

The state and exchange of agricultural scientific and technical information in Armenia

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Abstract

Decades ago Armenia possessed an efficient system of agricultural research and education. Information products such as documents and publications were available through different channels. This is no longer the case. Scientometric (bibliometric) analysis reveals a significant decline of Armenian scientific output during the last two decades. Principal agricultural information resources and channels of information exchange of the past period are identified. Analysis is based on citation database ISI Web of Science, CAB Abstracts and Agris. Serious stagnation is noticed. The paper examines other more recent ways of publishing scientific materials in Armenia. Also under investigation are various national stakeholders in the field of agricultural information. Assessment of agricultural research and education institutions and academic libraries reveals severe underequipment (lack of computers, lack of international publications). Several international aid and cooperation projects exist, aiming at possible improvement of information exchange in Armenia, e.g. FAO TCP projects, FAO Agora, Agris National Centers, AgroWeb CAC (Caucasus and Central Asia). Better agricultural publishing indicators can only be achieved by promoting better information literacy and IT skills and competencies.

Introduction

The countries of Caucasus were decades ago quite developed in terms of scholarly activities. Agricultural research and education was actively integrated in a wider regional and also international environment. Scientists published results of their research in many different publications and there existed lively exchange of library materials which were catalogued and indexed according to the state-of-the-art methods of that time. In the late 80s, however, many problems began to surface and the region became involved in a crisis which deeply afflicted publishing and exchange of scientific and technical information, especially in the agricultural sector. Some automated bibliographic systems were established in the region as early as 1975 (Walker 1977). Later political developments began to generate serious problems in the structure of the library information system (Brine 1992). With the breakup of the federation, its scientific system began to disintegrate into fragments (Rabkin and Mirskaya 1993). The library-information system suffered greatly. But the advent of new electronic resources brought new possibilities to promote information skills and information literacy in the region (Bawden and Robinson 2002). There exist many international projects to facilitate access to scientific information in the region such as those funded by the Open Society Institute (Robinson and Glosiene 2007). Transition to independence brought about many serious problems in Armenia, especially in the early years of reform. This was also reflected in agriculture (Pogossian 2005). In 2001 systematic steps towards developing a Union Catalogue began (Zargaryan 2007). Recently many international information-related projects have been under way. Awareness for the need of educating a new generation of librarians and informations is reflected also in the new Armenian curriculum on library and information science (Zargaryan and Hopkinson 2009). FAO of the United Nations soon realized the importance of capacity building in less privileged parts of the world (Ballantyne *et al* 2000) so some important agricultural-information-related projects are facilitated in the region by FAO and its partners (Mirzabaev 2009). In terms of agricultural information Agroweb (FAO SEUR) began to serve as an

important catalyst of regional information (Demes 2004). The utility of AgroWeb Caucasus and Central Asia and its role in Armenia was presented by national coordinators (Manukyan 2005, Yaralyan *et al* 2009). The AgroWeb initiative was recently described in detail by Bartol and Stopar (2008). AgroWeb Armenia also embraces many principles of VERCON (Virtual Extension and Research Communication Network). This is one of many field activities supported by the FAO's and its Technical Cooperation Program (TCP) (Portegies Zwart 2003). Program Agora, which is active under auspices of the FAO (Chisenga *et al* 2006), has also been introduced to Armenia (Bartol 2008). We will present and assess scientometric indicators for Armenia which appear to be rather unfavorable. We will identify some more recent agriculture-related publications and institutions which should play a role of advancing agricultural research, teaching and consultancy. Some international technical cooperation programs will be presented along with information products which should be used more extensively by Armenian professionals. These should take more advantage of technologies which are available on open-access principles.

