Research Support Services:
Agricultural Sciences

Marston Science Library
George A. Smathers Libraries
University of Florida

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Introduction
The University of Florida George A. Smathers Libraries is one of 19 institutions that participated in the Ithaka S+R Research Support Services: Agricultural Sciences study. The formal description of the research design is outlined by Ithaka S+R:

“This study is an in-depth qualitative analysis of the research practices of academics in agriculture in order to understand the resources and services these faculty members need to be successful in their teaching and research. This information will be used to articulate the research activities and needs of agriculture scholars including identifying improvements to pre-existing research support services at [University of Florida] and opportunities for developing new research support services for agriculture more widely. This study also adds to the knowledge in library and information studies on user needs and activities by examining the specific needs of agriculture scholars, a group that has been previously under-represented in this literature.

The local study proposed here is connected to a suite of parallel studies being developed locally at other US-based higher education institutions with agriculture departments” (Ithaka S+R, 2016a, p.6).

The local research project was implemented exclusively by the researchers at the University of Florida. “Ithaka S+R, a not-for-profit research and consulting service that supports academic, cultural, and publishing communities, ...[provided] guidance on research methodology and data analysis” (Ithaka S+R, 2016a, p. 6). Researchers at UF participated in an Ithaka S+R training designed to encourage consistency across all participating institutions. “The anonymized aggregated data and analysis from all 19 institutions will be incorporated into a comprehensive report written and made publically available by Ithaka S+R.” (Ithaka S+R, 2016a, p.6). A number of core themes emerged from the analysis of research practices in the local study at UF. This report summarizes a subset of the results, focusing on themes related to research support services. The UF research team will present analysis of additional themes that emerged from this study in subsequent publication(s).

University of Florida Institute of Food and Agricultural Sciences
All of the interviews for the local study involved agricultural science researchers in the UF Institute of Food and Agricultural Sciences (UF/IFAS). UF/IFAS is one of the nation’s land-grant institutions addressing “critical issues in agriculture, food, the environment, and communities” (USDA NIFA, n.d.).

“A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The original mission of these institutions,
as set forth in the first Morrill Act, was to teach agriculture, military tactics, and the mechanical arts as well as classical studies so that members of the working classes could obtain a liberal, practical education."
(University of Florida, 2012).

As a land-grant institution, UF/IFAS is charged with an outreach mission to disseminate research results to practitioners throughout the state. This outreach typically occurs through the world-renowned Cooperative Extension Service, a tri-body partnership between the federal, state and local county governments where off-campus faculty work as extension agents. Extension agents rely on content provided by state extension specialists from agricultural scientists. In recognition of the different dissemination goals of UF/IFAS faculty with extension appointments, UF researchers made an effort to recruit interviewees with varied responsibilities.

UF/IFAS faculty typically have appointments in 2 of 3 areas: research, teaching and extension. While not within the original scope of this study, the UF research team acknowledges that success in extension activities is also important to academics in the agricultural sciences. The expectation to translate research results into practical guidelines permeates all appointments:

“I do not have an extension appointment, but the nature of my grants usually require that …we demonstrate impact and to demonstrate impact, you’re usually doing some kind of extension programs for extension faculty and growers.”

The responsibility to provide information to the public extends to the publication practices of all agricultural scholars:

“So you’re basically writing two different types of articles, then, because one’s a very applied [one] for the extension publications, you’re talking to the practitioner. But the other ones are more for the researchers.”

UF/IFAS employs 10-12% of the university faculty (UF OIPR, 2016) and comprises a total of 14 departments and 2 interdisciplinary schools: School of Natural Resources & Environment and the School of Forest Resources & Conservation (UF/IFAS Briefing Book, 2013). Ithaka S+R “recognize[s] that Agriculture has important connections with veterinary medicine, forest management, natural resources management, and other adjacent fields. For the purposes of this project, scholars more strongly aligned with these fields, and less focused on the science and practice of farming, will be held out of scope.” (Ithaka S+R, 2016b). However, UF study participants described a shift in focus in agricultural research towards sustainability, including conservation of natural resources. Therefore, for a more comprehensive understanding of research needs of agricultural scholars at UF, the UF research team included participants from forestry and wildlife ecology. Participants from the College of Veterinary Medicine were not included. UF/IFAS employees are located at 12 off-campus Research and Education Centers (RECS) in addition to the main campus. These RECs provide statewide
presence of UF/IFAS faculty and enable region-specific research, teaching and extension throughout the state.

