



COALITION FOR A SUSTAINABLE AGRICULTURAL WORKFORCE 2013 AGRICULTURAL SCIENCE WORKFORCE CENSUS

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Summary

SUMMARY

In January 2013, CSAW (Coalition for a Sustainable Agricultural Workforce) conducted (through a third party research firm) a confidential survey among CSAW member companies to better understand their projected, near-term needs for hiring domestic agricultural scientists.

Answers from the six largest responding CSAW life science companies show they expect to hire more than 1,000 domestic scientist-level FTEs between now and 2015, representing 13% of their current agricultural scientist workforce. The largest numbers of ag scientists to hire (84% of the total) are needed in the disciplines of:

- plant sciences
- plant breeding/genetics
- plant protection

Nearly half (46%) will need to hold doctoral degrees.

These companies are concerned about their ability to successfully fill this workforce need between now and 2015. In each of those three major disciplines, virtually all respondents concurred that:

- The pipeline of graduates in this discipline isn't as full as it needs to be.
- We anticipate challenges in finding quality applicants.
- We are likely to have difficulty hiring the education and experience we seek.
- We will need to retrain some hires in this discipline.

CSAW was organized by a consortium of agribusiness companies and scientific societies to promote the education and training of future generations of the agricultural workforce. These data suggest there may be both a long-term and very near-term issue in finding the skill and talent needed to ensure a sustainable agricultural enterprise.

About This Research

ABOUT THIS RESEARCH

The Coalition for a Sustainable Agricultural Workforce (CSAW, www.sustainableagworkforce.org) is a novel partnership of professional scientific societies and agricultural industry leaders formed to promote the education and training of future generations for the agricultural workforce.

To provide data much requested by policy makers regarding the scope and characteristics of future workforce needs, CSAW commissioned a confidential survey of its corporate members, to be conducted by a third-party research firm to preserve confidentiality of response. Companies were asked to provide workforce planning and development data to create a broad inventory of the future need for scientists and associated talent, and an industry-based collective perception on the upcoming availability of such talent.

The survey was developed by a CSAW steering team and Readex Research, the third-party research firm. An extensive web-based survey instrument was created, and pilot tested with two member company representatives prior to survey launch.

On January 9, 2013, emails were sent from CSAW to representatives of its 18 member companies, alerting them of the survey invitation soon to arrive from Readex, and urging participation.

On January 10, 2013, Readex sent emails on behalf of CSAW inviting the companies to complete the survey on its secure web site. Followup emails were sent to nonrespondents on January 16 and January 22. At that point a list of nonrespondents and partial respondents was provided to the CSAW steering team, and they followed up to encourage participation via a variety of means.

In April, with ten CSAW member companies having responded, Readex examined the data in hand and then followed up with the six largest life science companies (employing 97% of reported agricultural scientists) to provide missing information and confirm answers to key questions. This report is based on the responses from those six companies:

- Bayer Crop Science
- Dow Agro Sciences
- Dupont Pioneer Hi-Bred
- Dupont Crop Protection
- Monsanto
- Syngenta

Results are reported only in aggregate, to preserve the confidentiality of the companies' responses.

The survey was conducted and this report was prepared by Readex Research in accordance with accepted research standards and practices.

Findings

RESPONDENT PROFILE

The six largest responding CSAW member companies ("the companies") indicated more or less the same three primary areas of business (out of 12 options offered):

- biotechnology
- crop protection
- seed

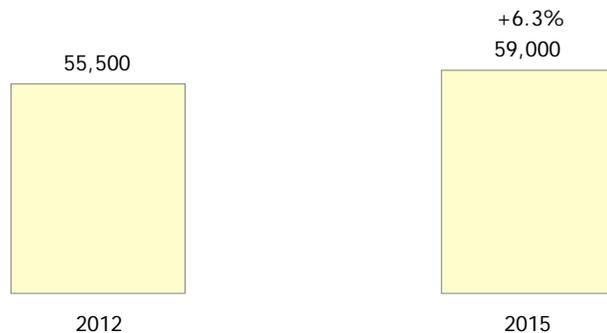
Reported 2012 worldwide ag-related revenues for each company is in the range of \$1 to \$24 billion.

