

## SCIENTOMETRIC ASSESSMENT OF PUBLISHING PATTERNS AND PERFORMANCE INDICATORS IN AGRICULTURE IN THE JCEA MEMBER COUNTRIES

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Manuscript received: December 1, 2009; Reviewed: December 15, 2009; Accepted for publication: January 4, 2010

### ABSTRACT

The study assessed selected characteristics of documents published in national journals and other publications in the countries which participate on the editorial board of an international journal JCEA (Journal of Central European Agriculture). Bibliographic citations from the CAB Abstracts database were employed. Search syntax along with some cataloging characteristics of the database was addressed. In total more than 89.000 agriculture-related documents were identified in the period 2000-2008 with journal articles predominating, followed by proceedings (conference papers). The two document types can overlap. English plays a role of the principal language, accounting for more than half of all records (48.000). Poland is the major contributor of documents, being by far the largest country. Croatian publications show the highest level of international participation in domestic publications, whereas the Slovenian authors shows the highest level of publishing in non-domestic publications. Altogether some 378 different agricultural and related life- and environmental sciences journals have been active in the region in this period. The results can serve as an indicator of regional publishing activities and behavior of authors.

Keywords: bibliometrics, scientometrics, publishing indicators, performance, information science, library science, regional cooperation

## INTRODUCTION

The Journal of Central European Agriculture (JCEA) was established in 2004 in Croatia within the scope of the Faculty of Agriculture in Zagreb. Soon some selected scientists affiliated to the agricultural schools and research institutes from the neighboring countries were invited to publish in the journal and participate on the Editorial Board. An important aim of the journal was to facilitate exchange and distribution of agricultural information in the region with comparable geographical and climatic patterns and also with certain similarities in the more recent history of organization of agricultural research and production. In its foundation the journal was created as an electronic-only publication. Given the diverse cultural heritage of the region the journal was conceived as a multilingual channel in order to support the scientific development of the regional languages. However, in order to receive a more global audience most authors soon began to employ English as the language of communication even though the abstracts are frequently bilingual. At the moment the following countries participate: Bulgaria, Croatia, Czech republic, Hungary, Poland, Romania, Slovakia and Slovenia.

After five years of existence of the Journal an interest arose to assess the overall published national agricultural production in the participating countries in order to gain some insight into the publishing patterns of the region in the more recent period. Citations used as references in the JCEA journal articles offered some information on the rich national documentation in the participating countries. We identified dozens of different journal titles. These citations, however, did not provide a complete insight into the publishing activities. Therefore we resolved to use a major international information service in order to identify, according to similar principles, most relevant publishing data pertaining to the above participating countries. Among the three leading agricultural databases Agricola, Agris and CAB Abstracts we selected the later which at the moment offers the most systematic bibliographic coverage of the published documents in the region. This service indexes not only international journals but also tries to capture most relevant national journals written in languages other than English.

The region of Central and Eastern Europe (CEE) has always been active in the process of exchange of scientific information in the field of agriculture. General published output of the region was systematically investigated as early as 1969 when a comprehensive bibliography of publications, including journals was explored [6]. The publishing patterns changed after the political transition in the region. Behavior of Central and Eastern European scientists was thus assessed with regard to the changing

international circumstances in the mid-90s when it became easier for these scientists to participate in international information exchange [5]. The CEE region has also been very active in the process of organized exchange of agricultural information in terms of e-portals and networking. AgroWeb network connecting libraries and information centers and specialists in the region was established as early as 1999 [1]. Research of the role of libraries and information services in the CEE region also focused on obstacles in distribution of scholarly work published in the region [7].

Countries or nation states were frequently compared with regard to publishing indicators, based on different database records, such as Pub Med database for plant-related documents [4]. Agricultural output in general as measured by CAB Abstracts database was investigated on an example of the capital cities in the CEE region [3]. This database has been identified as the most important agricultural database and has been used for scientometric purposes and assessment of core periodicals [8]. The database has been compared with other information resources such as SCI and Google Scholar with regard to the coverage of agricultural economics [11] or with the agricultural database Agris regarding classification and indexing of agricultural journals [2]. Even though CAB Abstracts is judged as the best in the field it does not always sufficiently cover all agriculture-related areas such as economics which might be dispersed in other non-agricultural resources [15].

