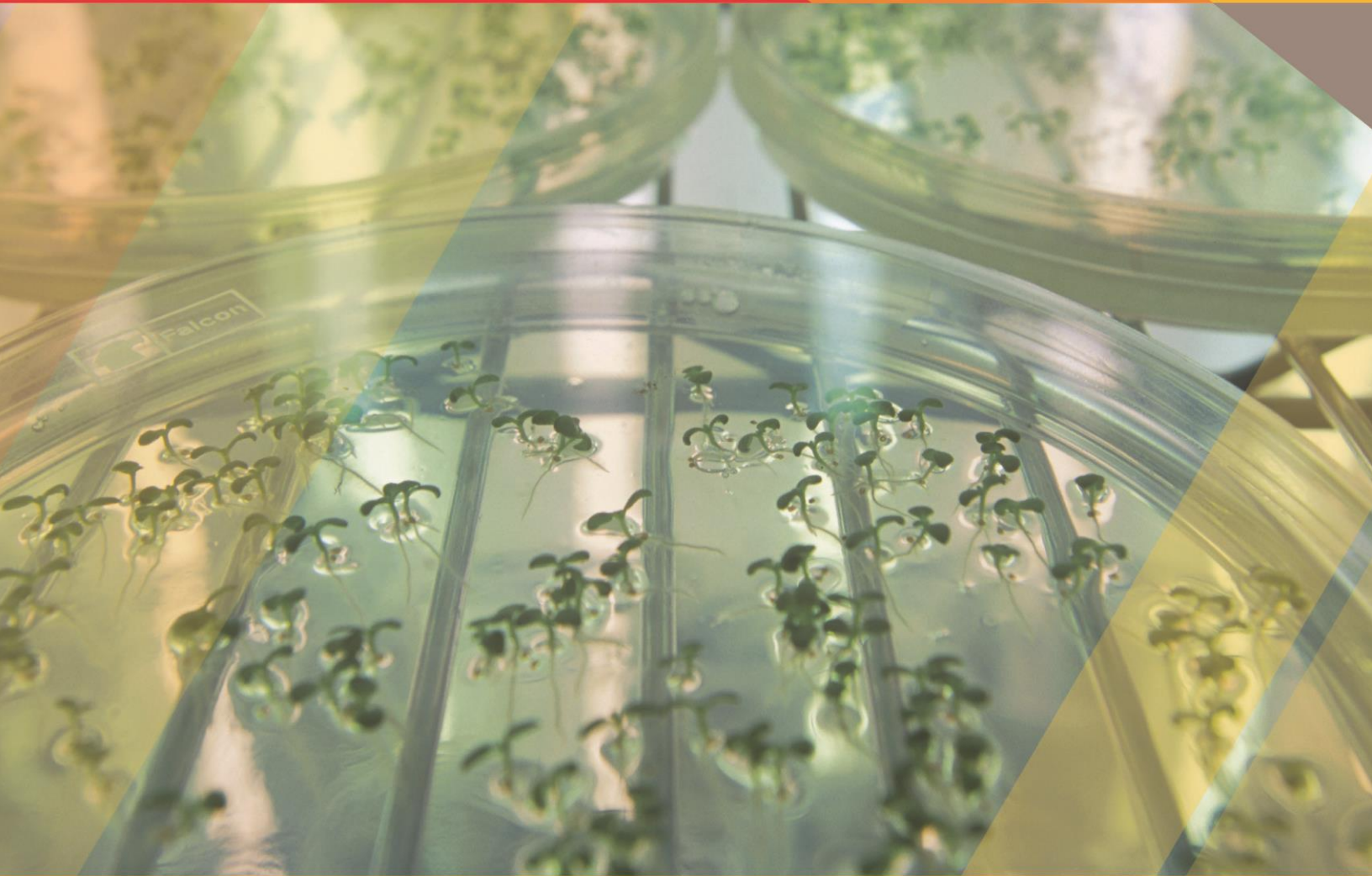


Life Sciences & Agriculture



LINCOLN PARTNERSHIP FOR ECONOMIC DEVELOPMENT
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A PROFILE OF LINCOLN'S
LIFE SCIENCES AND AGRICULTURE
INDUSTRY CLUSTER

