

Analysis of needs of researchers in agronomy: implementation of agricultural information system in Algeria

Radia Bernaoui

PhD in Information Sciences, Lecturer, ENSV of Algiers, Algeria

radiabernaoui@yahoo.fr

Mohamed Hassoun

Professor, ENSSIB of Lyon, ELICO-Research Centre, Lyon, France

mohamed.hassoun@enssib.fr

Rosa Issolah

Professor, ENSA of Algiers, Algeria

iss_rosa@yahoo.fr



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Abstract:

This abstract summarizes the results of a survey which we conducted with Algerian scientists specialized in agronomy, veterinary and biological knowledge to manage, analyze their information practices and evaluate the place they agree to share knowledge and the process of collective intelligence, facing the creation of a national information on agricultural research in Algeria. The data reveal a critical need to create an appropriate framework to share knowledge for collective intelligence. This is the project of creating an information system with high added value (National Information System on Agricultural Research). The organization of our investigation consisted of two main phases. An exploratory phase for which was conducted for qualitative interviews, followed by a pre-survey and another phase which was devoted to the questionnaire survey. Algeria, strongly faced with constraints of insufficient agricultural production, needs to fit into this logic and use its search results as a source of innovation and performance in its current strategy of reducing its food bill. However, one of its limitations is the lack of tools to facilitate the capitalization and enhancement of its scientific output. This research on knowledge management from the scientific production of researchers Algerian highlights need even more crucial : that to enable knowledge sharing, not only between research communities but also with businesses and farms.

Keywords: *Agricultural Research, Information needs, integrated information system, Knowledge management; Information system, Algeria.*

1. Introduction

Agricultural research is primarily a scientific activity. It has a special role in the development of the productive sector, while promoting agriculture and the financial return. Research efforts are mainly due to an economic problem and that countries want to invest in agricultural research. "Agricultural research provides farmers and agribusiness tools of economic development. Its primary role is to drive innovation in a country with a long agricultural tradition became a major agricultural"¹.

Indeed, policy makers, scientists and development actors have no Algerian sources of information and scientific knowledge to assist in decision making when defining research programs and evaluation of scientific production. Makers, researchers, farmers, extension workers lack tools for development and exploitation of research results for development of the country.

Only scientific research is not sufficient to ensure sustainable development. There must be a system able to manage information and knowledge acquired knowledge. We are witnessing, in developed countries, a phenomenon of the proliferation of databases of research publications, research projects, experts and research portals for the management and sharing of knowledge. To register a logic value, so that they become "shared social goods,"

Researchers need to acquire visibility tools and analysis of their activities.

For the case of Algeria, and given the constraints that are specific, our main concern throughout this work is to determine how we can allow an area as sensitive as the agricultural sector to have an adequate system to exploit and develop the whole knowledge base which is producer and secondly how to implement tools that can provide an answer to this need to create synergy between the different levels of activities (scientific, economic, ...) that compose it.

This question concerning the implementation of knowledge management mechanisms of the Algerian agricultural research in order to integrate it as a source of development, in turn, raises a host of other issues that should be addressed prior to any consideration of a model of information system to serve this purpose.

Among the questions that we arise for the actual practices of researchers:

- Have the Algerian scientists this culture exchange, collaboration and knowledge sharing?

¹ Signing of the contract between the State of objectives and the National Institute of Agronomic Research (INRA). (Accessed 12/15/2012). URL : <http://agriculture.gouv.fr/sections/presse/discours/signature-du-contrat-d-objectifs-entre-l-etat-et-l-institut-national-de-la-recherche-agronomique-inra>

- What are the needs and expectations of the scientists in the field of information offer for the future information system on agricultural research Algeria?
- What are their patterns of practice knowledge management?

Beyond the results we obtained from our different readings, many analyzes data specific to Algeria, we conducted a large national survey that attracted the participation of more than three hundred Algerian researchers, in order to assess the real needs of the Algerian researchers, in terms of specific measures to control one of their research activities focused on development priorities.

2. Survey Design and Methodology

We conducted a large national survey that had attracted the participation of over three hundred researchers in Algeria, to know their degree of knowledge on different criteria and evaluation methods.

The organization of our investigation consisted of two main phases: at first, an exploratory phase was developed to conduct qualitative interviews, followed by a pre-survey and, at second, another phase that has been devoted to the questionnaire survey.