Analysis of publishing indicators

Methods of data collection

In order to evaluate published production we assessed selected international databases which contain an important segment of agricultural records. CAB Abstracts (CAB) is a global agricultural database. We also assessed records in the Web of Science (WoS). We designed an experimental database where we uploaded the data (records) pertaining to Armenia. It was necessary to select an appropriate name form for Armenia in order to collect relevant data. The name occurs under the forms of Armenia or Armenian (Republic, SSR). We excluded noise occurrences relating to cities or addresses employing the name of Armenia in other countries. We also briefly consulted Agris database. In Agris databasa we used the following syntax: (*armyan* or armen* or erevan* or yerevan* or ehchmiadzin**).in. We used truncation because some instances of address data occurred only in adjective forms (Armyanskij, Armyanskaya, Erevanskij). Echmiadzin used to be a seat of an important agriculture-related institution in the vicinity of Yerevan. We needed to subsequently exclude records affiliated with the French town of Armentieres and the town of Armenia in Colombia.

Results

We identified 354 records in CAB and 187 records in WoS. In WoS we used only selected agriculture-related subject categories.

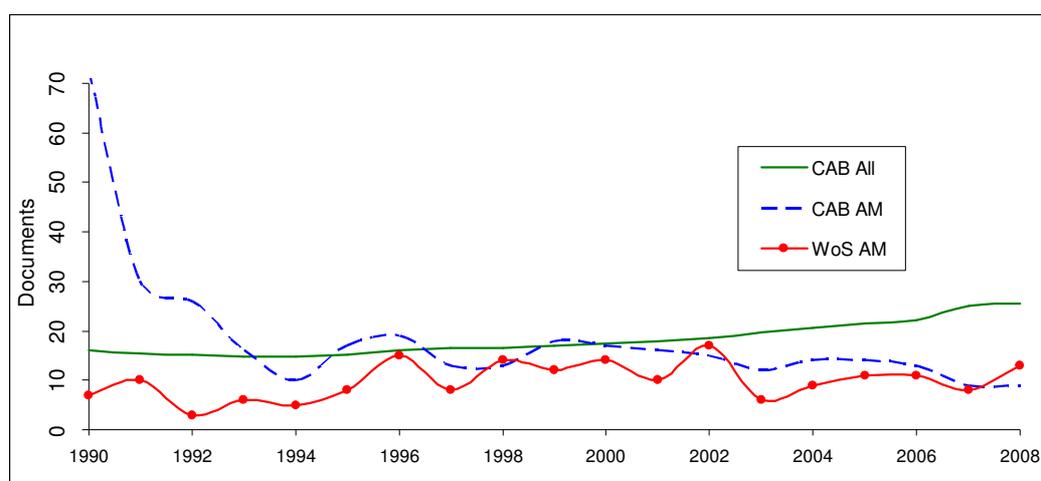


Fig. 1. Indexing of Armenian authors by CAB Abstracts and Web of Science

The figure compares indexing of Armenian authors by CAB and WoS. CAB data offer comparison with the growth trends in the entire CAB database (Fig 1). These general CAB data have been divided by the factor of 10,000 for better comparison of trends. In the year 1990 159,000 total records were indexed by CAB. In the year of 2008 there were already 256,000 yearly records. In contrast, 73 records by Armenian authors were indexed in 1990 but only 9 records in 2008. The CAB figures show a dramatic and constant decline for Armenia, especially in the early years after independence. The participation in WoS is fairly stable, oscillating around 10 yearly records. This is nevertheless a rather weak yearly outcome. The WoS documents are scattered among many journals.

In order to offer some more particular information regarding publishing patterns in a certain period, based on journal articles in CAB Abstracts, we present the data for the first initial three years under observation (1990-1992) and the last three years (2006-2008). The difference is quite obvious. There are 129 records in the initial 1990-1992 period and only 31 in the period 2006-2008 so we analyse only the data for the first three years (Fig. 2). Among the 129 initial documents 107 were published in Russian and 22 in English language. 123 were articles and 6 proceedings papers. The articles were published in 35 different journals. The three most productive journals were *Biologicheskii Zhurnal Armenii* (by far the most prolific: 48 records), *Chemistry of Natural Compounds* (7 records) and *Botanicheskii Zhurnal* (6 records). There were 14 journals with only one abstracted article each, and 10 with two articles (Fig. 2).

