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# New methods of co-operation: networks

**Mustapha Lasram**

Ministry of Agriculture (Tunisia)

**Abstract.** Co-operation in higher education and research has developed considerably thanks to networking. New information and communication techniques have opened up new possibilities for working in networks. However, the southern countries do not have sufficient access to these tools.

CIHEAM, which has long experience in co-operation in postgraduate training and research, should help southern countries to gain better access to this technology in order to undertake several pilot distance learning experiments in partnership with the countries of the Mediterranean region.

**Keywords.** Formation – Distance learning – NICT – Networking – Co-operation.

## Introduction

Networking has been widely practised for several years by research and higher education teams in general and by teams concerned with agriculture in particular. Co-operation via networks has been privileged during the past two or three decades and after the development of agricultural training and research systems in emerging countries because of the advantages in terms of effectiveness for the work carried out and in terms of cost-benefit.

Today, the rapid development of new information and communication technologies (NICT) and the resulting benefits mean that we must use them widely in research and teaching as an effective tool for co-operation between teams.

## I – The traditional form of networks

### 1. Research and teaching networks

The networks used by research teams are of different types according to the activities in which they result. The most common are networks for the exchange of information and publications.

Others, which involve exchanges between researchers, rapidly led through concertation and the examination of research methodology to the setting up of joint research projects by various teams in several countries which have an advantage in running this research work in a concerted manner. These working procedures have evolved to become true co-operative research networks with periodic meetings between researchers and seminars presenting the results of research leading to joint publications.

In this context, the most effective networks have achieved the division of labour, avoiding the duplication of work and making better use of the resources available.

Higher education networks are also of different types. These include the exchange of training contents and pedagogic engineering, teacher and student exchanges and joint teaching. Traditional co-operation

in teaching has also concerned the training of training staff, the transfer of teaching tools and exchanges of persons.

The term 'network' can thus have several meanings. It can form a working concept, a technique for exchanges, an organisation or group structure, a method for transmission of information or a form of communication.

## 2. The disadvantages of traditional co-operation methods

In spite of the numerous achievements of co-operation programmes in training and agricultural research, which have led in particular to the training of high-level national teachers and researchers, the traditional forms of co-operation have certain disadvantages and limits. As only a small population is concerned, the knowledge transfer process remains very slow. The cost—and especially travelling and accommodation expenses—is often high and forms a limiting factor with regard to the number of beneficiaries. Finally, initial training is inadequate unless it is followed by a continued training system enabling the continuous updating of knowledge and unless the persons trained have access to scientific and technical information.

In addition, the universities in most developing countries have serious difficulties as a result of the large, continuously increasing numbers of students, infrastructure that cannot cope with the number of students enrolled and inadequate budgets. The quality of teachers is sometimes inadequate and their lack of motivation and isolation from the source with regard to the updating of knowledge add to these problems and the teaching received is often not up to the standard desired.

## 3. The first steps of distance learning

Distance training by the radio has been used for two or three decades as a mass teaching facility in some African countries. The experience has not been conclusive and the system has been practically abandoned. In contrast, when some African countries have wished to undertake a strong schooling policy and have encountered the problem of training and refresher training for teaching staff, radio has been an excellent vector for pedagogical material and content and has given very good results.

Radio is hardly used today for training except for awareness and extension campaign or for mass education concerning certain features of everyday life.

# II – The new information and communication techniques

## 1. The evolution of information and communication technologies

In recent years, communication techniques have developed very rapidly and have totally changed the datum and scope of distance learning. Today, we are experiencing the early days of:

- ❑ **the information society**, whose exploitation leads to the construction of knowledge in the various fields,
- ❑ **the communication era**, through new procedures for the exchange of information and knowledge.

The great revolution in information and communication techniques took place in 1457 with Gutenberg's invention of printing. Books and writings on paper are still the most commonly used communication tools. We had to wait for nearly four centuries for a new invention in communication—the telegraph (1837). The main inventions in communication techniques are shown in Table 1. It can be seen that the data processing and multimedia revolution is less than a quarter of a century old and that the rate of innovation has increased in recent years.

**Table 1. The evolution of information and communication technologies**

(after René Tréguët in “Des pyramides du pouvoir au réseau des savoirs”)

	Mass media	Year of invention	Type of storage	
<b>Writing</b>	Printing	1457	Library	
	Telegraphy	1837	Printing telegraph	
<b>Sound</b>	Telephone	1876	Gramophone	1887
	Wireless (then radio 1920)	1896	LP record	1948
			Magn. support	1960
<b>Image</b>	Photography	1816		
	Cinema	1895	35mm film	1909
			16mm	1923
8mm			1932	
<b>Audiovisual</b>	Talking films	1923	Optical track	
	<b>Multimedia</b>	Tele-electronics	Prof. video	1950
Gen. pub. video			1970	
	Collective computers	1945	CD-ROM	1983
	Personal computers	1975	DVD	1997

The new information and communication techniques (NICT) have thus included the appearance of personal computers in 1975 and then, successively, the modem, the CD-ROM, the CD-I and Intranet and Internet networks. All these NICT form tools that can aid conventional teaching and give the possibility of using new distance teaching methods. Teachers must now be provided with the necessary training and be persuaded of the usefulness of the NICT.

## 2. Some examples of the application of NICT in teaching

### **Réseau Africain pour la Formation à Distance – RESAFAD**

([www.lid.jussieu.fr/resafad](http://www.lid.jussieu.fr/resafad))

- Launched by EDUCATEL, the private French leader in distance teaching, this network targets heads of schools in West Africa. Five countries benefit from the programme—Benin, Burkina Faso, Guinea, Mali and Togo. EDUCATEL has set up in Morocco and Tunisia.