An administrative mail was also sent to reference research institutions and to allow the completion of this survey by the researchers. The exploratory phase is divided into two stages: the exploratory interview and the pre-survey. These two approaches reveal that the qualitative survey and pre-test were very effective in gathering opinions. This is due to the fact that the comments we have published were more personal and subjective.

Therefore, it is important to note that the start of our study by the qualitative survey allowed us to understand the mechanisms of thought and behaviour of the investigated scientific community. A total of 500 set of questions were distributed. We received 395 returns from which 345 were correctly filled, a rate of 69% of valid questionnaires.

Algeria is facing a challenge by creating an information system of production and dissemination of knowledge on agricultural research. That is what we propose to present as results an extensive survey that we conducted among more than 300 researchers at the national level.

3. Information Offer of the Planned Information System on Algerian Agronomic Research

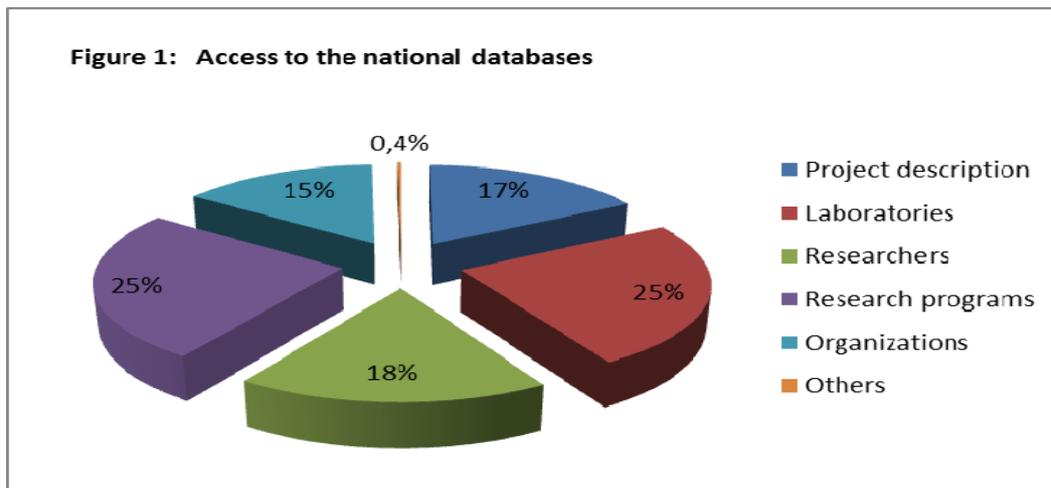
There are various ways of access to information, in order to facilitate the exploitation and to enhance the value of the results of a research, and their appropriation by the various actors as well as their diffusion. Through this study, we want to evaluate the needs of the scientists

in terms of informational offer, which should be available by the future Algerian information system of the agronomic research. This analysis is based on the demands expressed by the researchers concerning the access to information in a big variety of fields: national device of research, national and international publications, databases on the actors, tools of technological monitoring and collaboration.

3.1 Access to National Databases

Concerning the various intended databases by the information system to describe the national status of research, the demand expressed by the scientists is quite balanced. The number of selected items is in total 1019, each researcher has selected on average approximately 3 different items (cf. Figure 1).

The strong homogeneity of these answers shows that the researchers wish to have information on all the research details in its various components. This consolidates the choice of the agencies of the observatory project who planned to create five distributed federate databases: organizations, research laboratories, research projects, researchers, and research publications.