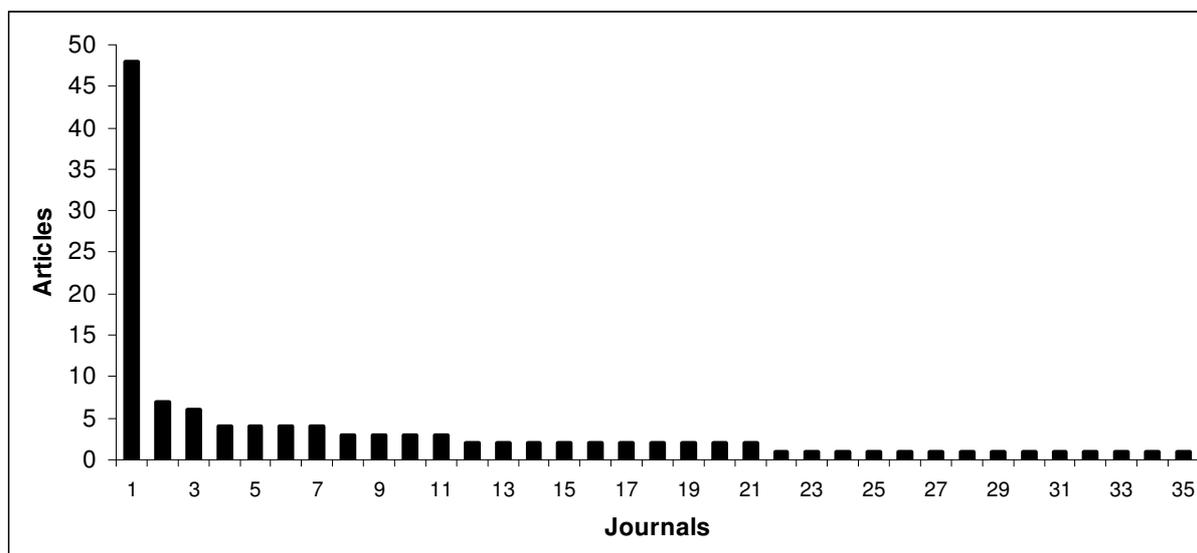


Fig. 2. Journals articles by Armenian authors in 1990-1992 by journal title

The contribution of 31 total records in the last period (2006-2008) is much less substantial so it does not allow a more critical numerical evaluation. But given that this is almost the only systematic documentation of Armenian agricultural scientific publishing these figures need to be presented. Eight (8) records belong to proceedings and 23 to journal articles. 27 recent documents were published in English and only 4 in Russian. Quite interesting are dispersion patterns. These 23 articles were namely published in 21 different journals. Only one journal, *Zashchita i Karantin Rastenii*, hosted three articles (the three of the total four Russian language articles). It need to be added that the inclusion of records in CAB Abstracts does not necessarily reflect the scientific quality of documents. The database is a content-based bibliography and does not perform very strict selection with regard to the nature of documents. It can serve as a tentative indicator of production.

In Agris database we identified 176 records for the entire period 1975-2009. Only a few selected records were available for the last 20 years. Most records predated independence and were contributed mostly

by the Soviet Union. Frequently, the information for the name of the Armenian republic was not present in the older Soviet data.

Assessment of present state of agricultural information in Armenia

In the former Soviet Union information exchange was centralized. The exchange system was called "Bibliotechni Collector" or Bibcollector. This was a specialized book trading establishment which included all libraries-related procedures. The Central Collector for Scientific Libraries in Moscow directed distribution to other subordinate scientific and special libraries. An exchange system for scientific information existed in over 300 cities. With the breakdown of the Soviet Union this system ceased to exist. Institutions of higher education and pertaining library-information activities were deeply afflicted by disintegration and had to embark on a path of structural redefinition. The following sub-chapters present the recent state of some principal stakeholders (Atayan 2004, Avetisyan 2007, Tarverdyan 2009).

