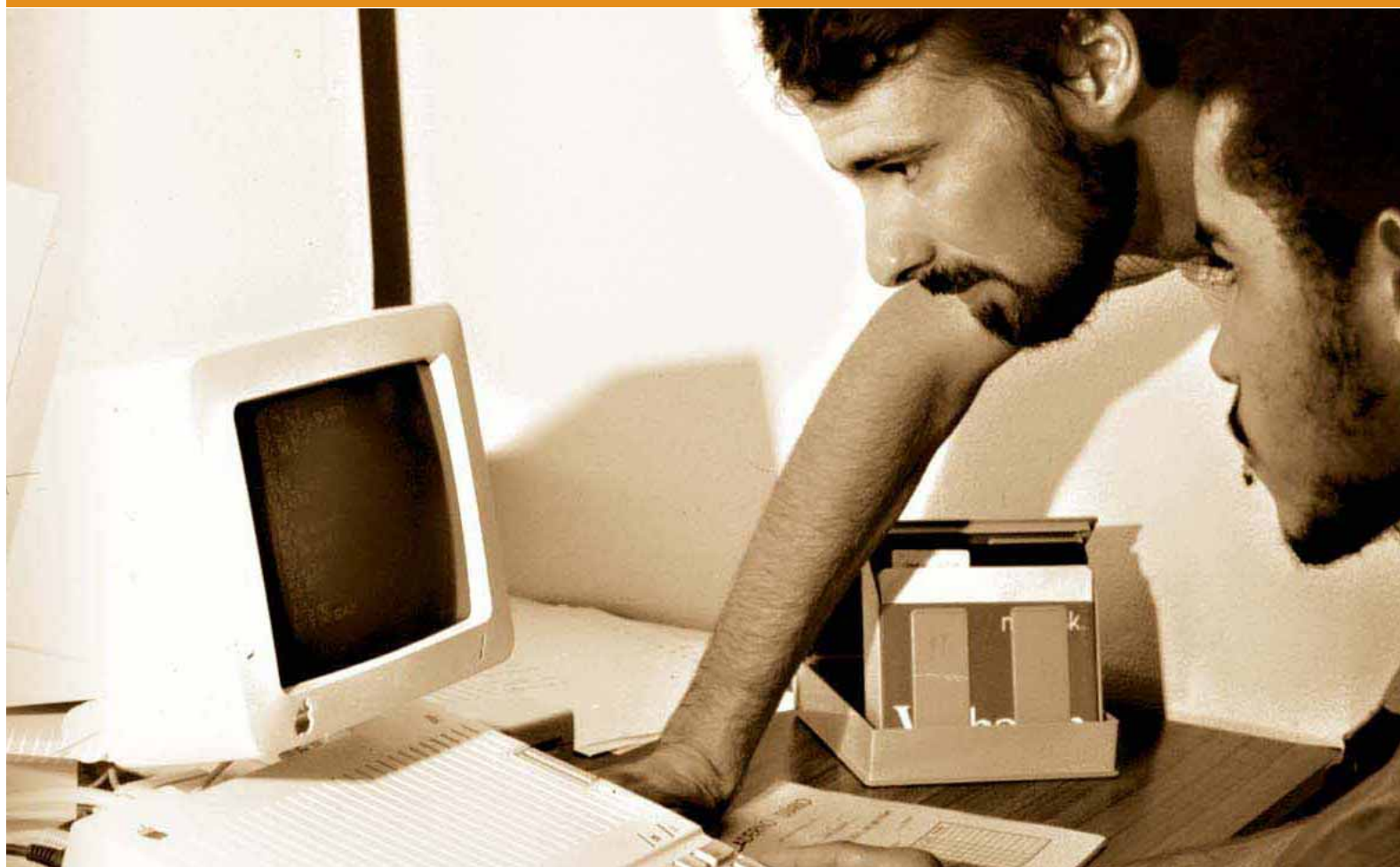


Computerizing agricultural cooperatives: a practical guide





Computerizing agricultural cooperatives: a practical guide

Preface

After more than a decade of liberalized market reforms and a continued decline in development assistance to agriculture, small farmer cooperatives in transitional and developing countries are having a particularly difficult time. Long accustomed to benefiting from government support to finance their investment needs and to operating in protected product markets, they now must operate in a much more open and competitive business environment. This will require major improvements in business efficiency and in the way in which cooperatives mobilize member capital to finance growth.

Computerization of cooperative business information systems can lead to large increases in efficiency and competitiveness. Unfortunately, the level of computerization of agricultural cooperatives remains alarmingly low. But this is changing as businesses in other sectors computerize and as competition with private firms increases. Many agricultural cooperatives, especially larger ones, are now beginning to think more seriously about the benefits that can accrue through computerization. Yet experience has shown that computerization efforts do not always succeed; they involve risk and failure can be costly.

So far, managers and board members interested in exploring the feasibility of computerization have no introductory reference to guide them in assessing the benefits, costs and risks involved. The manual's friendly format, with humorous drawings to illustrate difficult-to-understand points plus frequent reference to concrete examples, is meant to ease some of those concerns. We hope the formula works.

Maximiliano Cox

Director

Rural Development Division

FAO

Acknowledgements

In the spring of 2003, FAO commissioned regional issue papers to review agricultural cooperative experiences in computerization in Asia, Africa and Latin America. This was followed by a two-day international workshop on the topic held at FAO headquarters in October 2003.

One of the main findings of the regional papers was that the level of computerization in agricultural cooperatives in developing countries was low compared to other sectors and that this was having a negative impact on cooperative business performance. One reason for this deficiency was that there was a lack of practical guidelines, specifically targeted to agricultural cooperatives that they could turn to for help.

To address this issue, one of the outputs of the workshop was the preparation of an outline for these guidelines, which has served as the main basis for the development of this manual. Many people with experience in the computer field contributed to this effort and deserve mention. This of course includes the authors of the three regional papers: Roxana Bassi on Latin America, Drew Birnbaum on Africa and M.S. Sriram on Asia. However, a special note of thanks needs to go to Roxana, since she took on the difficult task of synthesizing the findings and recommendations from the three papers and the workshop and preparing the initial draft text.

Additional and useful comments on the draft text were received from others, including: Chet Aeschliman, Drew Birnbaum, Pekka Jamsen, David Kahan, Tida Kairusmee, Wim Polman, Francisco Proenza, and Fred Snijders of the Bank for Agriculture and Agricultural Cooperatives in Thailand and the Network for the Development of Agricultural Cooperatives in Asia (NEDAC) and to Bernard Kadasia, Regional Director of the International Co-operative Alliance (ICA) Office for Eastern, Central and Southern Africa whose strong support of our computerization project in Kenya served as one of the inspirations for this initiative.

Producing an interesting and readable guidelines manual on a topic like computerization is not easy. Fortunately, we had other help from Brian Ford who prepared the humorous drawings that have made the manual more entertaining and reader friendly, from Hazel Bedford who did the final edit and from Lorella Candido who prepared the page layout and cover design.

Finally, this manual would not have been possible without the solid support provided by my Director, Maximiliano Cox and Service Chief, Jennie Dey De Pryck, both of whom strongly encouraged the activity and ensured I had the time and resources to carry it through to the end.

John Rouse

Senior Officer

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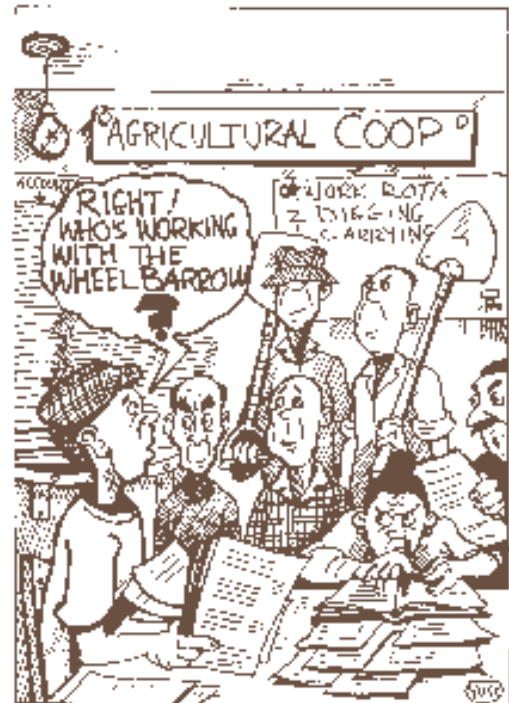
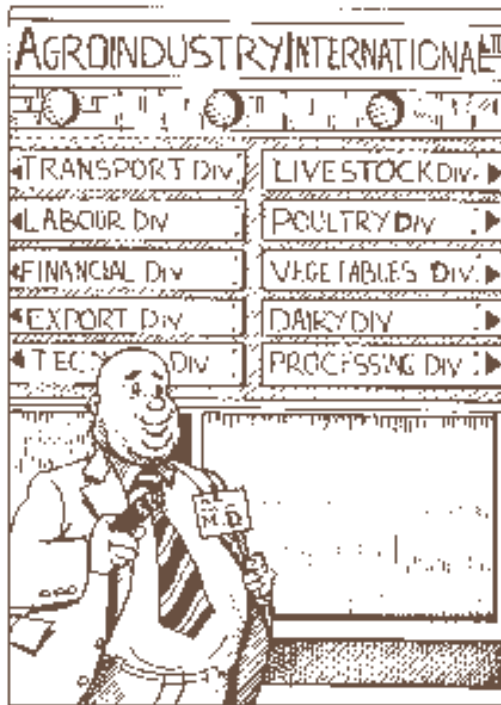
Rural Institutions and Participation Service

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1. Introduction



Agricultural cooperatives in developing regions are being hit from all sides. They are receiving far less support from government than they have in the past, and with the liberalization of agricultural markets, many of them are struggling to survive in an increasingly competitive business environment. Member services are declining and farmers are leaving. The world is changing and these changes tend to favour small, decentralized organizations that are able to respond rapidly to the ever-shifting demands of the market.¹

In large measure, this transformation is being enforced by the liberalization and globalization of markets and the growing use of information and communication technologies (ICTs). If agricultural cooperatives are to survive, they must learn how to compete. One obstacle to achieving this is that information-processing in farmer

cooperatives in developing countries is notoriously slow; most large cooperatives still operate with manual or semi-manual accounting systems. Such systems are labour-intensive to maintain, leave plenty of occasions for errors and create opportunities for abuse. It is difficult for managers to be competitive when they must work with outdated or inaccurate information.

The immediate advantage that computerization brings is the enhanced ability to handle large amounts of information. The introduction of modern information and communications technologies (ICTs) in cooperatives can significantly improve results: they can facilitate the collection, analysis, storage and reporting of information much faster and more accurately than could be accomplished using manual systems.

¹ Classical definitions of “information technology (IT)” tend to distinguish between computer hardware, computer software and telecommunications. “Information technology” comprises various technology elements that are used to collect, transform, manage or transmit data or information. These component technologies may exist alone or, more commonly, as part of systems which are themselves collectively becoming part of a larger “information infrastructure”. With the increasing importance of telecommunications, the use of the Internet and mobile telephony, and convergence of technologies, the preferred term information and communication technologies (ICT) is more comprehensive and appropriate.

Computerization also can help cooperative managers streamline operations, cut operating costs, enlarge their networks of members and affiliated institutions, increase sales and respond to signals from far away markets. Connecting to the global network of the Internet also has its advantages, allowing faster communication with members, partners and clients at a fraction of the cost.

Yet experience shows that the benefits do not come as quickly as might be expected. That happens because computerization is more than just a technical issue involving the installation and linking of a few computers and the development or use of appropriate software. It also means changes in work habits and the way people relate to one another; these behavioural and institutional changes cannot easily be predicted or planned for beforehand. They are the result of experimentation and innovation after adoption of the technology, and this can take time.

WHY THESE GUIDELINES?

Currently, those agricultural cooperatives considering computerization have no reference book to turn to for guidance. This manual is intended to help fill that gap and ensure that their first attempt to computerize will be a successful one. It is based on a review of computerization experiences in Asia, Africa and South America.

Intended readers:

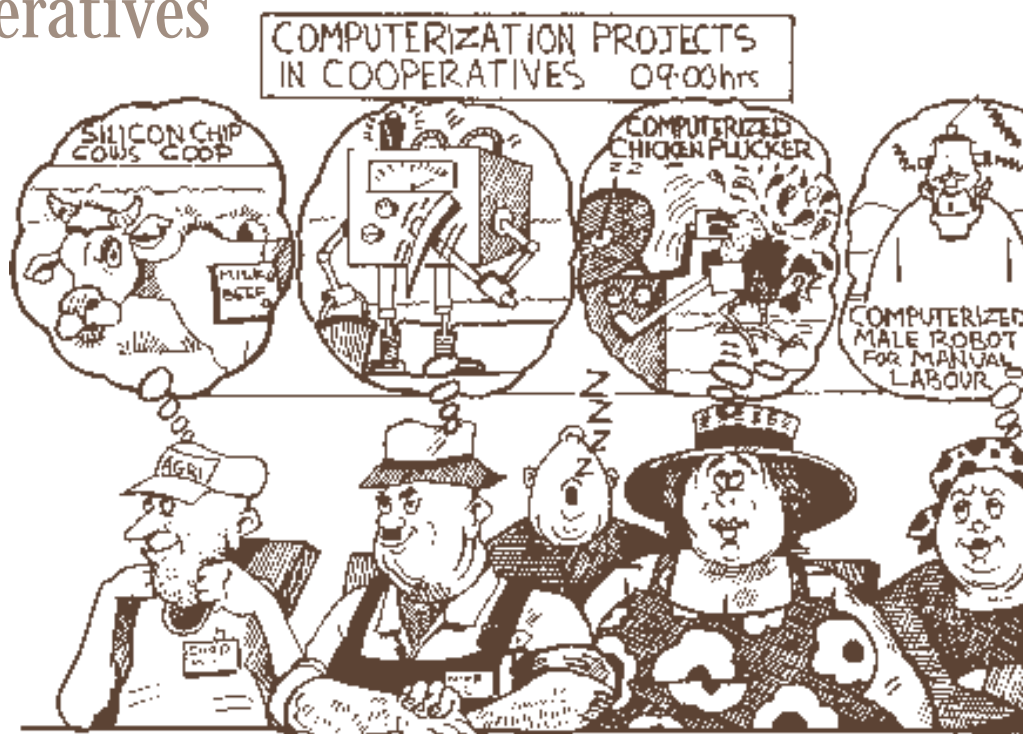
This manual is written for developing country cooperatives that are just starting to consider whether or not or how to computerize. Its intended target audience includes managers, trainers and policy makers with little experience in working with computers.

