

# Metaschool: Introducing Learning Repositories in Agricultural Education

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## Abstract

Agricultural education can help farmers to increase production, preserve natural resources, and provide nutritious food, thus contributing to a better quality of life. The advent of ICT revolution has provided many ways for supporting successfully the agricultural e-education. To this end, this paper focuses on supporting agricultural education through the use of digital learning repositories and learning objects. Digital learning repositories are used for storing, reusing and sharing learning objects. The deployment of various agricultural learning repositories has stimulated tutors in using them in their educational activities. Therefore, training tutors in using these technologies is an imperative need. This paper gives an overview of the METASCHOOL project, a new European initiative for supporting the in-service training of tutors on learning objects and learning repositories. In particular, it presents the training of agricultural tutors in using, sharing and tagging Organic Agriculture and Agroecology resources and enhancing their skills and experience on resource and teaching activity exchange among European tutor communities.

*Keywords:* digital learning resources, digital learning repositories, agriculture, training

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## Introduction

Supporting agricultural education comprises a significant issue for economies so as to ensure a sufficient, quality and affordable food production, as well as the conservation of natural resources, the competitiveness and sustainability of agricultural businesses and the welfare of rural communities. Agricultural education is considered as the community of scholarship between agriculture and education; it is the scientific study of the principles and methods of teaching and learning as they pertain to agriculture (Barrick, 1988). In broad terms, it is the instruction on various aspects of agriculture such as crop production, livestock management, and soil and water conservation. It includes several subjects such as needs assessment, formal and informal teaching methods, curriculum and program development, instructional and program delivery approaches, educational technology application, program and instructional evaluation, appropriateness of education, related policy issues, institutional organization and management of agricultural institutions in domestic and international settings (Williams, 1991).

Agricultural education can be distinguished into elementary, vocational, college and general. Elementary agriculture is taught in public and private schools, and deals with subjects such as plant and animal production and cultivation techniques and soil conservation. Vocational agriculture regards training in occupations relate to areas such as agricultural production, marketing, and conservation. College agriculture involves training on teaching, conducting research, or providing information to advance the field of agriculture and food science in other ways. General education agriculture informs the public about food and agriculture (Wikipedia, 2010).

Also, agricultural education addresses particular audience, namely the agricultural learning society. This society comprises of target groups, which can be identified as: (a) academia (professors, tutors, researchers etc.): producing new knowledge; (b) agricultural stakeholders (farmers, growers, agricultural co-operations): practicing new knowledge; and (c) extension employees (agronomists): connecting academia and agricultural stakeholders by transferring the knowledge from the former to latter; (d) public (students, entrepreneurs, citizens): having interest in acquiring agricultural knowledge. Thus, agricultural knowledge and its diffusion comprise the basis and common point of reference of the target groups.

Nowadays, the plethora of available Information and Communication Technology (ICT) tools raises new opportunities and challenges for knowledge creation and sharing introducing electronic education (e-education)

or electronic learning (e-learning). Respectively, agricultural e-learning societies should be developed. Nonetheless, this is not achieved in practice, as different types of ICTs play an important role in agricultural value chains having different strengths and weaknesses and tutors are not aware or familiarized with current ICT developments due to lack of training. Therefore, this study focuses on supporting agricultural education through training in using digital learning repositories and learning objects. The impact of such repositories in agricultural education depends on the tutors' skills to use them and incorporate their resources in their educational activities.

In this context, this paper gives an overview of the METASCHOOL project, a new European initiative for supporting the in-service training of tutors on digital learning repositories. In particular, it presents the training of agricultural tutors in using, sharing and tagging Organic Agriculture and Agroecology resources. Special emphasis is given on adding agricultural metadata and organising agricultural learning resources in personal portfolios and learning repositories and exchanging resources and teaching strategies with tutors around Europe.

The next section provides definitions of the concepts of learning objects and digital learning repositories and gives some good relevant examples for the agricultural case. Also, an overview of the METASCHOOL project, as well as a detailed description of its training framework focusing on Organic Agriculture and Agroecology is given. In addition, short reviews of the state of the art of ICT use in the Greek educational system and of the agricultural education in Greece are apposed. In the third section, results from METASCHOOL training for teachers in agricultural education in Greece are analyzed. Lastly, the conclusions of the paper are given.