Agricultural institutions

The Armenian State Agrarian University

The Armenian State Agrarian University (ASAU) was constituted in 1994 (as the Armenian Agricultural Academy) by a merger of the Armenian Agricultural and the Yerevan Zoological-Technical and Veterinary Medicine Institutes, founded in 1930. In 2007 it was renamed as ASAU. It is the only agricultural school of higher education in the country. ASAU also includes branches in the towns of Sisian, Vanadzor and Stepanakert (Artzakh/Kharabakh). At the moment more than 4000 regular students are enrolled in the four years of undergraduate studies (B.Sc. degree) and 240 in the two years of postgraduate studies (M.Sc. degree). But as many as 5000 additional students which do not attend university studies on a regular basis are enrolled in different programs based on correspondence- and distant-education. The duration of these "part-time" undergraduate studies is six years. A few foreign students come mostly from Iran and Syria. ASAU also includes one college (two-year program) with 190 students. ASAU and its affiliates operate under the Ministry of Education and Science. In Armenia there are also nine agricultural state colleges (dispersed in provinces/marzes) which operate under the Ministry of Agriculture. The colleges offer a two-year program (no B.Sc. degree is awarded). Another important institution for agricultural research and studies is the Agribusiness Teaching Centre (ATC). It has been established within the ASAU but plays a special role in the activities related to agricultural economics. It has been supported by the USDA Foreign Agricultural Services and is based on the Texas A&M University's agribusiness curriculum.

Library of ASAU

The ASAU Library is the only agricultural library in Armenia although some agriculture-related literature is also available at the National Library of Armenia and the Republican Scientific-Technical Library. According to the currently statistics the library has 7500 users but it currently subscribes to only 37 Journals (27 of those from Russia). International scientific serials are virtually nonexistent at the library. The library has several reading halls with no access to computers so the end-users must still use paper catalogue cards to look for materials. Internet is not accessible to the end-users in the library. Library/ ASAU website is static and offers very little information. It was last updated some two years ago. Library employs a rather substantial staff of more than 30 workers, mostly trained in traditional librarianship in the former system, what is also reflected in the average age of library professionals and their computer or language skills. There exists a great shortage of skilled information professionals, exacerbated by low salaries in public sector. Around the year 2000 a program was initiated to establish an Armenian Automated Library Network. Bibliographic digitization (Aleph-based) at the ASAU Library began only in 2007. This venture, however, involves mostly cataloguing of monographs, quite old on average. To this end there exists a limited local area network but most computers are technically no longer suitable for state-of-the-art requirements.

Other Agriculture Research Organizations

Besides the ASAU there are in Armenia seven research organizations subordinate to the Ministry of Agriculture. In total, these organizations involve 249 research workers including many PhD holders. We provide information on the respective numbers of researchers in each centre.

- Agriculture and Plant Protection Research Centre (66)
- Vegetable and Technical Crop Research Centre (23)
- Petrosyan Soil Science, Agricultural Chemistry and Land Improvement Research Centre (53)
- Horticulture, Viticulture, and Winemaking Research Centre (41)
- Livestock Management and Veterinary Research Centre (47)
- Agri-BioTechnology Research Centre (10)
- Technical Crop Experimental Centre (9)

Consultancy

The consultancy (agricultural advisory system) under the Ministry of Agriculture involves the Agricultural Support Republican Centre in Yerevan and the Marz Agricultural Support Centers in all 10 marzes/provinces. Researchers from the agricultural research centers and the ASAU provide advisory services. The advisory services during 2007 involved 25.650 consultations. In addition, 679 different extension documents were published.

Electronic/digital resources and international information projects in Armenia

Some principal information resources such as AGORA, HINARI, PERI, CAB Abstracts (availability through Agora) are hypothetically accessible but the only access to international Web-linked materials at the ASAU library is available through the computer of the FAO-depositary library (FAO DL), which, however, serves also as a personal computer of the FAO DL manager. The connection is erratic. A few computers were also installed in the newly funded "multimedia laboratory", but there is no Internet connection. Also, the existing library staff lacks sufficient knowledge to support such a service.