Characteristics of study participants

Respondents for this study represented 12 departments and 2 schools. The academic rank of respondents were 6 Full Professors, 4 Associate Professors, 4 Assistant Professors and 1 non-tenure track Research Assistant. 11 were based on the main campus and 4 were based at off-campus Research & Education Centers. Observed diversity measures were noted: 9 respondents were male; 6 female; and for nearly half of the respondents, English was their second language.

Departments & Schools Represented

- Agricultural & Biological Engineering
- Agricultural Education & Communication
- Agronomy
- Animal Sciences
- Entomology & Nematology
- Environmental Horticulture
- Food & Resource Economics
- Food Science & Human Nutrition
- Horticultural Sciences
- Plant Pathology
- School of Forest Resources & Conservation
- School of Natural Resources & Environment
- Soil and Water Sciences
- Wildlife Ecology & Conservation

UF/IFAS departments not represented by study participants: Family Youth & Community Services, Microbiology and Cell Science, Veterinary Medicine (IFAS Directory, Centers and Programs, 2016).
Rank of study participants

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of Participants</th>
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<tbody>
<tr>
<td>Full</td>
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<tr>
<td>Associate</td>
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<tr>
<td>Assistant</td>
<td>4</td>
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<tr>
<td>Other</td>
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Appointment of study participants

One of the respondents had responsibilities in all 3 appointment areas (teaching, research, and extension) and one was in a fully administrative role. With the exception of one administrator, all respondents in this study had research appointments; 9 also had teaching and 6 had extension appointments.

<table>
<thead>
<tr>
<th>Appointment</th>
<th>No. of Participants</th>
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<tbody>
<tr>
<td>Research</td>
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</tr>
<tr>
<td>Teaching</td>
<td>9</td>
</tr>
<tr>
<td>Extension</td>
<td>6</td>
</tr>
<tr>
<td>Administration</td>
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Note: Numbers exceed the total 15 participants because 14 participants has split appointments: Research plus either Teaching or Extension. 1 participant has appointments in all 3 areas. 1 participant has an exclusively administrative appointment.
### Location of study participants

<table>
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<tr>
<th>Location</th>
<th>No. of Participants</th>
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<tbody>
<tr>
<td>Main campus</td>
<td>11</td>
</tr>
<tr>
<td>Off-campus REC</td>
<td>4</td>
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UF/IFAS has 12 off-campus Research and Education Centers (REC) throughout the state.

### Research Methodology

The University of Florida research team comprised three librarians: Valrie Minson (Chair of Marston Science Library and Agricultural Sciences Librarian), Suzanne Stapleton (Agricultural Sciences Librarian & Digital Initiatives), and Laura Spears (Assessment Librarian).

The UF team obtained study approval from the UF Institutional Review Board (IRB) and participated in an Ithaka S+R training designed to encourage consistency across all institutions participating in the Ithaka S+R study of agricultural scholars. During the summer of 2016, 15 UF/IFAS agricultural scholars participated in one-on-one semi-structured interviews with a member of the UF research team. The interviews lasted 60-90 minutes and took place in the participants' primary work spaces. As part of the interview process participants gave consent for researchers to take photographs documenting their work space. Recorded interviews were transcribed by a commercial transcription service.
The UF research team met to discuss the interviews conducted, reviewing highlights and developing a research design based on a grounded theory approach. Key concepts and terms were derived from multiple readings of the interview transcriptions and the researchers identified core themes that summarize the user needs and activities of interviewees. The UF research team used the resulting focused codes to summarize and annotate findings from each transcript, resulting in Research Support Service themes categorized by topics including finding sources and research needs, data management issues and tools, repositories for sharing research products and research dissemination. A synthesis of implications for academic library services reviews the opportunities for libraries’ access services and collection management and summarizes opportunities for library resources and instruction to better support agricultural sciences research at the University of Florida.

**Research Support Service Themes**

**Finding sources for research**

Agricultural science researchers interpret primary sources in many different ways. All interviewees were asked “how do you locate the primary and secondary source materials that you use in your research?” The intent of this question was to explore the resources used to discover literature relevant to each scientist’s research. However this question immediately followed the question “What kinds of data does your research typically elicit?” leading to answers that included:

- databases for locating journal articles,
- bacterial specimens needed to do microbiology research,
- graduate students, as the primary people responsible for lab work,
- expected research findings, with serendipitous findings considered "secondary" findings.