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DEVELOPMENT

A Profile of Lincoln's Life Sciences and Agriculture Cluster



A Bureau of Business Research Report
From the University of Nebraska—Lincoln

A Profile of Lincoln's Life Sciences and Agriculture Industry Cluster

Final Report, 2017

**Prepared for the
Lincoln Partnership for Economic Development**

Prepared by: Dr. Eric Thompson

July 26, 2017
Bureau of Business Research
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A Profile of Lincoln's Life Sciences and Agriculture Cluster

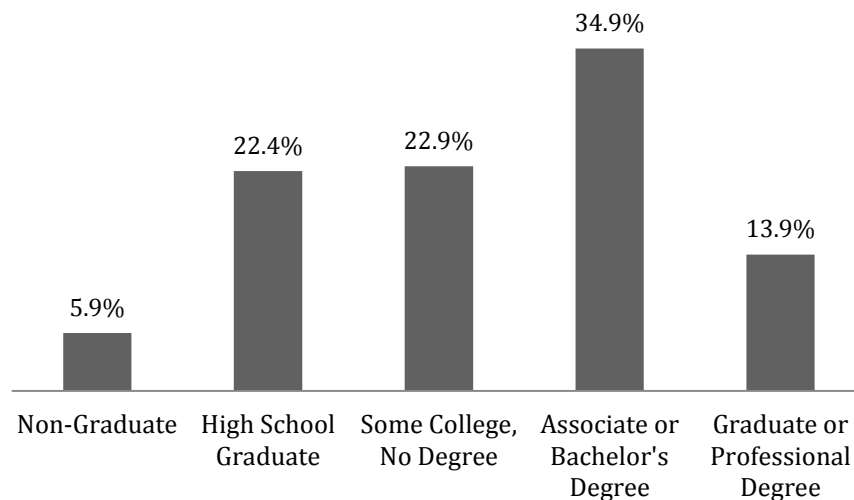
Introduction

The life sciences and agriculture sectors encompass a broad spectrum of industries and technology-partnerships, ranging from industrial-agricultural technology research to organic agriculture to final-product food processing. Life sciences is a capital-intensive, highly-technical, highly-skilled industry. Food processing is also a high-valued added agricultural industry. Lincoln, Nebraska is an ideal location for such businesses due to its highly educated workforce, low labor costs, low cost of living, low traffic congestion costs, business friendly environment, and university research facilities.

Why Lincoln?

Lincoln, a centrally-located metropolitan area of 330,000, is well positioned to cultivate this industry through its **highly educated workforce¹**, **existing agriculture-related biotech presence**, **extensive university research** and **outstanding quality of life**.

**Education Attainment, Age 25 and Over
Lincoln Metropolitan Area, 2015**



Graph 1

Lincoln offers the ambiance of a friendly small town and the amenities, attractions and entertainment opportunities of a major metropolitan area. Lincoln is both the **state capital and home to the flagship campus of the University of Nebraska**; as a result it provides a greater range of offerings than might be expected in a community of its size. Efficient transportation, a stable business environment, advanced health-care technology and an excellent educational system are just a few of the reasons why **Lincoln ranks highly in livability studies**. As described in the pages that follow, Lincoln has significant costs advantages in terms of cost-of-living, wages, space costs and other business costs. **Lincoln's strengths in agriculture and animal sciences and its research centers dedicated to food processing make the city a natural fit for the life sciences and agriculture industries. In particular Lincoln benefits from the significant food science**

¹ U.S. Census Bureau, 2015 American Community Survey (1-year Estimates), Table S1501.

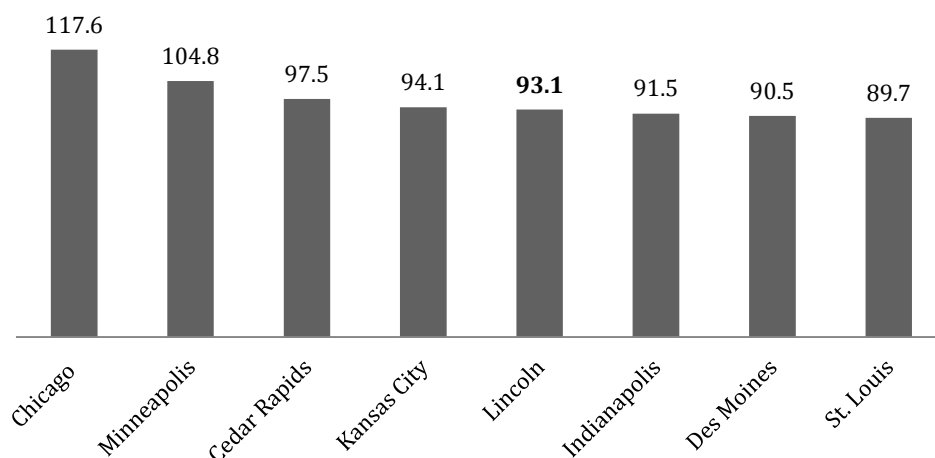
A Profile of Lincoln's Life Sciences and Agriculture Cluster

