in agriculture.

More precisely, the group's objectives can be summarised as follows :

1. To obtain wide knowledge of studies on subjects related to IT dissemination and to describe the methodology and the content of each experience.
2. To bring together persons with vastly different experiences in order to compare and to discuss their ideas.
3. To attempt to understand why a major project of IT dissemination, in its own context, met with success or failure.
4. To provide a common format helpful for the comparison and synthesis of approaches that are diverse as to their main assumptions, scope and methods.

Methodology

To achieve the goal, it was decided to document and assess six European experiences of the dissemination of Information Technology. Group E's activity included the development of a methodology for the study as well as the study itself of the diverse experiences related by a variety of actors (researchers, software developers ...). For this reason, a call for proposals was issued before the working group met to select appropriate experiences which would contribute the most information to the project. Six case studies were selected and eventually carried out between August 1996 and December 1997.

The first phase of the study was the creation of a methodology to evaluate the projects and to extract conclusions. Using this methodology it was then possible to describe thoroughly the six European experiences of IT dissemination and with this documented evidence it was then possible identify the critical-success factors for optimal conditions of dissemination of IT in Agriculture. More precisely, the methodology can be described in 5 stages as follows:

1. The creation of common guidelines to describe each experience.
2. The documentation of experiences by the experts

3. The identification of all critical success factors (CSF) which influenced the uptake and dissemination of the project during the development, the take-of and the follow-up stages
4. Aggregation and Generalisation of the results
5. Conclusions

Results

The Working Group developed a specific methodology and guidelines for analysing the six case studies:

- The AFIMILK Dairy Information System (Israel)
- AGRIMAT: An Information Kiosk for Agricultural Information (France)
- Crop Management System in The Netherlands
- PC-Plant Protection : A Decision Support System for Control of Weeds, Pests and Diseases in Field Crops (Denmark)
- ADAS Business Recording Service (United Kingdom)
- SIEA: An Accounting Software to Improve Farm Management (France)

Discussion and recommendations

There are clear lessons to be learned from the conclusions outlined in the six case studies. The following activities should be undertaken by every project leader before embarking on a new project;

1. Define the **type** of project carefully as the relative importance of CSFs will vary. In particular, distinguish between commercial and non-commercial objectives.
2. Focus clearly on the **need** to be addressed. Where the need is to be generated by the project itself, state this clearly in the business case and accept the high degree of risk associated with this type of project.
3. Consider carefully whether or not an **external influence**, a potential **product champion** or useful **intermediaries** should be utilised or neutralised. This area is particularly important for non-commercial products and it should be remembered that the presence of one of these influencers can be very positive but their absence may not necessarily be detrimental.
4. Study alternatives or competing options to determine product **marketing** strategy - especially for commercial products.
5. Study nature and aptitude of potential users to satisfy human factors aspects especially in cases of technology push.

Recommendations

1. Study the role and impact of end-user's involvement. Very little work has been done in this area and this study identified real gaps in knowledge about how users contribute to or in some cases detract from projects. A more detailed survey of a large number of projects is needed to obtain sufficient data for significant conclusions to be drawn. Work in the USA should also be studied.
2. A cost benefit analysis on each case studied. The benefits of investment in IT are very difficult to identify - especially in a biological industry like agriculture where there are so many other variables. More robust methodologies are needed to undertake detailed studies of the benefit of substantial resources in this area.
3. Research into how farmers make decisions. Although there are many so-called decision support systems under development and completed in the industry, very few of them are used. There is a clear lack of understanding about precisely how farmers

4. A study of social consequences of projects of IT dissemination. Technology can be and end in itself but in most cases there are profound implications for users and their families when IT systems are introduced.
5. A study of end-users satisfaction. This study could provide valuable input to the recommended study on user involvement. It is also important to understand what benefits the eventual recipients of this technology feel they have derived.

Dissemination

The full publication on Working Group's achievements is available at www.efita.org

Publications

Steffe, J., Gelb, E., Kamp, J., Offer A., Giannerini G., & Murali N.S.1997. Dissemination of information technology in agriculture. Final report of EUNITA Working Group E, 20 pp.

6 APPLICATION OF INFORMATION TECHNOLOGY IN SOUTHERN EUROPE

Working Group F

Summary

The EUNITA WG F has achieved its goals concerning the organisation of two open forums for experts in specific areas in which there is a need for transfer of innovation from Northern to Southern Europe

The workgroup has been coordinated by Guido Bonati (National Institute of Agricultural Economics, Italy) and Gianni Jacucci (University of Trento, Italy). The activity has consisted in the creation of two networks:

- on information technologies applied to plant protection;
- on Internet applications for extension services.

Specific objectives

A report of the needs required to improve the use of information technology in agriculture in southern Europe, including transfer of know-how from other regions, and with particular emphasis on management and information systems and research planning.

Members

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Meetings

Rome, 28-29 November 1996

Alberese, 10-12 September 1997.

Introduction

The use of IT in agriculture is often very varying from one country to another as well as between regions of Europe. It is therefore of great potential benefits to facilitate an exchange of know-how, software and experiences between countries. Working Group F is in particular engaged in the transfer of agricultural IT between southern and northern Europe.

Methodology

Working Group F organised its work such that the WG members prepare and organise workshops, which has also participants on their own expenses. Two workshops were held on, respectively,

- information technologies applied to plant protection;
- Internet applications for extension services.

The objectives of the two workshops will for the rest of this report be adapted as the objectives of Working Group F.

Objective 1. Information technologies applied to plant protection

Introduction

Plant protection is one of the fields in which the adoption of innovative information technologies is more advanced. This is due to a number of reasons: the development by entomologists and plant pathologists of many simulation models, which require computer facilities to run in an effective way; the need by extension services for using these models and disseminating information to farmers; the need of farmers to optimise spraying both for environmental and economic reasons.

At European level the most advanced and successful applications are in the Northern countries. This is due both to the fact that the climatic situation in Northern Europe is much simpler than in Southern Europe (and therefore simulation models can be developed in a rather simple way) and to a greater tradition in transferring research results to extension and farmers.

Southern European countries are facing a much more difficult situation: climatic situations are extremely diversified and are normally suitable for a quick development of the most common pests; in many cases the links between farmers, research and extension are weak.

Advanced information technologies can play a great role in this field, but their importance still has to be fully understood, not only by farmers and extension agents, but also by researchers.

For these reasons it was decided to organise the first of the meetings of group F in the field of plant protection. At the very first step it was decided to get in contact with the Italian Plant Pathology and Crop Protection Research Institute, in order to have the scientific and technical background for the best success of the meeting. At the same time it was decided to get in contact with Bo Öhlmer, coordinator on another EU concerted action on plant protection, in order to avoid any duplication of activity.

Following this first stages, it was decided to organise the workgroup meeting in Rome, inviting both experts from Northern European countries with successful experiences in plant protection and researchers and extension agents from Southern European countries. The meeting took place in Rome, on November 1996 1996.

Results

The experts have stressed the importance of advanced information technologies for extension services in Southern European countries in the field of plant protection. The workshop has been successful in demonstrating how experiences from Northern countries can be replicated to Southern countries and in creating a network of experts, which is continuing its activities without funding from the European Union.