Structure and format:

The information in this booklet is presented in a simple, well illustrated and easy-to-understand style. It is supplemented by practical examples of how agricultural cooperatives in developing countries tackle computerization problems at local level. It is organized in the following sections:

1. Introduction to this manual.
2. Why should cooperatives computerize? Advantages and risks of computerizing.
3. The computerization project: stages of a typical computerization plan. Things to look for at each stage, advice and suggestions.
4. A case example of a cooperative that designs a computerization project, developed in more detail in the Annexes.
5. Conclusions and recommendations on the application of technologies in cooperatives.
6. Annexes: a glossary, references, a series of checklists, and more detail on the case study.

2. Computerization and agricultural cooperatives



So, you are thinking about computerizing your cooperative's bookkeeping and accounting system, just like the credit union next door has already done. Congratulations, but how are you going to do that!?

of your cooperative is worth investigating. So what are some of the things you need to think about before you proceed much further? What are some of the problems that you might have to confront? What are the priority business information needs of the cooperative that need to be addressed? How many computers will be needed? How much will all this cost? How long will it take?

A computerization project: an extensive task requiring concerted effort and planning, and dealing with the introduction of one or more computer technologies.

OK, you have seen computers used in other business and you know what a big difference they could make in helping you and your staff manage the cooperative business more efficiently and profitably, but your knowledge of how to install, operate and maintain computer systems is limited to what you have heard from others. For example, you know from the credit union manager that computerizing can cost a lot of money (members never like that), and a long time can pass before members see clear benefits. Therefore, convincing your staff, elected leaders and regular members will not be easy; nevertheless, you think the idea of developing a computerized information system specially tailored to meet the needs

The first thing you must realize is that every computerization effort is unique. While many of the steps in any computerization process may be similar, each effort is tailored to **fit the specific requirements of each cooperative** and will depend on the business activity focus, scale of operations, the external environment under which the cooperative operates and the specific information processing needs you want to satisfy through the use of this technology.

DEFINITION OF A COMPUTER SYSTEM

The second thing to remember is that any computerization effort involves the development of a computer system:

What hardware and software will be used, how this will be linked together and what the skill capacities are of the people who will use, operate and maintain these components. Most computer systems are composed of the following elements:

The **hardware**: consists of the physical equipment that will run (execute) the programmes. This includes computers, monitors, printers, CD ROM drives and hard disks (where data are stored).

If computers are going to be interconnected in a network (LAN or WAN) you will also need other hardware like network cards, network cables, hubs, routers, modems.

The **software**: a computer, by itself, can do nothing. It needs a set of instructions that tell it what to do, which operations to perform. These instructions are called "software programmes" that can be written and inserted into the machine by a local computer specialist or purchased through a large software company.

An **Internet connection**: nowadays, a modern computer system cannot be sustained if the cooperative does not have reliable, preferably high speed Internet access. Most of the software and firmware updates are now delivered through the Internet. Implementation will quickly run into overwhelming system problems without Internet availability.

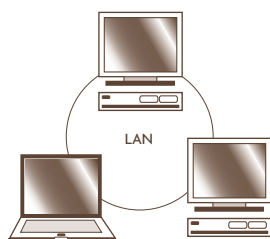
The **people**: qualified and motivated people are needed to design, programme, operate and maintain the systems. Selecting the right people to work on the project is important. Some of the base qualifications they should have include: age (18-30), highly motivated, logical and systematic approach to work, good math skills, accounting/information processing experience. Indeed, most problems occur because of lack of attention to this important variable.

The final output of any computerization project, however, is an **integrated functional system, existing in a local business environment that allows individual people to collect, share and process information using a specific set of software and hardware**. The complexity of the system will normally depend on the size and scale of operations of the cooperative involved as shown below:

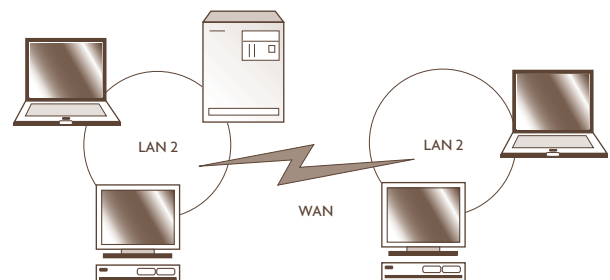
Initial Stage



Local Network



Large system



WHAT ARE THE BENEFITS OF COMPUTERIZATION?

If computerization is so risky and costly, then **why are agricultural cooperatives computerizing?** Mainly because they are beginning to realize that improving the efficiency with which they collect, analyze

and use information will help them achieve their business goals. The improvements sought fall in one, two or more of the areas shown in the figure below:



*Jawahar Shetkari
Sahakari Sakhar
Karkhana Cooperative,
Maharashtra, India
Computerization
of sugar processing
activities has led to
improved efficiency
and profits in this
agricultural
cooperative.*

In general, the expected benefits are related to the usual advantages of computerized information systems, i.e. their response speed, reliability and possibility to analyze large amounts of stored data; however, since one of your first tasks will be to convince yourself and doubting members about the actual benefits of computerization, collect as much information as you can on the real

experiences gained by other cooperatives nearby or in larger urban areas that have already computerized and can give you that information first hand. If you do not know where these cooperatives are located, contact your national federation of cooperatives. They should have a list of the names of these cooperatives and be able to tell you how best to contact them.

Based on our review of experiences used to prepare this manual, some of the benefits that computerization can bring to farmer cooperatives are likely to be in the following areas:

a) Business services and management:

- *Accounting and management:* computerization of accounting and administrative records (payroll, invoicing, accountancy, bookkeeping, purchases and sales) and tax requirements (assessment of taxes and duties) reduces paperwork and offers the possibility of keeping updated accounting records in real time.

*Githungiri Dairy Farmer Cooperative, Githungiri, Kenya
This large, 6000-member society, near Nairobi, used to employ a staff of 30 bookkeepers to maintain its manual accounting system. It is now computerizing. The savings will be passed on to members.*

*Muang Uttaradit Agricultural Cooperative, Thailand
The computer increases work efficiency, saves time, reduces mistakes.*

- *Inventory control:* product stock inventory records can be easily updated and additional information on production factors (agrochemicals, fertilizers, machinery, seeds), included. This allows for a better control of stocks, which can mean financial savings.

b) Governance and member relations:

- *Administration of member participation and member shares:* computerization allows for the

automated tracking of each member's transactions and balances and calculation of his/her patronage refunds and dividends on shares can be quickly done. This improves the quality of service offered to members.

The PIYELI women's group banking scheme in Bamako, Mali, was computerized in 1996 using the FAO MicroBanker computer system. Within 5 years, it was operating 4 branch offices and effectively handling 14,000 borrower clients!

- *Improving member-management relations:* automation allows for more frequent and detailed reporting to members by management and provides individual members with easier access to more detailed and current information on their business transactions with the cooperative.

*Wang-Nam-Yen Dairy Farmers Cooperative, Thailand
The membership database and raw milk collection records could be easily maintained on the computer.*

*Solidarité Financial Cooperative, Lome, Togo
computerization led to more accurate and frequent tracking of member transactions. 18 months after computerizing in 1992, membership had increased from 300 to 1,500 members, savings increased by 75% and member loans by 120%.*

- *Improved communication and information sharing:* computerization also broadens communication channels among members, suppliers and consultants, through the publication

of contents on Web sites with restricted access (intranets), delivery of news by e-mail, newsgroups and discussion lists for debating subjects of interest, electronic publications, and so on.

*Dairy Cooperatives in Gujarat, India
Some societies now use computerized electronic weighing and butter fat testing machines, and plastic card readers. This ensures fairer prices to members who sell their milk and faster reporting on member transactions*

c) Policy level:

- **Data access:** raw data² can be stored in digital format and accessed much faster. Using computer systems larger volumes of data can be easily saved and retrieved.
- **Turning data into policy decisions:** data can be more easily organized for analysis or presentation to assist in management and policy decision making. For example, cumulative historic production data can be analysed and future trends projected in order to plan future scenarios. Networked computers allow for multiple analysis of data in an easy way.
- **Optimization of procedures:** the logical setup of computer systems leads to a more unified way of doing things, easier compliance with regulatory and/or legal requirements, and better overall quality of the administration.

d) Capacity building in cooperative business management

- **Learning:** training in the use of computers to solve day-to-day cooperative business and member service problems helps in building new abilities in cooperatives' staff and members.

- **Real time information:** it allows for instant access to real business information that can be used to support staff training processes.

e) Mobilizing member capital

- **New services to members:** it facilitates the delivery of regular and frequent up-to-date information on each member's shareholdings, transactions and balances with the cooperative, and helps manage regular payment of patronage refunds. Return on member capital helps build confidence in the cooperative enterprise, thus encouraging members to invest more in their cooperative.
- **New mechanisms of member capitalization:** it also permits the introduction of new, more efficient mechanisms for mobilizing member capital, like deferred payment revolving capital funds that are difficult to administer using a manual system, keeps members regularly informed of changes in the value of their equity stake and ensures that deferred payments are revolved back to the members on schedule.

*Amalsad Multipurpose Cooperative Society, India
Computerization of the main office of this 2,300 member cooperative has increased the efficiency of its credit, petrol and fruit marketing services and allowed for the introduction of a more effective member capitalization system that links member use to member capital contribution*

² Data: collection of facts from which conclusions may be drawn. <http://www.dictionary.com>

f) Communicating beyond the boundaries of the cooperative:

- *E-mail, mailing lists, newsletters:* computers, connected via modems to the telephone system and to the Internet, permit the use of e-mail thus facilitating faster, cheaper and easier communication between managers and distant buyers and sellers of the cooperatives' goods and services.
- *Web sites:* a cooperative can easily create its own public Web site to provide members, non-members, and potential buyers and sellers information on the cooperative's performance and services.

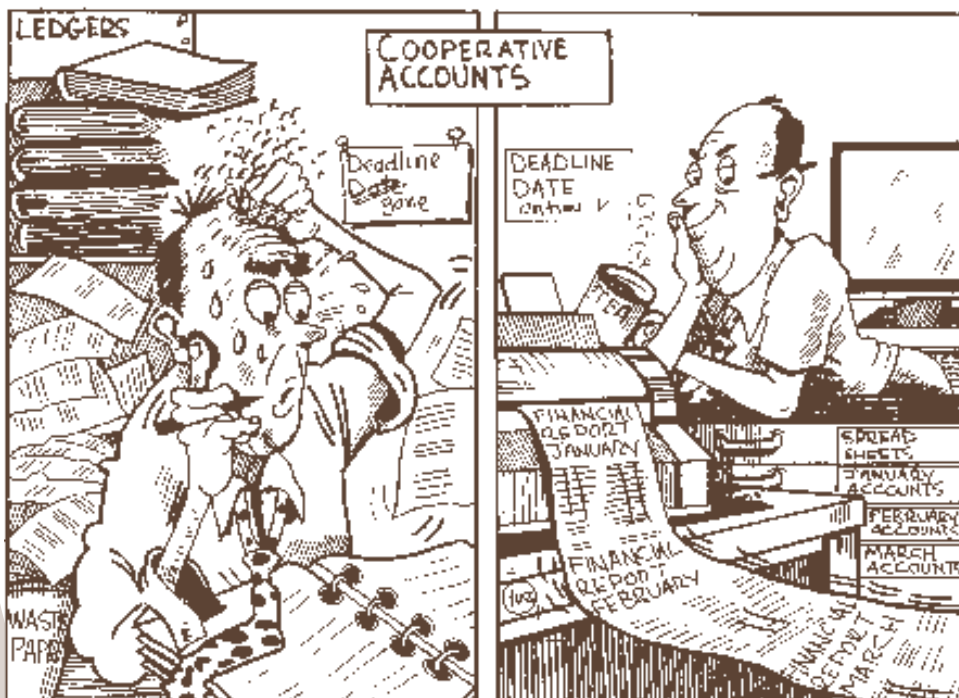
The National Dairy Farmers Cooperative (CONAPROLE), Uruguay
 Thanks to computerization, many members can now more easily send and receive e-mail, receive CONAPROLE news updates, access the Internet, market and weather information

- *Information networks:* intranets and extranets offer restricted access (password protected) to real-time information systems, for example, allowing members to check the status of their accounts.

In summary, there are lots of ways in which computer and telecommunications technologies can help agricultural cooperatives optimize their business results, solve problems, and assist in creating new member services or improving existing ones.

WHAT ARE THE COSTS?

Of course these benefits are not free; there are costs involved. Fortunately, in terms of hardware and software, the costs are relatively low and within reach of most mid-sized agricultural cooperatives. For example, the cost of a typical 2-3 computer system capable of handling large amounts of data is well below US\$5,000. Commercially available software programmes, like Microsoft Office® or Access® that enable computers to perform many of the information processing needs of a typical farmer cooperative are also fairly low cost,



averaging below US\$600 per copy.

Open Source software programmes, like Open Office or MySQL by Linux are even cheaper; in fact they are practically free³! The cabling and connection costs of linking the computers together in a network and accessing the Internet are also comparatively low.

Yet hardware and software costs are not the only costs. There are also “people-related” expenses to consider. Since the information processing needs of each cooperative are unique, these other expenses will depend on a host of factors, including:

- Size of the cooperative and volume of operations;
- Business activity of the cooperative;
- The type and number of computers and other supporting equipment to be used and;
- The kind of software selected, whether it is commercially available software or Open Source software.