## **Material and methods**

### **Background**

A learning object/recourse is any entity, digital or non-digital, that may be used for learning, education or training. Learning objects should include some learning objectives and outcomes, assessments, and other instructional components, as well as the object itself. Digital learning repositories are used for storing, reusing and sharing learning objects. Focusing on agriculture, some examples of agricultural learning repositories are the Rural e-Gov Observatory ([rural-egov.eu](http://rural-egov.eu)), the Bio@gro ([bioagro.gr](http://bioagro.gr)), the CG-Online Learning Resources ([learning.cgiar.org](http://learning.cgiar.org)), TrAgLor ([traglor.cu.edu.tr](http://traglor.cu.edu.tr)) and Organic.Edunet ([organic.edunet.gr](http://organic.edunet.gr)).

In particular, Organic.Edunet is a multilingual federation of learning repositories with quality content for the awareness and education of European youth about Organic Agriculture and Agroecology. It aims at facilitating access, usage and exploitation of related digital educational content. It deploys a multilingual online federation of learning repositories, populated with quality content from various content providers. In addition, it deploys a multilingual online environment (the Organic.Edunet Web portal) that facilitates end-users' search, retrieval, access and use of the content in the learning repositories. It studies educational scenarios that introduce the use of the Organic.Edunet portal and content to support the teaching of topics related to Organic Agriculture and Agroecology in two cases of formal educational systems, i.e., high-schools and agricultural universities. Furthermore, it evaluates project results in the context of pilot demonstrators in pilot educational institutions, as well as through open validation events where external interested stakeholders will be invited. Moreover, Organic.Edunet focuses on achieving interoperability between the digital collections of Organic Agriculture and Agroecology content that has been developed in various European countries, as well as facilitating publication, access, and use of this content in multilingual learning contexts through a single European reference point. In this way, digital content that can be used to educate European Youth about the benefits of Organic Agriculture and Agroecology, will become easily accessible, usable and exploitable.

### **Overview of the Metaschool project**

METASCHOOL is a European project aiming at improving the in-service training of tutors and school ICT staff through the effective use of digital content. METASCHOOL focuses on organisation, sharing, use and re-use of digital learning resources that can be accessed through online learning repositories. Analytically the aims of the project are the following: (a) adaptation, development, testing, implementation and dissemination of a training framework regarding metadata, learning resources, and learning repositories. The framework will include a curriculum, training activities with good in-school practices and supporting material; (b) development and implementation of strategies/ best practices for organising favourite/useful learning resources into personal portfolios of digital resources and setting up learning repositories at school or regional level; (c) proposal and testing of teaching methodologies/ pedagogical strategies regarding the use of digital learning resources in the context of the educational process for the subjects of Science and Agriculture; (d) promotion of a European

virtual space for interconnecting school repositories and exchanging/sharing teaching resources; (e) organization of pilot training and validation activities for teachers/ ICT staff to develop methods/ strategies for taking advantage from organising learning resources into personal portfolios/ learning repositories and exchanging resources with teachers around Europe; (f) involvement of European organisations activating in school education and working on the promotion and best use of digital learning resources in the classroom; and (g) development of a structured and reusable set of guidelines and recommendations for supporting the creation and assessment of relevant teacher training programs.

METASCHOOL consortium comprises of nine partners with expertise and experience in various areas from six European countries, namely Greece, Belgium, Sweden, Austria, Germany and the Czech Republic. The project improves teacher practice and propels new knowledge on Agriculture and Science based on the experience gained from the successful projects of Organic.Edunet (<http://www.organic-edunet.eu>) and COSMOS (<http://www.cosmos-project.eu>) respectively. As far as agriculture is concerned, the particular project can support it in many ways. As mentioned above, environmental/agricultural education is one of its thematic areas (Sotiriou et al., 2009). The particular area has been chosen because from one side numerous agricultural content and resources are available on the Internet allowing for a variety of instructional approaches, and from the other environmental/agricultural education has not been fully incorporated in the school curricula despite its significance to sustainable development.

### **Training Framework**

Regarding the METASCHOOL tutors' training, it is distinguished into three levels. The first level refers to digital learning resources and repositories and involves training on integrating online content to core academic content in lesson plans. The second level concerns educational metadata and training on accurate tagging and adding metadata to resources that tutors have used/ created. The third level regards social metadata and folksonomies and involves training in developing skills on combining the advantages of traditional metadata with state-of-the-art folksonomy approaches.

