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**Agriculture Task Force Report
Findings and Recommendations**

Illinois Workforce Investment Board
Agriculture Task Force

November 30, 2009

I. Introduction

The Illinois Workforce Investment Board (IWIB) established the Agriculture Task Force in December 2008 to develop recommendations for addressing workforce development needs in the agriculture sector in Illinois. The Task Force was asked to identify major education and workforce development issues and challenges in the agriculture sector, and make recommendations for improving the agriculture workforce in Illinois.

This report summarizes the major findings and recommendations of the Agriculture Task Force. The first section provides information on the work of the task force including membership, meetings, and the major issues addressed. The second section defines the agriculture sector in Illinois in the context of the national Agriculture and Natural Resources Career Cluster Framework. The third section addresses how future education and workforce initiatives must be part of a larger set of economic development strategies to promote the growth of the agriculture sector in Illinois. The final section summarizes major findings and recommendations and suggests immediate projects that could be undertaken to address these findings and recommendations.

II. Background

The Agriculture Task Force was chaired by IWIB member Larry Walsh, CEO of the Will County Board and Chris Merrett, Director, Illinois Institute for Rural Affairs at Western Illinois University. The task force included representatives from the agriculture industry and universities, community colleges, and K-12 education as well as state education, workforce development and economic development agencies. The task force members are listed in Appendix A.

The task force met seven times between March and November 2009 and held a conference call in November 2009, to review the final draft report submitted to the IWIB at the December 2009 IWIB meeting. The first two Task Force meetings focused on defining the agriculture sector and scope of the task force work as well as defining the major issues to be addressed. The remaining task force meetings focused on developing recommendations for each issue, identifying high-priority short-term projects to implement these recommendations and reviewing drafts of the final report.

III. Agriculture Education and Workforce Development in Illinois

The agriculture sector is a large and diverse economic sector that is critical to the future growth and development of the Illinois economy. As defined by the IWIB Agriculture Task Force, this sector includes agricultural production, food manufacturing and related types of manufacturing that use agricultural feedstocks to produce bio-fuels, chemicals and

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materials. This sector also includes the transportation and distribution of agricultural products as well as the packaging and distribution of value-added agricultural products to end-use customers. Agricultural production and distribution includes large-scale commodity products, horticulture products, local and organic food products, which are distributed through local, regional, national, and international food systems. The agriculture sector also includes related agri-business services as well as research and technical services to support production, manufacturing, and distribution. Finally, this sector includes related conservation, environmental services, and natural resource management.

As presented by the Agriculture and Natural Resources Career Cluster Framework in Appendix B, the agriculture sector in Illinois must draw from a broad education and workforce development pipeline. This pipeline must include secondary and postsecondary programs in six major career pathways ranging from agri-business to natural resource management. The Agriculture Task Force believes that Illinois must develop comprehensive education, and workforce development initiatives for all six major career pathway areas. However, given time constraints, the Task Force focused most of its attention on those career pathways that had major implications for three critical segments of the industry—commodity production, horticulture, as well as local and regional food systems. Natural resource management was not directly addressed by the Task Force.

IV. Promoting Agriculture in Illinois

The Agriculture Task Force believes that maintaining a competitive workforce is one of the most important strategies for promoting the growth and competitiveness of the agriculture sector in Illinois. However, current and future agriculture education and workforce initiatives, including those recommended in this report, will only be effective if they are part of a larger set of economic development strategies. This larger set of economic development strategies should minimally address the following:

- Public Image of Agriculture. The general public in Illinois does not have a complete understanding of the role and scope of the agriculture sector in the Illinois economy. This includes how business entrepreneurship and science and technological innovations are creating new career opportunities, while improving the quality of life for Illinois residents. This lack of understanding undercuts public support for economic development initiatives to support agriculture as well as education and workforce development initiatives that attempt to attract more students and workers to pursue careers in this sector. Illinois must expand current efforts to improve the public image of the agriculture sector.
- Business Entrepreneurship and Financing. Illinois must develop new strategies to promote the startup and development of farming operations and related agri-businesses. One critical need is expanding access to capital and business financing, especially for farmers and small to mid-sized agri-businesses. Illinois must expand

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access to financing as part of more comprehensive business entrepreneurship programs. This should include education, training, business and technical expertise, as well as access to other resources.