GLOBAL AG-RELATED WORKFORCE

Including operations all over the world, and all types of workers, the companies reported a 2012 ag-related workforce of 55,500 FTEs (full-time equivalents). They estimate that workforce will grow by 6.3% between 2012 and 2015, to approximately 59,000.

EXHIBIT 1

Global Ag Workforce 2012 and 2015 FTEs (Full-Time Equivalents)

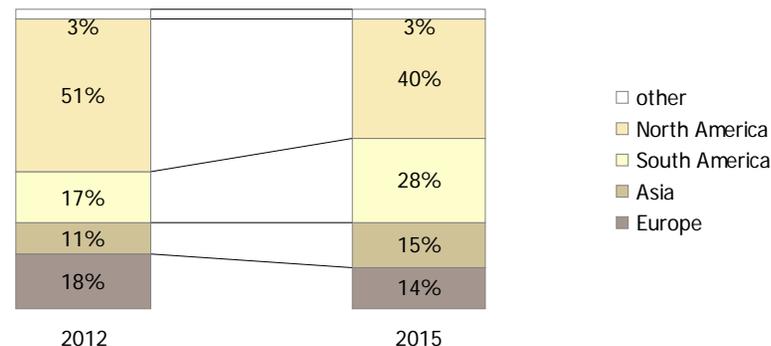


base: six largest responding CSAW companies

The companies estimate that the bulk of their 2012 ag-related workforce FTEs were located in four regions: Europe (18% of FTEs), Asia (11%), South America (17%), and North America (51%). When asked where the FTEs they plan to hire between 2012 and 2015 will be located, companies indicated that they will be hiring larger percentages in Asia (15%) and especially South America (28%), balanced by lower percentages in Europe (14%) and North America (40%).

EXHIBIT 2

Global Ag Workforce 2012 and 2015 by Region Percent of FTEs



base: six largest responding CSAW companies

Countries mentioned most often as those where companies anticipate making the greatest numbers of new ag-related hires between 2012 and 2015 include:

- Brazil
- Argentina
- China
- India
- United States

Findings

DOMESTIC AG SCIENTIST WORKFORCE NEEDS

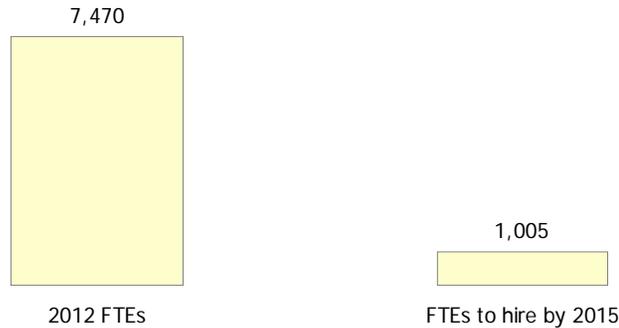
The primary focus of the workforce census was to better understand the companies' projected, near-term needs for hiring domestic agricultural scientists, defined as:

- individuals in positions which require an undergraduate or graduate college degree in agriculture or related science disciplines (for this survey, plant sciences, plant breeding/genetics, plant protection, environmental science/ecology, and regulatory science)
- working in the agriculture, food, and/or natural resources sectors
- working in the United States
- working in a "scientist-level" capacity (R&D / discovery)

The six companies reported a total of 7,470 FTEs in such positions in 2012; they expect to hire 1,005 between 2012 and 2015, representing 13% of 2012 levels.