For example, it is highly unlikely that either commercially available software or free Open Source software will uniquely fit the information requirements of any given cooperative. That being the case, adjustments will have to be made, and unless your cooperative is lucky enough to

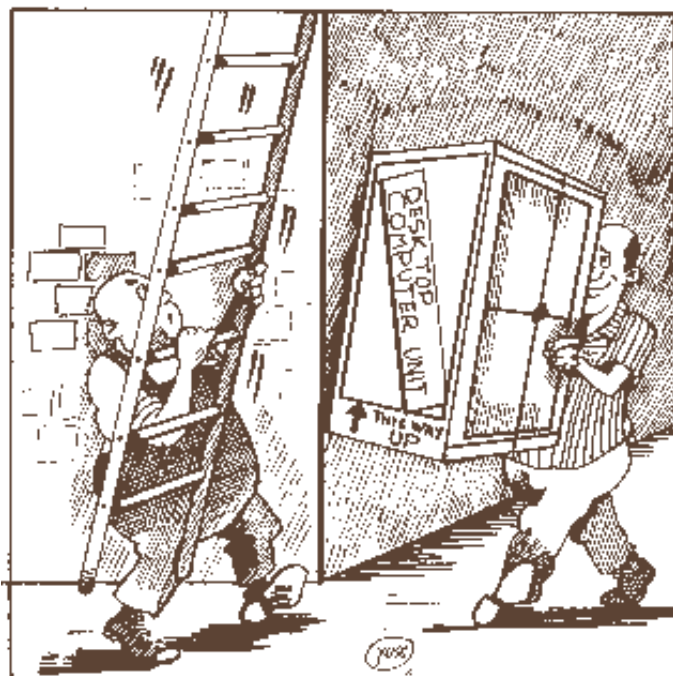
have its own in-house “computer whiz kid”, it is almost certain that you will have to hire qualified personnel to help customize the programme so that it meets your special needs-- and that costs money.

Then, there is the cost of the upkeep and maintenance of the equipment purchased plus the cost of upgrading the software used as new developments occur. These additional costs also need to be estimated. Finally, there is the cost of the training of the people who will use the system, not just the preparatory training at the start but the continued upgrade training of them as new developments and updates in software occur. These “people-related costs” are usually underestimated.

MANAGING THE RISKS

As with any other business initiative, there are also risks to consider. There is always something that can go wrong, and if the process is poorly planned and provisions have not been made to cope with the problem, solving it may end up costing the cooperative and its members a lot of money. The main way to manage these risks successfully is to plan carefully and adopt a project approach.

As shown in the table on the next page, the risks of computerization can be broken down into three main categories: (1) those risks due to external factors, most of which are beyond the control of the project; (2) those related to cooperative management and member acceptance of the proposed computer innovation, which are partly controllable by the project team, and (3) those which relate to the design and implementation of the project itself, which should be totally under



³ “Open Source software” is any software programme whose source code is made available for use or modification, usually free of charge.

the control of the project team.

Project success will be influenced by all three factors; however, the project team will have the most control over project-related risks, less over organization acceptance risks and the least control

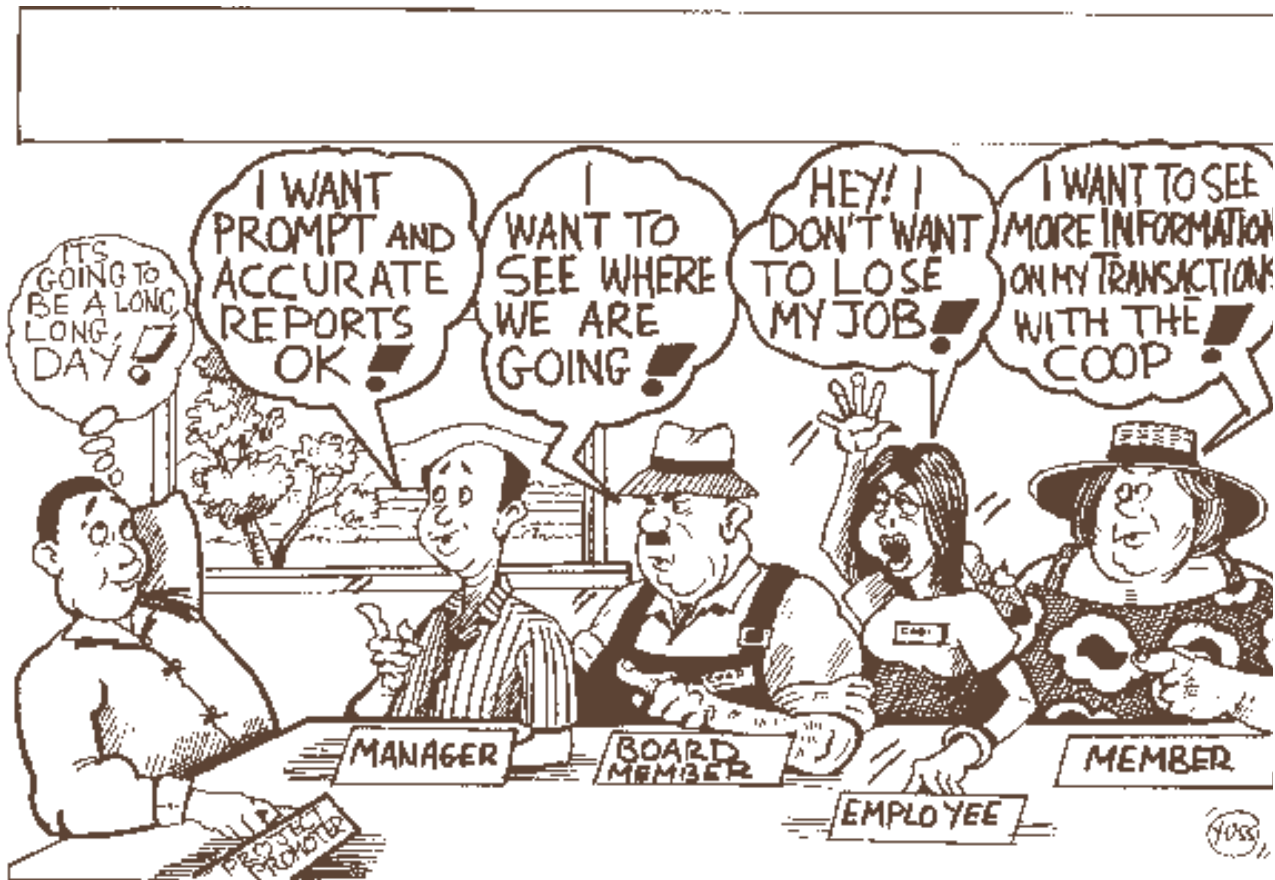
over external risks.

To make these risks more concrete and to see what preventive actions can be taken to handle them, we have classified some of the principal ones that can occur in any process of computerization and listed them in the table below:

COMPUTERIZATION PROJECT RISKS AND WAYS TO MANAGE THEM

Risks	Ways to manage risk
EXTERNAL	
Electrical power supply is unreliable or erratic	Purchase of an auxiliary electric generator and/or battery-based uninterrupted power supply (UPS) for the cooperative may be required
Unreliable fixed line telephone system	May require the purchase of a mobile telephone set-up, if mobile phone service is available in the area
Local Internet service provider too expensive and service is poor	Find another less expensive or more reliable service provider
INTERNAL ACCEPTANCE	
Staff maintaining manual system fear computer will replace them	Explain that computerization can improve business efficiency which can lead to expanded operations and this will require more staff Provide job re-training to redundant staff to work in new areas
Some staff feel threatened by new technology	Special on-the-job training implemented in a gradual manner may overcome this resistance
PROJECT MANAGEMENT	
Project objectives not met and member needs not satisfied	Develop a careful project design before starting and be sure to consider users' needs. Estimate resources with a certain safety margin Define measurable success indicators at each stage of implementation Define scope and cost of project: What problems have to be solved? Does the coop have the resources to solve it? What will the net benefits be?
TIME	
The project took longer than expected	Prepare a detailed work plan with clear milestones indicated and be sure to define target dates for each
COST	
The project cost more than expected	Plan carefully. Estimate the time required and costs involved with a margin of safety Make sure that contracts with external service providers specify what has to be done, by when and by whom, along with penalties for missed targets
MAINTENANCE	
Post-project maintenance costs more than expected	Assess maintenance facilities before implementation. Plan upgrade (growth) of the computer system, both software and hardware Consider subsequent follow-up support requirements and costs, availability of a reliable service provider in the post-project period

3. Computerization projects in cooperatives



WHAT DO STAKEHOLDERS WANT?

Even though you may be convinced that computerization is a good idea, other stakeholders may not be. Take time to find out what other stakeholders and potential users – elected leaders, employees, regular members and clients – think about it: What type of information do they want? Are they satisfied or dissatisfied with the existing manual information system? What improvements would they like to see? And most importantly, are they willing to pay for those improvements?

Elected leader, employee, regular member and client needs for information may differ considerably and ideally, the proposed computerized system should try to address as many of them as it can. Without broad stakeholder agreement on what are the priority information problems of the cooperative that need to be addressed and whether some form of computerization will solve them, the project idea will probably fail.

This information can be collected through a series of informal talks or meetings with a representative sample of staff, elected leaders, regular members and cooperative business clients or through a series of workshops or larger group meetings. Below is a listing of the key areas that your questions should address:

- **Type of information provided:** What type of information do they currently receive from the cooperative?
- **Accuracy:** Is the information provided accurate and useful? If not, why not?
- **Timeliness:** Is the information provided in a timely and frequent manner? If not, why not?
- **Additional information:** What other information needs do they think the cooperative should fulfill?
- **Priority stakeholder needs:** Which of the above current and additional information needs do they think are the most important to them?

PRIORITIZING THEIR INFORMATION NEEDS

Once the information needs of each stakeholder group are defined, you will have to reach consensus on the overall priority information needs of the cooperative, and decide how those needs are going to be satisfied: through improving the existing manual system or through some kind of computerization. This can usually best be done by calling a general meeting of representatives from all stakeholder groups and management.

Make sure information needs are collectively addressed and equal weight given to the concerns of each major stakeholder group (not always an easy task!). Then get stakeholders to organize those needs into short term, medium term and long-term objectives. There are several techniques that you can use to identify and prioritize these needs. One of the more effective means is called “structured brainstorming,” which is described in Chapter 4. The results of this exercise should give you a much clearer idea of what the priority information objectives are that the proposed project will tackle.

KEEPING STAKEHOLDERS INVOLVED

Stakeholders should not only be consulted in the design stage of the project but also throughout its implementation:

- **Managers and elected leaders:** keep them informed of the project’s evolution at regular intervals. It is advisable to provide them written reports on the status of the project and following steps.
- **Staff:** employee support of the project is critical to success, so consult them frequently and keep them well informed of developments during the design and testing stage. These are the persons who will use the system on a day-to-day basis, and who usually know how things are done in the cooperative.
- **Members:** make sure that at least a small group of respected members and leaders are involved at the start of the project, and also use them as testers of the first functional versions of the software. Since regular members often consult with and acquire information from these “opinion leaders”, keeping the latter involved will ensure that all members stay better informed on project progress. The more informed members are, the less apt they are to be suspicious and critical.

The first step taken by the management of Tulaga Dairy Farmers’ Cooperative in Kanangop, Kenya in June 2004 was to hold a series of sub-regional stakeholder workshops to identify and prioritize member and management information processing needs.

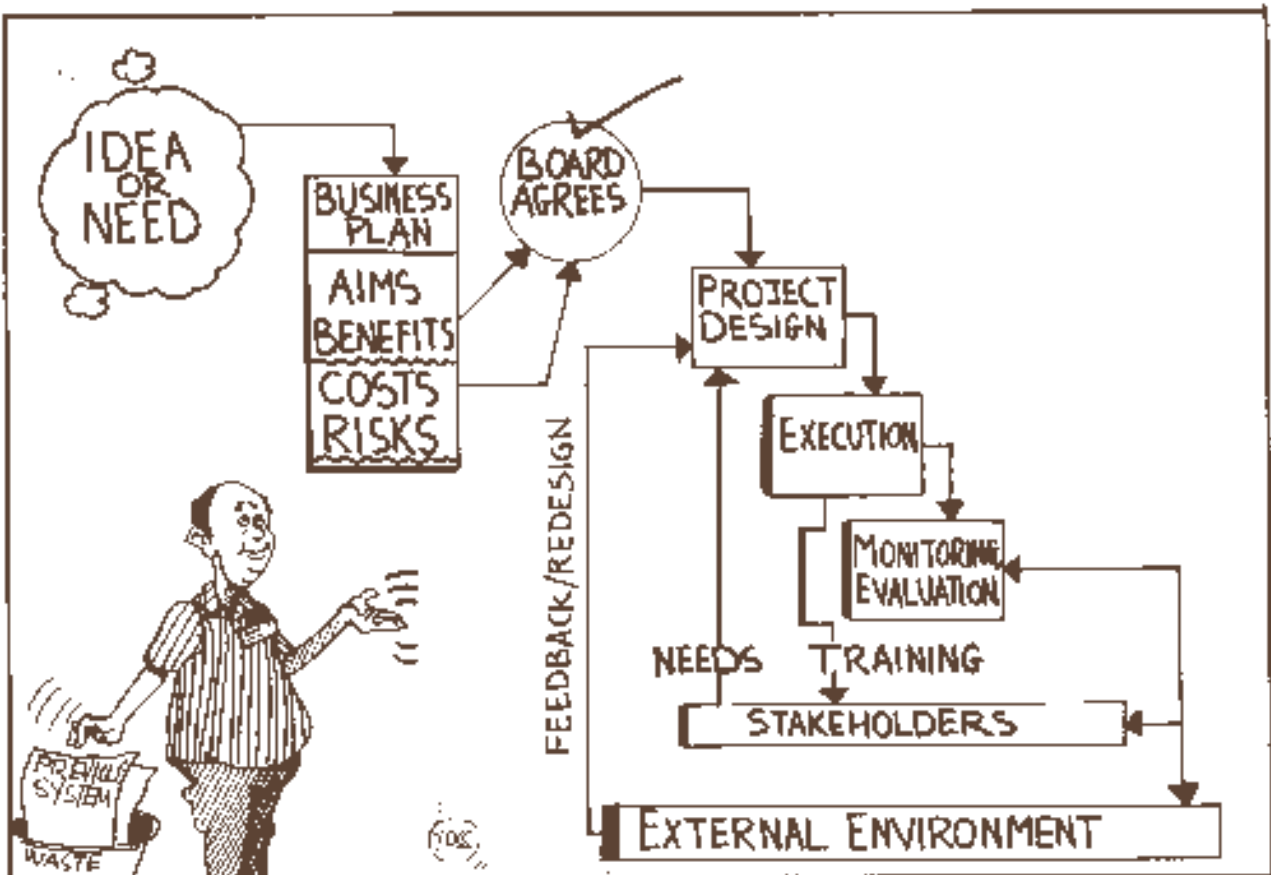
PROJECT PROPOSAL DESIGN

The project life cycle

All projects have a **life cycle**, which means they are organized into a series of logical implementation steps that begin with the formulation of the original idea and development of a business plan, proceed to the identification and verification of stakeholder capacities and needs, and then to address the project design, execution and evaluation stages.