- Business Incentives and Regulations. Illinois also must take immediate steps to improve the overall business investment environment for agriculture by revising incentives and regulations to ensure that Illinois remains competitive with other states and countries. Illinois needs to look at reforming, reducing, or removing legal, regulatory, and tax disincentives relative to other states or jurisdictions in order to create comparative advantages for agricultural investors and entrepreneurs to better compete with other states. Illinois also should convene inter-agency and public-private working groups to streamline and harmonize the multiplicity of local, state, and federal regulations that hinder farmers and food entrepreneurs while continuing to protect public health and safety.
- Research and Innovation. In order to remain globally competitive, Illinois must maintain its leadership in agriculture research and development at our major universities, federal laboratories, and agricultural businesses. This will require the maintenance and expansion of state research and development funding programs, such as Illinois Council on Food and Agricultural Research (C-FAR) program; the programs are now being threatened by state budget problems. It also will require the strengthening and expansion of broader public-private partnerships to open collaborative networks which engage a larger community of researchers, practitioners, and customers in promoting agricultural innovation throughout the state.
- Transportation, Distribution, and Broadband Infrastructure. The Illinois agriculture sector requires a strong statewide transportation, distribution and broadband infrastructure to remain competitive. Illinois' position as a global center of agriculture must be preserved by maintaining its investments in physical infrastructure and promoting the competitiveness of the transportation and logistics sector. This serves the agriculture industry through the export of large-scale commodity products as well as distribution within local and regional food systems. A strong broadband infrastructure is critical in harnessing the power of information technology throughout the agricultural sector.
- Education Infrastructure. Agriculture education and workforce development programs rely on a strong overall education infrastructure. Illinois must maintain a strong secondary and postsecondary education infrastructure by maintaining and increasing educational funding.
- Value-Added Agriculture. Illinois must expand opportunities for agriculture to capture a larger share of the revenue across the entire value chain of the sector. This includes products and services in the traditional segments, as well as those in new and emerging segments. This includes, but is not limited to, traditional production agriculture, research and development, biotechnology, food processing

and manufacturing, distribution, local and regional foods, renewable energy, nursery, and agritourism.

- Green and Sustainable Agriculture. Illinois must become a leader in green and sustainable agriculture. Recognizing Illinois' leading role in commodity agriculture to meet expanding local and world food and industrial product needs, Illinois must continue to build on its significant record of soil, water, and farmland conservation by more widely implementing best management practices and by creating new approaches to achieve a more sustainable agriculture sector in Illinois. This should also be done in horticulture. Growers, landscape designers and contractors, irrigation specialists and garden centers already produce and offer green products and services with a passion and expertise that drive the state's landscaping industry. As the original green industry, these individuals, businesses and organizations rely on trees, plants, and water to make a viable living and have long embraced their responsibility to be good stewards of our natural resources. They welcome and seek out the newest emerging green technologies and practices to ensure they remain productive, responsible and efficient. As the green industry grows, innovative partnerships and technologies will surface that require a statewide proactive approach with regards to agriculture. The development of a comprehensive, intrastate food production and distribution system holds much promise. It has the potential to expand markets for organic and locally grown products, providing an abundant supply of food such as fresh fruits and vegetables for consumers, a diversified source of income for farmers and greater economic prosperity for rural communities. Sustainable agriculture has the potential to address a variety of environmental issues.

The remainder of this report will focus on education and workforce strategies as well as their linkages to many of these broader economic development priorities.

V. Findings and Recommendations

Integrating Business Entrepreneurship and Workforce Development

The Agriculture Task Force believes that Illinois must develop new strategies to promote the startup and development of farming operations and related agri-businesses that include a stronger focus on education and workforce development. Illinois will need to expand the new generation of entrepreneurs in the agriculture sector to: 1) replace retiring farmers, agri-business and horticulture owners, and managers; 2) significantly expand the number and scale of local and regional food system operations throughout the

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state. This will require improved coordination of entrepreneurship and workforce development initiatives at all stages of business development across all segments of the agriculture industry including horticulture, commodity and value-added agriculture, as well as local and regional food systems.