presence at the University of Nebraska-Lincoln (UNL). Areas of excellence include **bioinformatics, plant genomics, and entrepreneurship**; all central pillars of strong food processing and agriculture industries. A number of local firms stem from research conducted at UNL. In addition, **UNL graduates hundreds of agriculture, agribusiness, engineering and life sciences students per year**—individuals who are ideal professionals for the agricultural products industry.

Cost Comparisons

Lincoln's cost of living compares favorably with the comparison metropolitan areas nationwide.²

Cost of Living Composite Index, Q3 2016



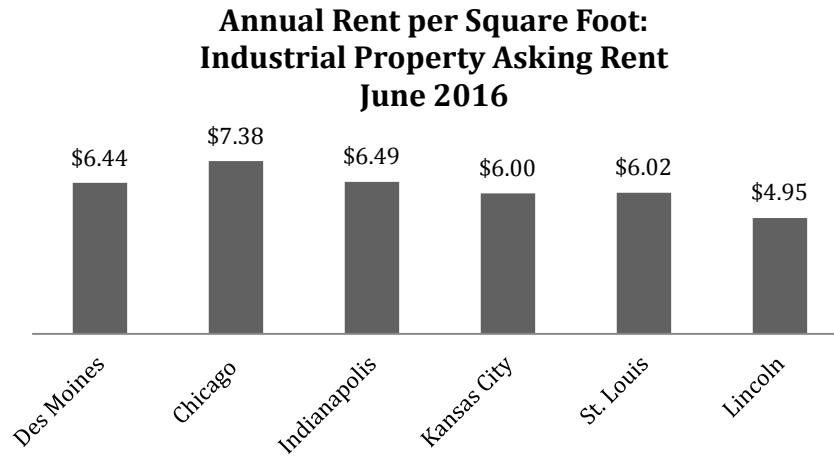
Base = 100, National Average

Graph 2

² Council for Community and Economic Research, "Cost of Living Index 3Q 2016." Published Oct. 2016.

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In addition to Lincoln's exceptional amenities and educated workforce, Lincoln has the lowest combined industrial manufacturing space costs among comparison metropolitan areas.³ Rent costs are presented below for industrial properties.



Graph 3

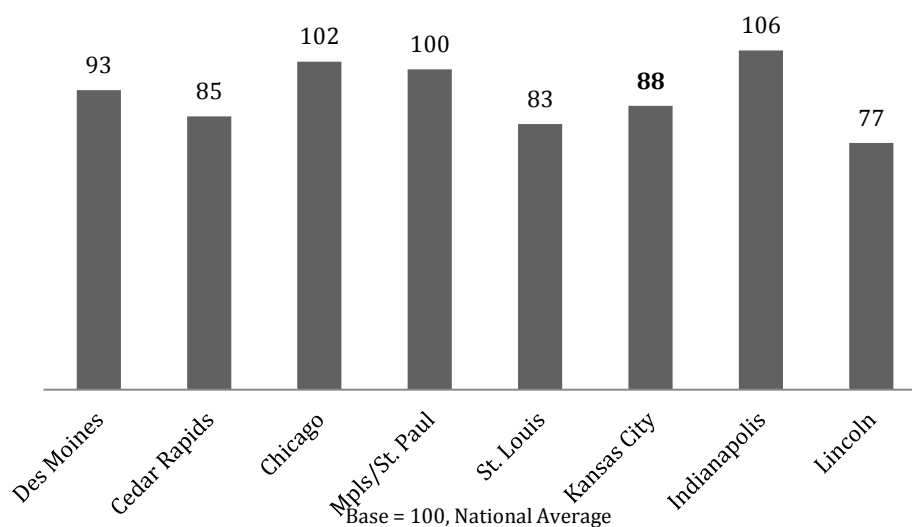
Lincoln also ranks amongst the lowest with regard to relative wage costs.⁴ This completes a perfect combination of unique amenities, low cost of living, and an attractive business environment through a highly educated workforce, and low costs of industrial space and employment. Finally, Lincoln also has truly unique access to raw materials for food processing. Nebraska and surrounding states are able to supply food processors with the raw materials that make the Midwest, and particularly Lincoln, a logical choice for locating their operations. In addition to being a large corn producing region, Nebraska counties produce much of the country's beef, wheat, soybeans, and other vital raw materials for food processing.