Within the information science community, primary sources are considered original documents and within the humanities this may be diaries, letters, or original historical materials. Within the scientific community, primary sources are typically the original data/research, scientific experiments, or research studies. When interviewees were asked about specific tools for locating primary research, answers included:

- Web of Science
- CAB Abstracts
- GRIN Taxonomy
- Agricola
- Zootaxa
- cited references
- conference presentations
- ERIC
- PubMed
● Google Scholar, particularly utilizing alerts and "backward and forward citations" of people
● evaluation reports through a local Center's database
● skimming Table of Contents for journals
● specific journals
● listserv
● statistical and theory based books that assist with coding

Not unlike the challenges of locating primary research materials in other disciplines, the general response from interviewees can be expressed in this statement: “...much of what we do these days, of course, everything pretty much is, I mean, through Internet sources. So online sources. So how do you locate that? Well, the process is not easy. Okay. So either you as an expert have been exposed to those tools through conferences or meetings or colleagues or you can discover them through certain years, okay, and more often than not, they are as ancillary products of the papers that are written. So you —... have to use, find the literature, and then they would refer to a particular study and from there, you can get to their data. Now, unfortunately as you know, the data is not readily available in publications. That's a big barrier. So I usually have to contact the authors and get those data or in some way or another get access to that data if you can.” Not only does this quote highlight the difficulties of identifying primary sources, but also the importance of locating primary data.

Primary data is very important within the sciences and interviewees communicated the importance of Dryad, Figshare, GBIF, or GenBank for locating primary data. One biological sciences researcher discussed the importance of accessing/viewing the original research article when a species or organism was initially discovered. The researcher communicated the challenge of accessing the historical literature and the importance of the librarian to the process.

The need for publications in multiple disciplines as well as assistance locating relevant journals that cover multiple disciplines is support that researchers need. As one researcher stated, he/she “... was combining different stressors in animal studies, ecology, and biology in which the stressors can be genetic or environmental and therefore, he/she frequently consulted experts in other fields, resulting in what he/she considered to be fruitful interdisciplinary studies”. The libraries need to continually explore new, hybrid publications for researchers working in a variety of fields on one study.

**Data management issues & tools**

Data is seminal to the work of the agricultural sciences. Due to the breadth of research that falls within the agricultural sciences, agricultural data covers a wide range of types including:

● quantitative, qualitative, or non-normal data (such as rating scales);
● behavioral or economic data;
● spatial, such as remote sensing data;
● images, such as satellite images or images to identify vegetation density;
● sound recordings, such as bird songs;
● Existing data, such as legacy data collected by retired researchers or data collected by federal agencies or corporations;
● field trials that include vegetation density;
● museum specimen data

Agricultural researchers collect, sanitize, and analyze data as a means to solving agricultural challenges both big and small. Many of the researchers utilize data to predict change. Taking into account many different types of variables—whether biophysical, chemical, or land use—researchers analyze the data to try to understand what might be the main drivers behind that change. As one researcher explained:

“... real complex systems can never be understood in their parts. So what we’re trying to do is reduce the complexity of that system to a few meaningful components that then we can go and operate on, and that’s typical of every environmental system. So wherever humans and natural system are, they are complex systems. They cannot be really fully understood, and we still are trying to understand it perfectly, just reduce them to a few things that matter...”

Data helps researchers better understand the complex systems, both the drivers of the system and the unique context. Not only is the agricultural research environment complex, so are the barriers encountered when attempting to collect, find, or access data. The barriers include:

● Challenges of collecting data: “you can’t just go out on the farm and count cows and measure milk anymore”.
● Finding and accessing data can be difficult. Not all data is readily available and many data can be expensive to acquire.
● Costs of data analysis tools can be very high.
● Processing large chunks of data takes time and expertise, “It’s crushing, the amount of data to look at. So, okay. Great. Now we’ve got all the storage we need. We got all the data we need. Now, how are we going to process it?”
● Data has the ability to be analyzed in countless ways, but there are time constraints both in the collection of the data and also in that a student will need to defend their data. “95% of the time, (time is required) in investing and collating and putting the data in useful form... we should be really using the time and the analyses and brainstorming the results”.
● Processing data requires specialized programmers, or specialized skills. Data processing requires complex mathematical modeling insights that are difficult to learn. “Our fields are becoming increasingly quantitative, computationally intensive, and require skill sets in computer programming and the analysis of increasingly complex or large datasets. And so, I can do those things myself, but it’s slow, whereas if we had access to, say, computer programmers in the department, you know, someone who had expertise in computer programming and database management and manipulation who can help prepare and analyze the data.”
• Data scarce regions in the world often lack infrastructure to support data availability. Additionally, when the data is available, many of the agencies in charge of collecting these data will not publically share.
• Understanding the complex systems also assists the agricultural community with the development of policy. “Policy is the end point of the analysis in some way”.