There continues an ongoing dilemma of where to publish the results of agricultural research and what kind of journal to select as a venue of publication [13]. Analyses of this kind frequently cover journals indexed by Web-of-Science or Science Citation Index (SCI) but very often national journals which are not indexed by SCI are also considered [9]. An important aim of any national journal is certainly international visibility. Such visibility of national journals was investigated on an example of South African scientific journals [14]. The level of internationalization was also investigated on the example of foreign contributions published in scientific journals published in different countries. Different indicators such as publishing institution and publishing language were assessed [10]. The utility of scholarly journals published in non-English countries and attitude towards publishing in national vs. international journals continues as an interesting topic of research in the field of information science [12].

The aim of the study was not to assess the scientific quality of documents but to present an information on the number, characteristics and possible specific patterns of documents published in these countries as indexed by

Table 1.

Long Field Name	Short Field Name	Example of Syntax
Country of Publication	CP	croatia.cp
Country of Affiliation	IN	croatia.in
Language	LG	Croatian.lg
Year of Publication	YR	2000.yr
Publication Type	PT	Journal article.pt

the CAB Abstracts database in the period 2000-2008. The analysis also offers some insight into the cataloging and classification patterns of the database and can serve as a support to end-users wishing to retrieve data of this kind.

## MATERIALS AND METHODS

We selected the 2000-2008 period in the CAB Abstracts database, produced by CAB International. This global database specializes in agriculture and related life sciences. The database includes also some publications dedicated to environment and tourism so some figures may also have involved such data. We used the version available through the platform Ovid Technologies which is available for licensing. We designed a few simple experimental tabular databases where we uploaded the downloaded records pertaining to the countries under observation. We used the field "Country of Publication" or CP as defined by CAB Abstracts. We then conducted several analyses according to different criteria, such as total number of documents, document types, documents by respective countries and growth trends, relations between a country of publication and country of an institution of an author, languages and active journal titles.

### Search syntax

Several different database fields were used to select the applicable data. The fields and examples of search syntax are presented in the Table 1. The short name fields and syntax are presented as they appear in CAB Abstracts.

### Document types

CAB Abstracts database delimits different document types, such as Abstract only, Annual report, Annual report section, Book, Book chapter, Bulletin, Conference paper, Conference proceedings, Correspondence, Editorial, Journal article, Journal issue, Miscellaneous, Patent, Standard, and Thesis. We used only the most frequent and habitual document types, such as Book chapter, Conference paper, and Journal article. As a method it was necessary to carry out a pilot analysis of methods of

document-type assignment in order to investigate some possible characteristics of document classification which might distort the figures if not taken into consideration. It turned out that most conference papers acquire also another category, either journal article or book chapter. We additionally identified 300 documents which were classified as conference-papers-only, without an assignment of other document types. Most of those documents, however, had been supplied with standard bibliographic data, such as page numbers, so they had probably been published as books of proceedings. We also investigated the documents which had not been classified as any of these selected document types. We found that there were also some 450 bulletins and bulletin articles. Technically, bulletins and bulletin articles are serials, just like journals, so there exists certain ambiguity as to the necessity of applying this document type. However, in order to follow the classification patterns of CAB Abstracts, we excluded these records from the further analysis of serials and categorized them as "other" (Figure 1).

### Growth-trend of documents

Growth trend by respective publishing countries was estimated on the basis of all documents. We used the search field Country of Publication (CP) which is phrase indexed. It is necessary to use the exact (or appropriately truncated) name of a country as codified by the technical rules of CAB Abstracts. As there was some slight error in the database we used the truncated country-name forms Slovak\* in order to capture both variants of Slovakia and Slovak Republic.