Dissemination

The proceeding or the experts' meeting are in print as an annex of the scientific journal *Petria*

Objective 2. Internet applications for extension services

Introduction

Information and Communication Technologies are playing a role of increasing importance in the development of rural areas and in agricultural policies. They are becoming a strategic tool to guarantee a constant flow of information for farmers and an optimal use of available resources and funds.

They could also strengthen links between citizens of urban and rural areas, specifically with rural tourism and promotion and telemarketing of agricultural typical products. Finally, they can be a new possibility of employment for people living in rural areas.

In this context Internet, with its new and widely available protocols, can play a very important role. The number of sites distributing information of agricultural interest is increasing rapidly, both in European countries and abroad.

Two key elements in Internet services are their abilities to provide real and measurable benefits to end users and to integrate with existing structures, specifically extension services, avoiding to waste efforts and resources.

It is therefore necessary to examine the present state of the art in the European countries, taking into account aspects related both to the contents of services and to the technology.

For these reasons it was decided to organise a workgroup meeting on "Internet and extension services":

The following sectors have been examined:

- transfer of innovation and of information on OE regulations;
- integrated decision support systems;
- input and output of statistical data;
- long distance training;
- promotion of rural areas.

The meeting took place in Tuscany from September 10th till September 12th 1997.

Methodology

The purpose of the meeting was to identify Internet applications and evaluate success factors and failures as a guide for more effective Internet adoption. This purpose was achieved. A structured survey of workshop participant's experiences indicated a general agreement on

potential user benefits from Internet capabilities and content; what are the critical success factors for effective Internet use and what are the knowledge gaps and relevant new trends. Consensus did not extend to what should be done and what are the organizational implications.

All workshop participants were divided into workgroups of 15 members and requested to relate to workshop issues. The main exchange of views took place in these workgroup discussions and presentation of their conclusions. Appendix A summarizes all the subjects discussed and scoring of their of importance - as workgroup members perceived them. The discussions followed a structured framework of nine categories within which members raised and considered experiences, ideas and proposals. It is important to note that the subjects **were not** ranked in any preference or group agreement of any kind. This task is left to readers according to their country's state of the art and personal experience. Discussed-subject similarities reflect workgroup participant's country nuances e.g. subjects 2.2. and 2.4 The category titles are self explanatory and were used to guide workgroup discussions. They were not supposed to suggest the organizer's opinions, ranking of categories or subject importance. That was left to workgroup participants.

The scoring was done in a survey of the members of two workgroups - who together had at least one representative from each participating country. There were 23 replies from the 28 members of these two workgroup participants. The scoring was done for each subject discussed: a subject was scored 1 if considered "not important" - even though it was discussed ; 3 if considered "very important" with all the rest scored with a 2. In this manner the maximum score a subject could attain was 69 (23x3). An additional index shows how many members from the 23 that replied to the survey considered the subject to be "very important" by scoring it with a 3. This result appears for each subject in parenthesis - with the maximum possible score being 23.

Results

Following is a condensed summary of the subject-scores within each of the nine subject categories that were evaluated. The subjects included were those that were scored 55 or higher. It should be read as follows - e.g. for Category 1:

There were 19 subjects discussed in this category. Of these 19 only two subjects received a score of 55 or higher (2/19) - re category title. Of these two subjects Subject 1.9 was scored at 58 (out of a maximum score of 69. A score of 55 represents 80%). 15 participants (out of a maximum of 23) scored this subject as being "very important" (with 18 respondents representing 80%); subject 1.10 scored 55 with 12 participants scoring the subject as very important, etc.

1. Technical problems in adopting or using Internet for extension (2/19)

1.9 Sites untested for farmer needs, friendliness, technical attributes, etc. 58(15)

1.10 Level of supplied information incompatible with farmer's level of production technology. 55(12)

2. User benefits from using Internet by extension or by farmers (7/14)

2.2 Updated and comprehensive information. 67(21)

2.3 Availability of new types of information - in addition to extension's field of competence. 56(12)

2.4 "Just in time" information. 67(22)

2.5 Access to more and to competing information sources. "One stop information shopping". 55(12)

2.6 Easy to exchange information and/or ideas and discuss them. 63(17)

- 2.7 Easier to collaborate and /or access peers, other farmers and experts. 60(16)
 - 2.9 A ranked list of useful information: updated market lists, weather information, plant protection, news, bulletins, plant protection products. 55(16)
- 3. Drawbacks from using the Internet for extension (2/8)*
- 3.1 Too much (possibly contradicting and/or non focused) information. 58(15)
 - 3.2 Unreliable or outdated information. 58(14)
- 4. Critical success factors for effective Internet use (12/22)*
- 4.1 Internet accessibility at individual farm or farmer group locations. 59(16)
 - 4.2 Find out what information the farmer wants. 65(21)
 - 4.3 Find out what information the farmer needs. 65(20)
 - 4.4 Find out what information "extension" needs. 61(17)
 - 4.5 Identification of a tangible benefit to information users. 57(16)
 - 4.10 Identify the information's target audience. 59(15)
 - 4.11 Package information in a way that it can be understood and applied. 62(17)
 - 4.12 Simplicity, good design and easy to navigate search engine. 58(14)
 - 4.13 Someone has to be responsible for the information quality and reliability. 61(17)
 - 4.14 Credibility/reliability of Internet use will have an effect on Internet application development. 58(15)
 - 4.15 Updated information. 63(18)
 - 4.19 Realize that a site must provide professional information and not just presence. 63(17)
- 5. Organizational structure aspects and networking responsibilities (1/11)*
- 5.6 There is a need to define the role of the extension officer as part of the new Internet options. 57(13)
- 6. Obstacles to use of Internet (9)*
- There were no subjects that reached the score of 55.
- 7. Knowledge gaps and new trends relevant to Internet (6/14)*
- 7.1 There is a need for local (versus "global or average") knowledge. 57(14)
 - 7.2 There is a need for identifying the practical aspects of research results. 61(16)
 - 7.6 PCs should be viewed as communicators in as well as "advanced calculators". 60(16)
 - 7.9 Interactivity will become ever more important and feasible. 57(14)
 - 7.10 Demand will become a more important factor in developing services available via the Internet. 59(14)
 - 7.11 Use and friendliness will facilitate easier and more efficient use of Internet. 56(12)
- 8. Proposed and/or potential development projects (4/15)*
- 8.2 An international exchange of extension Internet professionals - at least a discussion group. 61(15)
 - 8.5 EFITA could start a pool for ideas and 'What's going on'. 61(15)
 - 8.6 Establish an inventory of extension projects and sites and make them available on the Internet. 58(14)
 - 8.12 Establish and agree on standards for data exchange and development. 56(13)
- 9. Issues discussed (1/9)*
- 9.3 The benefit of integrating Internet in agricultural schools and training as a research tool. 57(15)

Discussion

The categories and the subjects reflect what **workgroup participants** thought worthy of discussion. The results provide an indication of subject priorities and can be the basis of a more focused evaluation. One approach which could greatly assist in evaluating these subjects would be to obtain and integrate direct end user input. In this case end users would be **farmers** - as information users and information generators (opinions and field results); **extension personnel** - as information disseminators and information generators (field trials and “imported” know how); **agricultural researchers** - as information generators and information users (feedback from farmers and extension) and **service providers** such as packing houses, wholesalers, soil labs, agrometrology services, veterinarians, equipment suppliers and many more. This is one proposal for further activities as are the other items proposed in category 7 “Knowledge gaps and new trends relevant to Internet”. One recommended option would be to have a follow up workshop focused on key issues.