Computer simulation models are utilized to reproduce the behavior and identify the various ways to reproduce the behavior as a means for understanding complex systems. Data visualization and analysis has built a new framework of how to test, store, and curate data. The various types of analysis conducted on agricultural research includes:

- statistical analysis
- risk models
- distribution models
- simulations
- Integral projection models
- Econometrics
- Variance analysis
- Bioinformatics
- RNA-Seq
- ESTs
- Cloning

Repositories for sharing research products

Agricultural scientists are active users of research repositories. There is a strong tradition of using shared data in agricultural disciplines. Respondents described the expectations of being a “good citizen” by sharing one’s own data, yet they also acknowledged the costs and risks of contributing to repositories. While knowledge and use of data repositories is advanced among these scientists, use of repositories for published papers was less developed.

As one researcher stated, “perhaps the biggest development for us in the last 10 years has been the data side of the analysis….it has brought a whole new framework of how to deal with data, how to test it, how to store it, how to curate it and so on”.

Active use of data repositories

Appreciation for shared data is well established among agricultural scholars. Agricultural scholars have used shared data of natural resources, specifically weather and soil data, for centuries. Over time, shared data has expanded to include markets and trade, water quality, and genetic code. The vast majority of these data are provided by national government, although some scholars report using proprietary
data or working in countries where national data is not shared. With this common appreciation for using shared data, agricultural scholars are strong supporters of repositories.

Scholars in agricultural disciplines also contribute their own data to data repositories by requirement and by their own initiative. Researchers in several disciplines are required to deposit biological specimens into specific repositories, as is the case of first reports of invasive species. Depending on the discipline, biological specimens collected by respondents have been deposited into the USDA Fungal Isolate Collection, the Food & Drug Administration’s American Type Culture Collection, the Center for Disease Control, and in local herbariums that report to statewide agencies, such as the Florida State Collection of Arthropods.

Researchers voluntarily contribute their own data into repositories as well. On-going contributions to data repositories are critical for modelling, as more data leads to better models. In addition to improved research and collaboration, motivations for depositing data into repositories include preservation and being a good citizen. Generally, agricultural scholars are strong supporters of data sharing. Their own research benefits from using shared data and many expressed a sense of duty to contribute their data for others use.

“my work was supported by the taxpayers of the United States and they deserve a return on their investment and I think part of that return on investment is the availability of those data for other researchers to use.”

“There are data programs out there that will model what they think will happen in that treatment step based on what’s happened in other similar food products. .... what you do in those cases is you take your raw data from those trials and you input that raw data into their repository so that it can be used to help strengthen the models...Both of those programs are Open Access. ... So sometimes, we use those repositories, and a lot of food companies use those repositories to try to predict what’s going to happen in their food products. And so, sort of being a good citizen in our field is to add data into those repositories for sort of the use of the general community.”

One agricultural researcher mentioned the challenge of sharing data saved on internal servers or drives and transitioning these data into publicly accessible repositories:

“We do have a website or drive here that I guess all of our data goes on. We call it TDrive that all of our group, all 18 or 20 people, post docs and grad students can get in, and we’ve got it back to 1977 or something like that....We usually have...reams and reams of data on every study, but I
Another researcher commented on the importance of embargos when archiving data:

“...now more and more journals are actually requiring mandatory data archiving, but I started doing that about six years ago just because I thought it was important to do. And so, that's something else that I do require my students to do. Whether they've published, no matter what journal they're in, I want their data archived upon submission. And they're welcome to embargo it. I embargo mine too for a couple years at a time or whatever sometimes, but everybody also archives their data and I also try to archive my code, any kind of computer code as well.”

Costs and Risks of Sharing Data

In spite of widespread support of data repositories, respondents recognize the costs and risks of sharing data, both at personal and disciplinary levels. The cost of sharing data is mainly incurred in the preparation of the data for widespread use. Formatting “that information into a useable product is a phenomenal enterprise” and there are costs for this time commitment, time that could otherwise be spent “brainstorming” and working on innovative research.

“Whenever you post some data, you have to clean it and you have to document it. We have historical data for years. It has inconsistencies. The missing variables are not what it should be. The zeros are not consistent. The names of the variables through the years are not very good... You need to also put a document that says what was measured....So who pays for that time?......we should have a more proactive ways to store this data, and--but you need computer scientists. You need people to clean the data. You need students and masters trained on putting everything together in the database. .... We are a faculty. We have too many small tasks and one task of cleaning and preparing a dataset doesn't look good in your [promotion packet]..... I don't think it's a waste of time. I think it's an investment for the long-term.”