EXHIBIT 3

Domestic Ag Scientist FTEs 2012 and 2015 FTEs (Full-Time Equivalents)



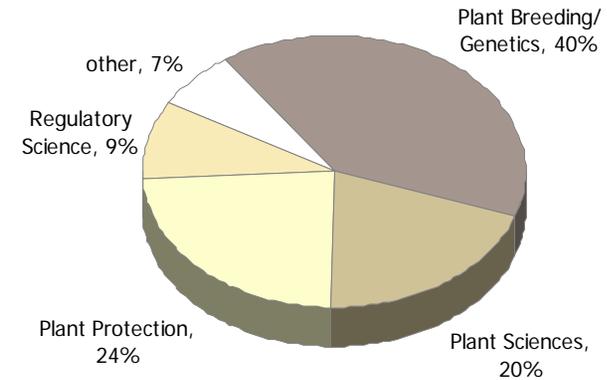
base: six largest responding CSAW companies

The largest numbers of ag scientists to hire (84% of the total) are needed in the disciplines of:

- plant sciences
- plant breeding/genetics
- plant protection

EXHIBIT 4

Domestic Ag Scientist Hires by Discipline Percentage of FTEs



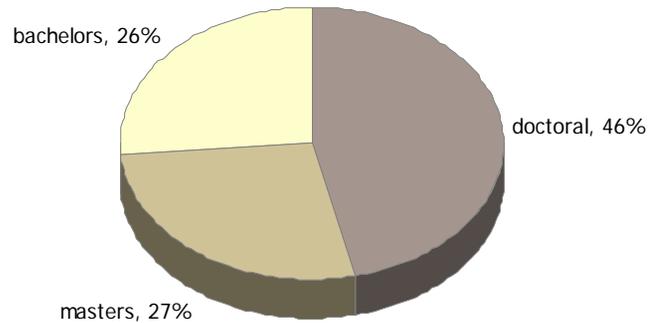
base: six largest responding CSAW companies

Findings

Nearly half of FTEs to hire (46%) will need to hold doctoral degrees.

EXHIBIT 5

Domestic Ag Scientist Hires by Academic Requirement Percentage of FTEs



base: six largest responding CSAW companies

A majority of planned hires are doctoral level in the disciplines of plant protection, environmental science/ecology, and regulatory science.

DISCIPLINE DETAILS

Plant Sciences

In the discipline of plant sciences, about a third of the anticipated ag scientist FTE hours to hire are expected to be spent in the sub-discipline of plant science/agronomy, with the remaining hours split between three other sub-disciplines: plant production, plant development, and seed technology.

EXHIBIT 6

Needed Sub-Disciplines of Planned Plant Science Hires Percentage of FTE Hours

plant science / agronomy ... broadly trained in plant production, physiology, breeding, soil sciences, whole plant physiology and seed technology	36%
plant production ... field aspects of the production of agronomic, horticultural or other cropping systems including soils	21%
plant development ... use of molecular tools and bioinformatics for understanding the growth and development of plants	26%
seed technology ... seed physiology, pathology, and biology related to seed development, production, and storage	17%
other	0%

base: 202 FTE hours to be hired in this discipline

36% of these hours will be needed from candidates at the doctoral level, 24% the masters level, and 40% the bachelors level.

Findings

Plant Breeding/Genetics

In the discipline of plant breeding/genetics, anticipated ag scientist FTE hours to hire are expected to be roughly evenly split between three sub-disciplines: plant molecular genetics, traditional plant breeding, and plant biotechnology.

EXHIBIT 7

Needed Sub-Disciplines of Planned Plant Breeding/Genetics Hires Percentage of FTE Hours

plant molecular genetics ... use of molecular tools for mapping genes for crop improvement (bioinformatics, sequencing, molecular biology)	28%
traditional plant breeding ... crossing and field evaluation of plant lines for plant improvement (production, pest / disease resistance, nutrition, drought, or other traits)	40%
plant biotechnology ... technology-based introduction of novel traits for plant improvement	32%
other	0%

base: 407 FTE hours to be hired in this discipline

47% of these hours will be needed from candidates at the doctoral level, 26% the masters level, and 27% the bachelors level.