Since the implementation of a computerization project may involve considerable cooperative staff time

and expense, your next task will be to convince the elected leaders, directors or Management Committee that it is a good idea. You will need their strong OK before proceeding. That will require the preparation of a brief 1-2 page **“project proposal”** for their consideration which summarizes the aims, objectives and expected benefits, costs and potential risks of the project. This may seem like a waste of time, but actually it is not, since it will help you answer many of the questions that they are likely to raise.



KEY FACTORS AFFECTING PROJECT OUTCOME

So let us take a look at all of the factors that might affect your project's outcome. Some of them are not controllable by the cooperative, but need to be considered right from the start but others are. Some of the elements to consider are:

Internal factors

Now that you have a good idea of what the priority information needs are of each stakeholder group and of the cooperative, there is a need to look at several other issues, like:

- **The existing business information system.** What are the strengths and weaknesses of the existing system? What needs to be changed?
- **Alternative solutions.** Why computerize? There may be several other ways to solve the problem. Examine each option, its costs and benefits. How will computerization address those weaknesses and how will stakeholders benefit?
- **Management, elected leaders and member support.** Do all stakeholders think that computerization will help solve the cooperative's priority information needs? Who are the supporters and who are the doubters? Are members willing to invest some of the cooperative's net earnings to finance the costs of computerization?
- **Resources available.** What are the financial, people, software, and hardware resources that can be invested in the project? Will that be enough?

External factors

Another important area to examine is the external environment within which the cooperative operates. There are a number of factors largely beyond your control but which may influence the success or failure of the project; therefore, you should know about them.

Policy and legal conditions:

- **Economic conditions** of the country and region. Are economic and market conditions favourable? How will they affect project costs and returns?
- **Relevant laws and regulations** governing information sharing and processing, patent protection, contracting and tax reporting should also be assessed.

Technical requirements:

- **Electrical power:** If the electrical supply is not reliable, you might have to buy a generator (to provide electricity), a stabilizer or voltage regulator and/or a UPS (uninterruptible power supply) with battery and stabilizer that might provide up to 2 hours of electricity in case of power breakdown. A good ground connection is also advisable. An electrician might provide advice on your specific needs.
- **Telecommunications:** If you want to connect to the Internet you will need a phone line or other means of connecting (wireless, broadband, microwaves, radio, ADSL) according to your area. See your local ISP (Internet Service providers) in your region and get a quotation for the type of connection that you want. Note: connecting to a regional ISP might require long distance calls.
- **Technical support:** Consider the availability of suppliers and IT professionals in your area, and the cost of their services. How expensive it is to acquire and maintain computing equipment? Are there other cooperatives or businesses in your region that have already computerized? If so, they can be a very useful source of information.

PREPARING THE PROJECT PROPOSAL

Now that you have gathered the necessary information about stakeholder information needs, consolidated and prioritized them and checked to see if the external environment is favourable, it is time to develop a well thought-out proposal to obtain elected leadership approval to proceed.

Since the costs of this project will have to be covered by the cooperative, you may receive many questions from members and elected leaders about the desirability of the project. That is normal, but it does mean that you will have to develop a convincing argument supporting the project.

After having examined the expected costs, the potential risks and expected benefits of the project, it is worthwhile developing a “Business Plan” justifying the project, which could be presented to the elected leadership of the cooperative to obtain their approval and support. An example of the structure of a typical business plan is provided in the figure below.

Should the Board decide to go ahead with the project idea, and provide the necessary financing to start work, then the next step would be to prepare a detailed implementation plan.

Structure of the proposal

Business goal: (1 or 2 sentences, e.g. Increased business competitiveness and improved member services)

Objectives: (improve response time and efficiency of business information processing for management, improve member access to information on their participation in the cooperative business, etc.)

Outputs: (operational computer system, trained staff, etc.)

Potential risks: (give some examples, i.e. management employee fears regarding complexity or loss of their job, electrical or communications problems, inadequate local IT support, etc.)

Expected benefits: (cost savings due to better information on various aspects of the business, more frequent and accurate reporting on the business, more frequent reporting to members on their transactions with the cooperative, improved access to market information via the Internet, capability of introducing more effective systems of member capitalization of the business, etc.)

Expected costs: (initial purchase of hardware and software, installation of equipment, customization of software to meet requirements of the cooperative, training, updating of hardware and software, etc.)

Funds required: (give rough estimate in terms of personnel, equipment, software and where the money will come from: additional member contributions, the cooperative and/or external lender or donor)

Expected start and finish dates (self-explanatory)

4. Preparing the project implementation plan



Before developing such a plan, pause a moment and reflect on what are some of the key questions the plan will have to address:

- What are the expected benefits to stakeholders?
- What are the risks?
- What scale of technological solution do you need?
- What cooperative services are covered?
- Which personnel will be involved in the process?
- How can we ensure good performance?
- How can the system be maintained in the long run?

Once you have given some thought on how you are going to answer these questions, it is time to take the next step: preparation of a detailed **project implementation plan**.

Take your time, because mistakes can be costly. Please also keep in mind that the design process should be as participatory as possible in order to guarantee its success. Consult with others before forging ahead. “Two or more heads are usually better than one.” Below are listed some of the tasks you will have to complete:

Designing the project implementation plan is a VERY important step that requires a lot of thought. Changes made once systems are implemented are much more expensive!

DEFINING PROJECT OBJECTIVES AND THE BUSINESS GOAL

- **Deciding on project size and time frame.** The amount of surplus funds the cooperative has available, the experience of its employees, and the influence of local computer hardware suppliers will have an impact on project size and time frame. One major cause of computerization project failure is the tendency to start on too large a scale. It would be advisable to proceed cautiously in a step-by-step manner; that way mistakes will be smaller and the cost of correcting them more manageable.
- **Identify feasible and measurable objectives and goals.** Separate them into: **project objectives** (for example, computerize accounting records, increasing speed of processing large volumes of data, improving accuracy, access to a new market, industrialization of products, etc) and **business goals** (for example, to increase profits by 20%, reduce financial costs by 30%, increase members by 10%).
- **Obtain agreement from all stakeholders** (members, staff, everyone) on the objectives and benefits of the project. Try to achieve consensus. Stakeholders must be involved in the project as soon as possible.
- **Develop a method for monitoring project implementation progress.** Define measurable **success indicators** to monitor progress. If possible, assign an economic value to some. Some examples are: monetary savings, new members, business profits, more clients, etc.

The use of computer systems has allowed Manfrey Dairy Cooperative of Commerce and Industry Ltd., Argentina to have information on cooperative business performance, which enabled it to gain access to bank loans.

GETTING STARTED

- **Establish a project team** whose main responsibility will be to assist you in preparing the plan and overseeing project implementation, interacting with external developers (consultants), managers and members.
- **Identify all tasks required** to attain each objective: key human resources, capital requirement and budget, formal risk analysis, software test plans, training plans, pilot and implementation plans. Define time and resources for each. Define and estimate costs. Assign tasks to individuals or groups of individuals.
- **Identify all risk areas** and consider measures taken to minimize risk.
- **Define references to other key documents that are needed:** e.g. risk assessment document, training plan, software testing plan.
- **Establish a backup system:** keep the manual system running in-parallel during the development and testing phases. If something goes wrong with the new system during these phases, no data will be lost and cooperative business operations will continue to operate smoothly.

IDENTIFYING THE MAIN REQUIREMENTS OF THE SYSTEM

Since software is designed to operate only on certain platforms (a platform consists of hardware, computer programming language and operating system), choosing the most appropriate platform is important. Also, once the software has been programmed for a certain platform, it is not easy to adapt it to another platform. You will need professional advice to design a technological solution, but at least the following variables have to be considered when designing it:

- **Hardware:** equipment cost and ease of upgrade. How many computers will you buy? What brand and model?
- **Operating system:** cost of licensing, years on the market, language, stability.
- **Access levels:** Different users need different levels of access to information. For instance, the elected leaders will need to be able to see all the cooperative's accounts, while an individual member will only need to see his or her account. These access levels must be defined for each information resource and user profile.
- **Usability requirements:** The users' ability to navigate and exercise functions of the information system. If usability is taken into account, the software achieves faster acceptance among users since it is intuitive, easy to navigate, has online help and provides most desired functions and reports.

Source code: consists of a series of consecutive programming statements that are written by a programmer in a certain programming language to carry out a particular task. These files are later compiled (converted to machine language).

Machine language: a set of instructions that a computer can understand. When you purchase software, it is usually in the form of compiled object code and the source code is not included, so the programme cannot be modified or customized.

Open Source: any programme whose source code is made available for use or modification as users or other developers see fit.

DEVELOPING A TRAINING PLAN FOR STAFF AND MEMBERS

- **Ensure a formal Project Manager is assigned to project.** Obtain commitment on use of human resources where appropriate.
- **Identify what the manager and employee skills are that will be required** to operate and maintain the new system, what their existing skill capacities are, and what additional skill training needs to be done.
- **Develop a training plan.** Define employees re-training and adaptation process in order to overcome the fear of losing jobs and encourage their participation and support.
- **Assign staff to continue running the manual system** during the project as a back-up. This is essential to ensure that the day-to-day operations of the cooperative and member services are not negatively affected by any problems that might occur as a result of project implementation.

- **Anticipate the eventual need for procedural changes and analyse their implications on organization, structure and incentives:**

Computerization does not just involve installing computers and software: the whole “way of doing things” is altered; this means that special emphasis must be put on the staff, with training and support to ensure that they can adapt as required.

PREPARING THE PROJECT WORK PLAN AND BUDGET

An easy way to prepare a work plan is by organizing the information you have collected on what you want to do in a hierarchical sequenced fashion: starting with the objective, then moving on to the outputs that contribute to that objective, then to tasks that contribute to achieving the output. A partial workplan for one of probably many objectives is shown below:

WORKPLAN

Objective	Output	Task	Activity	Who?	When?
1. Computerized information system	1.1 System installed and functioning	1.1.1 Purchase hardware and software	1.1.1.1 Visit hardware and software suppliers and get best price	Manager	03.06.04
			1.1.1.2 Obtain board approval of purchase	Manager	10.06.04
		1.1.2 Installation and wiring of computer network	1.1.2.1 Installation and wiring	Technician	11.06.04
			1.1.2.2 Electrical testing	Technician	12.06.04
		1.1.3 Hardware installation	1.1.3.1 Install equipment	Consultant	15.06.04
		1.1.4 Software installation	1.1.4.1 Install software	Software developer	22.06.04
		1.1.5 User training	1.1.5.1 Plan training	Manager teacher	12.06.04
			1.1.5.2 Develop training material	Manager teacher	25.06.04
			1.1.5.3 Arrange training schedule	Manager teacher	27.06.04

The next step is to look at the timing and sequencing of all of these outputs, tasks and activities to see how everything fits together. This is often best done using a Gantt or bar chart, as shown in Annex 4.4.

The final step is to assign costs to all of these sequenced actions to determine when funds will be needed to cover the expenses. This information is then arranged in the form of a monthly or quarterly expenditure plan or budget, as illustrated below:

COMPUTERIZATION PROJECT

Task/Activity description	Planned expenditures				
	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	1 st Year Total
Purchase of hardware and software	4,500				4,500
Installation of hardware and wiring		500			500
Software development			1,500	1,500	3,000
Staff training				250	250
TOTAL	4,500	500	1,500	1,750	8,250

ESTABLISHING A PARTICIPATORY MONITORING AND EVALUATION SYSTEM

In addition to the implementation plan and budget, you will also have to create a simple mechanism to monitor project implementation performance. This is usually done by identifying clear and measurable “milestone events,” or outputs, tasks and activities that have to be accomplished within a specified period

of time and meet certain quality standards. If you have prepared the project work plan correctly, you should be able to extract most of the information you will need to monitor implementation performance from the work plan itself. In summary, the more detailed it is, the easier it will be to track project performance.

Planning issues and tools

In the planning phase, you and your project team must make a number of important hardware and software decisions. Since the software decision will have an impact on subsequent development, test, implementation, education, and support activities, it must be made with great care and foresight.

Small-scale or large-scale?

The scale and scope of computerization you decide on will depend on the size of your cooperative, the staff experience and financial resources available, and a number of other factors. If your cooperative is small, your staff has little or no experience in the use of computers and you have limited financial resources to invest in the project, the safest approach might be to purchase a single computer and printer, plus a commercially available software application⁴.

Once you and your staff have gained sufficient experience in operating the computer and learning how it can help improve your information processing, you may then want to purchase another and network them together so that they can share information more easily.

If your cooperative is large, some of your staff may have some experience in using computers and you will have more resources available. You may therefore want to begin by installing a small system of say, 2-3 computers, plus printer and server, linked together in a network, but keeping an eye towards expansion in the near future. This cautious approach is recommended for two reasons: (1) it is less expensive; and (2) if mistakes are made and problems occur—and they most certainly will occur—they will have less negative impact on member services or on cooperative business operations.



⁴ The main advantage of this approach is that it costs less and is low risk. Today, the local cost of a single computer, including printer and standard office software in most countries, is well below \$2,000.

Buy packaged tools or develop own software?