### Journal articles

We placed some more emphasis on journal articles by analyzing both country of publication of a document (Country of Publication - CP) and country of the institution of an author or author affiliation (Institution - IN). These fields are designed somehow differently in the CAB Abstracts database so some caution has to be exercised in extracting the data. As opposed to the field CP which is phrase-indexed the field IN is word-indexed so a term can appear anywhere in the IN field. All possible

country-name forms need to be taken in consideration.

**Journal titles**

We tried to identify and consider all journal titles that were active at certain point between 2000-2008. In addition to the database itself we also used the data and journal lists available on the web page of CAB International.

**Language of a document**

The documents were also analyzed by the original language of a document to show language patterns in all documents. The field Language (LG) was used which is also phrase-indexed so only normalized language name-forms can be employed in this database, such as Slovakian or Slovenian, and not Slovak or Slovene.

Finally, two selected countries were compared with regard to possible differences in authorship (IN) and publisher (CP) data.

**RESULTS AND DISCUSSION**

In total more than 89.000 agriculture-related documents were published in publications issued in the JCEA member countries in the period 2000-2008 (Figure 1). Journal articles were by far the most frequently published document type (83.300), followed by conference papers (11.800). The data in Figure 1 require some further interpretation. According to the CAB Abstracts classification and cataloguing rules, which follow methodology of standard library-cataloguing, one document can be assigned

more than one document type. In a few selected cases a document can be a Book chapter, Conference paper and Journal article at the same time although this is rare. However, we identified 7.900 documents which had been classified as both Conference paper and Journal article, and 3.600 documents classified as both Book chapter and Conference paper. The Book chapter document type is a rather unreliable indicator because it is apparently not assigned consistently. Namely, Conference proceedings, especially if published in a standard paper format, are technically also a book (monograph). We noticed that there exists no clear distinction whether a Conference paper will also be described as a Book chapter so these figures should be employed with caution. The total numbers of 89.300 records and 83.800 journal articles, however, are unambiguous and can serve as a good indicator of trends. In the future, an increasing number of electronic-only Proceedings will probably be published so we may expect an increase of non-book or non-journal type of Conference papers.

The total number of records, document type notwithstanding, was used to ascertain growth trends in the period 2000-2008 by respective countries which are represented by ISO 2-digit country codes in Figure 2. As expected, Poland is the principal contributor, being the largest country. There is a rather interesting growth in most countries between 2000 and 2001 which later steadies somehow. Also it is possible to note some reduction in growth between 2007 and 2008. This could perhaps be