Plant Protection

In the discipline of plant protection, about a third of anticipated ag scientist FTE hours to hire are expected to be spent in the sub-discipline of development/discovery of new and novel chemistries for crop production and protection, with the remaining hours split between seven other sub-disciplines.

EXHIBIT 8

Needed Sub-Disciplines of Planned Plant Protection Hires Percentage of FTE Hours

plant protection ... broadly trained in entomology, plant pathology and weed science; focused on practical pest, disease, and weed management	21%
disease management ... mitigating the impact of plant diseases (inclusive of nematodes) in production crops (e.g., field and greenhouse)	8%
disease biology ... understanding the biology of plant-associated microbes and their associations with plants (e.g., fungi, bacteria, viruses, nematodes) for novel approaches at the molecular level to understand the beneficial impact of microbes (e.g., symbiosis, mycorrhizae) and mitigate the impact of diseases; uses tools of molecular biology, bioinformatics, biotechnology	9%
insect management ... mitigating the impact of insect pests in production crops (e.g., field, greenhouse) and in structures	7%
insect biology ... understanding the biology of insects for novel approaches at the molecular level to mitigate the impact of insect pests; uses tools of molecular biology, bioinformatics, and biotechnology	8%
weed management ... mitigating the impact of weeds in crops (e.g., field and greenhouse)	8%
weed biology ... understanding the biology of weeds at the molecular level to mitigate their impact	4%
development / discovery of new and novel chemistries for crop production and protection	34%
other	0%

base: 244 FTE hours to be hired in this discipline

50% of these hours will be needed from candidates at the doctoral level, 31% the masters level, and 19% the bachelors level.

Findings

SPECIFIC NEEDS

For each discipline, an open-ended item asked respondents what specific scientist-level positions are particularly critical hires for their companies. Several categories received mentions from multiple companies:

- molecular biologists/geneticists, molecular biology/informatics
- ecologists, ground water ecologists, non-target ecology
- environmental chemists/toxicologists
- environmental modelers
- entomologists
- plant breeders (molecular marker experience)
- plant pathologists
- plant physiologists
- regulatory science, regulatory toxicology
- statisticians
- weed scientists

DOMESTIC AG SCIENTIST WORKFORCE CHALLENGES

The companies are concerned about their ability to successfully fill these workforce needs between 2012 and 2015. In each of the three major disciplines, virtually all rated themselves as agreeing, often strongly agreeing, with these statements:

- The pipeline of graduates in this discipline isn't as full as it needs to be.
- We anticipate challenges in finding quality applicants.
- We are likely to have difficulty hiring the education and experience we seek.
- We will need to retrain some hires in this discipline.

Asked what tactics they will use to find and recruit the best ag science talent, every company indicated taking an "all of the above" approach, with tactics planned including:

- use of headhunters / professional search firms
- hiring from other companies
- posting positions with scientific society job services
- participation in scientific society annual meeting activities for identification of potential candidates
- direct contact with university departments for upcoming graduates
- focus on key universities
- focus on individuals who receive internships / fellowships from your organization

The only planned tactic asked about that was not universally reported was "focus on global universities".

Findings

CONCLUSION

The six largest responding life science CSAW member companies estimate their global ag-related workforces (all positions) will increase by 6.3% between 2012 and 2015, while estimating that their need will be to hire 13% more US ag scientists in that same time frame.

All companies express concern about expected challenges in meeting these workforce needs, and all are planning to use a full array of tactics to make sure they can find and recruit the best ag science talent.

CSAW was organized by a consortium of agribusiness companies and scientific societies to promote the education and training of future generations of the agricultural workforce. These research results suggest there may be both a long-term and very near-term issue in finding the skill and talent needed to ensure a sustainable agricultural enterprise.