There are three general approaches to software selection: (1) develop (programme) your own software, (2) customize an existing application, or (3) buy packaged (commercial) software. Using the table below can help you decide on the best option to choose:

Option	Advantages	Disadvantages
Develop own software: ⁵ hire programmers to design a customized solution	<ul style="list-style-type: none"> - Complete control over features: software is built to your specifications - It can be maintained, updated and extended as needed - It can be developed in local languages - Possibilities of replicating software, since intellectual property belongs to the cooperative 	<ul style="list-style-type: none"> - Writing software is a complex process. - Takes longer to implement - You cannot learn from other organizations that implemented the software before - Might end up being more expensive (programmers notoriously take more time than originally planned) - Requires hiring computer professionals on a medium term basis
Customize existing software: hire a software developer to adapt an existing software solution	<ul style="list-style-type: none"> - Faster than developing entirely new software from scratch 	<ul style="list-style-type: none"> - Limited control over features and generally no control over the interface - More difficult and might be more expensive to maintain⁶ (update)
Buy packaged software: ⁷ acquire an off-the-shelf software solution from a known vendor	<ul style="list-style-type: none"> - Generally less expensive to buy and maintain (update), since it is mass produced - Faster to implement: it is already developed and tested - If the software was developed for other coops with similar needs, probably has more features than those you initially require - Easier to support and maintain over a long term 	<ul style="list-style-type: none"> - No possibility to modify the software; it can only be configured as the programme allows - Limited availability in local language - Cost of licences might be high as the system grows

⁵ Large cooperatives, with more complex operations and member transactions, usually find this approach more suitable to their needs.

⁶ This is because the intellectual property (the computer instructions contained in the software) of the software belongs to a software developing company. Changes to the main versions are slow and reflect the needs of all the clients, so specific changes or updates can be slower and more expensive.

⁷ Smaller cooperatives, or those with little or no experience with computers, generally find this option more appropriate

Project planning tools

A number of business tools exist that can help managers define and keep track of the tasks and resources involved, in an easy and organized way. Three common methods are: structured brainstorming, the Bar (or Gantt) Chart and the PERT Chart.

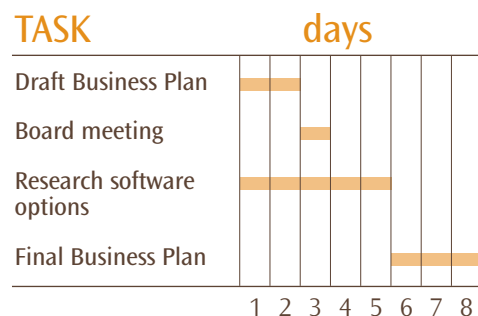
Structured brainstorming

An easy way to begin defining project goals, objectives and tasks is in a small group through a process of collective problem solving, or “brainstorming.” All you need are: an unobstructed wall, a supply of blank sheets of office stationery, some marking pens or charcoal points, and adhesive tape. First, the facilitator pastes sheets of paper on the wall vertically showing the logical structure of the project, as shown previously in Section 5 on the Work Plan and Budget, beginning with: project objectives, followed by outputs that have to be produced to achieve the objective, followed by the tasks to produce each output and an estimation of the time that will be required to complete each one, followed by identification of the people who will be responsible for performing the tasks.

Participants are asked to write: in 1-4 words per sheet, what they think the project objectives, outputs and tasks should be. The facilitator tapes them in random order on the wall and then asks participants to group and rank them in order of importance. This way everyone participates in defining the issues addressed. The best approach is to work from objective to output to tasks, to people, etc., grouping and ranking the ideas at each step and then proceeding to the next one. At the end of this process, all participants will have a clearer idea of how the project will be structured and implemented.

The Bar or GANTT Chart

Frequently used in project management, a Gantt Chart or “bar chart” as it is often called provides a graphical illustration of a schedule that helps to plan, co-ordinate, and track specific tasks in a project. Tasks or activities are listed in order of sequence on one side and the time required to complete each activity is represented by a line or bar to the right. The longer the bar, the more time the task or activity requires. By keeping this chart updated with real project information, you will be able to track, detect and even estimate the cost of a delay in the project. The following is an example of a very simple Gantt chart.

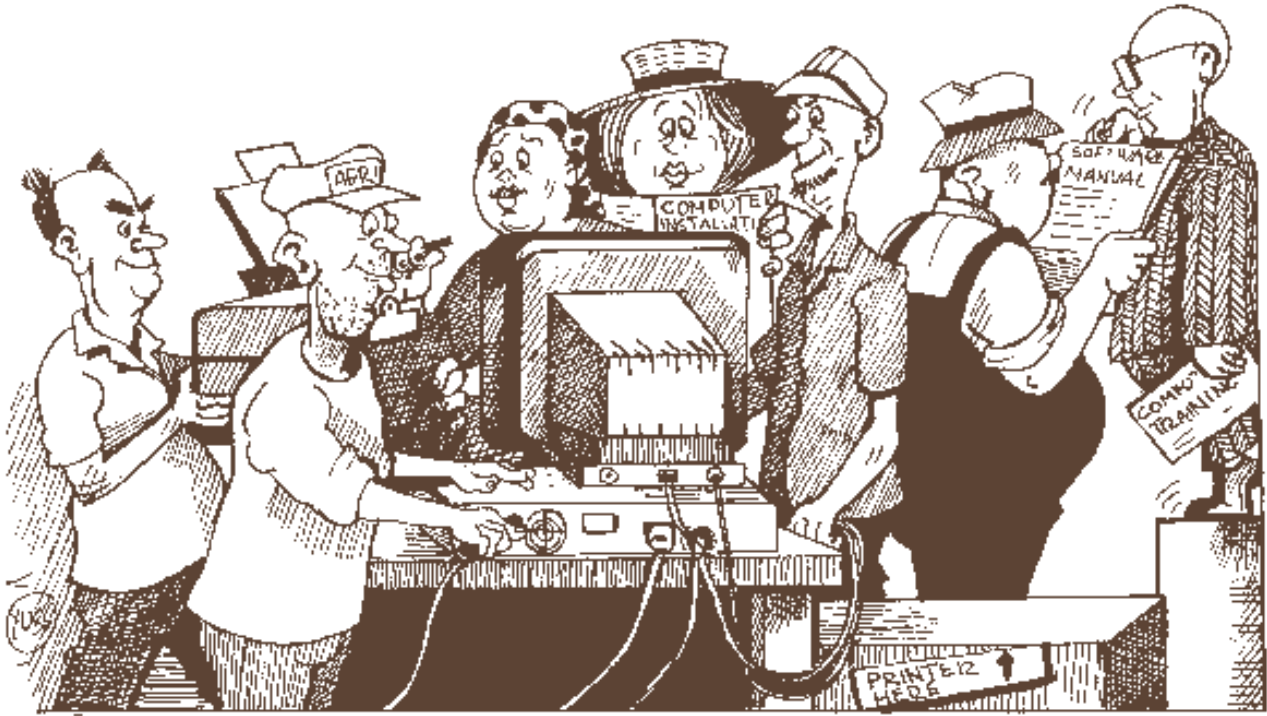


A more complex chart developed with Project Planning software (e.g. Ms Project) can be found in Annex 3.

The PERT Chart

PERT stands for *Program Evaluation Review Technique*, a methodology developed by the U.S. Navy in the 1950s. It is another planning tool used to schedule, organize, and co-ordinate tasks within a project. One advantage of the PERT chart is that it illustrates task and activity dependencies in a visually more graphic way. An example of a PERT chart is provided in Annex 4.2.

5. Project execution



Once the project implementation plan has been completed and the required resources have been obtained, it is time to put the plan into effect.

Some of the activities that occur during this stage are: hiring consultants, purchasing hardware and basic software, installing hardware, training staff, bench-testing the software implementation and monitoring the progress of the project. Each of these issues will be discussed in the following sections.

SOFTWARE DEVELOPMENT ISSUES

Suppose your organization has decided to develop its own software, and hire a computer professional to do the work. Then there are a few issues you must consider in order to protect your interests and make things easier for the future evolution of the system. Let us examine these issues more closely:

Software development strategy
An incremental, step-by-step approach that can quickly demonstrate to doubting managers, staff and members, through a series of visible outputs or events, how they can benefit from computerization is preferred.



SANCOR United Cooperatives Ltd., Argentina has standardized its administrative operations to optimize relations with secondary cooperatives, by providing each of them with the same administrative software package.

Documentation: most programmers and system architects are reluctant to write things down, not only because it is an arduous, non-creative task, but also since not doing it increases the business's dependence on their continued employment.

So, insist on proper documentation and make it a strict condition of any contract that you have with them. Such documentation must include: information on the system's internal design processes, data table structures and relationships, source code, installation requirements.

A well-documented system is easier to maintain, makes problem solving easier, and most important of all, gives you freedom to hire subsequently contractors other than the original ones if the developer does not satisfy your needs. Documenting is also fundamental if you plan to share or sell your software to other organizations. It is also a good idea to include the development of administrators' and users' manuals as part of the documentation bundle.

Contracting issues: if you decide to hire software developers, it is strongly recommended that you prepare a detailed service contract with them that defines among other issues the:

- **Scope and limitations:** be sure to include the scope and limitations of the services you hire, especially regarding user support, documentation, error correction and updates over time.
- **Source code:** as previously mentioned, source code files are necessary to make future changes to the system. If you pay for the development of the source code, you should insist on securing copies of these files. This gives you the exclusive right to modify and sell them if you wish.

Licensing and intellectual property rights: if you have hired a programmer to develop software for the cooperative, make sure that the cooperative has the

exclusive ownership and possession of the **source code files**. Many software development agreements do not include clauses requiring the sharing of source codes, to the chagrin of cooperatives which decide to modify the code later on.

That may not be a problem as long as the service provider agrees to provide maintenance and updating support (at a reasonable cost) in the post-project period. However, there are some instances where the provider has had complete rights to the source code and then goes bankrupt. In these cases, the cooperative is unable to recover the code and there is no way to correct errors or improve the software. One way to cope with this problem is by placing the source code in escrow, i.e. held "in-trust" by a third party. In case certain specified events happen, the user is then allowed access to the code.

You might also have to register the intellectual property rights of the system so that it cannot be sold to someone else or copied without your authorization. The procedure is different for each country. Consult a lawyer to learn the specific procedures in your country. If, on the other hand, you acquired pre-packaged software from a vendor, you will be bound by the licensing contract you signed with the vendor: it might limit the quantity of computers the software is installed in or have other licensing restrictions.

PROGRESS REPORTING

The project team should require all those involved in project implementation (especially hired contractors or consultants) to report to it regularly on progress in completing required tasks, activities and outputs.

Such reporting requirements should be made a standard part of all contracts and final payment made only upon satisfactory completion of assigned work.

On the other hand, the project team is responsible for keeping elected leaders and cooperative members periodically informed on project progress achieved, problems encountered and action taken to solve those problems. This can be done through a series of open meetings (monthly or bi-monthly) held during the project development and implementation phases.

BENCH-TESTING

Bench-testing is the last stage of development where the system is tried by a few users to identify the final adjustments that are needed. Testing should be conducted by people other than those who have been directly involved in developing the software program for the simple reason that the latter usually have a vested interest in shielding their work from excessive critical analysis. A formal defect correction process also needs to be developed in case mistakes are made which have a negative impact on project performance. Testing carried out by programmers rarely works since programmers are usually blind to functional shortcomings in their own code. A successful bench test result should be made the last condition that the contractors or consultants should have to meet before they receive their final payment for work done.

Once the bench-testing is over, you should be in a position to begin using the first functional version of the programme.

During the first months of operation, it is best to keep the manual system running in parallel until you are sure that the computerized system runs effectively and can completely replace the manual processes.

Also, now that your data are stored in digital media (diskettes, hard disks, tapes, CDs) instead of on paper, do not forget to define a regular backup strategy to protect the data stored in case of system failure or disaster. The backup strategy should include the following:

- regular duplication of the data files, according to the value and rate of update of each;
- data should be backed up on diskettes, tape, zip drives or hard disk media according to the volume of information and cost of the media hardware;
- a copy of the files should be stored at least once a month outside the building where the system is located;
- a copy of the most critical system and data must be kept, in order to be able to continue work in case of failure of the main hard disk or server.





TRAINING

The amount and type of training that staff and members will need to operate and maintain the new system will depend on a host of factors, including the existing skill capacities and experience of cooperative staff and members, the tasks to be performed and the particular characteristics and maintenance requirements of the hardware and software system used.

The subject matter content and focus of training should be based on a careful pre-assessment of existing end-user skill capacities and training needs. Training of end-users and other stakeholders is crucial for the system to function effectively. The following stakeholders need to have targeted training:

- **Cooperative administrative staff:** The cooperative staff must be trained thoroughly in the usage of the new information system. Training should include a general introduction to computers, operating system basics, as well as specific training in the use of the system.
- **Elected leaders:** Executive leadership of the cooperative should have good familiarity with what the software can do and what it cannot. Elected leaders should receive basic training in the use of the software, with emphasis on financial and business reporting and interpreting data for decision-making purposes. Keeping elected leaders informed about the project and its advantages and problems will help ensure the project's survival in the long term.

- **Cooperative management:** Cooperative management should receive the same training as cooperative staff plus more specialized training on financial and business record keeping and analysis, and on preparing reports for the elected leadership and regular members.
- **Cooperative members:** Members should be trained in the use of the system if they will access it. Otherwise, they should be informed regularly about the project's evolution and the value added services it provides, so that they will be able to perceive the return on their invested capital. Training should include a general introduction to the system, its objectives and how it works, a view of the main features of the system, reports generated of interest to members, how to interpret and analyse the information they present, and how to connect and access the system (if they will have access to it).
- **Information systems staff:** At least one employee (but preferably two) should be trained in the usage, testing, maintenance, and troubleshooting of the information system. Their main responsibility will be to provide support to other staff users of the system as questions arise, and to solve technical issues related to system backup, recovery, network operation, and electrical problems, and take the lead in reporting and defining suspected defects in the automated system.
- **Training is a continuous process:** Computer training should not be regarded as a one-off event, but rather as a continuous process. ICT technology develops so fast that continual training courses are necessary to keep users up to date. With new computer models and software updates appearing in the market almost monthly all users have to

keep up to date with these changes.