Recommendations

The subjects discussed during the meeting are of vital interest to agricultural extension services all over Europe. It is therefore recommended that such meetings are organised every year. INEA and the regional extension service of Tuscany are in the process of organizing the meeting, as an international workshop, in 1998.

Dissemination

The meeting’s proceedings are being disseminated in scientific journals and via the Internet

Publications

Bonati, G. & Rossi, C. (eds.) 1997. Proceedings of the 1st Workshop: Successful applications of information and communication technologies in plant protection, Petria 1997, 7, Suppl. 1.

Gelb, E. & Bonati, G. 1999. Evaluating Internet for Extension in Agriculture. EFITA Papers No. 3, www.efita.org, 31 May 1999

7 APPLICATION OF IT TRANSFER IN AGRICULTURE IN CENTRAL AND EASTERN EUROPE

Working Group G

Summary

The result of Working Group G is a collection of presentations, opinions and statements collected at the WG-G workshop held from May, 22 -24, 1996 at the Pannon University of Agricultural Science, Georgikon Faculty, Kesthely, Hungary.

This workshop brought together experts on the field of IT application, communication in agriculture from countries of Western and Eastern/Central Europe. This experts represent national organisations like universities and extension services as well as software developers.

This mixture of know-how - from practise and science - was used to get an overview on the current situation of IT transfer and application in Central and Eastern Europe and to find out similarities and chances of common fields of work.

The results of this workshop show a great variability of IT transfer in the EE countries. In general there is still need for support and know how transfer from the „well established Western European countries to the East. A lot of fields of work have been mentioned and some suggestions were made to get forward on our way into a European partnership. Within these workshop a first step was made to bring together people on the field of IT in agriculture, but many steps have to follow.

Specific objectives

1. A review on use and prospectives of information technology in Eastern Europe's agriculture with an assessment of the possibility of an integration in the ENITA network and cost-benefits of possible Western support

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Meetings

Kesthely, Hungary, May, 22 -24, 1996

Objective 1. A review on use and prospectives of information technology in Eastern Europe's agriculture with an assessment of the possibility of an integration in the ENITA network and cost-benefits of possible Western support

Introduction

This summary of the final report of Workgroup G - **Application of Information Technology Transfer in Agriculture in Central and Eastern Europe** - within the EUNITA concerted action is a collection of presentations, opinions and statements collected at the WG-G workshop held from May, 22 -24, 1996 at the Pannon University of Agricultural Science, Georgikon Faculty, Kesthely, Hungary.

Methodology

This workshop brought together experts on the field of IT application, communication in agriculture from countries of Western and Eastern/Central Europe. This experts represent national organisations like universities and extension services as well as software developers. This mixture of know-how - from practise and science - was used to get an overview on the current situation of IT transfer and application in Central and Eastern Europe and to find out similarities and chances of common fields of work.

Results

In the frame of this workshop an intensive experience exchange about the current situation in the field of the IT application in the Eastern European countries was expected. The reports of the workshop participants give a good view on the situation and the „atmosphere" in agriculture of each country. Always the same problems that unable in many cases the new orientation of the agricultural production are posed. There are technically marked as well as politically and economically influenced fields and issues that come to light in a very different form. The workshop of the work group 'G' should here represent a step forward towards a more intensive co-operation and should invite to a collective discussion and research for solutions through plenary reports, work groups in diverse partial fields and demonstrations of concrete IT solutions.

One of the most important conclusions of this workshop is that there is an increasing need for IT in the Eastern European countries. Great differences between the countries can be noticed concerning the scope and the objectives of the IT support. The range extends from the national requirement for computer-aided recording and information systems for administrative and legislative purposes such as market information systems to typical applications for the daily on-farm management such as the cow planer, the sow planer and the parcel manager. For all present parts, it is necessary that IT applications in Eastern Europe should be more effective and more appropriate than they have been until now.

The condition for this is as follows:

- an intensive cooperation between experts in Eastern and Western Europe (as it was the case in this workshop)
- the avoidance of 'dead-end solutions' regarding standardisation efforts or system configurations - experience in this field in Western Europe is here also very important
- improvement of learning and training possibilities to deal with current data processing for a new generation of farmers and the associated organisations such as advisory services and educational establishments

Concerning the last two points, the great need for knowledge about the farm book-keeping and corresponding economical rentability considerations was taken as an example. The urgent need for national standards in recording systems (similar to our account codes) as a basis to enable comparisons clearly appeared.

Discussion

Until now, the transfer of IT applications has usually taken place in the form of the applications commonly used in Western Europe in the field of on-farm management. A few software houses are there represented on the market. However, the available applications meet the needs and the situation of Eastern European farms only to a limited extent, and therefore, reach only a relatively small target group. Moreover, another problem lies in the diffusion and the configuration of hardware that are often available only in advisory services and authorities. According to experts, it would often be sufficient if the advisory organisations were equipped with modern electronic data processing and if they had the corresponding know-how. In the sense of the top-down principle, the IT diffusion and application would be subsidised.

Also on that level, the requirement for a more intensive experience exchange between East and West became clear. The existing exchange programmes for trainees and advisors should become more intensive and, if possible, also up to the professional training level (specialised schools and universities). Here, teachers are first required to transmit necessary knowledge. That is why a particular need for knowledge transfer is here to identify. „Train the trainer" programmes are necessary to reach a required multiplication effect through the training establishments. The principle of „from the practice - for the practice" is here also particularly highly regarded. The Western European countries are asked to extend necessary programmes and financial support possibilities.

Owing to the turbulent restructurations in the Eastern European countries in the political and economical area, responsables - particularly in agriculture - must have clear-sightedness and tact. New and changing ownership conditions, radical restructurations in the farms' forms and size, the opening of the market to the rest of the world (here especially to the European economic area) are so many worrying events that should concern farmers and persons working in the agricultural sector. However, they are insufficiently aware of the importance of these events. Therefore, the required background for a market-oriented production and the corresponding farm management must be ensured with the help of specific information. Supporting farms by advising requires efficient means and information technologies.

For this purpose, a specific strategy has been followed. It can be expressed through the following catalogue of measures:

1. Rehearsal of the farmers' professional skills and know-how by improving the educational and training potential
2. Support and funding of advisory services with the view of a stronger specialisation of advising in the sense of real specialised skills
3. Simplification and/or transformation of complex issues (i. e. market mechanisms) and practical solutions

Recommendations

The workshop made it clear that information exchange with the view of a fair partnership in Europe is of particular importance. In times of an increasing integration of nations in supranational political and economical mechanisms, it is important to evaluate correctly the situation of the „neighbour" and to provide help according to the given possibilities. Moreover, the representations of the partners from the Eastern European countries have

already contained very concrete representations about a potential, more intensive cooperation - here, the example of IT in agriculture.

Collective platforms for the co-operation must be found out. Funding possibilities and bases for collective project activities are to be verified and be extended. A first step towards the right way is to intensify contacts between already existing and newly founded national organisations for informatics in agriculture. Countries such as Poland, Hungary or Slovakia are about to found such organisations and wish for their integration to corresponding multi-national top organisations, such those already existing in Europe, in addition to the concrete aid during this founding and structuring phase. The newly founded EFITA (European Federation for Information Technology in Agriculture) is a step towards this way.