In order to assess whether the aforementioned goals are feasible and centred to the target groups (tutors and ICT staff) there has been a study on their needs. According to the needs analysis, the tutors participating had more ICT skills than the average and were more motivated to learn. They are mostly using PowerPoint, Moodle and linked repositories, Google and GoogleMaps and have restricted knowledge in Web 2.0 tools, but are willing to learn more since they are widely used by their students. They would like to be capable of (a) finding structured material (e.g. videos, images, lesson plans) relevant to their subject in their language and with their country cultural focus; (b) using and accessing systems/ scientific repositories easily; (c) publishing their own learning content; communicating via various tools (e.g. chats); and (d) ranking material.

Also, the European state of the art regarding the available equipment in schools and teachers' attitudes towards ICT has been studied and particular recommendations have been derived for the training (D2.1, 2009). It should be flexible, allowing for different levels of ICT competence of teachers; carried out in their home language; ☐ taking into account the different levels of hardware provision in schools; ☐ including case studies related to the teachers' interests and meeting their needs. The case studies regard the use of specific applications, tools and repositories, such as the COSMOS repository for sharing information about Science, the Confolio system for sharing information for Organic Agriculture and Agroecology from Organic.Edunet repository, and the Naturnet Redime URM repository for sharing spatial and non spatial context.

In this light, the training has been designed mainly on non-technical and technical aspects. Analytically, the non-technical dimension concerns issues such as evincing the value of sharing educational material, using social networks in education, informing on Intellectual Property Rights protection and Creative Commons Licence. The technical dimension concerns issues such as interconnecting repositories, localisation of concrete learning resources, using the Internet in educational activities, introducing learning repositories, objects/resources and communities. It must be mentioned that the training will also include broader issues regarding the lack of teachers' time and ensuring the high quality of educational material. According to the aforementioned requirements, a framework comprised of 21 self-contained modules has been designed. The modules are distinguished into three types: (a) teaching and learning; (b) ICTs in teaching and learning; and (c) technical training.

Currently, the modules are in English but by the end of 2010 they will have been translated into local languages. They are self-contained, offering flexibility and individual learning paths and taking into account different levels

of ICT competence and experience with metadata and repositories. There are various ways of interconnecting the modules. There are modules providing introductory information that apply to teachers with little ICT experience, whereas others build on previous knowledge. Other modules refer to the most frequently mentioned application. One or two modules present good examples of practice to motivate teachers to use them directly in their classrooms (D2.1, 2009). The modules are presented in Table 1.

Table 1. METASCHOOL training framework

Topic area	Topic	Beginner	Intermediate	Expert	Trainees	Pedagogically focused	Generic
<b>Introduction</b>	1. WWW and educational uses for teachers	x	*		teachers	x	x
	2. Strategies for searching information online	x	*		teachers		x
	3. Introduction to the concept of learning objects	x	*		teachers		x
<b>Learning resources and repositories</b>	4. Introduction to sharing learning resources	x	*		teachers	x	x
	5. Introduction to learning repositories	x	*		teachers		x
	6. Review & demonstration of popular repositories	x	*		teachers		x
<b>Metadata</b>	7. Introduction to metadata, educational metadata, and metadata-based searching, educational metadata schemas	*	x		teachers		x
	8. Introduction to the tools for describing resources with metadata	*	x		teachers		x
	9. Social metadata and Web 2.0 tools (folksonomies & social tagging)	x	*		teachers		x
<b>Social Web</b>	10. Web 2.0 tools in education	*	x		teachers	x	
	11. Popular social tools (e.g. Flickr) and scenarios for their use in the classroom	x	*				x
<b>Hands-on sessions</b>	12. Pedagogical strategies and best practices for using learning resources in the classroom	x	*		teachers	x	
	13. Practical demonstration of learning resources and their classroom use		x	*		x	
	14. Practical demonstration of metadata descriptions		x	*			x
	15. Hands-on session working on resources related to organic agriculture & agroecology (use of Organic.Edunet)			x	teachers		x
	16. Hands-on session working on resources related to science (use of COSMOS, xplora)			x	teachers		x
	17. Searching school's resources through the LRE portal	x	*		teachers		x
	18. Supporting teachers in sharing resources through social tagging in LRE	*	x		teachers	x	
<b>Technical session</b>	19. Introduction to setting up a portfolio and connecting to the outside world		*	x	teachers ICT staff		x
	20. Setting up a repository (e.g. using Confolio tool) in the school's server			x	ICT staff		x
	21. Connecting educational repositories, e.g. Confolio and LRE as an example			x	ICT staff		x