Agris in Armenia

As it turns there is no functional Armenian (agricultural) bibliography based on automated principles. The ancient but once internationally highly acclaimed Soviet bibliographic system Referativnyi Zhurnal (by VINITI) no longer systematically indexes Armenian publications. In the preceding analysis we have shown that abstracting of Armenian documents experienced significant stagnation after independence. It is now very difficult to assess publishing activities. Agris database, which has recently undergone some serious changes, could offer a very good possibility to present Armenian national scientific output to the international audience, also through academic search engines (Google Scholar). DL manager attended an Agris workshop in 2004. FAO DL was established at the ASAU in coordination with the FAO. DL manager attended another workshop and managed to install input software (WebAgris) but after an input of only a few test records this software was disconnected from the library network and the input stopped before it even began. It's imperative that the input be resumed.

AgroWeb

Agroweb Armenia was introduced in 2003 on the initiative of information officers at the FAO SEUR in Budapest (CIT) and national coordinator for Armenia (CIT). It is a branch of the AW network as well as AW CAC (AW Caucasus and Central Asia) network. The CAC initiative was endorsed in 2004 at a meeting of official representatives from the Ministries of Agriculture and the Agricultural Academies from the respective countries. The aim was to integrate various agriculture-related databases in the region and to promote the role of Russian language as a basis for regional platform. The CAC AW receives an especially strong support on the part of Armenian specialists. There exists a team of information professionals which constantly update the Website. FAO DL manager posts up-to-date information on events related to agricultural information.

Agora In Armenia

AGORA was introduced through e-mail from the FAO AGORA. ASAU registered in 2004. Throughout this period AGORA has been underutilized. Virtual unavailability of computers at the library and weak English language skills have strongly hampered its use by students. In 2009 a new initiative to use Agora was launched. In this frame and information literacy presentations as well as classes were held in June, July and September within the frame of FAO TCP/ARM. Agora was introduced to different groups of participants, especially researchers, teachers and selected groups of university students. FAO DL manager also makes presentations to students at the DL and introduces them to Agroweb, AGORA and WebAgris. But these presentations are rather limited and static because of the aforementioned lack of equipment and weak Internet connections.

FAO TCP ARM

Special meetings and workshop dedicated to information and communication in agriculture were held in Yerevan in June and July, 2009. They were attended by FAO Research Officers and Knowledge Management Specialists, Armenian national coordinators, and international consultants. The activities were organized within the framework of the Technical Cooperation Project for Armenia supported by the FAO. Within the structure of this project (Establishment of a virtual extension and research information and communication network) some more important agriculture-related research and extension institutions were identified which were later to serve as pilot sites for implementation of further training activities dedicated to information and communication platforms. The presentations during the main workshop included survey on information and communication needs assessment of the national agricultural research and extension systems and stakeholders, presentations on lessons learned from VERCON (Virtual Extension and Research Communication Network), ESCORENA (European System of Cooperative Research Networks in Agriculture) and AgroWeb Network. There were also presentations on "Lessons Learned from the eFarmer EU Project" and "Access to the global agricultural knowledge", and "Communication for Development". Subsequent activities in the period Sept-Dec 2009 were dedicated to information literacy training for intermediaries, such as scientists and extension specialists. Training for utilization of web platforms for information sharing was also aimed at farmers.

Identification and characteristics of recent Armenian agriculture-related publications.

There is no functioning Armenian agricultural bibliography as yet so this tentative bibliography had to be compiled by research and "analogue" identification of materials. The bibliographic elements were determined by analysis. This bibliography could serve as a basis for resumption of Armenian AGRIS input in order to provide some information to the global research audience. Given the rather weak serial production we further identified proceedings that had been published in Armenia during the last decade. The following abbreviations, relative to countries and/or languages are used: Am-Armenian, En-English, Ru-Russian, Ge-Georgia, Az- Azerbaijan, Ua-Ukraine, Us-USA.

Armenian agriculture-related journals

There are only a couple of agricultural journals in Armenia. We provide basic information.

News of ASAU (Scientific journal, monthly). 2003-present. (full text 2006-2007).

<http://armagrar-uni.am/eng/eng-page=mag2007.html>. Articles in Am, En, or Ru (Mostly Ru). There is usually an abstract or short annotation in En. Some full-text articles are available on the Web for the years 2006-2007.

Agroscience (Scientific journal, quarterly). 1958-present. (no full text online).