### **Université Virtuelle Francophone - AUPELF-UREF**

([www.aupelf-uref.org/UVF](http://www.aupelf-uref.org/UVF))

- The foundation stone of this virtual university (UVF) was laid in March 1988. Its objective is the production and dissemination of training in various fields. Dakar is the centre for pedagogical resources and also a regional virtual centre. The other regional centres set up during the start-up period are in Antananarivo, Bucharest, Hanoi, Port-au-Prince and Yaoundé. This university is to cover the 52 member-countries of AUPELF. The final objective of UVF with regard to distance training is to contribute to the development of endogenous training capability. With 500 students enrolled free of charge in 1998, UVF plans to have 10,000 students in 1999.

### **Université Virtuelle pour l'Afrique – World Bank**

([www.worldbank.org/aftdr/connect/avu95.htm](http://www.worldbank.org/aftdr/connect/avu95.htm) and [connect/eec2/htm](http://connect/eec2/htm))

- Université Virtuelle Africaine (AVU) is a pilot project launched by the World Bank in 1995. An initial pilot phase began in 1998. It provides various educational products, essentially in scientific disciplines. The training modules are broadcast by satellite (INTELSAT) from the USA.

### **National Technological University by satellite**

([www.ntu.edu](http://www.ntu.edu))

- This is an inter-university network for broadening education by satellite. Teaching covers scientific and technical subjects in various fields. The project has been running for about a dozen years at the

National Technological University of Colorado in association with several other universities. It is reported that 100,000 students have already enrolled! UNESCO is said to be envisaging the development of this network on a world-wide scale. An Internet host site is reported to be envisaged for the Arab countries at Cairo University.

**Réseau Electronique Francophone pour l'Education et la Recherche – REFER**  
([www.refer.org](http://www.refer.org))

- This large network interconnects Francophone universities and the various higher education establishments. The centres belonging to the *Système Francophone d'Édition et de Diffusion* (SYFED) host several servers forming part of the network. Several 'contact countries' are associated with the network in Africa, in the Maghreb (Morocco and Tunisia), in the Mashrek (Lebanon and Egypt) and in other regions.

**3. The constraints for NICT in developing countries**

In spite of the rapid development of NICT and the steady decrease in the cost of purchasing equipment and in connection costs, the beneficiaries of these technologies are still an 'info-rich club'. Several indicators illustrate this observation.

There are 50 telephone lines per 100 persons in the northern countries and an average of only 2 in the southern countries. To this it should be added that the systems are old and call charges excessively high in many developing countries.

In the Francophone countries, only 75% of computers are connected to the Internet but 98% of these are in America and northern Europe.

In Africa, 7,200 computers were connected to the Internet at the end of 1997, when the estimated world total was 16 million computers connected. It should be stressed that even in the northern countries there is a considerable disparity in the number of computers connected to the Internet per 10,000 persons, as is shown in the data below (end of 1996):

Finland:	552	Austria:	112
Norway:	390	United Kingdom:	100
USA:	380	France:	42
Canada:	201	Spain:	28
Denmark:	201	Italy:	26
Switzerland:	185	Portugal:	26

The number of Internet domains created increased very rapidly in the past three years from 5 million in 1995 to nearly 30 million in 1998. The distribution of the domains is shown in Table 2 and shows in particular the lag of certain European countries and above all of the southern countries.

**Table 2. Distribution of Internet domains (July 1998)**

<b>.com</b>	10 000 000	<b>.pt</b>	45 000	<b>.ma</b>	478
<b>.net</b>	7 000 000	<b>.gr</b>	40 000	<b>.jo</b>	360
<b>.us</b>	1 300 000	<b>.tr</b>	27 000	<b>.tn</b>	57
<b>.fr</b>	430 000	<b>.eg</b>	2 043	<b>.dz</b>	19
<b>.it</b>	320 000	<b>.lb</b>	1 400	<b>.ly</b>	1
<b>.es</b>	240 000	<b>.mt</b>	785	<b>.sy</b>	0

### III – What projects for CIHEAM?

#### 1. CIHEAM's strong points

CIHEAM has obvious advantages in the Mediterranean region to initiate regional co-operation in post-university distance education. Indeed, it is the only establishment of its kind in the Mediterranean region for the agriculture and agrofood sector. It has operated as a network for 35 years in training and research and possesses a fairly rich database on institutions and skills in agricultural science and associated disciplines in the Mediterranean.

In its future programmes, CIHEAM intends to strengthen partnerships and enhance the opening up to the countries in the region. It has started to develop a web information and communication network for CIHEAM and the IAM with statistical and documentary databases.

#### 2. A few proposals for CIHEAM

CIHEAM should consolidate, develop and broaden its information and communication network with the main teaching and research institutions in the region and establish links with the regional and international networks already established in the fields of agricultural teaching and research.

CIHEAM could undertake several pilot experiments in distance training in partnership with the institutions in the region. This is what IAM Montpellier has started to set up within the framework of its reflection concerning the Virtual Mediterranean Agricultural University. Distance teaching modules could be developed jointly and be integrated in regular curriculae.

Distance training could also be used in continued learning modules for agricultural managers in Mediterranean countries by developing various teaching material, in particular using the short courses provided by CIHEAM.

Finally, CIHEAM could develop support for distance supervision of theses and research work by disseminating scientific information and providing access to documentation for researchers in southern countries.

### Conclusion

NICT applied to teaching have certain advantages over classic classroom or lecture teaching. They enable broad dissemination of 'knowledge' and information and are therefore of use to a population of beneficiaries. The use of these technologies in teaching thus has a good cost/benefit ratio.

The technologies also make it possible to strengthen partnerships and co-operation between teaching and research institutions in the region.

However, it must be stressed that **“the new communication technologies can in no case replace either books or teachers but complement them...”**

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