x= directly applicable, \* = also applicable

METASCHOOL training will help tutors and ICT staff to increase their digital competence and in particular succeed certain goals (concerning tutors and ICT staff), regarding: understanding the educational benefits of the World Wide Web, being able to search effectively using the World Wide Web, understanding the concept of learning objects, understanding the concept of sharing resources, becoming familiar with the concept of learning repositories and communities, knowing how different learning repositories work and what they contain, understanding the concept of metadata, becoming familiar with COSMOS, understanding the concept of social metadata such as tags, understanding how Web 2.0 tools are used in education, becoming familiar with popular Web 2.0 applications, appreciating the benefits of using digital resources in the classroom, grasping how learning objects can be used in teaching and learning, being able to add metadata to learning resources and upload them to a repository, being able to use Organic.Edunet, being able to use COSMOS, becoming familiar with searching school resources through the Learning Resource Exchange (LRE) portal, being able to share

resources through tags, becoming familiar with Confolio, becoming familiar with e-portfolio, being able to set up the Confolio system (for ICT stuff) and becoming familiar with the technical interconnection between Confolio and LRE (for ICT stuff).

### **Greek educational system and ICT readiness**

The Greek Ministry of National Education and Religious Affairs (YPEPTH-[www.ypepth.gr](http://www.ypepth.gr)) has the overall responsibility for education, namely the provision of human and technical resources (e.g. computer labs, software) and the implementation of the National Curriculum. Also, 58 regional centres (KEPLINET) are providing educational and technical support of primary and secondary education. The National Curriculum is formulated by the Hellenic Pedagogical Institute at national level and includes all the EU key competencies except for learning to learn. Digital competence is a cross-curricular subject. A new National Curriculum has been issued, incorporating new subjects (such as environmental education, health education, cultural affairs) and boosting interdisciplinary learning and open methods of teaching and learning. A good example is the “Flexible Zone” (2 to 4 teaching hours) that has been included into the primary school schedule for extending interdisciplinary project work among students through collaborative teaching and learning (D2.1, 2009).

The subject of Informatics is instructed at all educational levels. Setting the integration of ICTs in educational process as one of the educational policy priorities, efforts for improving the infrastructure (e.g. broadband networks, personal computers) and digital material and services (e.g. educational software, portals), as well as supporting teachers’ training have been done in the context of the Information Society Framework Programme (<http://en.infosoc.gr>). In the same context the Greek Schools' Network (GSN - [www.sch.gr](http://www.sch.gr)) has been developed. It comprises the educational intranet of YPEPTH for the creation of educational communities through the connection of primary and secondary schools, teachers, students, administrative staff and libraries across Greece. Concerning in-service teacher training, through the Information Society Operational Programme teachers get familiarized with basic computer applications and ICT use in daily classroom activities. Already, 76% of Greek teachers have attended these courses. Although teachers believe that the use of ICTs in educational activity is very beneficial and that it makes students more motivated and attentive to the lesson, Greece is among the European countries with a very high percentage of teachers that do not use computers in their classrooms. Teachers attribute this fact mainly to the lack of computers in their schools, their lack of necessary skills to use them and the persuasion that their subject is unsuitable for instruction through personal computers.

Currently all schools have personal computers, but the rate is only 7 computers per 100 pupils. Also, all have Internet but only 13% use it via a broadband connection, which puts Greece among the last EU member states. The low level of infrastructure and personal computer usage shows that Greece has still a long way to go to reach other Western European countries and even several new member states (EC, 2006). Nonetheless, teachers feel that the number of computers and the speed of Internet connection are satisfactory. Most of them are capable of using the email service and a text editor, but are not comfortable with downloading and installing software or preparing presentations.

Moreover, teachers who use computers prefer to find information from various sources in their lessons, and mostly material from offline sources (e.g. from compact disk) (83%), much from online sources (68%) and less from school networks and databases (55%).