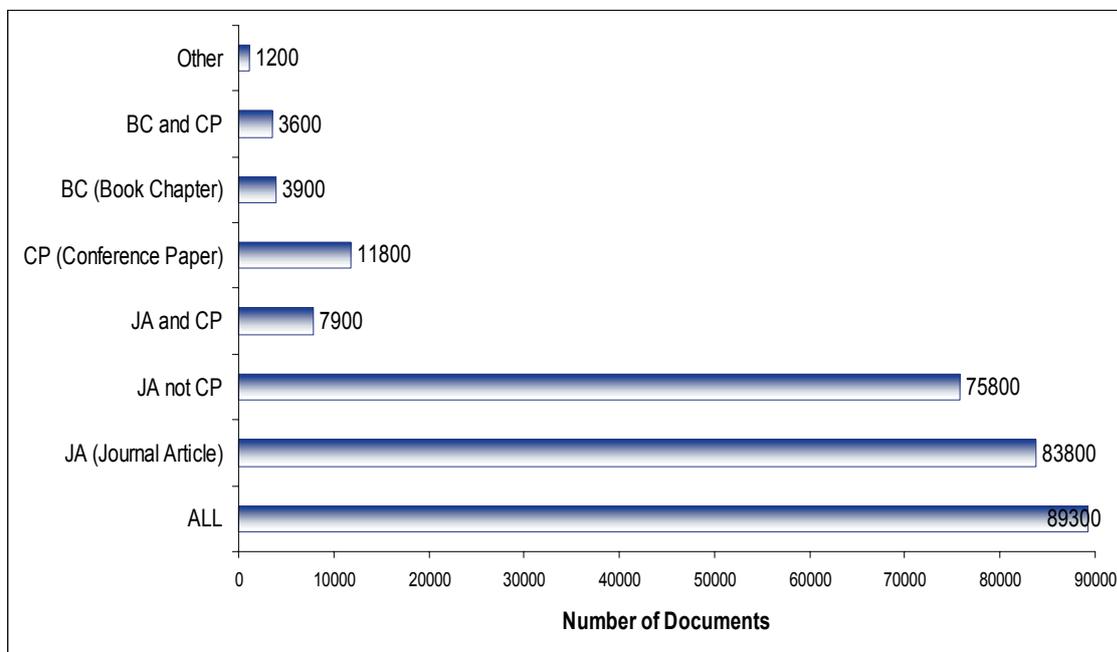


Fig. 1. Total number of documents (all JCEA countries) in 2000-2008 by document type

attributed to some delay in publishing and indexing in the most recent current year. The oscillation between years can frequently be attributed to ad hoc international scientific meetings in certain countries in certain years. An international meeting with a large scale participation can in certain years account for a significantly greater number of published documents in that particular year.

The analysis by language of publication shows the predominant role of English as the principal language of agricultural scientific communication in the region. It is prominently followed by Polish as the language of the by far most populous JCEA country. If considered by the number of inhabitants of a particular country, the Slovenian language occupies the first place, followed by Croatian. The joint number of documents itemized by language is somehow higher than the total number of 89.300 documents in Figure 1 on account of some documents having been published in two languages and thus having received two language qualifiers. Some documents were published also in languages other than English or national languages, such as French, Russian, German etc. French occurred mostly in Romanian publications. There were some isolated cases of other languages, such as Ukrainian and even Japanese. The last example triggered our curiosity so we consulted the database record. This paper was indeed written by a Japanese author and published in a Polish journal. As we do not have access to that particular journal issue we can't check if the paper was really published in Japanese or was

that just an error in the database. Some disambiguation is also needed with the Croatian language. There were 15 documents classed (probably wrongly) as Serbo-Croatian which is an outdated language qualifier and which can not be used any longer. As these documents were published in Croatian journals they should probably be attributed to the Croatian language.

In order to assess a more steady and more regularly recurring form of document type we conducted a more detailed analysis on journal articles. We assessed not only the number of articles by the country of a publisher but contrasted these figures also with the country of an author (Figure 4). We noted interesting opposite patterns in the two neighboring countries Slovenia and Croatia which in the previous Figure 3 exhibited the highest number of documents per capita with regard to the national language. At this point it needs to be noted that the figures for authors were estimated on the basis of the entire CAB Abstracts, that is by taking into account all countries of publication that occur in the database. Also, the figures are based on the data for the year 2008 in order to elucidate the most recent publishing patterns. The figures pertaining to Slovenia thus indicate that in 2008 the Slovenian authors (co)authored 570 CAB Abstracts-indexed global documents. In Slovenia itself some 260 documents were published which were indexed by the CAB Abstracts database.

The next two figures (5 and 6) shed some more light on yearly figures in Slovenia and Croatia with regard to the