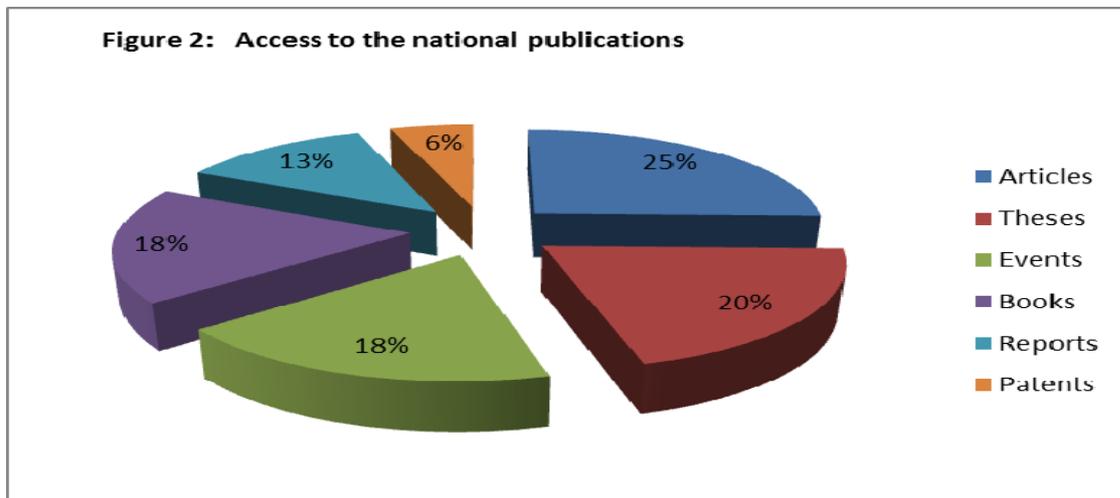


3.2. Access to National Publications

The analysis of the researchers' demands concerning the access to the national publications, according to the type of publication, indicates the information sources to be taken into consideration by the future information system on the agronomic research.

The scientists express a clear preference for journal articles (25%), which communicate information of best scientific level, relevant and topical in the field of the agronomic research, either fundamental or applied.

The theses, come in second position, with 20%; they are followed by lectures and books (18% for each of the two types). The reports represent 12% of the demands (cf. Figure 2).



On the other hand, the investigation reveals a lack of interest in national research patents for the development of innovations and the protection of knowledge, in spite of their interest to develop innovation and the economic potential of the country. This disinterest marks for some, an ignorance of the existence of this type of publication in their field. Others estimate that they do not need another information source on the inventions and the holders of the inventions except for the INAPI (Algerian National Institute of the Industrial Property), where they can carry out their bibliography research in the Property patents.

Globalement, ces chiffres montrent que le chercheur algérien souhaite exploiter les résultats de la recherche, tout en pensant à valoriser ses propres résultats et à les rendre accessibles à tous les acteurs concernés.

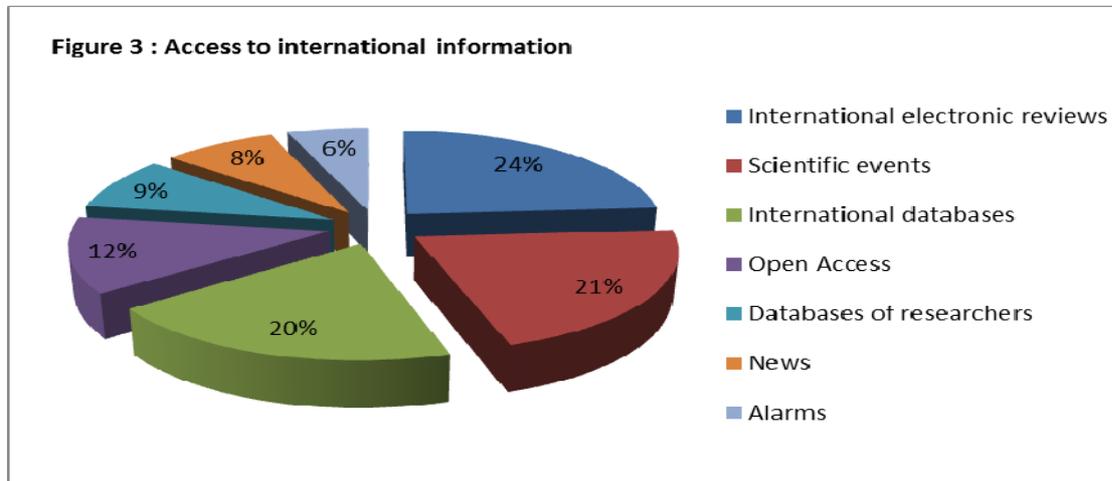
We can say that all these figures show that the Algerian researcher demands to exploit the results of research, he also thinks to enhance his own results and to make them available for all the actors.

3.3. Access to International Information

The context of international research, the new information technologies, the evolution of the knowledge and the development of the interdisciplinary transformed the practice of research and the environment in which the researchers carry out their work. In particular, the

access to international information is regarded as a precondition to scientific research innovations in the various countries all over the world.

The survey gives the following results: 24% of the expressed demands concern the access to international electronic reviews, 21% the access to scientific events and 20% the retrieval in international databases (cf. Figure 3).