### **Agricultural Education in Greece**

From the 19th century till 1950's agriculture constituted the basis of Greek economy. Thus, the evolution of agricultural education has been closely related with the political and social situation that era. In that period, agricultural production has remained at medium level due to lack of infrastructure, suitable equipment, farming methods and relevant educational infrastructure. Till the beginning of the 20th century, farmers ploughed with animals and used traditional farming methods existing from ancient and medieval times. Many reasons (e.g. war, economic crisis) forced farmers to migrate to urban cities or other countries. Early enough, the need for systematic agricultural education has been identified so as to solve the remaining food problem, the agricultural agency reform and the increase of agricultural production. The first “Agricultural School” has been founded in 1829 in Nafplio. It provided elementary agricultural education to children of poor farmers. Lack of resources and bad economic situation led to the closure of the School in 1873.

During the next years, there has been intense cogitation regarding whether there should be higher agricultural education or only agricultural stations and farms, where courses with general agricultural background would be

provided and practical solutions would be given for problems locally. In 1887, three Agricultural Schools named after their donor Triantafyllidis were established by the Greek state in Athens, Tirynth and Volos, which will comprise a turning point to the development of agricultural education. The last one operated till 1914.

The Agricultural University of Athens (AUA) is the third oldest university in Greece. Since 1920, it has been making valuable contributions to Greek and European agricultural and economic development, by conducting basic and applied research in the agricultural sciences, and by producing high quality graduates as well as cutting edge scientific knowledge. Its sixteen buildings comprise of auditoriums, 41 fully equipped laboratories, a modern library, computer rooms, and extensive agricultural facilities (arboretum, vineyard, experimental fields, flower garden, greenhouses, cowshed, sheep pen, chicken coop, dairy installations and aquaculture tanks). AUA has seven departments, namely Crop Science, Animal Science and Aquaculture, Agricultural Biotechnology, Agricultural Economics and Rural Development, Food Science and Technology, Natural Resources Management and Agricultural Engineering, and General Sciences. Formal learning and practical training has been and remains embedded within groundbreaking research addressing major current challenges. In the past century, academic staff and graduate students firmly established Greece as an equal EU partner by fostering: the distribution of arable land to landless farmers; refugee resettlement after the tragic events in Asia Minor; eradication of hunger in Greece by remarkably increasing farm production; initiation of export of quality agricultural products. For many years now AUA has been an advisor of the Ministry of Rural Development and Food and public agencies, as well as to the European Commission and other international organizations. Also, it has undertaken rural development projects on various areas such as diet and environmental protection, food quality and safety, water resource conservation, biological farming, alternative energy sources, biotechnological applications in agriculture (AUA, 2010).

In 1904, the American Farm School (AFS) in Thessaloniki has been founded. It is an independent, non-profit educational institution serving the rural population of Greece and the Balkans. It has been serving the sectors of food and agriculture providing theoretical and practical education on farming and business practices that are economically viable, ecologically sound and socially responsible (AFS, 2010). It consist of the Secondary School, offering high school education with an additional practical focus on a full range of agricultural and technical subjects, the College of Agricultural Studies providing a BSc degree focusing on agribusiness, tourism, and environmental protection and the division of Lifelong Learning for transferring knowledge and skills on sustainable rural development through short courses, seminars, workshops and conferences.

The current status of the Greek education system and agricultural education has led to a set of statements and recommendations that have to be taken into account for deploying a successful training framework for Greek teachers in the context of the METASCHOOL project. The statements are the following:

- Greek government supports the incorporation of ICTs in schools.
- School reform provides individual autonomy which will probably promote uneven development.
- Access to personal computers and broadband Internet connections is less than adequate, particularly the latter.
- ICT funding is low.
- Teachers are generally not ICT-ready.
- Teachers use sources and networks in Greek, though some are competent in English.

The proposed recommendations are the following:

- Recommendation I: Training should be initiated after ensuring the access to ICT infrastructure.
- Recommendation II: Training should be more thorough than in other countries of the project and not make assumptions about access, competence and motivation.