One faculty described the “generational divide” around the support of open data, whereby younger scientists are strongly supportive of open access to data while older scientists may be more protective of their research data. Younger scientists are more apt to use others’ data, for instance in modeling research. These attitudes may not always hold true, however, as younger faculty may need to protect their data for use in future publications necessary to achieve tenure while established faculty are more immune to the pressures to publish, having already gained tenure. Attitudes vary across disciplines as well, where, for instance, time to publication in agricultural
economics is a considerably longer process than in other fields. Peer pressure to contribute data towards collaborations may be stronger in some research areas than others.

“Once you find a dataset, typically you write like three or four papers on it, and you can imagine how long that takes. There is a concern with putting – if it’s your own collected data, putting it out there right away. The published work, I don’t have a problem with, but if I’m not done with the data and I want to publish three, four more papers out of it, which is going to take a few more years I don’t want to put it out there and risk someone else beating me to it.”

There are risks inherent in contributing data to a repository as well. Shared data is open to be used by others, perhaps in ways unintended by the original researcher. Scholars expressed the need to “protect the quality of your data” from misuse. One scholar mentioned an example of poorly conducted studies on genetically modified organisms (GMOs) that “have been thrown away by the majority of people but are constantly picked up by people to use as examples, even though the studies themselves are corrupt”. The misuse of shared data is one risk that can contribute to reluctance of scientists to deposit their research data in repositories.

When asked whether they had ever deposited “data or other research products” into a repository, all agricultural scholars interviewed responded to their use of data repositories. Only two respondents volunteered practices regarding repositories for their research papers without prompting. One submits publications to a local reprint repository. Another sends citation information to the Food and Drug Administration’s Center for Produce Safety where active links are maintained to all relevant papers. Some scientists post their publications on personal websites or on social media sites. Agricultural scholars expressed unfamiliarity with repository locations as one barrier impeding their contributions to research repositories. Most were embarrassed to admit that they were unfamiliar with the University’s institutional repository, the IR@UF. Many were interested to learn more – whether data and grey literature were appropriate and could be easily handled by the IR@UF. This is a topic that merits follow-up education.

“I’ve heard about it [IR@UF], and it doesn’t have shape in my mind as to what it is. So I’ve love to hear about it, like, go to a session or something and hear more about it, but I don’t know if you guys do that. But you know, what kinds of things would go in there? Do you take datasets? Do you take the whole gamut of things we just talked about? Well, cool… And how accessible is it? Is it indexed?”

Only about half of the respondents were aware that the Office for Science and Technology Policy’s public access mandate of 2013 applies to research articles as well as data (Holdren, 2013). Most rely upon publishers to archive their publications. Although several respondents post their published work on websites (e.g. own
webpage, ResearchGate), this is mainly for increased readership and not for preservation objectives.

Agricultural scholars are aware of funders’ new requirements for data management plans to be included in grant proposals. As scientists become more proficient in developing and implementing data management plans, it is expected that the knowledge and skill of formatting data for re-use will increase.

In conclusion, agricultural scholars are very familiar with the benefits of sharing data to advance research. Individual study data, however, is still very difficult to access. Some of the constraints to accessing this data are the need to format this data for widespread utility, persistent unwillingness to share it (e.g. for legitimate plans to use the data in future publications or for fear of being scooped), and uncertainty about appropriate repositories.

Use of research repositories in agricultural disciplines is expanding, in part due to requirements by funders and the federal government. The beneficiaries of research repositories include current and future scientists, and through the improvements in their research afforded by access to shared data, all global residents. Ultimately, "we must maintain those data repositories because they give us an edge in trying to solve the problems that we have today, which are ever so complex".

Research Dissemination

Dissemination of research results in peer-reviewed journals is an integral component for success as an agricultural scholar. As research has become more specialized, the number of journals has been increasing, providing greater options and new challenges for agricultural researchers. Scientists are challenged to evaluate and select the most appropriate outlets to communicate research results. Assessment of journals involves familiarity with the readership, the editorial board and reviewers. Each scientist maintains an unwritten hierarchy of journals that structures their dissemination practices. Hierarchy of prestigious journals as defined by peers in the same discipline do not always align with the hierarchy structured by Journal Impact Factors®. The pressure “to publish, and publish well” are considerable.