A result deserves a deeper consideration: the open access represents only 12% of the demands. Exploratory interviews highlighted the ignorance of the scientists related to this type of resource of information (Open access and HAL - Hyper Article on-line). These results correspond to the rate of answers of a study performed in 2007 on “The initiative of open access in Algeria” with a sample of 108 people: 78% of the Algerian researchers seem to be unaware of the existence of the movement of free access repositories (ArchiveSIC, arXiv and HAL; cf. Amrouni, 2007). Another study on “The electronic edition as tool for the enhancement of the agricultural scientific research in Algeria” made in the same year showed similar results: 80% of the researchers are unaware of the existence of open access (Bellahreche, 2007).

We have found this reluctance in other French studies. Those of Swan in 2005 and Wojciechowska in 2006 respectively reveal 22% and 30% of reserve related to unguaranteed author rights (Swan, 2005), (Wojciechowska, 2006).

We note that the researchers of both countries (Algeria and France) are unaware that the sites of open access facilitate the access to publications, accelerates scientific exchange and improves persistency of the stored data. This collective initiative of the movement of free access emphasizes the relevance of co-operation for sharing knowledge, production of innovations, and the creation of a society of knowledge.

The researcher databases (Who is who?) represent only 9% of the expressed demands. However, this type of database recording competences facilitates the search for colleagues

sharing similar interests, the establishment of partnerships and the exploration of new fields or new tendencies.

In the same way, the tools of scientific monitoring do not seem to be known. The news account only for 8% of the demands and alarms (SDI) 6%. These results affirm that, within the Algerian research institutions, there is not only nonexistence of tools adapted to circulation, diffusion and division of scientific and technical information, but that there is also a lack of researchers interest for these tools.

Hence, the Algerian researcher is unaware that these tools currently constitute the principal means of access to the topicality of scientific information; they allow a shared knowledge and facilitate the communication and the interactions near the centers of excellence.

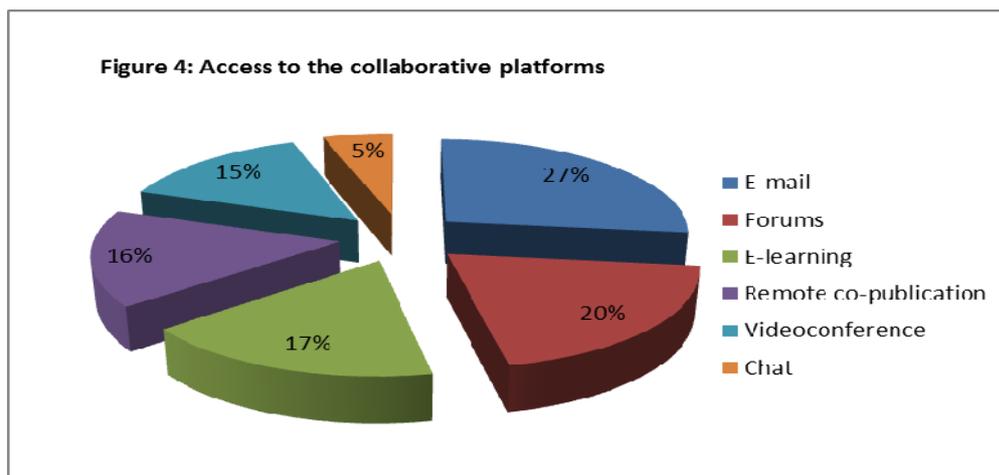
3.4. Access to Collaborative Platforms

As collaborative work tools intended for scientific production and exchange, the Algerian scientists classify in first the position e-mail with 27% of the expressed demands.

We found the same tendencies as those revealed by a study which was undertaken in France in the year of 2000 among researchers of a business school and which reveals that the use of e-mail is also a means mostly used by the researchers to share the writing of an article (Melot, 2002).

According to Poissonet, “e-mail is based on a representation of exchanges as a space of a singular meeting between two subjects” (Poissonet, 2002). Then, we have the forums of specialized exchanges with 20% of the demands. These are also tools which support the membership of virtual scientific communities and the performing of collective scientific productions. In addition, if we compare our results with those of a study carried out on the “Pooling of knowledge and the Web community portal” concerning the use of technological by Algerian teacher-researchers, today we note that the Algerian researchers start to be interested in the tools of sharing knowledge. The study quoted above shows that the discussion forums are used by 30% of the researchers in the background of people networks sharing the same knowledge and the same foci of interests (Boukara, 2007).