All sectors of Illinois agriculture are facing imminent transfer of ownership and management of production operations and small firms, due to demographic trends in the industry. As an example, the Illinois Green Industry Association, there will be a major turnover in the ownership and management of Illinois horticultural companies over the next 5 to 10 years as the Baby Boom generation retires. These new owners and managers will likely need stronger business and entrepreneurship skills to manage modern horticultural operations in a rapidly changing, highly competitive marketplace. The Illinois Green Industry Association also sees the need for expanded education and training opportunities for existing and entering owners and managers. These business and entrepreneurship skills will complement their strong technical training in plant sciences or related areas.

The Vision for Illinois Agriculture (VIA) has recognized the need to attract and develop more entrepreneurs to replace an aging workforce, and drive future innovation. This will benefit commodity and value-added agriculture, food manufacturing, and other segments of the agriculture sector in Illinois. One major component of the VIA Smart Agenda is ensuring a framework of support for business startups to translate innovation into economic activity. The Smart Agenda recommends that Illinois develop a stronger “ecosystem of people, capital, and organizations, including a competitive package of support programs for science-based startups, so that Illinois can consistently translate its above average research capabilities into commercially viable new businesses and keep them here.” These support programs must address access to venture capital, markets, and business and entrepreneurship training and support stages of development. One example support program that provides many of these elements is the PROPEL program operated by the Illinois Biotechnology Industry Organization (iBIO). This program is designed to increase the number of life sciences start-ups in Illinois as well as boost the success rates of existing companies. Other examples are the efforts of the Illinois Finance Authority, the Treasurer’s Office (Cultivate Illinois), and others to expand access to capital for farmers attempting to start or expand farming and related agri-business operations in Illinois.

Finally, the Illinois Local and Organic Food and Farm Task Force recently reported to the Illinois General Assembly that Illinois must produce over 7,500 additional farmers and other local and regional foods infrastructure entrepreneurs by 2020 to realize the full potential of local and regional food systems in Illinois. These local and regional food systems require business entrepreneurs to play a variety of roles in production, aggregation, storage, processing, packaging, and distribution. To produce successful

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entrepreneurs, Illinois must establish comprehensive support structures that provide stronger business and entrepreneurship education and training opportunities along with technical training. This support structure should address the policy framework for entrepreneurship, including reduction of regulatory barriers that discourage the entry of new entrepreneurs and impede growth of food and farm businesses. This support structure also should address other barriers to entrepreneurship including access to financing, markets, land (affordable land in smaller acreages), equipment, technical assistance, and peer mentoring. This support structure should include a major focus on farmer-to-farmer training and providing access to farmland, such as programs like Prairie Farmer's "Cultivating Master Farmers" program which pairs young and master farmers. It also should include business development centers and incubators, and collaborative networks of professionals that are linked with agriculture education programs at universities and community colleges. It should draw and build on leading models in Illinois such as Stateline and Central Illinois Farm Beginnings, Prairie Crossing Farm Business Development Center, Angelic Organics Farm and Learning Center, Windy City Harvest and the Collaborative Regional Alliance for Farmer Training (CRAFT). National and regional models such as the Sirolli Institute's regional enterprise facilitation networks and the Driftless Region Co-Op can act as guides. It should include expanded efforts to attract young entrepreneurs as well as at-risk youth with programs like the Roots & Wings youth leadership and urban agriculture network in Rockford, the Chicago Botanic Gardens Green Youth Farm Program and the Prairie Farm Corps. Finally, it should leverage existing resources and expertise in the existing Illinois entrepreneurship and small business development network, as well as the University of Illinois Extension network.

In summary, Illinois must take immediate steps to integrate entrepreneurship and workforce development programs under a comprehensive support structure for entrepreneurs in the agriculture sector. This support structure must be linked to and leverage the existing Illinois entrepreneurship and small business network administered through the Illinois Department of Commerce and Economic Opportunity and its partners. This support structure should provide current and future entrepreneurs at each stage of business development from early exploration of entrepreneurship opportunities with mentors, to pre-start-up planning and training to first year startup thru the 2-5 years of operation. Finally, this support structure should provide ongoing professional development, mentoring, and exchange opportunities for agricultural entrepreneurs including owners and managers to continue to develop their businesses.