Where to publish

The number of journals in agricultural sciences continues to grow; hence agricultural scholars face more options in disseminating their research. “I get a lot of emails, two a day probably, where…journals of unknown origin request submissions…I think that has really boomed.” It’s a “constant education” about where to publish. There are a number of factors agricultural scholars consider in determining where to publish:
Agricultural scholars state that their primary selection criteria is the journal audience and “You need to publish where you think your audience is going to be”. For agricultural scholars at land grant institutions there is an obligation to disseminate research results to practitioners; most agricultural faculty rely upon speaking engagements and extension publications to reach farmers and lay people. At the University of Florida, extension publications are produced by EDIS, the Electronic Data Information Source of UF/IFAS Extension following departmental review. However, peer-reviewed publications are the ‘name of the game’ for agricultural faculty success. “They expect three or four grants or …peer reviewed publications a year for promotions”; “the game here is you got to publish, publish well, and you have to get money”.

When selecting a journal to publish in, scientists assess the journal’s editorial board, especially the caliber of reviewers. Peer review establishes “credibility” of the research. Scholars avoid journals that don’t have “the people qualified to do the reviews”. “I know some editors they’ll say they’ll have to go through 10 or 15 people to get three reviewers, which tells me you’re not getting the people directly in the area that know the most…when you have to go through 10 or 15 people to get three people, something’s broken, and you see that in …the quality of the reviews.”

One respondent proposed a solution by spelling out the necessary commitment to the common good – all scholars should review a paper for every paper they submit and provide three reviews for every paper they author that is accepted.

Every scientist interviewed maintained an internal hierarchy of journals they wanted to publish in. Although the specific journals vary by discipline, the structure of the hierarchy of desirability was similar. The very top tier in the hierarchy are the scientific weekly publications that reach a broad, national audience. Then, there are the 3-4 “pinnacles” in each field, these are the “career makers” for agricultural faculty. A second tier of journals within each field follow. It is noteworthy that the most prestigious journals in a field do not necessarily have high Impact Factors.

“If we think we have something really exciting, we’ll send it to one of the weeklies: Science, Nature, Proceedings of the National Academy of Sciences type places, and then we have our top-of-the line disciplinary journals and then a kind of second tier disciplinary journals and so on”. One researcher stated, “The
Journal of Experimental Biology, although it doesn’t have a huge impact factor is the premier journal in the field of experimental biology. So that’s why this is my first aim”.

The impact factor of a journal is the most controversial criterion for where to publish. The Journal Impact Factor (JIF) is the ratio of citations to articles published within a journal, typically over a year time period (Pringle, 2008). The term “journal impact factor” is a proprietary term developed by Clarivate Analytics to establish the relative merit of journals indexed within the Web of Science Core Collection (Testa, 2016). However, the JIF developers caution against its misuse, the “user is encouraged to explore the data and use it appropriately, instead of simply grabbing the JIF and using it as the universal answer to any evaluative question.” (Pringle, 2008).

Respondents described the need to get published “in something that has an impact factor greater than one” and noted that high impact papers draw a lot of attention. However, many respondents spoke strongly against the use of journal impact factors to represent journal quality. These scientists question the ability of the journal impact factor to provide “quality control” in evaluating journals. Certainly there are scholarly agricultural journals published that are not included in the Core Collection of Web of Science.

“I am a firm believer that impact factor is a bunch of BS and if you – if you read about the origin of impact factors, if you look at how impact factors are calculated, there’s absolutely no reason that an impact factor should have something to do with an individual faculty member’s research. It was never meant to be that, but people for some reason that I don’t understand, particularly university people who should- who should have critical thinking ability, put a lot of faith in impact factors.”

Scientists with interdisciplinary research spoke of the challenges of publishing since their research exceeds the traditional boundaries of discipline-specific journals. Extra effort was needed to select the most appropriate journal and to write with that journal’s scope in mind. Research considered “too birdy” for an ecology journal, or too alternative for a weed science journal, can be rewritten for a different journal; “we have to write in all kinds of different ways” for different journals. Research papers rejected from one journal are rewritten for submission to other journals; these revisions can be burdensome.

A few additional considerations in disseminating research were noteworthy. The costs of publishing can be prohibitive and influence dissemination. Rising page charges prompted one scientist to stop submitting to a journal s/he had used previously; now the page charges have recently dropped and the scientist may submit to that journal again. New types of journals provide additional dissemination options; journals that
specifically publish data. Two scientists mentioned their desire to disseminate research results via video and to become better “storytellers”.

Choices for disseminating research results abound and scholars are well aware that where they publish has important implications. One agricultural scholar compared work in academia with her/his prior work in the private sector: “the pressure I had there wasn’t even one-tenth of the pressure I feel as a tenure track assistant professor, and I was getting paid much better.”

Agricultural researchers have many options to disseminate their research that evaluating the merits of various publications can become a concern. Generally, the researchers select dissemination outlets based upon the appropriate audience for their research – they aim to publish where their targeted readers are reading. This can require substantial revisions to place their research within the scope of a particular journal. This is particularly apparent for cross-disciplinary researchers who must re-write their research results in the context of different disciplines for different journals.