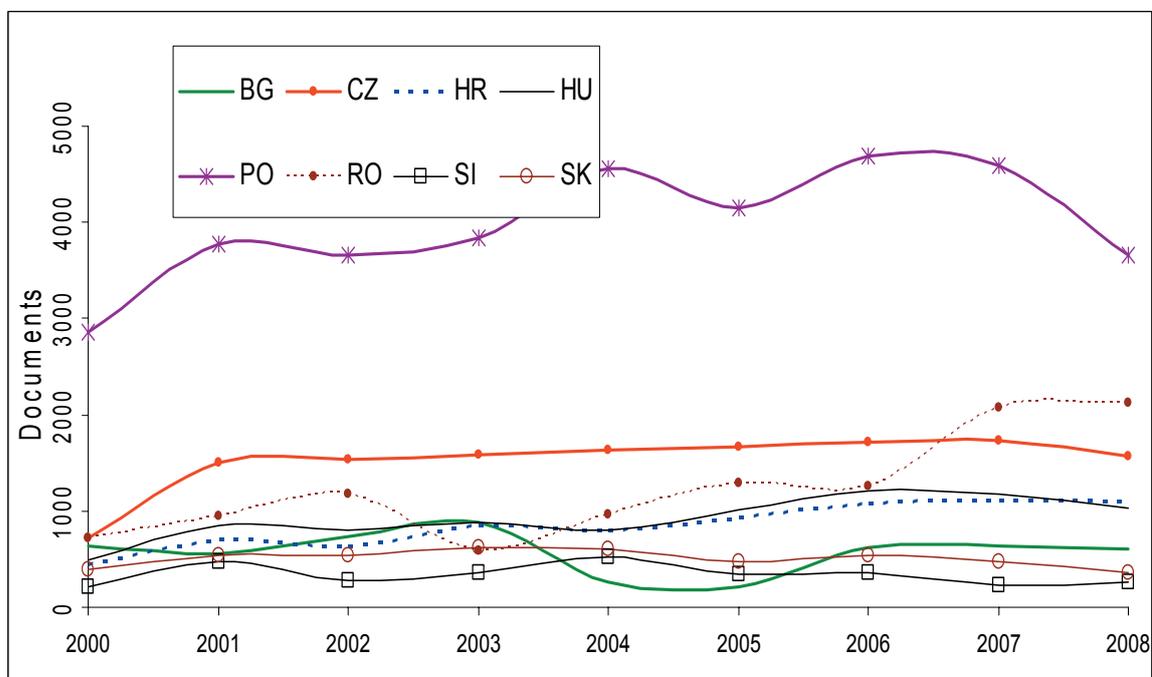


Fig. 2. Growth-trend of documents (all document types) by publishing countries

country of publisher and country of an author. We may observe some stagnation during the last five years in Slovenia. In Croatia, however, a constant growth can be noted with the figures for the publisher leading over the figures for the authors. This indicates that the contribution of non-Croatian authors in Croatian publications is rather important, thus demonstrating a high participation of foreign-based authors which is the highest among all JCEA publishing countries. Some of these figures can certainly be attributed to the Journal of Central European Agriculture. On the other hand, Slovenian publications show less international involvement, but authors, however,

seem to be more eager to publish internationally. The final assessment was dedicated to the total number of journal titles published in respective countries. As has already been shown in some previous figures Poland again offers the highest numbers. As many as 140 different journals indexed by CAB Abstracts have been published in Poland during the period of observation. Slovenia ranks the last with 14 journal titles. Again we need to take into consideration that Slovenia with its two million inhabitants is almost twenty times smaller than Poland (38 million). Altogether, 378 different journals have been indexed by CAB Abstracts at some point during 2000-