## Results

In the context of the METASCHOOL training for agricultural tutors' in Greece a workshop at the premises of AFS on 23rd March 2010 has been organized. The aim of the workshop was to provide advanced training in using online repositories and metadata. Eleven persons participated in the workshop, representing academic administration, in-service teachers, and library and computer resource staff. Although the audience was of different background and interests, the workshop was very well received, the faculty was quite engaged and enthusiastic and the level of commitment was pretty high. The workshop has been based on the module entitled

“Hands-on session working on resources related to Organic Agriculture & Agroecology (use of Organic.Edunet)” and consisted of four phases. In the first phase the participants created educational scenarios on environmental topics. Then in the second, they searched the Internet and the Organic.Edunet portal to find online resources for supporting their scenarios. In the third phase, they had to upload their scenarios in Confolio. In these three phases the participants worked in groups of 2-3 for enhancing collaboration.

The fourth phase regarded a twofold evaluation, namely evaluation of the workshop and the presented module. Also, two personal interviews have been taken. According to the evaluation, the majority of participants believe that the METASCHOOL workshop has much value for them and that it is useful for their future instructions. An outstanding part considers that the workshop can improve much or very much their future instructions and most that it will enrich them. Also, the smashing majority is willing to attend another workshop. Participants have no doubt that the workshop could be beneficial and all agree that it is an important activity. More than half believe that the workshop was average to very good. Regarding the workshop leader’s explanations, a big part believes that they were satisfactory to very good. The majority seems to have enjoyed the workshop. The majority believes that the knowledge presented was averagely known by them and they did not have much difficulty in using the tools/techniques shown.

The overall procedure was smooth and in a good rhythm. In addition, there was little or no difficulty in following the content, since it was average or just much unknown. The participants estimate that their teaching practice will change after the workshop from average to much. The motivation of the majority regarding using educational portal in teaching is higher than before attending the workshop and their motivation for using techniques and tools is much higher. The workshop has succeeded in adding very much to the motivation of participants in uploading learning objects or scenarios to an educational portal in comparison before the workshop. They found no difficulty in understanding content in the English language. The majority will introduce to their colleagues the knowledge they received. Overall, the workshop has fulfilled the participants’ expectations and more than half have increased their digital competence. Also, they feel more competent in metadata and the use of online resources. The METASCHOOL portal is considered much to very much user friendly.

The quality of the presented module has been considered as very good. All participants have understood from average to very well how the particular tools are used in education. In general, the module has met the participants’ expectations. The majority found that the use of the module is much easy. The description of the module presented in the METASCHOOL portal, as well as the slideshow helped a lot to understand the content of the module. The description and the slideshow matched much. Not important difficulties were encountered during the hands-on session. Most of the participants would recommend the module to a friend or colleague.

Among the remarks and suggestions regarding the presented module were that it is a very innovative open source but has some navigation problems. Also, the user friendliness should be enhanced. It has been noted that the workshop can bring people with similar objectives and ideas together and help them in sharing them. The hands-on session was the most stimulating part of the workshop. The participants are willing to exchange at least some of their learning objects through Confolio, LeMill and Slideshare. There was a lot of willingness from people to contribute to the workshop. Minimum technological problems have been encountered that did not affect the flow of the workshop. In general, the feeling of satisfaction has been achieved.

## **Conclusions**

Agricultural education can contribute to the improvement of quality of life by helping farmers to increase production, conserve natural resources, and provide nutritious food. The advent of ICT revolution has provided many ways for supporting successfully the agricultural e-education. Therefore, training tutors in using these technologies is an imperative need.

In order to cover this need various initiatives have been taken, such as the “e-Agriculture” ([www.e-agriculture.org](http://www.e-agriculture.org)). This paper has presented the METASCHOOL project that supports the in-service training of tutors on digital learning repositories. The project gives emphasis on organising agricultural learning resources in personal portfolios and learning repositories and exchanging resources and teaching strategies with tutors around Europe. The paper has focused on the METASCHOOL training for agricultural tutors in Greece. Thus, an overview of the METASCHOOL training framework taking into account the capabilities of the Greek educational system and Greek tutors has been given. The overview has evinced that the Greek government

supports the incorporation of ICTs in schools. However, the access to personal computers and broadband Internet connections is not adequate and teachers are not ICT ready yet.

Afterwards, the results from agricultural tutors' training in using online repositories and sharing and tagging Organic Agriculture and Agroecology resources have been apposed. According to the participating tutors, the workshop has increased their digital competence and particularly in using online resources. Also, the workshop has helped them to improve and enrich their instructions and has increased their motivation for using ICTs and uploading learning objects to educational portals. Overall, it has brought agricultural tutors together so as to enhance and share their learning resources and knowledge.

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