³ LoopNet Real Estate Research, <http://www.loopnet.com>

⁴ U.S. Bureau of Labor Statistics, Wages by Area and Occupation, May 2016, <http://www.bls.gov>.

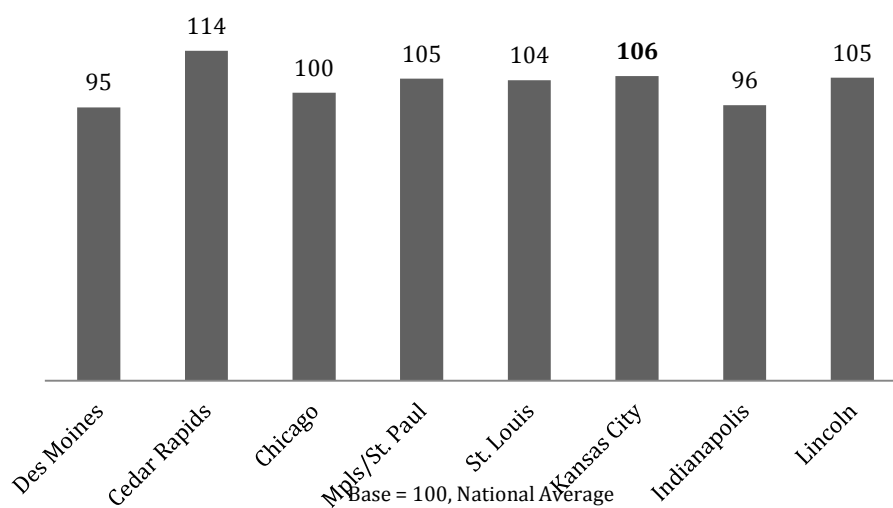
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Relative Wage for Life, Physical and Social Science Occupations, 2016



Graph 4

Relative Wages for Production Workers, 2016



Graph 5

We provide detailed salary information for selected advanced manufacturing occupations in Table 1 on the next page. The average unemployment insurance tax rate on taxable wages, average price for industrial gas per thousand cubic feet, industrial electric service typical industrial bill, and top state corporate income tax rate can be found on page 6. Lincoln is among the three lowest cost metro areas among comparison cities for average unemployment insurance tax rate, price for industrial gas, and typical industrial electric bill service rates.

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Life Sciences and Agriculture - Average Annual Salary, Lincoln MSA, Q1 2017			
Occupation	Annual Salary		
	Entry	Median	Experienced
TOTAL ALL OCCUPATIONS	\$22,310	\$36,498	\$56,762
MANAGEMENT OCCUPATIONS	\$52,468	\$85,843	\$126,177
Industrial Production Managers	\$65,490	\$94,511	\$112,091
BUSINESS AND FINANCIAL OPERATIONS OCCUPATIONS	\$35,225	\$56,087	\$75,363
Logisticians	\$47,392	\$68,526	\$82,175
ARCHITECTURE AND ENGINEERING OCCUPATIONS	\$42,967	\$66,441	\$84,871
Industrial Engineers	\$65,215	\$82,284	\$92,347
LIFE, PHYSICAL AND SOCIAL SCIENCE OCCUPATIONS	\$34,710	\$51,345	\$67,784
Chemists	\$50,208	\$71,495	\$91,696
OFFICE AND ADMINISTRATIVE SUPPORT OCCUPATIONS	\$22,669	\$32,289	\$40,873
Production, Planning, and Expediting Clerks	\$37,135	\$48,647	\$56,561
Shipping, Receiving, and Traffic Clerks	\$27,294	\$34,664	\$39,737
FARMING, FISHING, AND FORESTRY OCCUPATIONS	\$22,656	\$37,272	\$49,839
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	\$21,904	\$23,095	\$25,702
INSTALLATION, MAINTENANCE, AND REPAIR OCCUPATIONS	\$29,317	\$44,516	\$56,076
Bus and Truck Mechanics and Diesel Engine Specialists	\$32,804	\$49,213	\$57,771
Industrial Machinery Mechanics	\$39,750	\$50,860	\$57,270
PRODUCTION OCCUPATIONS	\$24,736	\$38,305	\$47,492
First-Line Supervisors of Production and Operating Workers	\$39,782	\$58,927	\$73,176
Inspectors Testers Sorters Samplers and Weighers	\$30,059	\$46,531	\$56,274
Packaging and Filling Machine Operators and Tenders	\$25,241	\$30,165	\$36,558
TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS	\$23,625	\$36,854	\$49,502
First-Line Supervisors of Trans. & Material-Moving Machine & Vehicle Operators	\$35,201	\$53,777	\$66,088
Industrial Truck and Tractor Operators	\$27,464	\$37,490	\$44,176
Source: https://networks.nebraska.gov/HistoricalDataAnalysis:Emp.andWageData,OccupationData,OccupationalWageRates(OES)			