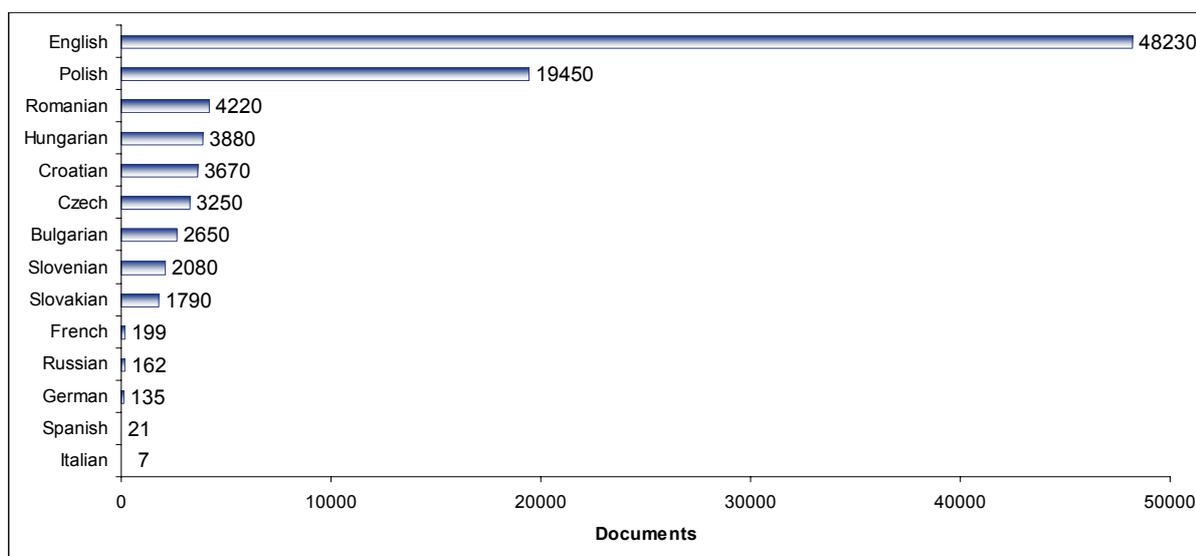


Fig. 3. All documents (all document types) published in all countries in 2000-2008 by language

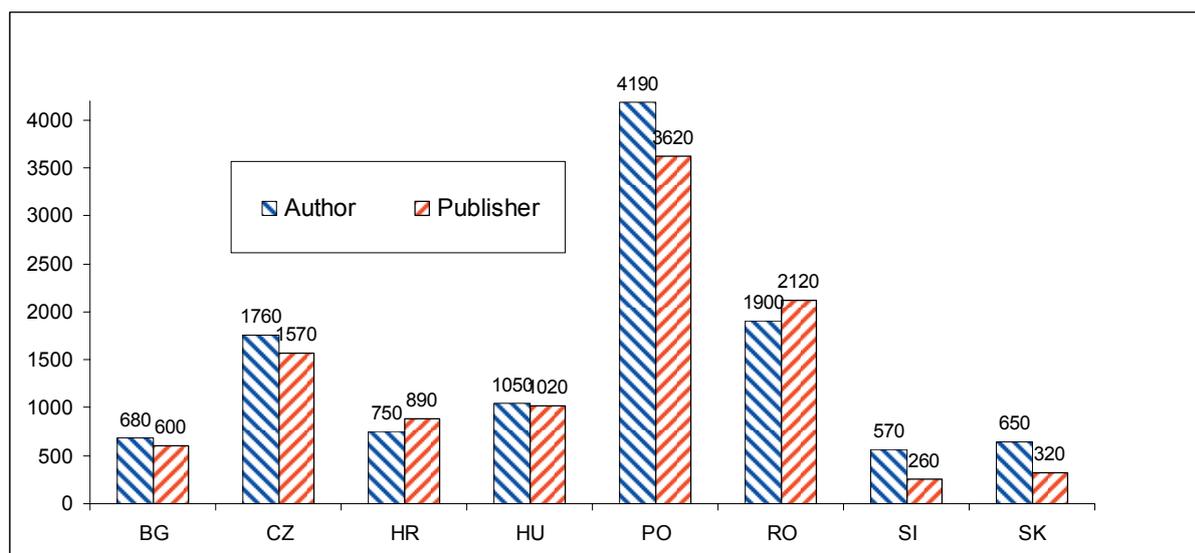


Fig. 4. Journal articles in 2008 with regard to the country of author and country of journal publisher

2008. Again, these are merely informative figures which do not reflect the number of journal articles extracted from each particular journal nor the quality of the journals. Namely, whereas many of these journals set strict peer-reviewing requirements for submitting and publishing of original scientific articles, many other journals, on the other hand, publish also short non-scientific informative articles which are nevertheless indexed and abstracted by the database information professionals. We are not in a position to impart qualitative judgment of individual articles and journals given that our analysis involved hundreds of journals and tens of thousands of records.