The workshop participants agreed that this form of co-operation is very effective and should be actively continued in future.

Dissemination

The complete report is available at www.efita.org or can be ordered via fax or e-mail at the FCL e.V. Bonn

Fax: +49-228 371 884

e-mail: fcl-bonn@t-online.de

Publications

Jürgens, P. (ed.) 1996. Application of Information Technology Transfer in Agriculture in Central and Eastern Europe. Final report of EUNITA Working Group G.

8 FARM-SCALE MODELING OF GRAZING LIVESTOCK SYSTEMS

Working Group H

Summary

A framework for modelling the production and environmental impact of European grazing livestock farms has been produced. The framework is intended to provide a skeleton which modellers can use as a starting point for different applications and to encourage re-use of information and submodels. The framework consists of a class diagram, showing the major components and their interconnectivities, and an outline of the basic operations that must be performed. Documentation and coding for the framework in C++ and Delphi are available on the WWW.

Specific objectives

- | |
|---|
| 1. A report on modeling grazing livestock systems with particular emphasis on combining models developed in different countries to an overall model including components common to all European grazing livestock systems |
|---|

Members

Nick Hutchings, DIAS, DK	Alan Sibbald, Macaulay, UK
Alberto Melacini, Macaulay, UK	Angel Mantecon, CSIC, ES
Egbert Lantinga, WAU, NL	Fergus Mould, NCRI, NO
Francoise Vertés, INRA, FR	Lars Fischer, Dina, DK
Toon van der Putten, WAU, NL	

Meetings

Wageningen Copenhagen

Objective 1. A report on modeling grazing livestock systems with particular emphasis on combining models developed in different countries to an overall model including components common to all European grazing livestock systems

Introduction

Grazing livestock farming is of economic importance for many rural areas in Europe. Such farming has both positive and negative effects on the environment (Phillips and Sørensen, 1993). In mountainous and low-lying areas, the traditional grazing of livestock has generated picturesque landscapes, often with a high value for nature conservation. Examples of such systems can be found in the Pyrenean mountains of Spain or the wetlands of the Carmargue in France. Elsewhere, the intensive farming of grazing livestock has contributed to nitrate

leaching and ammonia volatilisation, which has had a detrimental effect on aquatic or sensitive terrestrial ecosystems (Sutton et al, 1998).

Modelling is one method by which the costs and benefits of grazing livestock systems can be assessed. Across Europe, the objectives for grazing livestock systems and the economic and physical circumstances under which they operate vary widely. A single model is not suitable for all objectives and geographic locations; models have to be developed for particular purposes and adapted to local conditions. The rationale behind the establishment of EUNITA Working Group H (WG-H) was that there were sufficient similarities between grazing livestock systems within Europe that some of the knowledge gained modelling in one geographic location should be of value elsewhere. The objective of WG-H was to encourage this transfer of knowledge and thereby reduce duplication of effort. WG-H chose to fulfil this objective by developing a modelling framework for grazing livestock farming, the function of which is to provide a skeleton upon which model applications can be constructed.

Methodology

The method of development adopted by the Group was to start by agreeing a simple, conceptual modelling framework that was applicable to all grazing livestock farms in Europe. Through a combination of discussions and field visits, progressively more detail was added to this framework. At each stage of development, the question was asked 'Can a modelling framework operating at this scale potentially describe all farms or are separate frameworks required?' The modelling framework was considered to be capable of describing all farms if differences between farm types could be accommodated either by omitting one or more components or by varying the values assigned to parameters. The choice of participants was designed to cover the range of animal, plant and soil sciences that must be employed to describe grazing livestock farming. The varied geographic origins of the participants also allowed the field visits to cover a range of geographic locations and farming intensities.

Results

Many of the discussions within the Group focussed on the level of detail with which the components of the farm should be represented and the connectivity between components. Too coarse a representation would have made the framework trivial whilst excessive complexity would have made it hard to understand and too application specific. The conclusion of the Group was that the framework should distinguish between two types of grazing livestock farm within Europe:

Extensive systems: In extensive systems, the farmland is dominated by communities of indigenous or semi-natural plant and if divided into fields or paddocks, these are sufficiently large to permit animals substantial choices of graze and browse.

Intermediate/intensive systems: In intermediate/intensive systems, the grazed land will generally be divided into fields, each containing one or two main sown species of pasture or arable crops, as illustrated in Fig 2. Modelling of these plant species is feasible as their ecology, in comparison with that of the indigenous and semi-natural species, is well described. Farm management, in the form of such things as ploughing and fertilisation, have a substantial affect on both production and the impact of the system on the wider environment. This demands the use of more complex models of animal, plant and soil processes than for the extensive systems.

The modelling framework is shown in Figure 8.1.

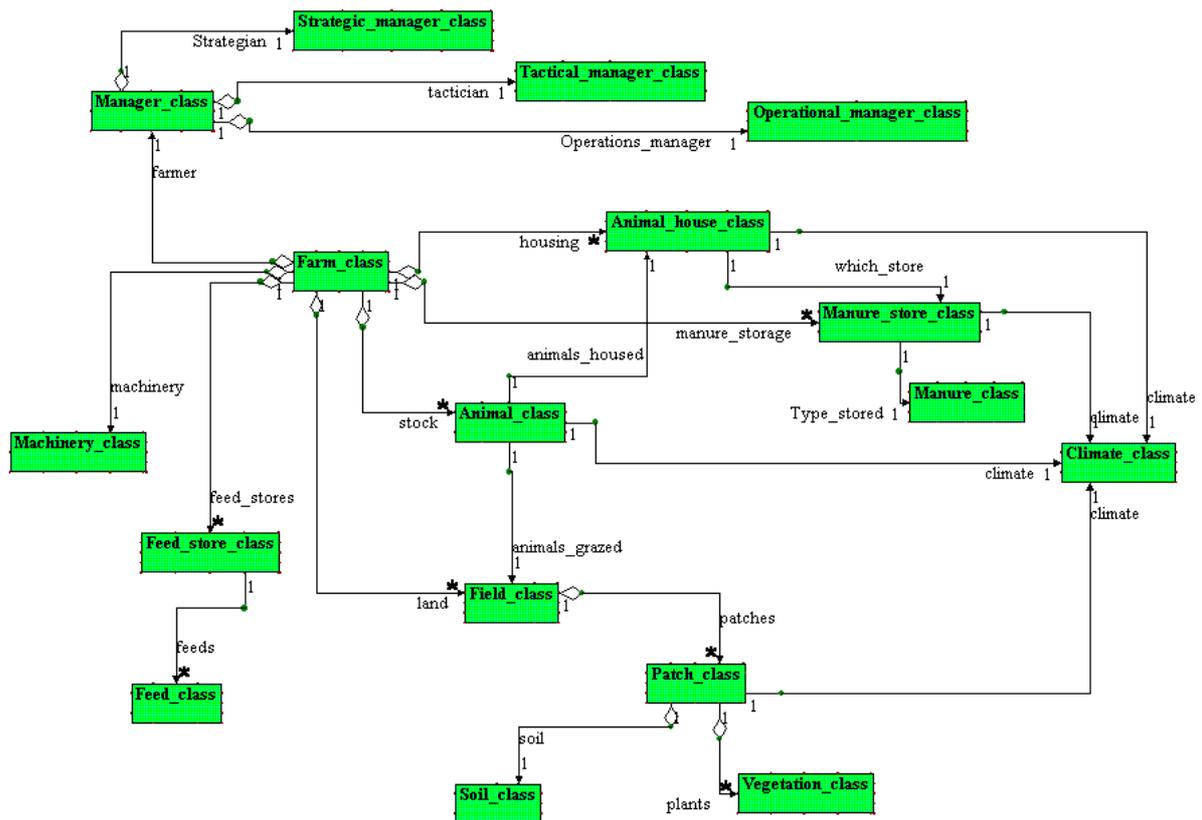


Figure 8.1 The modelling framework

The group undertook a number of case studies, in which we proposed how we would apply the framework:

- Case 1: Extensive dryland grazing system, S.W.Spain
- Case 2: Extensively grazed mountain pasture, N.Spain
- Case 3: Intermediate livestock farming, Brittany, France
- Case 4: Intensive livestock farming, S.W.England

Discussion and recommendations

A framework for modelling the production and environmental impact of European grazing livestock farms has been produced. The framework is intended to provide a skeleton which modellers can use as a starting point for different applications and to encourage re-use of information and submodels. The framework consists of a class diagram, showing the major components and their interconnectivities, and an outline of the basic operations that must be performed.

It is recommended that the framework for modelling the production and environmental impact of European grazing livestock farms is used and further developed by researchers working on this subject.

Dissemination and publications

Documentation and coding for the framework in C++ and Delphi are available on the WWW.

Hutchings, N., Sibbald, A., Melacini, A., Mantecon, A., Lantinga, E., Mould, F., Vertés, F., Fischer, L. & van der Putten, T. 1997. A modelling framework for grazing livestock farming. <http://www.efita.org/eunita/h/webreport1.asp>

9 DECISION SUPPORT UNDER RISK

Working Group I

Summary

Farmers have always had to manage risk, but this aspect of farm management may become more important in future. The reason is the widespread trend affecting agriculture in many countries towards a more open market structure.

Two seminars arranged by Working Group I provided opportunities for a broad range of researchers to meet and discuss risk management in agriculture. A large number of papers were produced for the seminars, and new ideas and methodologies were efficiently spread.

Specific objectives

1. A review of research and development in agricultural decision support system specifically designed to take account of decision making under risk
2. A test example of building a subject specific network preparing reviews by means of electronic communication

Members

Iver Thysen, Dina, DK

Ruid Huurne, WAU, The Netherlands

Meetings

Wageningen, 7-10 January 1996

Copenhagen, 23-24 January 1997

Objective 1. A review of research and development in agricultural decision support system specifically designed to take account of decision making under risk

Introduction

Agriculture is constantly changing. The lack of certainty about the future creates risk, which may be defined as exposure to the chance of injury or loss. Profit can be viewed as a return for managing risk. Without uncertainty and risk there may be no opportunity for profit. While farmers have always had to manage risk, this aspect of farm management may become more important in future. The reason is the widespread trend affecting agriculture in many countries towards a more open market structure.

Methodology

It was decided that the most fruitful way for Working Group I would be to support seminars dealing with the management of risk in agriculture.

Results

Two seminars were supported. The first one took place in Wageningen 7-10 January 1996. The seminar addressed the five following topics in risk management (1) sources and measurement of risk, (2) risk attitude assessment and riskbearing capacity of farmers, (3) risk management strategies, (4) agricultural applications of decision analysis, and (5) risk consideration in agricultural policy-making.

The second seminar took place in Copenhagen in January 23-24, 1997. This seminar concentrated on cattle and pig herd management and the application of decision support systems to manage uncertainty and risks. Topics treated were (1) simulation, (2) dynamic optimization, (3) knowledgebased systems, information technology and WWW, (4) monitoring and forecasting, (5) data analysis to determine the effects of management information systems and production systems, and (6) modelling disease spread and economic losses from diseases.

Discussion and recommendations

The two seminars provided opportunities for a broad range of researchers to meet and discuss risk management in agriculture. A large number of papers were produced for the seminars, and new ideas and methodologies were efficiently spread.

It is recommended that supporting seminars and other scientific meeting for European researchers within this topic is further supported.

Dissemination

The proceedings from both seminars have been published (see Publications).

Objective 2. A test example of building a subject specific network prepraing reviews by means of electronic communication

The intention was to create and operate a mailing list concerning decision making under risk in agriculture. Based on the rather few contributions to the general mailing list EUNITA-L it was, however, considered that the agricultural community was not yet mature enough for a very specialised mailing list. Objective 2 was therefore abandoned as not feasible.

Publications

Huirne, R.B.M., Hardaker, J.B. & Dijkhuizen (eds.) 1997. Risk Management Strategies in Agriculture. Proceedings of an international seminar, Wageningen, 7-10 January 1996. Mansholt Studies 7, 319 pp.

Kristensen, A.R. (Ed.) 1997. Proceedings of the Dutch/Danish Symposium on Animal Health and Management Economics, Copenhagen, January 23-24 1997. [*Dina Notat No. 56.*](#)

10 EUROPEAN ASSOCIATION FOR INFORMATION TECHNOLOGY IN AGRICULTURE

Working Group J

Summary

The objective of WG J has been achieved by establishing the "European Federation for Information Technology in Agriculture" (EFITA), which currently consists of 10 National Member Organisations (NMOs).

This was achieved by creating a European umbrella IT association which brought together all existing national associations for IT in agriculture (Germany, Netherlands, Denmark, France) and which fostered the establishment of new national associations (Georgia, Great Britain, Greece, Ireland, Italy, Spain).

The following results are particularly important in the development of EFITA and in assuring its viability after the termination of the EUNITA Concerted Action:

1. First EFITA European Conference, Copenhagen, June 15-18, 1997; the second is planned for Bonn, September 27-30, 1999.
2. EFITA web site (<http://www.efita.dk>).
3. Establishment of six new NMOs.
4. Ongoing assistance provided in establishing establish NMOs.
5. Arrangements to ensure the continuance of EFITA after the termination of EUNITA

Specific objectives

1. Compile a register of associates of IT in agriculture
2. Propose a charter of European Association
3. Organise a congress to establish new associations
4. Establish relationships with European associations in related fields
5. Develop the professional status of the association's membership
6. Assume secretariat functions of the association

Members

Houseman I., ADAS, GB	Dijkhuizen, A., Wageningen Agric. Univ., NL
Harkin M., ITC Associates, IE	Schiefer, G., Univ.of Bonn, DE
Waksman G., ACTA, FR	Gouveia, P., Confed. dos Agric. de Portugal, P

Meetings

Oxford	12-13 April 1995 (preliminary)
Paris	28 July 1995
London	28 November 1995

Introduction

WG J was essentially a set of administrative tasks to undertake the establishment of a pan-European association for information technology in agriculture through the collaboration of existing national entities and the creation of new national entities where none existed..