Recommendations

- Incorporate stronger business and entrepreneurship components into secondary and post-secondary agriculture education programs, and related programs such as 4-H, FFA, Collegiate FFA, and PAS (Postsecondary Ag Students Organization).

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- Provide after-school and summer urban, peri-urban, and rural sustainable agriculture programs operated by community based organizations in cooperation with urban and rural school districts to introduce at-risk youth to the agriculture field, while giving them exposure to local food systems, entrepreneurship activities and youth development activities.
- Expand access to business training for new owners and managers across the agriculture sector, including the horticulture industry, in cooperation with industry associations, education, and other stakeholders
- Increase the number of internship and mentorship programs that can improve the transition of future entrepreneurs from education to industry
- Expand regional farmer alliances that can provide farmer-to-farmer training and mentoring, as well as business development centers and incubators
- Promote the expansion of business development centers, incubators, regional enterprise facilitation networks and additional collaborative networks of peers and experts that are linked with agriculture education programs with strong entrepreneurship components at universities and community colleges. This includes promoting models tailored to small food-related businesses serving local and organic markets.
- Improve the integration of these programs and resources under more comprehensive entrepreneurship support networks including the existing Illinois entrepreneurship and small business development network that integrate entrepreneurship and workforce development

Expanding STEM and Innovation Talent

The Agriculture Task Force believes that Illinois must maintain its leadership in agriculture research and development at our major universities, federal laboratories, and agricultural businesses by reversing the state's trend of disinvestment in agricultural research, education, and extension and launching renewed efforts to attract, develop, and retain the top science, technology, engineering, and mathematics (STEM) talent in the world. However, this will not be enough. Illinois must also strengthen the STEM and innovation talent base to support a more comprehensive and open innovation system. This system should fully engage customers, business managers, and workers at all levels to drive and support innovation within the agriculture sector. In particular, it must expand the role of farmers and other front-line agriculture professionals in this new innovation system.

Illinois has a strong research and development infrastructure at our leading universities, federal laboratories, and agricultural businesses that must be maintained and expanded. According to the College of Agricultural, Consumer and Environmental Sciences (ACES), Annual Report (FY 09), page 2: "Among the programs cited by the Chronicle of Higher Education in its ranking of "Top Research Universities in the 2007 Faculty Scholarly

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Productivity Index," the University of Illinois ranked 2nd in animal sciences, 4th in food sciences, 5th in agronomy and crop sciences, and 8th in agricultural economics." The Department of Agricultural and Biological Engineering has consistently been ranked as the premier department of its kind in the nation. One example the University uses to expand access to agricultural curriculum is through a series of summer programs offered for high school students from under-served and economically disadvantaged groups. The Research Apprenticeship Program (RAP) has two phases. RAP-1 consists of an intensive summer career exploration and academic enrichment experience for high school freshman and sophomores, related to career pathways in agricultural, food, human, and environmental science fields. RAP-II is an intensive seven-week laboratory and academic enrichment experience for juniors and seniors with interests in further exploring careers in the food, human and environmental sciences. The Young Scholars Program is a summer and first-year academic experience provided for incoming ACES students from groups that have traditionally been under-served in the math and sciences fields. However, to build upon this level of excellence, expanded federal and state support for research and development as well as technology transfer such as provided by University of Illinois Extension must occur. According to the College of ACES Annual Report (FY 09), page 25: "... the state investment in the Illinois Agricultural Experiment Station ranked 24th in the nation. In our geographical region Illinois lags behind Indiana, Minnesota, Nebraska, Wisconsin, Michigan, Kansas, Iowa, Ohio, and Missouri, in state funding for agricultural research, despite being second in the region for aggregate agricultural output and first in the region in population and size of the state's economy." It will also require new strategies to maintain the top (STEM) and innovation talent in the world. Illinois, like other states, is projected to face major shortages in agricultural scientists and related technicians. Illinois must take immediate actions to attract, develop and retain agricultural scientists and related technicians in critical research fields. This will require stronger K-12 STEM foundations and P-20 education pipeline linkages that will lead more Illinois students into advanced STEM-related postsecondary agriculture programs.