**CONCLUSIONS**

All figures that we presented are based on the data as entered by information professionals at CAB International which compile the CAB Abstracts database. If some information was not included in the database, it is then not reflected in our study. It is probable that there exist many more documents which would be of interest to our analysis but have not been identified through this method. We believe that serials or journals enjoy rather good coverage by CAB Abstracts. Some other document types, especially Books and Proceeding, however, could have escaped attention of information professionals

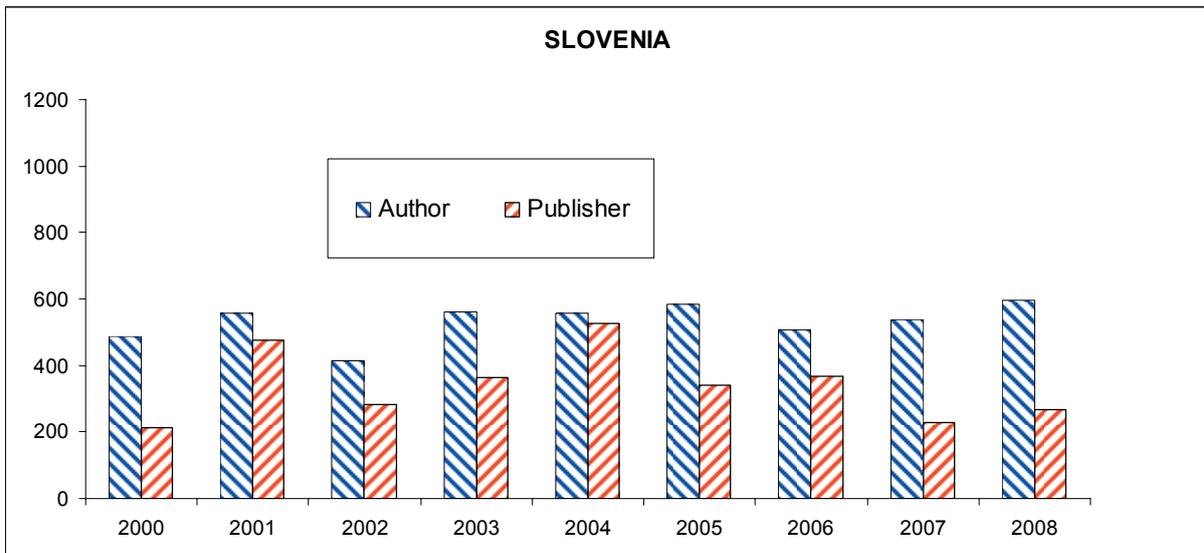


Fig. 5. All CAB-indexed documents from Slovenia in 2000-2008 with regard to authors and publishers