Table 1

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Selected Business Costs for Life Sciences and Agriculture Industry						
(Three Lowest Cost Metro Areas Listed in Bold)						
Metropolitan Area[1]	Average Unemployment Insurance Tax Rate on Taxable Wages 2015 (State Average)	Right-to-Work State?	Avg. Price Industrial Gas/Thousand Cubic Feet 2015 (State Avg.)	Typical Industrial Bill, Service Rates in Effect, January 1, 2016 (City)		Top State Corporate Income[2] Tax Rate 2017
				75kW, 50mWh	1000kW, 400mWh	
Lincoln	1.26%	Yes	\$4.56	\$2,667	\$29,969	7.81%
Des Moines	1.26%	Yes	\$5.28	\$3,081	\$23,013	12.00%
Indianapolis	2.52%	Yes	\$6.36	\$3,896	\$33,161	6.25%
Kansas City	2.00%	Yes	\$7.58	\$3,681	\$36,440	6.25%
St. Louis	2.00%	Yes	\$7.58	\$3,573	\$30,409	6.25%
Minneapolis/St. Paul	1.50%	No	\$4.87	\$3,761	\$35,085	9.80%
Cedar Rapids	1.26%	Yes	\$5.28	\$3,059	\$30,709	12.00%
Chicago	3.38%	No	\$5.47	\$4,155	\$34,803	7.75%
[1] For metropolitan areas located in multiple states (Chicago, Kansas City, and Minneapolis/St. Paul), the state averages from the state where the metropolitan areas' economic activity is concentrated are utilized (Illinois, Missouri, and Minnesota, respectively).						
[2] Tax may be eligible for use of credits earned in state incentive program.						
Sources:						
A. U.S. Department of Labor Office of Unemployment Insurance Division of Fiscal and Actuarial Services (2016), Significant Measures of State Unemployment Insurance Tax Systems, Average Tax Rate, http://workforcesecurity.doleta.gov/unemploy/pdf/sigmeasuresuitaxsys15.pdf						
B. National Right to Work Legal Defense Foundation, Right to Work States, http://www.nrtw.org/right-to-work-states						
C. US Energy Information Administration, Natural Gas, for Average Industrial Price, http://www.eia.gov/dnav/ng/ng_sum_lsum_a_EPG0_PIN_DMcf_a.htm						
D. Lincoln Electric System, National Electric Rate Survey 2016, Average Price/KWH, http://www.les.com/pdf/rates/rate-survey.pdf						
E. Tax Foundation, 2017, Facts & Figures: How Does Your State Compare?, https://files.taxfoundation.org/20170320110931/TF-Facts-Figures-2017-3-20-2017.pdf						

Table 2

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Education Resources

Lincoln's Life Sciences and Agriculture sector benefits from the vast array of programs that support the development of a specialized workforce for this industry.