A Workplan for the conduct of the entire WG J objectives was drafted at a preliminary work group meeting, Oxford, April 1995. The Workplan contains a breakdown of all the objectives into a number of component tasks and sub-tasks and delegation of responsibility for the accomplishment of tasks among the working group and, where necessary, involvement of other working groups. The Workplan is provided here as the means by which WG J objectives were achieved.

Methodology (applied throughout all WG J objectives)

Breakdown of the objectives into a number of component tasks and sub-tasks and delegation of responsibility for the accomplishment of tasks.

Objective 1: Compile a Register of Associates of IT in Agriculture

Task 1.1: To list and make contact with existing associations of IT in agriculture.

Compile a list of associations and groups from EUNITA and other sources. Contact them by letter and inform them of EUNITA objectives; seek their co-operation; inform them that a short questionnaire for their members to express interest in the "European Association for Information Technology in Agriculture" will follow. In addition, request the acquisition of their charters of association (*see Task 2.1*) The compilation of the list of Associations is to be finalised at the first meeting of Working Group J, Paris, 28 July 1995.

Task 1.2: To develop an "Expression of Interest"

Document to be distributed among potential European Association members (via existing associations, etc.). This document will inform them of EUNITA objectives and contain a short questionnaire to collect contact details. Timeframe/activists: April/May 1995 (to be finalised as an outcome of the first meeting, WG J).

Task 1.3: To develop an Individual Profile Questionnaire

To collect/confirm contact details and description of professional activities and interests; information on Organisation Type (in which the individual works, if applicable) will also be collected. Timeframe/activists: April/May 1995 (to be finalised as an outcome of the first meeting, WG J)

Task 1.4: To develop an Electronic Questionnaire

Based on the IP Questionnaire, with a view to distribution on the Internet for access (and for data entry) via the EUNITA WWW server or by E-mailing it directly to end users which have been identified. Timeframe/activists: Sept 1995; G Waksman/WG A; Trento WWW group.

Task 1.5: Distribution of the Questionnaires.

This is a two-part process: the Expression of Interest questionnaires will be distributed first; following their return (*see Task 1.6*), the Individual Profile questionnaires will be distributed

to those who responded. The particular national situation will determine the method of distribution of the questionnaires:

(i) Where a National Association **exists**: request the Association to inform its membership about the questionnaire via Newsletter, and/or to distribute the questionnaires directly to its membership. Timeframe/activists: Sept 1995. WG J members, Management members

(ii) Where a National Association **does not exist**: nominate national contact points (NCPs) in each country which has no formal Association to assist in identifying suitable end-users and distributing the questionnaires among them; the NCPs may, in turn, identify intermediaries to assist them in the distribution task. Timeframe/activists: Sept/Oct 1995. WG J members, Management members.

(iii) Electronic Questionnaire: provide the electronic version developed in Task 1.4 for distribution on the Internet for access (and completion) via the EUNITA WWW server or by E-mailing it directly to end users which have been identified. Timeframe/activists: Sept 1995. G Waksman/WG A; Trento WWW group

Task 1.6: Return of the questionnaires and data loading.

On completion, the questionnaires will be returned to G. Waksman (Work Group A) for data entry into the EUNITA Information Database and for distribution over the communication network. Following this process, the Individual Profile Questionnaire will be distributed to the respondents of the Expression of Interest questionnaires to collect/confirm contact details and description of professional activities and interests, etc., (as described in Task 1.3). Timeframe/activists: Sept 1995 onwards. G Waksman/ WG A.

Results

All the tasks specified under Objective 1 above were undertaken as planned, questionnaires designed and distributed, and the loading of data was initiated by WG A as an ongoing process. The user profile questionnaires, which were developed in cooperation with WG A, are presented in the WG A report.

A list of IT associations in Europe (GIL, Germany; VIAS, Netherlands; DSIJ, Denmark; AFIA, France) and other related groups was compiled and approached; charters (statutes) of their associations were requested.

Objective 2: Propose a charter of European association

Task 2.1: Collect charters of all existing national associations

Initiated under Task 1.1

Task 2.2: Translation of charters into English (if required).

The National Associations will be requested to provide an English language version of their charters (statutes), and the assistance of EUNITA members or national contact points will be solicited if necessary. It is not expected that professional translations will be needed.

Timeframe/activists: *Request under Task 1.1, August 1995*

Task 2.3: Analysis of charters

With a view to determining "commonality" and listing items for inclusion in the proposed European charter. Timeframe/activists: Sept/Oct; WG J

Task 2.4: Compilation of a draft European Association charter/statutes proposal.

This will present the aims, rights, privileges, etc., of the European Association as well as the organisational structure, rules, regulations, financial matters, etc.

Submission of a draft version to the National Associations for their contributions and approval. Preparation of final version. Timeframe/activists: Sept/Oct 1995 ; WG J, EUNITA Management Board

Task 2.5: Stimulating the development of National Member Organisations (NMOs)

Where National Associations do not exist. This will be undertaken by identifying national contact points whose function will be to promote the NMO concept among the agricultural IT community with a view to establishing national entities. Ongoing assistance will be provided to this process by WG J via personal contact, email communication and the WWW.

Timeframe/activists: Ongoing; WG J, all EUNITA participants.

Task 2.6: Inauguration of the European Association and founding of the General Assembly.

The establishment of the Association and election of officials (inauguration of Association and founding of the General Assembly) will follow the acceptance of the Statutes by the Management Board and NMOs, early in 1996.

Objectives: to convene potential Association voting members, elect a General Assembly and legally establish the Association. Following the establishment of the General Assembly, the Executive will be elected; the Executive will then appoint a General Secretary and Secretariat.

Results

Charters were collected from existing associations and analysed, and common ground sought from which to draft a set of Statutes for the new association - to be considered by the National Associations and the EUNITA Management Board. The final draft was produced by the EUNITA Board at the WG J meeting, London, 28 November 1995 for presentation to the inauguration meeting of the European Association for its acceptance.

It was further proposed to name the Association: "European Federation for Information Technology in Agriculture" (EFITA),

It was decided to hold the Inauguration of EFITA in Brussels on 19 February 1996; Working Group leaders, the EUNITA Management Board and representatives of the National Associations were invited to attend.

The stimulation of the development of National Member Organisations (NMOs) - in those countries where National Associations did not exist - was undertaken. National contact points were identified and contacted in a number of countries and assistance was provided to them to set up NMOs. In Ireland, Italy and Great Britain NMOs were established prior to the inauguration of EFITA.

The inauguration of EFITA took place in Brussels, 29 Feb 1996. The Inauguration document was signed by seven NMOs - GIL (Germany), VIAS (Netherlands), DSIJ (Denmark), AFIA (France), ISITA (Ireland), BAITA (Great Britain), AITICA (Italy) - on the basis of the draft statutes, subject to ratification by their legal bodies at the founding of the General Assembly of EFITA.

The founding of the General Assembly of EFITA took place in Wageningen, The Netherlands, on 17 June 1996. Based on the membership numbers of the National Member Organisations, the voting eligibility and delegate composition of the six participating NMOs was as follows: GIL (Germany-3) VIAS (Netherlands-3) DSIJ(Denmark-1) AFIA (France-1) AITICA (Italy-1) ISITA (Ireland-1). **BAITA (Great Britain) was, for logistical reasons, unable to participate in the General Assembly.** The General Assembly was an open meeting and constituted the first Annual General Meeting of EFITA.

