

Global Perspectives Grant Report

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Global Perspectives on Agricultural Science

As a faculty member in the Department of Agricultural and Applied Economics, a primary focus of my research is to study agricultural science and technology. During the summer of 2013, I proposed a multidisciplinary research project with a prominent information scientist named Wolfgang Glanzel at the University of Leuven, in Leuven Belgium. The proposal was to conduct a detailed study of global agricultural science using information collected from the scientific literature.

After receiving an invitation to be a visiting research scholar at the University of Leuven in the fall semester of 2013, I worked closely with a group of scientists in Leuven to conduct a detailed search of agricultural science papers in a bibliographic database called the Web of Science (WoS). The initial search resulted in the identification of 954,113 scientific papers related to agricultural and life sciences published in the period 1991-2012. After the initial search, we did additional refinements to the database to best represent applied agricultural science, and the final database included 466,459 papers.

The papers were then downloaded and analyzed electronically using specialized software that can reveal important information about the literature. Some examples of the ways that the database can be analyzed include an examination of the research performers (i.e. authors, institutions, and countries), the main topic areas of the research, the source journals, and the agencies funding the research. In addition, we also considered the evolution of global agricultural science over the previous two decades by examining the database of papers during 4-year time intervals from 1991 to 2010. Although the final study is not yet complete, our initial analysis is very revealing and I will highlight some of the more interesting findings.

Some Findings:

- The number of papers related to agricultural science has increased dramatically in the last few decades. In the 4-year period from 1991 to 1994 we identified 67,330 papers related to agricultural science, and in the period from 2007 to 2010 the number of papers we identified had more than doubled to 139,941.

- The United States is the largest producer of agricultural science literature. In the year 2012 the United States represented approximately 20 percent of the global agricultural science literature.
- The U.S. share of the global agricultural science literature has fallen in the last few decades, from 35 percent in the early 1990s to 20 percent today.
- China and Brazil drastically increased their shares of the global agricultural science literature from the early 1990s to 2010. China is currently the second largest producer of literature at 8.5 percent of total, and Brazil the third largest with 8.4 percent of total.
- International collaboration on agricultural science has increased since the early 1990s. In the period 1991-1994, 10 percent of all papers on agricultural science were written by scientists from at least two different countries, and by 2007-2010 this share had increased to 16 percent.
- Within the group of papers that included international collaboration, 21 percent had at least one scientist from the United States, and a whopping 45 percent had at least one scientist from China.

This research is still ongoing and we expect to have a formal study prepared by late 2014 that will be submitted to the scholarly journal *Scientometrics*.

Since returning from Leuven, I have been using some of the techniques I learned to conduct a study of the structure of agricultural science at the University of Wyoming. The Wyoming Agricultural Experiment Station provided me with a list of all of the research scientists, extension specialists, and faculty that worked for the College of Agriculture and Natural Resources in the period from 2007-2012. I used the list of employees to conduct a search of scientific literature in the WoS. This search resulted in the identification 1,047 scientific publications in the 6-year period. The 1,047 publications are currently being analyzed to uncover information about such things as the topic areas of the papers, the primary collaborators, the impact of the papers on the agricultural science literature in general, and other interesting topics. This study will be completed in the fall semester of 2014.



The University of Leuven was founded in 1425 by Pope Martin V. It is the oldest Catholic university in the world, and the oldest university in Belgium.

The university has approximately 40,000 students

The top picture on the left shows the university library. The middle and lower pictures show other interesting university buildings scattered around the beautiful city of Leuven.



Project sponsor Professor Wolfgang Glanzel, Faculty of Economics and Business, University of Leuven



The next page shows more pictures of Leuven Belgium





As a visiting research scholar at the University of Leuven, my family was eligible to stay in the *Groot Begijnhof*, an 800 year old World Heritage site in the heart of the city. The top picture is the view from our kitchen, and the bottom picture shows our street.



This famous statue in the center of Leuven Belgium is titled *Fonske*. Some believe that it depicts a student drinking from the fountain of knowledge, others believe it represents higher education as a form of 'brainwashing.'