The University of Nebraska-Lincoln (UNL), Union College, Nebraska Wesleyan University, Concordia University, and Doane College all provide biology and chemistry programs. While UNL is certainly the backbone of agricultural and food science research and education in Lincoln, there are many institutions that offer 2-year and 4-year degree programs in this field: **Concordia College, Doane College, Nebraska Wesleyan University, Southeast Community College, and Union College.**

In 2016 alone, the colleges and universities in Lincoln graduated nearly **921 students with bachelor's degrees** in majors related to this sector, and **121 with post-graduate degrees.**

	Concordia University	Doane University	Kaplan Uni. B	Nebraska Wesleyan Uni.	Peru State	Southeast Comm. College ^A	Union College	UNL	Total
Bachelor's Degrees Awarded									
Agricultural Business and Management, General								90	50
Agricultural Economics									43
Agricultural/Biological/Biosystems Engineering									44
Agricultural Mechanization, General									27
Agriculture, General									15
Agronomy and Crop Science									49
Animal Sciences, General									95
Biochemistry			6		9	10			58
Biology/Biological Sciences, General	25	24			36	5		2	105
Chemical Engineering									32
Chemistry, General	3				1			1	14
Foods, Nutrition, and Wellness Studies, General									135
Food Science									17
Horticultural Science									18
Range Science and Management									7
Total	28	30	0	46	15	90	3	709	921
A: Associates Degrees; B: Associates and Bachelors Degrees; C: Certificate Program.									
Source: http://nces.ed.gov/collegenavigator/									

Table 3

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Post Graduate Degrees (M.A. & Ph.D.) Awarded	<i>Doane University</i>	<i>UNL</i>	Total
Agricultural Economics		9	9
Agronomy and Crop Science		26	26
Animal Sciences, General		12	12
Biochemistry		4	4
Biology/Biological Sciences, General		10	10
Chemical Engineering		2	2
Chemistry, General		22	22
Foods, Nutrition, and Wellness Studies, Gen.		19	19
Food Science		15	15
Horticultural Science		2	2
Total	0	121	121
Source: http://nces.ed.gov/collegenavigator/			

Table 4

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Research and Industry Services

The life science and agriculture industries benefit from research programs at the **University of Nebraska-Lincoln (UNL)**. UNL's extensive agricultural-research, life sciences, and food processing infrastructure include:

Agricultural Research Division (ARD)

The Agricultural Research Division is the major research agency of the University of Nebraska's Institute of Agriculture and Natural Resources and is Nebraska's Agricultural Experiment Station. ARD is part of a national network of state agricultural experiment stations at Land Grant Universities across the United States. ARD scientists make important contributions to the state's agriculture, food industries, environment, the well-being of families, and community development.

For more information, see the source of this passage: <http://ard.unl.edu>

Food Processing Center

The Food Processing Center (FPC) at UNL serves to nurture growth and retention, as well as expansion of the food processing industry in Lincoln and surrounding communities. The FPC serves both established businesses and individuals and companies looking to enter the market. In particular, the FPC helps to ensure the successful implementation of new products into the marketplace.

The FPC provides a wide range of vital services:

Business and Market Development: research and evaluation of products, pricing, distribution channels and target markets; strategy development for product introduction, marketing and promotion; and assistance with electronic commerce, expansion planning and exporting.

Product and Process Development: development of concept, prototype and product/process specifications; assistance with line extensions and reformulations, ingredient substitution and quality improvements; scale-up from bench top; and assessment of food safety regulatory issues/requirements.

Pilot Plant Services: processing of fruits and vegetables, bakery items, tortillas and chips, meat and poultry; extrusion, dehydration and packaging technologies; dairy productions and research; and protein separations, purification and scale-up.

Laboratory Services: microbiological analysis, mold isolation and identification, and shelf-life testing; analytical and rapid methods development; nutritional analysis and labeling assistance; sensory evaluation; and food allergen residue analysis.

Specialized Services: Custom Processing Network; Food Entrepreneur Assistance Program; Food Allergy Research and Resource Program; and workshops and seminars.

For more information, see the source of this passage: <http://fpc.unl.edu>

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Food Allergy Research and Resource Program (FARRP)

FARRP is a cooperative venture between the University of Nebraska and more than 80 member companies, more than 30 staff members and several graduate students. FARRP develops and provides the food industry with credible information, expert opinions, tools, and services relating to allergenic foods. FARRP also provides the agricultural biotechnology industry with credible information, expert opinions, tools, and services relating to novel foods and food ingredients including genetically modified products. FARRP's vital contribution to the food industry includes developing analytical methods for the detection of allergens in food; conducting confidential analysis for the food industry; providing training and consultation for member companies in the areas of allergens, sanitation and food safety protocols; and assisting the food industry and related companies with the regulatory aspects of allergens.