Agricultural scholars are increasingly disseminating articles in Open Access avenues. This practice is more common for tenured scholars. Collaborations with international colleagues, especially in developing countries where resources are more limited provided several respondents with the motivation to publish Open Access.

With the desired audience in mind, all researchers maintain a hierarchy of journals in terms of preference for dissemination. The preferred journals are the big name scientific weeklies where publishing can be “career-makers”. Although some faculty believe their research is too specialized for the broader audiences reached by these outlets. Scholars identify 3-4 journals as “top tier” for their discipline, highly regarded by colleagues, regardless of Journal Impact Factor. Second tier journals are used when papers are not accepted in more preferable outlets. In addition, agricultural scholars also translate research results into practical guidelines for practitioners; these are published in EDIS for IFAS Extension.

Scholars expressed divergent opinions about Journal Impact Factor. Most acknowledged that publishing in journals with high Journal Impact Factors is important, particularly for non-tenured scientists. Many also expressed frustration with the weight placed on Journal Impact Factors since the most highly regarded journals in their disciplines do not necessarily carry high Journal Impact Factors. Scholars described the importance of good reviewers; some felt that “the review process is broken” and advised all scholars to accept reviewing offers, at least one for every paper submitted and three for each accepted paper authored.

Appropriate dissemination of research results is a key component of success for agricultural scholars.
Implications and Opportunities for Library Research Support Services

Collections have long been the traditional purview of the library and interviewees communicated several opportunities for libraries related to access to and development of collections. The prominent need by researchers for access to shared data provides an opportunity for libraries to expand their traditional concept of collections to include data by providing research repositories to the research community. Opportunities for expanded information literacy instruction are identified in the interviews. Interviewees were unfamiliar with key library services. The library needs to better market their role in providing unique services to the research community.

Access

Researchers may misunderstand which campus entity provides access to the campus-wide subscriptions: “I rarely go through the university’s library’s web portal to find them” as “those are almost entirely [provided] now via our university’s subscriptions to those journals”. Few scholars mentioned use of the library catalog, emphasizing its increasing irrelevance to information discovery.

Library communities need to improve the functionality of the library catalog, or retire the system and move to a better model. In recognition of the widespread use of Google Scholar for searches, librarians should inform researchers of its advantages and disadvantages compared with discipline-specific databases.

Also mentioned by interviewees was the importance of social network sites (e.g. Mendeley or ResearchGate) for accessing materials. Librarians should recognize these access methods aren’t disappearing; hence the importance of educating researchers about their value and limitation.

Collection Management

Several interviewees were frustrated in the lack of funding for journals important to their own publishing record. Libraries frequently purchase new journal subscriptions based on an increase in interlibrary loan requests, but specialized journals (where agricultural sciences faculty frequently publish) are not in high demand and, thus, subscriptions to these journals may not be owned by the library. One researcher recounted how important it is that libraries maintain collections, even those that are esoteric or little used, as these can become rich sources of data when the right study needs it, saying that “the development that happened from their own [study] was the result of somebody having had the hindsight to put together the data and the repository of the data with public access so that progress could be made”. This researcher reiterated
that access to data is key to a successful study, concluding that for librarians “...there is no substitute, and your role as storing to repositories, making accessible this information, is critical. Critical.”

Data Repositories

Given the prominence of access to data expressed within the interviews, library collection management should expand their traditional materials to include data as another material to offer patrons. There is strong evidence that libraries have an opportunity to design and create data/research repositories. Researchers are using subject specific repositories and agency repositories when required by a grant but most researchers lacked understanding of the options available to them within the university, and were not clear about the purpose of the IR@UF or whether their data could reside there as well. There are opportunities to provide training for researchers, both to increase usage and to create awareness of the policies that govern information deposited within the IR@UF.

Librarians offer guidance in development of data management plans to meet funders requirements. The Data Management and Informatics Librarians, new library faculty positions, reflect the expected increased demand for these key services. The researchers were pleased to hear that the libraries had hired individuals to support their data management needs but they expressed that challenges remain for them as their datasets can often be large and they lack the staff support to prepare it for storage and dissemination.

Information Literacy Instruction

Researchers emphasized the need to teach students how to conduct comprehensive literature reviews and identified this as an area that librarians could support. Librarians should also share techniques to evaluate appropriate dissemination outlets with research faculty.