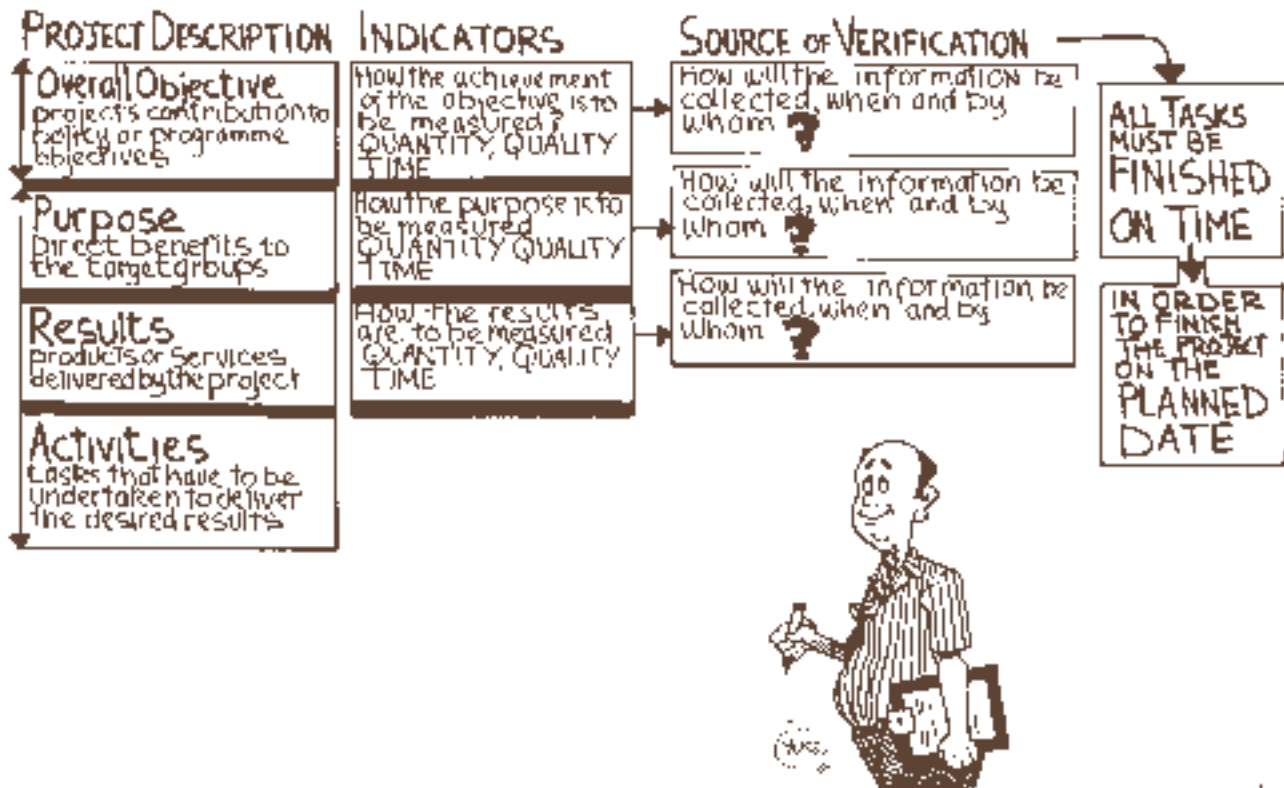
That requires continual training courses, not only at the initial stages but also as people, processes and systems change and evolve.

OTHER ISSUES TO CONSIDER DURING THE EXECUTION STAGE

- **Employee resistance to change: Computerization projects by their very nature involve change.** Employee fear of changing job roles and skill sets due to computer automation can damage the success of the project. Strategies to overcome this problem include: keeping them informed about the project status, objectives and their new roles, involving them in the project right from the start (designing, reviewing, testing), and ensuring that they receive adequate training.
- **Behavioural changes:** The use of a computerized information system might alter some of the power balance of an organization. Since the crucial information will be contained in a computer, those who can access will have more "power" over those who cannot. This is a normal situation, and training and good communications are key elements to help solve this situation.

Banaskantha District Cooperative Milk Producers' Union, in Gujarat, India, has been very innovative stimulating "buy-in" by the staff and members through rigorous use of training strategies, thereby overcoming many attitude-related problems.

6. Project monitoring and evaluation



PARTICIPATORY ONGOING MONITORING

Monitoring the project is necessary at all stages of the project life cycle. Continuous monitoring ensures that deviations are detected and corrected in time, minimizing any negative impact on the project. To be truly effective, it should be done in an open manner with broad stakeholder participation.

Monitoring is an ongoing process that should be done regularly at fixed intervals, and should focus on assessing implementation performance in several areas: client/user satisfaction, performance indicators evaluation, and ways to measure the effect of the system on profitability. Some of the indicators that could be used to measure performance are listed below:

Client/user satisfaction:

- improvements in the accuracy of information received
- Increase in frequency of information received
- Increased speed in processing and reporting information
- Improved format and presentation of information

Tasks completed, outputs generated and impacts

- extent to which tasks and outputs listed in the work plan have been completed satisfactorily
- other direct and indirect impacts produced by the project

Cost savings generated, impact on cooperative profitability, performance, etc.

- Reduction in staff time required to collect, process, analyse and report information generated by the system
- Improved response time in processing and handling product orders, delivery
- Better control of stock
- Improvement in member services
- Introduction of new approaches to member capital formation

Monitoring and evaluation: key points

- Ensure Project Management continuity wherever possible. Changes of management in the middle of the project can cause delays.
- Establish clear milestones and measurable performance indicators to ensure that staff and consultants meet their obligations on time.
- Arrange formal project reviews on a regular basis. For example, set meetings at the end of each stage of system development, and then every month of the first year the system is operating.
- Perform sensitivity analysis of actual results to plan more effectively. If the results do not satisfy expectations, it is easier to fix in the first months the systems is operative.
- Formulate recovery plans where task completion is behind schedule.

FINAL EVALUATION

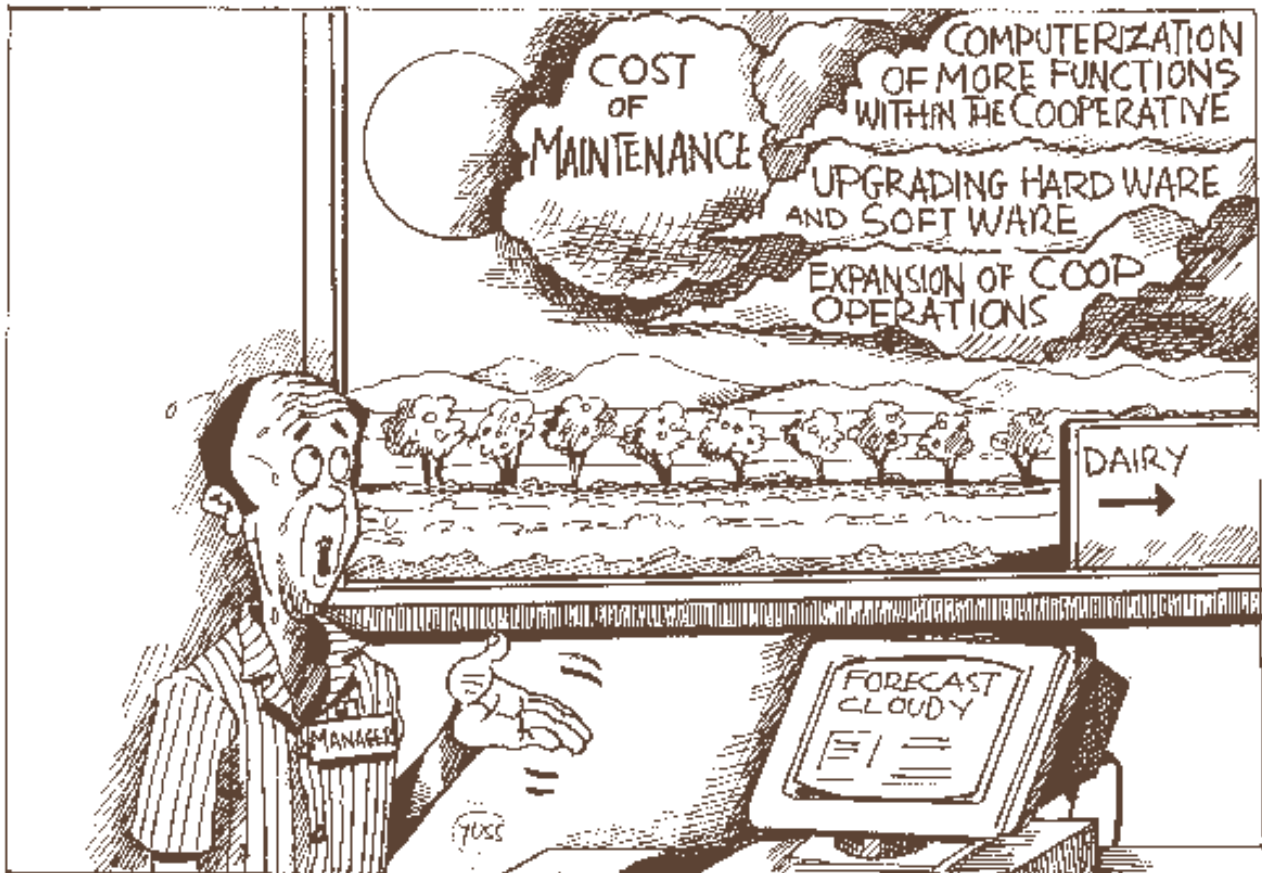
At the end of the computerization project, it is necessary to evaluate how successful the project was and if it satisfied its intended objectives, in order to inform other stakeholders, especially elected leaders, directors and members.

You do this by comparing the value of each **indicator** you have defined (such as the number of transactions, accuracy, speed, cost savings) before the software was implemented, and after it was implemented. You can also include predictions on future performance. The choice of indicators will depend to some extent on the business goal or objective of computerization.

For example, if the business objective was to reduce the time required to generate a trial balance and income statement, some indicators can be: improved transaction time, members' satisfaction, monetary savings due to a better administration of assets, timely compliance with legal requirements.

Evaluations can be performed by members of the cooperative, but an external opinion is always helpful and adds objectivity to the reports.

7. Project evolution: and the future?



The ability to track the daily production of each cow allows members of the Cooperative Societies of Dairy Producers of Rosario Area Ltd. in Argentina, to sell them at a better price, since the production of their offspring can be guaranteed and supported with many years of information about their ancestors.

Though all computerization projects have a start and an end date, computerization itself, once started, is a project that transforms and improves all the time as requirements, people and technology change. This is called **project evolution**.

Numerous studies of the impact of computerization have shown that computerization produces two major impacts:

- one is **felt immediately**, which is that processes are expedited or manual procedures are economized.

- the second, often more important, **occurs several years later**. This happens as enterprises learn to organize themselves better, and so become more competitive and make new investments that are enabled by computerization.

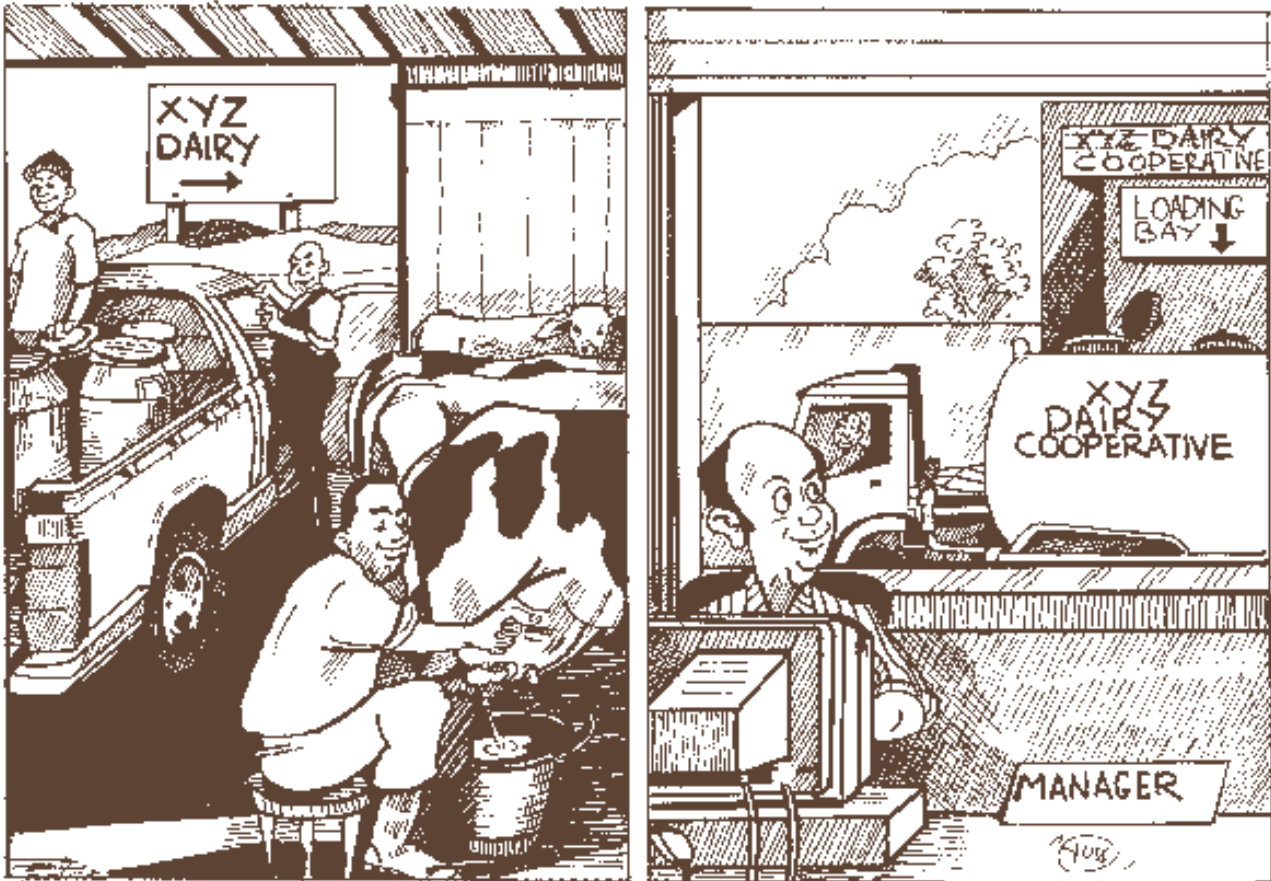
Exactly how the project evolves will depend on many factors: you might decide to change the technology or modify the procedures, or maybe expand the system to other areas, or add more services.