For more information, see the source of this passage: <http://www.farrp.org/>

Industrial Agricultural Products Center (IAPC)

Through this center, created in 1988, UNL scientists are researching and developing new industrial uses for biological materials. The broad mission of the IAPC is developing new markets for agricultural raw materials and new biobased products which can lead to a cleaner and safer environment. The IAPC provides testing and processing services to clients.

For more information, see the source of this passage: <http://agproducts.unl.edu>

UNL Center for Biotechnology

The Center has produced leading research on genomics, proteomics, and bioinformatics. The Center promotes research in all aspects of molecular life sciences leading to improvements in agriculture, health care and the environment. Core facilities at the Center include Bioinformatics, Genomics, Flow Cytometry, Microscopy, Plant Transformation and Proteomics & Metabolomics.

For more information, see the source of this passage: <http://www.biotech.unl.edu>

Organic Agriculture

Lincoln is home to the Organic Crop Improvement Association (OCIA) International a nonprofit member-owned organization that since 1985 has provided organic certification services to thousands of organic farmers, processors and handlers in North, Central and South America, Europe, Africa and Asia. OCIA's certification process facilitates access to numerous global organic markets including those in Japan, Central America, Europe and Canada.

OCIA also facilitates connections between farmers, researchers, consumers and decision makers, and educates organic producers and local and global communities regarding organic farming and foods. The goals of OCIA's research and education efforts include: promoting the image of organic products; identifying the needs of organic farmers and producers and facilitating the exchange on information; and supporting crop improvement and marketing efforts.

For more information, see the source of this passage: <http://www.ocia.org>

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Nebraska Innovation Campus (NIC)

Nebraska Innovation Campus (NIC) is a research campus designed to facilitate new and in-depth partnerships between the University of Nebraska-Lincoln (UNL) and private sector businesses. NIC is located adjacent to UNL, strategically providing access to research faculty, facilities and students. At full build-out, NIC will be a 2.2 million square foot campus with uniquely designed buildings and amenities that encourage people to create and transform ideas into global innovation. NIC aspires to be the most sustainable research and technology campus in the U.S.

For more information about NIC visit: <http://innovate.unl.edu/>

Engler Agribusiness Entrepreneurship Program

The Engler Agribusiness Entrepreneurship Program aims to support and encourage entrepreneurship amongst UNL students. This innovative program will facilitate entrepreneurship potential through student courses that lead to a minor, a lectureship series, entrepreneurship training camps, internship placement assistance, student travel and more. It will also help create a venture capital fund to support student startup businesses.

For more information about the Engler Entrepreneurship Program visit: <http://engler.unl.edu/>

A Profile of Lincoln's Life Sciences and Agriculture Cluster

Lincoln's Life Sciences and Agriculture Industry

Lincoln's life sciences, food processing, and agriculture industries include companies that develop and manufacture both **human and animal products**, conduct **research and testing**, produce **instruments and controls**, and provide **specialized industry-related services**. In total, Lincoln is home to dozens of life sciences, food processing, and agriculture industry firms. Many of these firms are listed below.

Note: Please check with companies for most accurate employment data.

Food Processors

AGP Pet Foods

Pet foods

<http://www.agp.com>

Archer Daniels Midland (ADM) Co.

Soybean products, specialty food ingredients, including soy meal and oil, animal feed

<http://www.admworld.com>

Archer Daniels Midland (ADM) Milling

Flour, pancake mix, corn meal

<http://www.admworld.com>

Arck Foods, Inc.

Deli Hams

<http://www.cedarhollowfoods.com>

Coffee Roaster

Roasted coffees (packaged & bulk bags)

<http://www.coffeeroasterlnk.com>

Colby Ridge Popcorn

Popcorn, caramel corn, & other flavored popcorn products

<https://www.colbyridgepopcorn.com>

ConAgra Foods - Lincoln Snacks Co.

Food products supplier

www.conagra.com

Del Gould Meats Inc.

Beef producer

www.delgouldmeats.com

Empyrean Ales Brewery

Draft and bottled small batch specialty ales and lagers.