<http://arm.agrowebcac.org/asrc/journal.php>. Articles in Am and Ru, abstracts in Am, En and Ru. En abstracts are available online on current basis.

Agrolratu (Newspaper, every ten days). 1951-present. (in Am, no full text online).

http://arm.agrowebcac.org/asrc/agrolratu_new.php. Short En annotation is available online for selected items.

Agriculturist/Hask (Newspaper, twice a month). 1958-present. (in Am, no web page)

Proceedings of Armenian agricultural scientific meetings

The list presents scientific meetings. Respectively, we also assembled information on languages of individual papers, languages of abstracts, total number of papers, papers by foreign participants, and countries of foreign participants. The meeting titles were translated by N. Khurshudyan when there was no published English translation.

- Materials of International Scientific Conference “Protection and Use of Water Resources in South-Caucasus Region”
/2009/Am,Ru/Am,Ru,En/45/3/Ge
- Materials of Scientific Conference Dedicated to 80th Anniversary of ASAU Veterinary Medicine Faculty
/2008/Am,Ru/Am,Ru/40/12/Ru,Ua
- Proceedings of “Armenian Apricot” International Conference”/2007/Am,Ru,En/Am,Ru,En/19/5/It,Ru,Se,Sk,Cz
- Materials of International Scientific Conference “Agrarian Policy and Problems of Agricultural Community Development” /2007/Am,Ru/Am,Ru,En/29/1/Ge
- Materials of International Conference dedicated to 75th anniversary of ASAU establishment
/2006/Am,Ru/Ru,Am/59/4/Ru,Ge
- Materials of International Scientific Conference “Nowadays Problems of Agri-Food Quality and Safety and the Tendency of Agrarian Scientific System Development”/2005/Am,Ru/Am,Ru,En/21/-/-
- Materials of Student Scientific Conference dedicated to 10th anniversary of students’ governing body
/2004/Am/Ru,En/41/2/Ge
- Materials of International Scientific Conference “Problems of Agrarian Education, Science, Extension and Production Quality and Efficacy” /2004/Am,Ru/Am,Ru,En/17/-/-
- Materials of Scientific Conference dedicated to 100th anniversary of H. G. Stephanyan/2003/Am/En/39/-/-
- Problems of the Stable Development of the Agro-Industrial System in the South Caucasus Region. In 3 Parts
/2002/Am,Ru,En/Am,Ru,En/106+100+46/17/Ge,Az,Us
- Agricultural and Environmental Problems in Transcaucasus” In 2 parts
/2001/Am,Ru,En/Am,Ru,En/100+37/20/Ge,Az,Us
- Materials of Student Scientific Conference dedicated to 1700th anniversary of Christianity in Armenia
/2001/Am/-/39/-/-

Conclusions

Publishing patterns of Armenian agricultural scientists exhibit two decades of decline and stagnation. It is however difficult to consistently assess Armenian output after independence. The initial period is marked by a high participation of Armenian scientists in Russian or regional publications. Nevertheless, agricultural libraries and information centers remain organized on rather antiquated principles of cataloguing printed materials. E-catalogue is only in the making, based mostly on monographs. Even open-access-based e-information is underutilized because of a lack of efficient infrastructure. Our judgment is somehow stern, but years ago Armenia already possessed a rather efficient system and Armenian life-sciences-related research activities were internationally recognized. And interestingly, Armenia gave name to a prominent fruit, the apricot (*Prunus armeniaca*). There are now many products and cooperation initiatives, such as those by the FAO, which can improve access to hitherto underutilized products. Some projects could also serve as a venue for international dissemination of domestic agricultural information. But evidently, information-literacy competencies and international language skills must in Armenia be boosted on all levels otherwise the resources will not be used to the full. University should play a more vigorous role to this end as it is the single most important source of future experts. Consequently, the inclusion and empowerment of the local scientific community should result in better agricultural productivity indicators and also in overall better stability of this volatile region which is confronted with many challenges.