Illinois also must expand the traditional research, development, and technology transfer model in agriculture to stimulate the engagement of more public and private partners. In the future, agricultural innovation will occur at the intersection of a wide variety of organizations and individuals who are engaged in open collaborative networks. Illinois already has taken major strides in engaging partners through a variety of initiatives including C-FAR. However, the state now must take further steps to develop a more comprehensive and open innovation system that is based on a more diverse public-private network of organizations, enterprises, and individuals. This needs to focus on bringing new products, services, processes, and business models into the agriculture sector. These changes will require supporting innovative farmers, farm enterprises, and farmer associations throughout the state, and linking them within these open collaborative networks. Illinois also must extend these innovation opportunities to secondary students. One model for this is the Innovation Talent Project in which government agencies, non-

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profit organizations and businesses presented innovation challenges to student teams. Many of these challenges were presented by businesses from the agriculture sector.

Illinois must take immediate actions to build and support these new types of open innovation systems by creating a new generation of agriculture innovators, able to drive innovation at all levels including front-line workers. This will require new efforts to build stronger STEM and innovation skills in the current and future agricultural workforce. It should include skills in using innovation and continuous improvement systems and tools at all levels.

Recommendations:

- Expand access and participation in all STEM-related secondary and postsecondary programs.
- Build stronger STEM and innovation components into all agriculture programs at the secondary and postsecondary levels.
- Provide professional development opportunities for existing workers at all levels to drive and support innovation in their organizations.
- Broaden engagement and capacity of public and private partners to directly participate in agriculture research and innovation including those community colleges, universities, and farmer-to-farmer networks operating business incubator programs.
- Build the capacity and skills of innovative local foods farmers to engage directly in open collaborative innovation networks to learn from each other and assist beginning farmers throughout the state.

Improving Performance of the P-20 Education Pipeline

Future efforts to integrate stronger entrepreneurship, STEM and innovation components into secondary and postsecondary components must be part of a more comprehensive effort to improve the performance of the overall P-20 education pipeline in meeting the workforce needs of the agriculture sector in Illinois.

Illinois has established a strong P-20 education pipeline that has reached over 500,000 K-12 students to improve their agricultural literacy. Also it has expanded their awareness of and access to a wide range of educational programs as well as careers throughout the state. The result is significant secondary agriculture education enrollment at most high schools that has remained relatively stable over the last decade. About 50 percent of Illinois high schools have Agriculture programs (319/672), predominately in rural settings. Overall, around 5% (4.2%) of Illinois high school students are enrolled in an agriculture curriculum. Over 25,000 students are taking multiple course sequences in areas of study

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such as agricultural business and management, agriculture science, and natural resource conservation and management. The agriculture education partnerships in Illinois have established a number of statewide initiatives to increase K-12 enrollments. They have also developed many new programs such as urban agriculture along with new curriculum updates. Also, resources to address new career and educational opportunities in the agriculture sector have been developed. Finally, they have launched efforts to address the need for more secondary agriculture teachers.

These initiatives at the secondary education level have been complemented by promising postsecondary education initiatives to maintain or expand educational opportunities at community colleges and public universities. Many community colleges, such as John Wood Community College and College of Lake County, are expanding programs for local and regional food production and distribution. Also, they are exploring regional agreements with other colleges and partnerships with universities to expand access to agriculture programs in Illinois including the new ACES ACCESS initiative with the University of Illinois.

Universities also are exploring new approaches to attract and retain students including new partnerships with community colleges that allow direct entry into upper level university programs. To complement the agricultural education pipeline from K-12 is the need to attract promising students who have interests in science, mathematics, engineering, and other disciplines of higher learning into the agricultural sciences and related professional fields.

Illinois should now take a closer look at many of these initiatives within an overall P-20 pipeline analysis to explore how well the overall educational pipeline is performing to meet the needs of the agriculture sector in Illinois. This pipeline analysis should be based on the national Agriculture and Natural Resources career cluster framework as well as the Illinois programs within each pathway as represented in Appendix B.