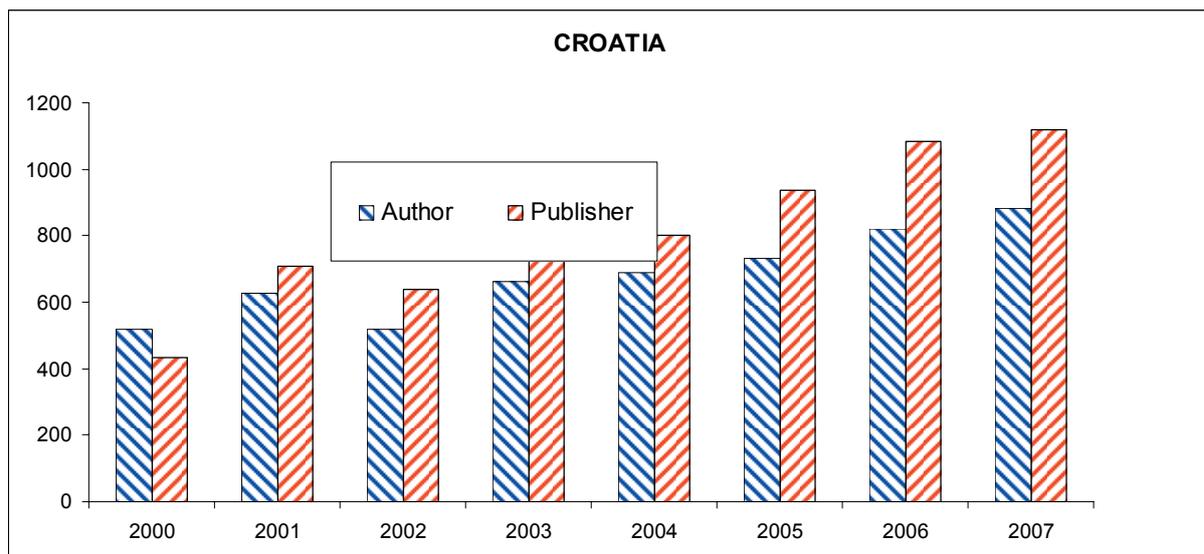


Fig. 6. All CAB- indexed documents from Croatia in 2000-2008 with regard to authors and publishers

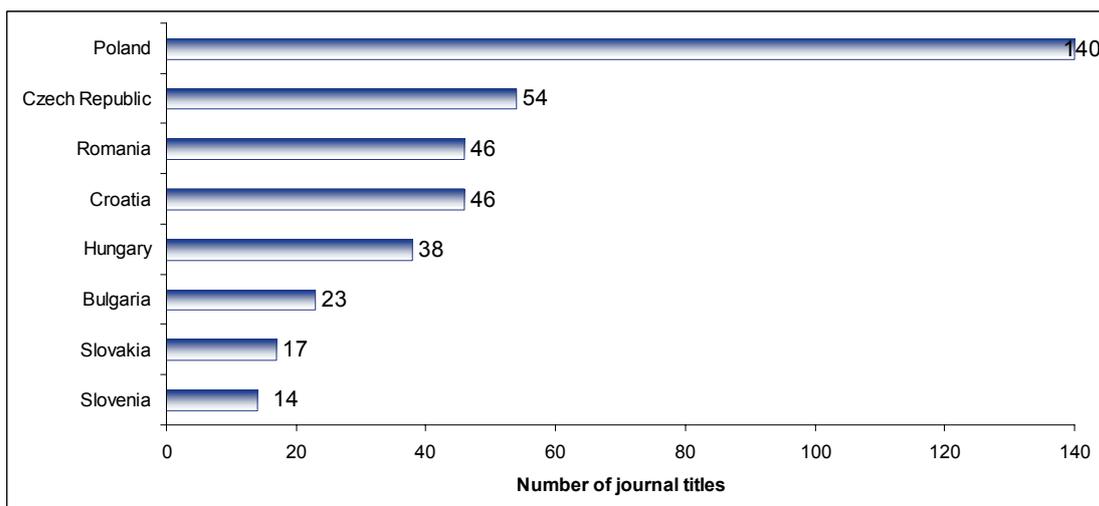


Fig. 7. All active journal titles in CAB in 2000-2008 with regard to the publishing country

at CAB International. This is quite logical. In the ever intensifying publishing activities of today it is getting increasingly difficult to keep track of all events. An increasing number of international meetings publish their output only in a form of electronic proceedings. These may meet with some challenges with regard to systematic capture by standardized databases although well defined e-publications do receive a very good data coverage as is exemplified by the *Journal of Central European Agriculture*. A good Web page can certainly add to global retrieval visibility. And global ambitions of the publishers are quite obvious given the prominent role of English as a language of choice of majority of authors.

In order to carry out an accurate analysis and search-queries it is necessary to take into consideration some characteristics of a database. Care needs to be exercised especially in interpretation of data pertaining to monographs. Even though some less conventional publication types may thus not be tracked through CAB Abstracts it is apparent that the coverage of authoritative serials is pretty much inclusive of the most important scientific publications. Any important research result will invariably get published in a journal and does receive some due attention.

The presented results can serve as a good indicator of very dynamic regional publishing activities in the field of agriculture and related life- and environmental sciences. The detected 378 different journals and some 90.000 different documents produced between 2000-2008 attest to this accomplishment.

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