Objective 3: Organise a Congress (Conference) of the European Association

To plan and organise the Conference by drawing on members of existing associations and on others interested in establishing national organisations where none currently exist.

Task 3.1: To formulate a Programme for the Conference.

Papers to be invited from the international community. Results of the EUNITA Concerted Action, where available. Venue and Date: Copenhagen, 15-18 June 1997.

Timeframe/activists: Ongoing; WG J, Management Group, Work Group Coordinators, Ad hoc groups (National Organising Committee, International Scientific Committee).

Task 3.2: Promotion

- Announcement at "Computers in Agriculture" Conference, Netherlands, June 1996
- Internet and e-mailshots
- EUNITA Newsletter
- National Associations
- Journal advertisements
- Conference Programme (Agenda) circulation via same agencies
- Other means (EFITA website)

Timeframe/activists: Ongoing - June 1997; WG J, EUNITA members, national contact points, National Associations.

Task 3.3: Conference organisation and administration

This task will involve the actual Congress bookings, billings, hotel reservations, conference hall arrangements, congress fees, hospitality, etc. It will be necessary to engage a professional agency to manage this function. However, close liaison will be required between EUNITA and the Congress management agency. Effective budgeting procedures will be established.

Timeframe/activists: November 1996 - June 1997; WG J, national contact points.

Task 3.4: Publication of Conference Proceedings

The proceedings will be published in both hard copy and on the Internet; refereeing, editing, standardisation, collation, etc., will be required. Timeframe/activists: Nov 1996 - July 1997; WG J, Coordinator.

Results

A National Organising Committee and International Scientific Committee were set up to deal with secretarial functions of the Conference (i.e. refereeing conference papers, conference website, formatting and printing of the proceedings, technical equipment and technical assistance). A professional agency, International Conference Services A/S, was engaged to handle the practical arrangement (i.e. registration, accommodation, catering, payments, etc.).

The EFITA website was implemented (<http://www.efita.dk>) by WG J and the Coordinator in December 1996 on the Dina server, Denmark (Ref: Annex 110.7 EFITA website). The Conference was actively promoted on the site, by emailshots, mailing lists, electronic newsletters, etc.

The call for papers, which was circulated widely in late summer 1996, attracted about 170 proposed papers, of which some 100 were accepted for presentation; the majority of these focused on practical and applications issues. The number of participants of the conference amounted to 197; about 20 spouses were registered. Participants had access to a number of computers with Internet connection, and these were intensively used for e-mail reading and discussions on Internet applications.

A number of new applications were presented at the conference; in particular, a large number of Internet applications for agriculture gave evidence for a quickly growing interest for using this new medium. User friendliness of agricultural software was also in focus, and some new ways of creating "software for farmers by farmers" attracted considerable attention. The closing session suggested that the next conference should aim at being more focused on some important themes, without losing the broadness which will permit new ideas to be put forward. It was also suggested that the presentations should be more targeted at establishing interdisciplinary and international cooperation.

The conference proceedings were published in hard copy in June 1997: "Proceedings of the First European Conference for Information Technology in Agriculture", Edited by H. Kure, I. Thysen, A.R. Kristensen, ISBN 87 7432 465 9. They were also published on the Internet in June (<http://www.efita.dk/conf>).

A copy of the Conference Programme, Conference Proceedings and a list of participants, along with the Conference Programme, were sent to the Commission, 16 June 1997, and will not be annexed here.

The Second General Assembly of EFITA, Copenhagen, 16 June 1997. EFITA's General Assembly was held to coincide with the conference. The most significant event was the enlargement of EFITA to 10 members by the federation of NMOs from Spain, Greece and Georgia (Ref: Annex 10.6 Minutes of the General Assembly, Copenhagen; Annex 10.8 EFITA NMOs)

Objective 4: To establish relationships with European associations in related fields

Task 4.1: Identify appropriate associations in agricultural disciplines and in IT fields

E.g. software houses, agriculture machinery, veterinary, agribusiness. The task of identification can be approached via the national associations, national contact points, journals/listings. Timeframe/activists: June 1996 onwards; WG J, Management Group

Task 4.2: Approach the identified associations with a view to establishing relationships

This will be undertaken by contact through letters/newsletters, exchange of information, attendance at Conferences, etc. Timeframe/activists: June 1996 onwards; WG J, national contact points, EUNITA Members.

Results

Informal contact was established with a number of organisations and agencies related fields in (DLG, International Assoc of Agric Librarians and Documentalists (IAALD), Elsevier -

Computers and Electronics in Agriculture, EurAgEng -agricultural engineers, EAAE - agricultural economists, etc). Although formal collaboration was intended, through cross-publication and exchange of information (activities, news, etc.) on each other's web sites, this has not yet occurred; such collaboration requires an active input from all parties and is expected to take some time to yield the desired outcome. Contact will be renewed and maintained.

Objective 5: Develop the professional status of the membership

By arranging for the exchange of information, provision of training, specialised workshops, circulation of software catalogues, etc.

Task 5.1: Exchange of information

By newsletter, W W W, E-mail. Timeframe/activists: Ongoing since May 1995; Coordinator, WG J.

Task 5.2: Training / specialist workshops

By identifying areas and needs; by developing a Training Prospectus/special newsletter / catalogue; by identifying organisations which can conduct relevant courses. Contributions will be required from Work Groups F (Application of IT in Southern Europe) and G (Application of IT transfer in agriculture in Central and Eastern Europe). Timefram/activists Ongoing since May 1995; individual WGs.

Task 5.3: Software catalogues and promotion of standards

By circulating information on the content and availability of agricultural software products via newsletters, W W W, E-mail and by encouraging the adoption of quality standards in the workplace among the membership (e.g. ISO 9000). Timeframe: Ongoing; WG B.

Results

Information was exchanged by newsletter, W W W, E-mail. The EUNITA and EFITA websites were information nodes and the mailing lists on both sites were utilised by the membership (and others) to exchange information: to communicate requests, queries, notices, announcements, etc. Information on the content and availability of agricultural software products was circulated by the same media.

Special workshops, dealing with specific topics were organised: e.g. Internet applications in agriculture (Dublin, February 1970), Agricultural Extension Services and the Internet (Alberese, September 1997), CD ROMs in agriculture (Paris, November 1997). These were well attended events and regarded as being highly successful; hands-on training/instruction was provided at the Dublin and Alberese venues. However, a more structured procedure for training provision and for the development of the professional status of the membership is recommended as EFITA matures.

Objective 6: To assume secretariat functions

To take over functions such as registration of members, operation of data bases, production and distribution of newsletters, etc. To ensure that these functions could be successfully taken over by the EFITA at the termination of the EUNITA concerted action, a budget and

business plan would be required to ensure the economic viability of the venture. In addition, the approval of the General Assembly (GA) for this course of action would be required.

Results

The results are best summarised by the following extracts from the minutes of The Second EFITA General Assembly, Copenhagen, 16 June 1997, which deal with the EFITA budget and election of officers for the period after the termination of the EUNITA Concerted Action.

Approval of Budget: The EFITA budget, prepared by the Management Board, was presented to the GA:

Costs: these are composed of three major elements:

Operational costs	5 000 ECU
WWW services	10 000 ECU
Journal activities	5 000 ECU
Total	20 000 ECU

Revenue: The proposed NMO contribution is 2.50 ECU per individual member (subject to acceptance by the NMOs).