Among the tools for distance collaboration that the researchers wish to find in the information system, we have the e-learning with 17% of the demands and the remote co-publication with 16% (cf. Figure 4).



The rate of these two media, according to the answers, copies not comparable to the extent of means set up by the ministry for higher education and scientific research (MESRS). Consequently, for the policy followed by this ministry to develop the e-learning in Algeria, it was agreed to create a device for teacher training in the field of ICTs, the mobilization around new telecommunication technologies and teleprocessing contributing to the improvement of the quality of teaching, with a greater democratization of the access to the university.

Indeed, the Algerian researchers work more in bulk-heading than in co-production. The exceptions apply to collective products made by researchers who are inserted in networks associating external organizations or in collaborative networks within the same research department. Okubo Yoshiko states “scientific creation still remains a largely national act: the co-authorships show that the researchers refer to national knowledge first of all and that they conjoin more and more within the same laboratory and between national laboratories ” (Okubo, 1996).

The videoconference appears only in 14% of the demands. This application makes it possible to organize conferences between people who are distant geographically and who do not need to move in order to establish distant contacts and exchanges.

At last, the chat (asynchronous messages) which makes it possible to constitute living rooms of discussions is also of limited interest (15% of the demands). The scientists consider that the chat is rather a tool of leisure and distraction. It is important to specify that this type of exchange is usually used within the scientific social networks and can meet, initially, a personal need for discovering others on the Internet. This data reveals how much certain preconceptions can force the bulk-heading research activities and the isolation of researchers. Contrary to what the scientists think, this type of tool proposes also services of collaborative information management between researchers. It can be used in order to have relation and to create project teams.

4. Conclusion

The general results of this survey allowed to locate a number of strong points and weak points. Among the strong points, we noted a rather strong expectations of the examined scientific community concerning a better visibility of the total national devices of agronomic research: they wish a broader diffusion of the cartography of the institutions and research laboratories, their programs and research projects and their poles of competences.

A second remarkable point is the interest of the majority of the scientists in research results treating unpublished new topics of topicality (journal articles , talks and theses). Thus, the Algerian researcher is initially interested in the national publications and then in the knowledge produced in his country. In return, he wishes to make known his own publications and his work to be valued by scientific peers. So, as Chartron underlines, the production process of the publication and the use of information are very linked: “The information sources preferred by the researcher are generally those on the basis of which he will seek to valorize his work, in order to be published” (Chartron, 2003).

Concerning the access to international information, the tendencies of the researchers are directed too much towards the international electronic reviews, the scientific events and the international databases, but the new forms of publication, like the open access are ignored. Among the collaborative work tools, the Algerian scientists are interested initially in the e-mail. Then we have the specialized forums of exchanges which are appreciated, but the directories of competences (Who is who?) are neglected. The tools of the technology monitoring (news and alerts) give rise also to little interest for the researchers. However these information sources permit to identify topical themes which carry innovation, to seek the specialists in the corresponding fields, to reinforce the networks between researchers, in order to lead to a consolidation and a mutualisation of knowledge.

Lastly, it would be important that tools such as chat platform exchanges, e-learning, videoconferences and resource sharing for coproduction see an increasing usage to decrease an inter-institutional bulk-heading of the research teams. Indeed, Serge Boulier insists on the importance of the groupware which develops [... an improvement of the contact between people concerned with the same task or the same project, an increased quality of production by the multiplication of views, a dynamic of creativity....] ([... une amélioration du contact entre personnes concernées par une même tâche ou un même projet, une qualité accrue de la production par la multiplication des regards, une dynamique de créativité....]) (Boulier, 2008).

The technical potentialities are such as they exist already: a broad co-operation between many scientific communities through a planetary network which builds a science without border. Research teams who are not very committed in this evolution will be quickly marginalized. It is the challenge which the must raise researchers in the Algerian agronomic research by increasing their participation in international scientific activities: seminars, exchanges of researchers, co-operations with broader projects, and collective publications, etc.

The survey that we conducted among those more than three hundred Algerian researchers reveals a fundamental need for the creation of a favourable framework for the division of knowledge to get more collective intelligence. This focuses on the creation of an information system of high added value, which will be in the hands of the decision makers and the scientists, a tool of piloting and increasing the value of the scientific research, through the development of several databases on the institutions, the research laboratories, the projects, the researchers and their publications.

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