<https://empyreanbrewingco.com>

Grama's, Inc.

Jams, jellies, fruit butters & fruit syrups

<http://www.gramasjellies.com>

Heartland Gourmet

Frozen doughs & dry baking mixes including organic line

www.heartlandgourmet.com

James Arthur Vineyards

Wine, processed & bottled

<http://www.jamesarthurvineyards.com>

Kamterter II, LLC

Proprietary product development of vegetable and flower crops; seed enhancement and coating systems; chemical dispersion systems

<http://www.kamterter.com>

Marsland Laboratories, LLC

Nutrition for high performance dogs & dogs with Arthritis or Hip Dysplasia

<http://www.amaize.com>

Meyer Natural Foods

Meat products- natural angus beef

www.meyernaturalangus.com

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Nature's Variety

Dietary & treat products for pets

www.naturesvariety.com

NC+ Hybrids

Production, research and sales of pest and herbicide-resistant agricultural seeds

www.nc-plus.com

Norland International

Design, manufacture, and sales of plastic bottles, bottled water equip, and bottled water products including private label brands

www.norlandintl.com

Land O'Lakes Purina Feed, Inc.

Liquid cattle feed (hog & cattle concentrates)

www.Landolakes.com

R U Nuts Co.

Distributor of bulk & packaged nuts, candy, snack mixes & specialty coffees

www.Runutsco.com

Sensory Effects Cereal Systems

Contract manufacturer of breakfast cereals, instant & quick-cooking food ingredient grains www.sensoryeffects.com

R&D in Life Sciences & Agriculture

AGP Grain Marketing

Agribusiness that processes, markets and transports oilseeds, grains, and related products

www.agp.com

Benchmark Biolabs

Contract vaccine, biological, and intermediates development

www.benchmarkbiolabs.com

BioStat Solutions

Provides statistical and bioinformatics expertise

www.biostatsolutions.com

Shuster's Meats

Meat & sausage products; pet foods

www.shustersmeats.com

Smithfield Foods

Ham & pork products

www.smithfield.com

Sysco

Distributor of food products

www.sysco.com

Tecumseh Poultry

Poultry processing

www.smartchicken.com

Universal Cold Storage

Cold storage & dry storage; packaging & labeling of meat products

universalpasteurization.com

Valhalla Bee Farm

Honey producer

www.valhallabeefarm.com

Channel Bio Corp.

Seed producer for agriculture

www.channel.com

Continental Conti-Tech

Nanoparticles for toxicology, encapsulation, and tissue engineering

www.contitech.us

Epicrop Technologies Inc.

Uses advanced technology to improve crop yields

www.epicrop.com

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GeneSeek, Inc.

Contract animal DNA sequencing and genotyping

www.genomics.neogen.com

GSK Consumer Healthcare, Inc.

Human OTC pharmaceuticals

www.novartis.com

Heinke Technology, Inc.

Plastic products for pharmaceutical and medical use

www.htiplastic.com

Holland Scientific

Plant canopy sensor specifically designed to measure plant biomass under any illumination condition

www.hollandscientific.com

Huffman Engineering

Engineering services firm which specializes in control system integration

www.huffmaneng.com

Huvepharma

Pharmaceutical company with a focused developing, manufacturing and marketing human and animal health products

www.huvepharma.com

Inverse Technology, Inc.

Neuromuscular and physical therapy equipment

www.protronics.com

Li-Cor, Inc.

Proteomics, genomics, environment and agricultural instruments

www.licor.com

NanoBugs, Inc.

Microbiology/Virology animated teaching flashcards

www.nanobugs.com

Nature Technology, Inc.

DNA vector design and construction

www.natx.com

Neogen

Implements animal healthcare products, food safety solutions and more

www.careers.neogen.com

Organic Crop Improvement Association

A nonprofit that provides organic certification services and access to global organic markets

www.ocia.org

Precision Machine Company, Inc.

Agricultural & animal research lab equipment

www.pmcinc.biz

Purina Mills Inc.

Producer of animal feed

www.purinamills.com

Stanley Senior Technologies, Inc.

Alarm and door monitoring systems for the health industry

www.stanleyhealthcare.com

Teledyne ISCO, Inc.

Environmental monitoring and chemical analysis instruments

www.isco.com

Zoetis

Veterinary and animal health pharmaceuticals

www.zoetis.com