SOME KEY POINTS TO PONDER

- **Training should be an ongoing process:** Technology changes all the time. Continual training will help to keep staff satisfied and reduce their fears of displacement. Businesses that learn how to cope with change and manage it tend to be successful in competitive markets. Those that refuse to change usually fail. This means that the cooperative's training plan should set short-term, mid-term, end-of-project, and post-project training objectives.
- **Upgrading hardware:** The expected life of a computer is from 24 to 48 months. Computer technology advances so fast that it is recommended to make some upgrade (improvement) in the equipment at least once a year. As the project evolves, you can buy new faster computers for those persons that will do computing-intensive tasks such as reports, graphs, and leave slower computers for others working on accounting, reporting or data entry.
- **Updating software:** The software application will also need to change over time. If you have developed your own software, the most organized way to update the application is to keep a list of desirable changes, cataloguing them into: (1) errors (called bugs) that affect the use of the software and require immediate fix; (2) small corrections that have minimum effect on the system; and (3) desirable changes that add services or improve existing features.
- **Internet Access:** A modern computerization project cannot be sustained if the cooperative does not have reliable Internet access. All software, hardware driver and firmware fixes are delivered through the Internet. An implementation will quickly run into overwhelming system problems without Internet availability.
- **Sustainability:** You have to make sure that there are skilled resources and enough funding available to **sustain the project over time**. You will need funds to pay for human resources, software, electricity, computer repairs and upgrades. You must try to assess to the maximum extent possible the human and financial resources to maintain the continued operation of a computer project. Since available cooperative funding may vary year to year depending on performance, you are encouraged to take the necessary precautions to build a fund to maintain and replace equipment.
- **Replication:** If you believe your software might be useful to other organizations, you might want to consider selling, renting or sharing the cost of updating the software with them.

Many cooperatives have set up a Web site giving information about their history, business and products. A Web site is easy to install and cheap to design and maintain, giving global visibility on the Internet.

8. A test case: Cooperative XYZ



In order to illustrate the previous sections the example of project planning carried out by a hypothetical cooperative XYZ will be analysed. This small cooperative has decided to implement computerization in order to administer a growing volume of data and also to improve its business efficiency. It has developed a business plan and designed a project plan to organize the development of this computerization plan. You can learn from the study case in Annex 3. The example includes a business plan, a detailed project plan with a Gantt chart and a cost analysis.

9. Conclusions and suggestions

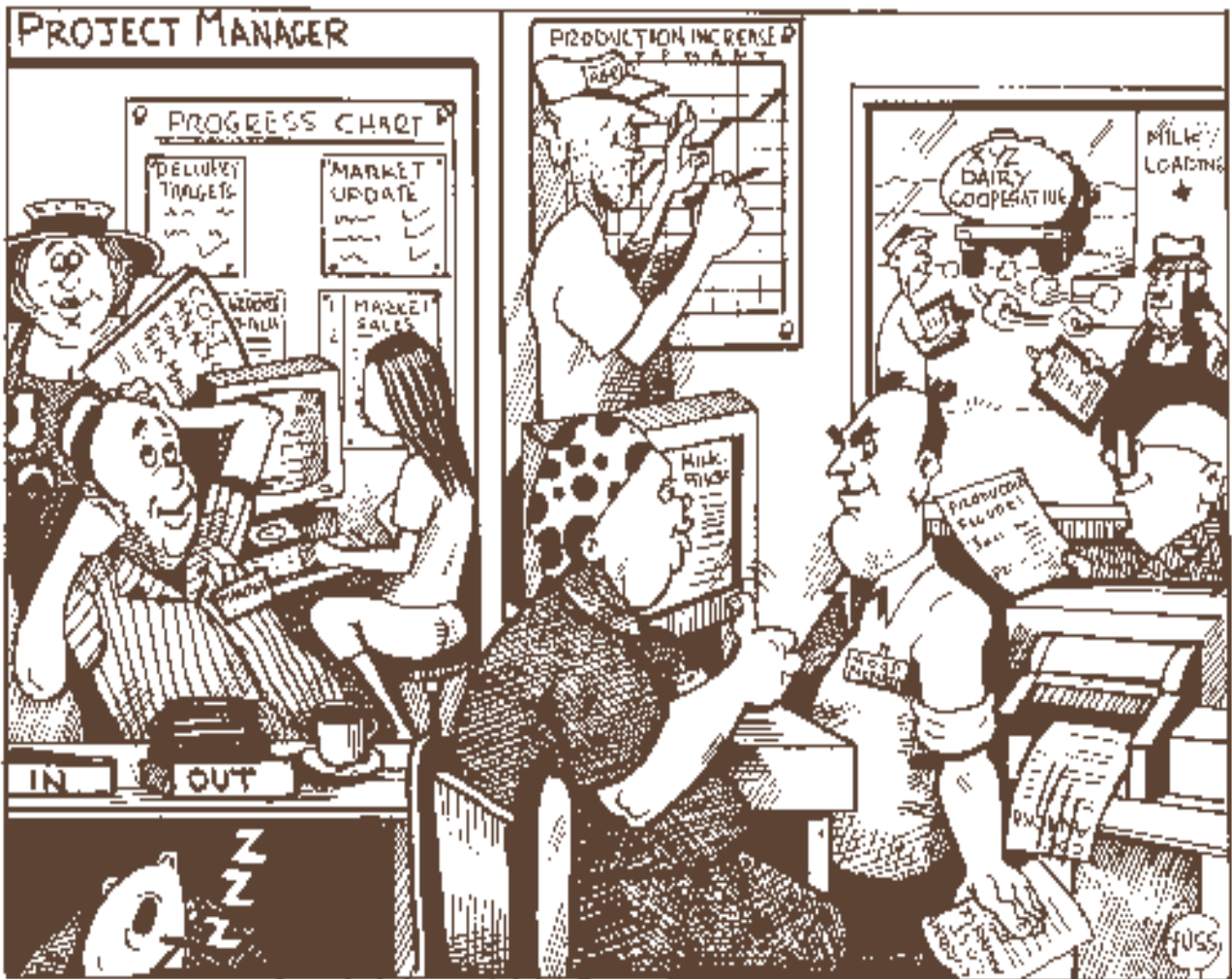
Agricultural cooperatives have been slow to computerize in least developed countries, but this fact is changing rapidly as computers become cheaper and access to the Internet grows in the regions. In order to compete effectively in liberalized markets, many cooperatives, especially larger ones, are finding computerization an **indispensable tool for improving member services and cooperative business performance**. In summary, computerization can improve cooperative business efficiency, provided a few practical rules of thumb are followed. Here are some of the most important rules:

The automation of accounting and administrative records, and the traceability of grain has allowed the Asociación Cooperativa Argentina (ACA) to comply with legal requirements on information management and quality requirements to export their product.

The Ten Commandments of Computerization

You may find these final Rules of Thumb useful:

1. Have a clear business goal. What is the business problem that computerization will solve? What do managers, employees and members want?
 2. Learn from others who have already computerized. What will be the expected benefits and costs of computerization? Do not just think installation. Also think maintenance, upkeep and training. What risks are involved?
 3. Prepare a Business Plan that carefully lays out your arguments. Find a champion: you may be convinced that computerization will solve many of the problems facing the cooperative, but many may not believe you. You need a champion.
 4. Establish a core development team. Two heads are better than one.
 5. Examine the system development issues carefully. Adopt a modular, step-by-step approach.
 6. Take sufficient time to develop the implementation plan. Define clear business goals and objectives, outputs, tasks, responsibilities, timing and costs.
 7. Be careful with contracting. Set measurable targets and time schedule. Consult a lawyer. Documentation is important.
 8. Keep running the manual system until you are completely satisfied with the new system.
 9. Be sure to train each person adequately. Training should be continuous.
 10. Do not forget about maintenance and updating.
- ...And good luck!!



GLOSSARY

- **ADSL:** ADSL stands for Asymmetric Digital Subscriber Line. With ADSL, you can have internet access at speeds of up to 25 times that of a normal dial-up connection! Using ADSL will mean that you will never have to dial up to connect to the internet again because the connection is always on.
- **Broadband:** a communications technology that allows for high-speed Internet access. ADSL is one type of broadband technology.
- **CD/CD-ROM/CD Writer:** a small portable optical disk containing computer data; CD-ROM: a CD containing computer data that cannot be altered; CD Writer: a device that can record data on a CD.
- **Client:** a client is the requesting programme, computer or user in a client/server relationship or network.
- **Computerization Project:** an extensive series of tasks requiring concerted effort and planning, and dealing with the introduction of one or more computer technologies.
- **Database:** a large collection of related data tables organized especially for rapid search and retrieval by a computer.
- **Disk drive:** a device which accesses data contained on a removable diskette or high-capacity zip disk.
- **Dot matrix printer:** a special type of old technology computer printer, ideal for printing multiple copy forms and reports.
- **Extranet:** a web site with restricted content intended for the members, associates, clients and partners of an organization.
- **Hard disk:** the most widely used storage media for computers. It consists of a magnetic disc that is fixed inside computers (non removable).
- **Hub:** in data communications, a hub is a place of convergence where data arrives from one or more directions and is forwarded out in one or more other directions. It is used to interconnect the computers of a local area network (LAN).
- **ICT:** (information and communications technologies) is a term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.
- **Ink jet printer:** a popular type of low-cost but low speed computer printer.
- **Interface:** point of interaction or communication between a computer and any other entity, such as a printer or human operator. Graphic Interface: layout of an application's graphic or textual controls in conjunction with the way the application responds to user activity.

- **Internet:** a worldwide system of computer networks - a network of networks - in which users at any one computer can, if they have permission, get information or share with other computers.
- **Intranet:** a web site with restricted content intended for a selected group of users.
- **ISP:** Internet service provider.
- **IT:** information technology. See definition of ICT above.
- **LAN (Local Area Network):** a group of computers and associated devices that share a common communications line and typically share resources within a small geographic area (for example, within an office building).
- **Machine language:** a set of instructions that a computer can understand.
- **Modem:** a device that converts signals from a computer to a form compatible with a telephone line, in order to transmit them to another computer.
- **Microwave:** a form of wireless, line-of-sight telecommunications in which electromagnetic signals containing information are broadcast from one antenna to another relay station or receiver that may be many, many kilometers away.
- **Network:** a series of computers interconnected by communication cables and hubs.
- **Object Code:** the resulting computer code after a source code is processed and converted to machine language. It is the form in which most commercial software is sold.
- **Open source:** any programme whose source code is made available for use or modification as users or other developers see fit, usually free of charge.
- **Operating System:** the main programme of a computer, the one that administers its resources. There are many operating systems, such as Windows, Mac OS, Linux, etc.
- **Platform:** in computers, a platform is an underlying computer system on which application programmes can run. It consists of hardware, computer programming language and an operating system.
- **Programming Language:** a human language used to design computer software. Some examples are: e BASIC, C, COBOL, DBASE, FOXPRO, ACCES, etc.
- **ROI (return on investment):** for a given use of money in an organization, the ROI is how much profit or cost saving is realised. An ROI calculation is sometimes used along with other approaches to develop a business case for a given proposal. If an enterprise has immediate business objectives, a return on investment might be measured in terms of meeting one or more of these objectives rather than in immediate profit or cost saving.
- **Router:** device in a network that handles message transfer between computers and networks.
- **Sensitivity analysis:** a cost-benefit methodology which allows the analyst to examine how different supply/demand, risk or price conditions, or “what if” scenarios might affect project outcomes.
- **Server:** a computer in a network that is dedicated to provide services (access to files or shared auxiliary equipment, such as printers, or routing of e-mail) to other computers in the network.

- **Spreadsheet:** a computer programme which allows the manipulation of tabular numerical data and databases such as Microsoft Excel, and which can also easily generate useful charts.
- **Source code:** consists of the programming statements that are created by a programmer in a certain language. These files are later compiled (converted to machine language).
- **UPS (uninterruptible power supply):** is a device that allows your computer to keep running for at least a short time when the primary power source is lost.
- **WAN (Wide Area Network):** a geographically dispersed telecommunications network.
- **Web or World Wide Web (WWW):** a distributed network of related documents, one of the services of the Internet.
- **Web site:** a public information resource, component part of the World Wed Web, created and administered by an individual or organization.
- **Word processing programme:** a computer programme that is used in the preparation of typed documents for printing.

Annex 2

CHECKLIST FOR EACH STAGE OF THE COMPUTERIZATION PROCESS

These are a series of checklists that allow you to make sure that you are ready to evolve to the next step of the computerization project: from assessing the environment to the execution stage.

Assessing the project enabling environment:

- a) Have you identified the strengths and weaknesses of the cooperative's existing business information management system?
- b) Have you assessed and identified the information processing needs of all the stakeholders involved: management, elected leaders and members.
- c) Have all project risks been identified?

Preparation of a business plan

- a) What is the business objective of computerization?
- b) What type of computerization is proposed?
- c) What are the expected benefits, costs and risks of computerization?
- d) Can the cooperative afford it? How?

Project implementation plan design:

- a) Do you have a comprehensive project implementation plan?
- b) Have you obtained strong elected leadership and member support?
- c) Did you define measurable success indicators at the end of each stage?
- d) Did you estimate all resources needed (economic, personnel, equipment, installations)?
- e) Is funding identified to maintain project viability?
- f) If you are hiring a software developer, make sure you have a contract in place that includes the source code, maintenance, documentation and user support

Execution and project evolution:

- a) Is the software thoroughly documented?
- b) Is there a software bench-testing plan?
- c) Has a plan for system backup been implemented?
- d) Is there a plan for hardware servicing?
- e) Is there a procedure for user support, to repair software errors and plan software updates?
- f) Is there a training plan for employees, elected leaders and regular members?