References

- ATAYAN, K., 2004. State Higher Education Institutions of Republic of Armenia. Antares Publishers, Yerevan, Armenia, 425

- AVETISYAN, S., 2007. Agriculture of Armenia. Published for "Fruitful Armenia", Yerevan, Armenia, 70 p.
- BALLANTYNE, P., LABELLE, R., RUDGARD, S., 2000. Information and Knowledge Management: Challenges for Capacity Builders. In: Policy Management Brief No. 11. Maastricht, The Netherlands: ECDPM
- BARTOL, T., 2009. International agricultural publishing in the regions of Caucasus and Central Asia in view of FAO program AGORA. In: Proceedings of ISSI (International Society for Scientometrics and Informetrics), B. Larsen and J. Leta, ed., Rio de Janeiro, Brazil: BIREME/PAHO/WHO, p. 908-909.
- BARTOL, T., STOPAR, K., 2008. Overview of AgroWeb networking in the countries of Central and Eastern Europe. *Agricultural Information Worldwide (AgInfo World)*, 1(3): 114-117.
- BAWDEN, D. ROBINSON, L., 2002. Promoting literacy in a digital age: approaches to training for information literacy. *Learned Publishing*, 15(4): 297-301. DOI: 10.1087/095315102760319279
- BRINE, J., 1992. Perestroika and Soviet libraries. *Libri*, 42(2): 144-166. DOI: 10.1515/libr.1992.42.2.144.
- CHISENGA, J., KEIZER, J., RUDGARD, S., ONYANCHA, I., PORTEGIES ZWART, R., 2006. FAO's capacity-building initiatives in accessing, documenting, communicating and managing agricultural information. *Quarterly Bulletin of the IAALD*, 51(3-4): 170-175.
- DEMES, M., 2004. Report of the First Meeting of Directors of the Network of Aquaculture Centres in Central-Eastern Europe (NACEE). In: FAO Fisheries Report No. 774. ANNEX 5, p 66-68
- MANUKYAN, A., 2005. AgroWeb Network: a platform for agricultural information and knowledge exchange. *INASP Newsletter*, (82): 8-9.
- MIRZABAEV, A., MARTIUS, C., LIVINETS, S., NICTERLEIN, K., APASOV, R., 2009. Kyrgyzstan's National Agricultural Research and Extension system: An assessment of information and communication needs. IC: Sustainable Agriculture in Central Asia and the Caucasus. No. 5. ICARDA-CAC/FAO, 80 p.
- POGOSSIAN, G. A., 2005. Social Transformations in Armenia. *Sotsiologicheskie Issledovaniya*, 31(12): 77-86.
- PORTEGIES ZWART, R., 2003. FAO/WAICENT Strategy on Strengthening Agricultural Research Information Systems. In: AARINENA ICT Expert Consultation, Cairo, Egypt., 30 p.
- RABKIN, Y.M., MIRSKAYA, E.Z., 1993. Science and scientists in the post-Soviet disunion. *Social Science Information*, 32(4): 553-579.
- ROBINSON, L., GLOSIENE, A., 2007. Continuing professional development for library and information science - case study of a network of training centres. *Aslib Proceedings*, 59(4-5): 462-474. DOI: 10.1108/00012530710817645
- TARVERDYAN A., 2009. Brief Report of ASAU Activities in 2008. "Hask" newsletter of ASAU, (1-2): p. 1-4
- WALKER, G.P.M., 1977. New management information-system for soviet publishing - ASU-PECHAT. *Journal of Documentation*, 33(2): 120-125.
- YARALYAN, N., MANUKYAN, A., DEMES, M., 2009. AGROWEB International Network: Platform for Communication and Information/Knowledge Sharing in Agriculture. Yerevan, Armenia. FAO/NACEE Conference on Aquaculture of the Caucasus/Caspian Countries, 21-22 Apr 2009, Yerevan, Armenia: 22 p.
- ZARGARYAN, T., 2007. Armenian libraries on the threshold of a digital era : Fifteen years of library automation in Armenia. *International Cataloguing and Bibliographic Control* , 36(1): 8-11.
- ZARGARYAN, T., HOPKINSON, A., 2009. Scientific publishing in Armenia. *European Science Editing*, 35(2): 43-45.