NMO contribution 1998: 3750 ECU (NMO membership 1997: 1500 members x 2.5 ecu)	NMO contribution 1999: 5000 ECU (NMO membership 1998: 2000(+) members x 2.5 ECU)
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The proposed NMO contribution would cover approximately 25% of the total costs; it was further proposed that collection of contributions would be initiated late in 1997 for funding activities in 1998. The Operational Costs are the first priority.

Sponsorship is required to cover the remainder of the costs; the priority is WWW services followed by Journal activities. The budget and NMO contribution was accepted unanimously by the delegates (the NMOs subsequently approved the contribution). It was agreed that a Business Plan for EFITA would be drafted.

Election of Officers

Outgoing Board (1996-1997)	New Board (1997-1999)
Pres: G Schiefer (DE)	Pres: Iver Thysen (DK)
Pres-Elect: Iver Thysen (DK)	Pres-Elect: A Dijkhuizen (NL)
Sec Gen: M Harkin (IE)	Sec Gen: M Harkin (IE)
Members: JM Attonaty (FR) G Bonati (IT) A Dijkhuizen (NL)	Members: JM Attonaty (FR) G Bonati (IT) C Noell (DE)

The GA which was attended by 60 people.

Publications

Kure, H., I. Thysen & A.R. Kristensen (eds.). 1997. Proceedings. First European Conference for Information Technology in Agriculture. The Royal Veterinary and Agricultural University, Copenhagen, Denmark, 15-18 June 1997. 500 pp.

11 Co-ordination

EUNITA Management Board

Summary

The members of the EUNITA Management Group were a panel of experts, the working group co-ordinators and the project co-ordinator. The Management Group met bi-annually. It took the strategic decisions concerning the project, supervised the progress of the project and the working groups, and maintained the connections between the project and important groups and organisations in the countries the members represented.

The EUNITA Management Group contributed significantly to the successful completion of the project and it was a major factor in assuring that the project's activities followed the general trends in the development of IT in agriculture in Europe.

The project co-ordinator fulfilled his duties as stipulated in the co-ordination objectives.

Specific objectives

1. Co-ordination of the concerted action and scientific and fiscal responsibilities to the Commission of the European Community
2. Participation in major events organised by the EUNITA Working Groups
3. Establishments of contacts to individuals and organisations within agricultural information technology, in particular through production of an EUNITA newsletter and contributions to the use of electronic communication and databases
4. Production of specific reviews on strategic subjects within agricultural information technology
5. Reports of the progress in the concerted action to the Management Board and organisation of board meetings with Working Group organisers
6. Final report on the concerted action with evaluations and recommendations

Management Board Members

Expert Panel	Working Group Organisers
Dijkhuizen, A., NL	Bonati, G., IT
Flensted-Jensen, M., DK	Caridad y Ocerin, J.M., ES
Jacucci, G., IT	Graumans C., NL
Schiefer, G., DE	Jürgens, P., DE
Sideridis, A., GR	Houseman I., GB
Talbot, M., GB	Hutchings, N., DK
Wahl, V., FR	Kamp, J., NL
M. Harkin, IE	Steffe J., FR
	Waksman G., FR

Management Board Meetings

Trento, Italy, 7-8 April 1995	Foulum, Denmark, 21-24 September 1995
Brussels, Belgium, 1 March, 1996	Athens, Greece, 25-26 October 1996
Copenhagen, Denmark, 15 June 1997	

Objective 1 Co-ordination of the concerted action and scientific and fiscal responsibilities to the Commission of the European Community

The rules for conducting the concerted action were agreed with the Management Board and made known to all members through the Working Group organisers. Special forms for requesting refunding from the project were worked out and used by all members. The co-ordinator established a secretariate, which maintained book keeping and payments. Some of the co-ordination functions were gradually transferred to Working Group H.

The concerted action were carried out efficiently concerning formalities and fiscal responsibilities, and with a minimum of administrative overheads.

Objective 2 Participation in major events organised by the EUNITA Working Groups

The co-ordinator participated in all EUNITA workshops and conferences, and in a high number of Working Group meetings.

Objective 3 Establishments of contacts to individuals and organisations within agricultural information technology, in particular through production of an EUNITA newsletter and contributions to the use of electronic communication and databases

The co-ordinator established the EUNITA homepage and the EUNITA mailing list in collaboration with Working Group A at the very beginning of the project. The co-ordinator was throughout the project the main responsible for the EUNITA homepage, which served as the main route for disseminating information about EUNITA and establishing contacts to individuals and organisations within agricultural information technology.

Three EUNITA Newsletters were produced and distributed to individuals and organisations within agricultural information technology. In the course of the project, nearly all individuals and organisations in the address list used for distributing the newsletters provided email addresses, and it was then considered more efficient and timely to use the EUNITA mailing list and homepage to distribute information about EUNITA.

Objective 4 Production of specific reviews on strategic subjects within agricultural information technology

See publications at the end of this chapter.

Objective 5 Reports of the progress in the concerted action to the Management Board and organisation of board meetings with Working Group organisers

Five meetings of the Management Board and the Working Group organisers were held during the project. The progress in the concerted action were reported in each meeting, and all Working Groups reported progress and future plans. The Management Board meetings agreed on strategic decisions concerning the concerted action, discussed the relationships with important organisations and institutes within agricultural information technology, and implemented the required measures to improve these relationships.

Objective 6 Final report on the concerted action with evaluations and recommendations

This report.

Publications

Thysen, I. 1994. Agricultural software development in the age of electronic communication. *Outlook on Agriculture*, 23, 257-260.

Thysen, I. 1995 Decision support in agriculture under uncertainty. In: A.J. Udink ten Cate, R. Martin-Couaire, A.A. Dijkhuizen & C. Lokhorst (eds). 2nd IFAC/IFIP/EurAgEng Workshop on Artificial Intelligence in Agriculture, Wageningen, The Netherlands, May 29-31, 1995. p 27-32.

Thysen, I & Hansen, J.P., 1995. Interactive tools to meet the needs of the user of agricultural information systems. In: B.M. Huirne, S.B. Harsh, A.A. Dijkhuizen (Eds.), *Farm Level Information Systems*, Conference Proceedings, Zeist, Holland, May 10-14, 1993. 139-149.

Jensen, A.L., I. Thysen, J.G. Hansen, T. Jensen, B.J.M. Secher & O. Juhl (1996). An information system for crop production on World Wide Web, 6th International Congress for Computer Technology in Agriculture (ICCTA'96), Wageningen, Holland, 6 pp.

Jensen, T. Hansen, J.G. Thysen, I. Jensen, A.L. & Boll, P., 1996. Regional agrometeorology on World Wide Web, International Symposium on Applied Agrometeorology and Agroclimatology, Volos, Greece, April 24-26 1996. Pp 293-297.

Jensen, A.L., Thysen, I., Boll, P.S., Hansen, J.G., Secher, B.J.M. & Juhl, O., 1997. Pl@nteInfo - Using the Internet for custom tailored crop information. Proceedings of the First European Conference for Information Technology in Agriculture (EFITA), Copenhagen, Denmark 15-18 June, 305-308