Annex 3

EXAMPLE OF A PROJECT PLAN PREPARED BY COOPERATIVE XYZ

The organization

XYZ is a small dairy cooperative in a rural area that has existed for over 20 years and has experienced rapid growth during the last two years. It now has over 500 members. The cooperative has traditionally maintained all its records using a manual accounting system. Consequently, its members do not know exactly how much the cooperative owes them for milk delivered until a balance is done every three months. But now they have too many members to manage manually, and the cooperative is starting to pay late, causing member dissatisfaction.

Meanwhile, a company from a nearby city has offered to buy all their production for their dry-milk plant, at an attractive price, but they require that the cooperative also provides them with daily reports on individual production and quality information on each batch. Furthermore, they would like to be frequently informed about the cooperative's milk production projections for the future.

The elected leaders have realized that this will require the use of computers and development of a computerized member record system. One member, who is familiar with computer systems and works in the administration of the cooperative, has offered to help in designing a plan. Elected leaders have designated this member as **project manager**.

The internal environment

About one quarter of the cooperative's members are founders of the institution, and most are traditional farmers. New members are younger and a growing number of them have some knowledge of computers. In order to gain member support for the proposed computerization initiative, the elected leadership of XYZ added this issue to the agenda of the last general meeting. To prepare for that meeting, the project manager prepared a short proposal (a "Business Case") that explained the advantages of having a computerized accounting system, in terms of financial benefits, speed of information flow, accuracy of data collected and used, and the economic perspective of these advantages. Furthermore, he invited a member from a neighbouring cooperative that had already computerized to explain what they had done in computerizing and what their experience was. Members approved the proposed project and work then began on developing a detailed implementation plan to determine the exact cost, resources and time frame of the project.

The Business Plan

Example of a simple Business Plan: a summary of expected benefits, costs and risks.

Business goal:

Computerize administrative information and offer improved member services that our cooperative needs in order to increase its business competitiveness

Objectives:

- Automate accounting, tax and administrative records. Permit the introduction of improved systems for mobilizing member capital to finance cooperative business operations
- Develop a computerized system that will generate daily reports on the individual milk production
- Provide members with daily access to information on the value of shares held and transactions with the cooperative via e-mail reports or by telephone
- Allow for the analysis of historical data used to project future scenarios and trends

Outputs:

- Local area network with 3 computers, printers, Internet connection
- Own software developed according to our specific needs and wishes
- Staff trained in the use of computers and software

Potential risks:

- Electrical network in the office has to be updated. Internet access still not available at local phone call cost (have to research if it will be available soon)
- Have to deal with employee fears regarding complexity of loss of their job
- Lack of technical consultants in the area (have to research and ask other cooperatives)

Expected benefits:

- Expected savings in external accounting and administrative services and expenses about 60 per cent
- Increase general financial savings levels by 10 per cent, and reduce membership loss by 50 per cent
- New business with dry milk plant for \$30,000 a year

Expected costs:

- Computer hardware, software, cabling and installation, basic software: \$6,000-\$8,000
- Software development: \$15,000
- Training: \$2000-2500
- Regular maintenance costs (hardware, Internet): \$200-300

Funds required: Approximately \$22,000-28,000 in 15 months. We estimate that we can use \$10,000 of the funds saved for technological upgrade, the rest through a bank loan at a 10 per cent interest rate. We estimate that the savings that the system will provide can allow us to pay the loan back in 3 years

Expected start and finish dates: Fifteen months from start date

The team

Once the initial business plan has been approved by the elected leadership, the project manager established a 3-person project team to assist in gaining a more detailed understanding of the information needs of the manager, elected leaders, staff and members, refine the project's objectives and begin working with the hired consultant on the design of the detailed project implementation plan.

The external environment

Over the last few years, computers have become more popular in the region. There are computer vendors in the city and a few small software development companies have started providing software development and support services. The cooperative has hired a computer consultant to help them in their planning stage.

There are dial-up services to connect to the Internet, though the prices are still quite high because you need to make a long distance call to the ISP (Internet Service Provider) located in the nearest city.

Computer system solution selected

The project manager and the consultant reviewed the suitability of available packaged software in the region and found that none of the packaged software application systems satisfied their exact needs, so they have decided to:

- 1) develop their own software for the cooperative business management plus
- 2) buy a packaged accounting tool, one that is commonly used in the region.

In the first stage they will install two computers: one will be used for accounting, invoicing, letter writing, e-mail and other administrative tasks. This computer will have the accounting tool installed, besides other software. The second computer will have the business tool and will be dedicated to member services.

Hardware

The consultant has determined that the cooperative does not need to buy the latest and most expensive high-tech equipment:

- Two medium range PC-compatible computers (Fast, stable, with large hard disc capacity)
- One modem to connect to the Internet
- One external CD-ROM writer to do backups
- One dot matrix printer for reports and invoices
- One colour ink jet printer for letters and fancy reports

Software

- Operating system was included in the cost of the computers
- Two packages of office tools (word processor, spreadsheet and presentation) and email software
- One package of administrative and accounting software
- Two licences of antivirus software

Installation

- The computers were installed as a local area network, connected by cables and a hub. Even though there are only two computers the cabling was designed to accommodate the addition of two more workstations next year.
- The electric cabling was redone in compliance with local norms. Since the electrical power is not stable all the time, a UPS and stabilizer have been installed to protect computers against power surges and the cooperative has decided to purchase a small gasoline-powered electric generator to keep the system functioning in case of an electricity blackout.

- A telephone cable was added for occasional connection to the Internet via dial-up. A surge protector was installed to protect the computers from electrical discharges, common on telephone lines where there are storms in the region as well as in many other areas.

Services:

It was also decided to:

- Open a dialup account with a local Internet Service Provider company so that the cooperative could connect to the Internet, and;
- Purchase an insurance policy for the equipment.

Other

- Paper, blank CDs, ink cartridges, training manuals and books for a small library available to members and employees.

Training Plan

Realizing the importance of starting a programme of continuous staff training in the use and maintenance of the new system, the cooperative decided to hire a short-term computer teacher to help train their staff and members, and to design support manuals and keep files for the software that they will develop.

The four persons operating the computers will be trained on the general use of computers, printers, operating system, use of office tools, email and web. One of them, who has more technical background, will learn to solve general problems and perform backups and maintenance. The manager and assistants will be trained on the reports and interpretation of the data the systems produce.

Implementation Plan

A summary description of the XYZ Dairy Cooperative's implementation and expenditure plans are found in Annex 4.

Annex 4-1

IMPLEMENTATION PLAN

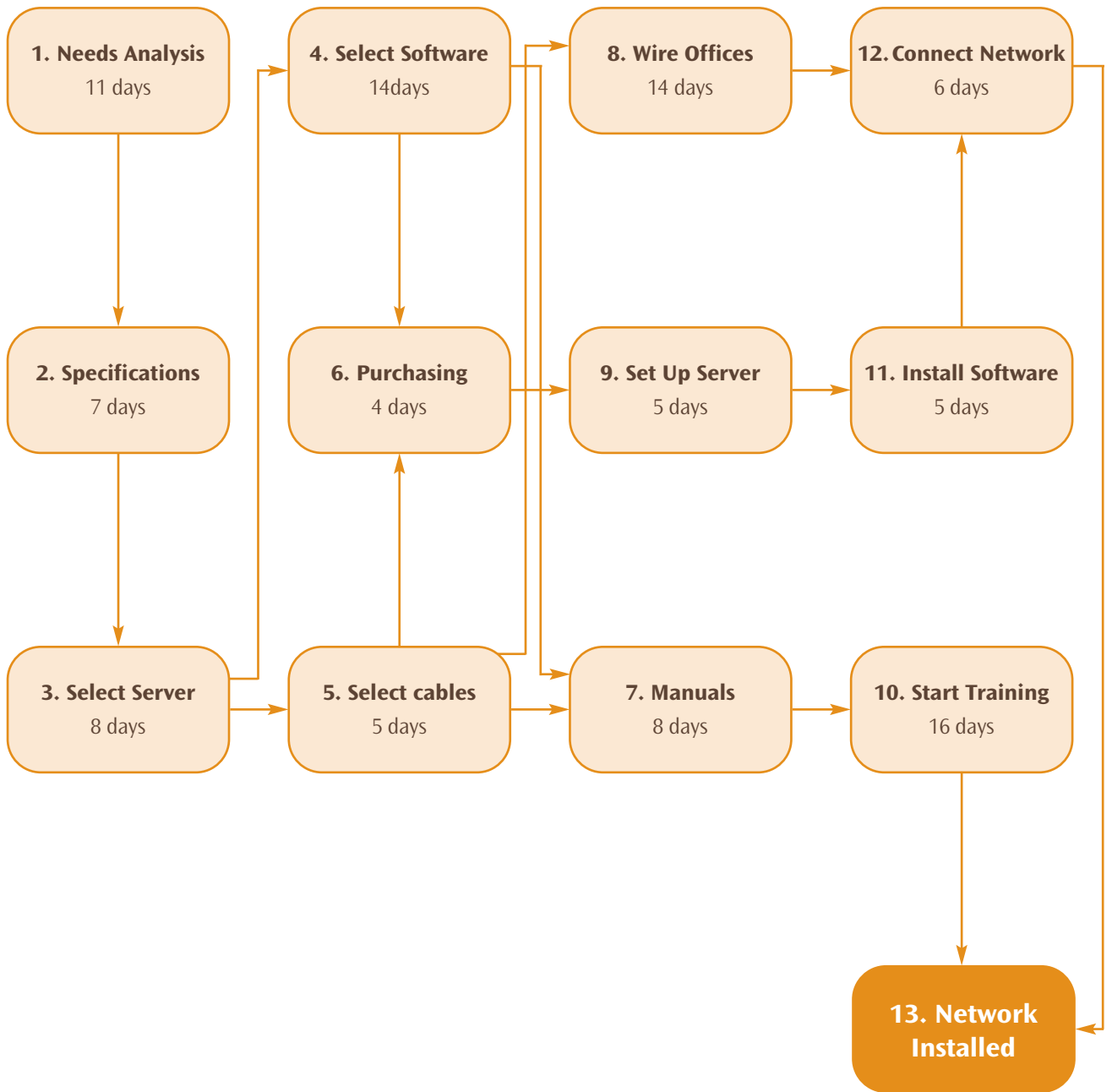
Stage	Task	Sub-tasks	Month
Define information needs	General stakeholder consultation	<ul style="list-style-type: none"> - Hold consultative meetings with key stakeholders - Reach preliminary consensus on project scope, objectives and expected outputs 	1
Assess external environment	Define technical requirements (hardware)	<ul style="list-style-type: none"> - Verify reliability of electricity supply, telephone and Internet communications; availability of IT support in region 	1
	Software	<ul style="list-style-type: none"> - Define the information systems need for the software, by consulting staff, members and managers - OUTPUT -> general information systems need (draft) 	1-2
Approval	Get Board OK and initial funding of project	<ul style="list-style-type: none"> - Collect information on project costs, potential risks and expected benefits - Prepare a Business Case to justify project and obtain Board approval /OK - Present case to Board 	3
Design	Establish project team	<ul style="list-style-type: none"> - Assign members of internal project team - Determine availability of each 	3
	Detailed stakeholder consultation	<ul style="list-style-type: none"> - Select 30 members and ask for their input - Select a bench-testing group - Hold workshop with staff and manager to define needs in detail - OUTPUT: Detailed information on processing needs. - Analyse existing software that satisfies these needs -> decide whether to develop or buy 	2-3-4
	Detailed project implementation plan	<ul style="list-style-type: none"> - Write a detailed plan including: tasks, person responsible, expected end date, outputs and needs - Define expected success indicators 	4-5
	Briefing session with managers	<ul style="list-style-type: none"> - Inform on project plan and expected benefits - Output: OK to proceed with project 	5
Execution	Hiring of computer professional and programmer	<ul style="list-style-type: none"> - Find a computer professional to assist in designing software solution - Write and sign contract 	5
	Accounting Software	<ul style="list-style-type: none"> - Research and compare available accounting software that satisfies needs - Choose one solution - Sign licensing contract 	4-6
	Programming of management software	<ul style="list-style-type: none"> - Approve programming plan in stages - Supervise programming, report on on progress, testing 	5-10
	Briefing session with managers	<ul style="list-style-type: none"> - Inform on project plan, status and expected benefits 	5, 7, 9
	Briefing session with members	<ul style="list-style-type: none"> - Inform on project plan, status and expected benefits 	6, 10

IMPLEMENTATION PLAN

Stage	Task	Sub-tasks	Month
Execution (cont)	Hardware acquisition and installation	<ul style="list-style-type: none"> - Determine specifications of two computers and two printers - Obtain several quotations on equipment. - Consider support options and warranty 	7
	Electric cabling, UPS, backup	<ul style="list-style-type: none"> - Install new independent electric outlet and one UPS - install additional telephone line for computer / Internet connection - Buy a CD writer to perform backups 	6
	Software installation and testing	<ul style="list-style-type: none"> - Install accounting software - Install first version of management software 	7-8
	Initial Training of users (staff, board)	<ul style="list-style-type: none"> - Assess computer knowledge of each person - Design two courses: one basic and one advanced - Hire computer teacher - Buy books or CDs for additional self-paced training 	7-10
Project evaluation	Evaluate project implementation	<ul style="list-style-type: none"> - Analyse member satisfaction - Analyse staff satisfaction, training needs - Analyse expected deadlines vs. reality and delays 	12
	Evaluate system performance compared to original requirements	<ul style="list-style-type: none"> - Measure results - Check results obtained against expected results - Analyse member, staff, managers, satisfaction - Do an ROI updated analysis 	14/15
	Report to managers and members on the project	<ul style="list-style-type: none"> - Report findings to board members and managers - Prepare report to members 	15
Maintenance and evolution	Hardware maintenance	<ul style="list-style-type: none"> - User support on hardware problems - Hardware upgrade plan 	TBD*
	Software maintenance	<ul style="list-style-type: none"> - Software error correction plan 	TBD
	Software evolution	<ul style="list-style-type: none"> - Software upgrade plan 	TDB

Annex 4-2

SIMPLIFIED PERT CHART FOR INSTALLATION OF NETWORK



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