Final Thoughts

The UF librarians found the Ithaka S+R research study to be of great importance and will disseminate the findings to library functional specialists that include the Data Management Librarian, the Digital Scholarship Librarian, the Scholarly Communications Librarian, and the Informatics Librarian. Additionally, the findings have provided a deeper understanding of the challenges agricultural researchers face and have fed into campus-wide research and scholarship conversations. This report summarizes themes related to research services support that emerged from analysis of research practices of agricultural scholars at UF. Additional themes from the local study, not
covered by this report, include shifts in agricultural research towards sustainability and
greater interdisciplinary collaboration, the development of a “scientist’s mindset”, and
the impact of public perceptions of agriculture on agricultural scholars. Analysis of
these additional themes will be summarized in the future. We thank the agricultural
sciences faculty who participated in the study and we hope to improve and better
promote library research support services, particularly in the areas of access to
resources, data support, and new instruction.
References


https://nifa.usda.gov/land-grant-colleges-and-universities-partner-website-directory?state=FM&type=All&order=field_filter&sort=asc
Appendix A. Semi-structured interview guide for research support services study for the field of agriculture

Interviewer: ___________ Date: ________

Identifier Number: _______________________

Research focus

1. Describe your current research focus and how this focus is situated within the broader agriculture discipline and the academy more broadly.
   [Probe for whether/not they see themselves as located firmly within agriculture as a discipline or located across/between disciplines; What are these disciplines? Does this involve collaborators here at UF? With other institutions?]

Research methods

2. What research methods do you currently use to conduct your research? [Are these methods typically used in your field? Can you describe an application of this in your own research?]

3. What kinds of data does your research typically elicit? [How do you capture this? How do you analyze this?]

4. How do you locate the primary and/or secondary source materials you use in your research?

5. Think back to a past or ongoing research project where you faced challenges in the process of conducting the research.
   a. Describe these challenges. [How did this turn out? Were you able to document these challenges?]
   b. What could have been done to mitigate these challenges?

Dissemination Practices

7. Where do you typically publish your research in terms of the kinds of publications and disciplines? How do your publishing practices relate to those typical to your discipline? [Do you anticipate any changes in these outlets? Are you prepared for these changes?]

8. Have you ever deposited your data or final research products in a repository?
   a. If so, which repositories and what has been your motivations for depositing? (i.e. required, for sharing, investment in open access principles)
   
   b. If no, why not?

   [Are you familiar with or have you used UFIR? Are you aware and/or have you been impacted by Federal public access mandates?]

Future and State of the Field

9. What future challenges and opportunities do you see for the broader field of agriculture?

10. If I gave you a magic wand that could help you with your research and publication process - what would you ask it to do? [or re-phrase: If you could have any resource that could help you with your research and publication process, what would it be? What do you need it to do for you?]

Follow-up

11. Is there anything else about your experiences as a scholar of agriculture and/or the agriculture discipline that you think it is important for me to know that was not covered in the previous questions?

Possible prompts or follow-up questions appear in brackets.
Appendix B. Glossary of Abbreviations and Terms

Agricola: (AGRIcultural OnLineAccess), Bibliographic database of citations to the agricultural literature created by the National Agricultural Library and its cooperators; https://agricola.nal.usda.gov/help/aboutagricola.html

CAB Abstracts (Centre for Agriculture and Biosciences international’s database of abstracts; http://www.cabi.org/publishing-products/online-information-resources/cab-abstracts/

Dryad Digital Repository: a curated resource that makes the data underlying scientific publications discoverable, freely reusable, and citable; http://datadryad.org/pages/organization

ERIC: Education Resources Information Center, a database of education research maintained by the Institute of Education Science, https://eric.ed.gov/

ESTs: Expressed sequence tags used to identify gene transcripts, instrumental in gene-sequence determination used for genetic research

Figshare: a repository where users can make all of their research outputs available in a citable, shareable and discoverable manner; browsers supports all file format types, content may include posters, presentations, datasets and code; https://figshare.com/about

GBIF (Global Biodiversity Information Facility) an international open data infrastructure to biodiversity data, funded by participating governments; http://www.gbif.org/what-is-gbif

GenBank: the National Institutes of Health genetic sequence database, an annotated collection of all publicly available DNA sequences; GenBank is part of the International Nucleotide Sequence Database Collaboration; https://www.ncbi.nlm.nih.gov/genbank/

GRIN Taxonomy (USDA Germplasm Resources Information Network): http://www.ars-grin.gov/


ResearchGate: a professional network of scientists to connect and collaborate with colleagues, share publications, discuss research problems and provide a job board for scientists; https://www.researchgate.net/about
RNA-seq: RNA sequencing

U.S.D.A. United States Department of Agriculture