Illinois should focus this pipeline analysis on key points of transition from secondary to postsecondary education and the workforce. It should also address the demographic and educational profiles of agriculture students compared to other students at the secondary and postsecondary levels. The success of these programs in enrolling and retaining the top student talent throughout the Illinois, including women and minorities should be analyzed. This analysis also should address how innovative secondary and postsecondary partnership can expand the capacity and performance of the pipeline. This includes dual enrollment and dual credit, credit transfer, regional partnerships, and alternative delivery systems such as blended on-line learning. These programs should utilize model cooperative efforts such as the University of Illinois/John Wood Community College model at the Orr Center, where research and education come together to provide taxpayers the best bang for their buck. With the Agronomy and Animal Sciences research units of the

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University of Illinois and the Ag Education center brought by John Wood Community College, the blending of research and education under one roof and at the same site, provides unique synergies as a center maximizing basic and applied research with education and training to deliver the latest results and information through to the classroom in a seamless fashion. Likewise, utilization of facilities, equipment, and infrastructure are maximized for the public. Another model cooperative effort that should be explored is the ACES ACCESS initiative. ACES ACCESS is a new collaborative initiative between the University of Illinois and participating community colleges where agricultural science foundation courses taught by the University of Illinois professors are offered using distance education technologies to community college students. Community colleges offer ACES ACCESS courses through their regular registration process and students pay the standard tuition rate of their home institution and earn course credit from their home community college. These types of collaborative efforts should be fully supported and utilized as models for the state's educational system and workforce development training.

Recommendations:

- Conduct a statewide P-20 educational pipeline analysis based on the national career clusters framework that measures pipeline capacity and performance at key points of transition: entry into secondary programs, transition to postsecondary education, and employment in the agricultural sector. This should address the cross-section of students at all levels we are attracting in agriculture education and the agriculture sector and we are attracting the top student talent including women and minorities.
- Explore innovative ways to expand the capacity of postsecondary education through innovative delivery and partnerships including regional partnerships, dual enrollment, and new delivery systems.

Expanding Access for Non-Traditional Populations

Because of changing statewide demographics and the growing skill requirements of jobs in the agriculture sector, Illinois must explore new approaches to engage more non-traditional adult students in postsecondary agriculture programs. A particular focus should be low-income populations that have traditionally faced academic and economic barriers to postsecondary education. Illinois, like other states, is growing older and must now rely more on adult workers who have already left secondary education to fill many of its critical skill shortages. Many of these adult workers do not have the skills to enter postsecondary education without academic remediation. Also, many have entered and left postsecondary education without completing a program to gain the necessary skills to enter critical shortage occupations in key sectors. Some adult workers are displaced from other sectors and do not have awareness of agricultural careers. Other adult workers have extensive work experience in critical sectors but do not have the opportunities to pursue career

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opportunities beyond unskilled, entry-level jobs. This is especially true for immigrant populations who face multiple barriers to careers and postsecondary education.

The agriculture sector, like other key sectors in Illinois, must launch major initiatives to expand career opportunities to low-income, low-skilled adults including immigrant and migrant worker populations in all major agriculture career pathways. As with other sector initiatives in Illinois and the Shifting Gears Initiative, this effort should focus on developing agricultural bridge programs that can provide career guidance, academic remediation and technical training. These bridge programs should be designed to allow entry into agricultural career pathway programs at community colleges and universities such as horticulture or local and regional food production as well as WIA (Workforce Investment Act) -funded certificate programs. As an example, the Windy City Harvest program offered at the City Colleges of Chicago Arturo Velasquez Institute (Daley College) is a WIA approved certificate program in sustainable urban horticulture focusing on local, sustainable food systems for at- risk young adults. Related programs such as the Growing Home program and Cook County Boot Camp Garden program should be further developed as alternative bridge program models. For youth, there are programs such as Roots & Wings, which provide in-school and out-of school youth and young adults with exposure to urban farming, academic assistance, and 'green' jobs. Historically, 4-H and FFA programs have long engaged young people in science learning, including areas such as animal science, food science, plant science, and agricultural technology. Nationally, 4-H has committed to a goal of preparing 1 million additional young people to excel in science, engineering, and technology by 2013. Illinois' "4-H After-School Programs" are organized in partnership with schools and other community based organizations to improve the quality and quantity of after-school programs. Also unique to Illinois, the Chicago High School for Agricultural Sciences was founded in 1985 with an ambitious mission – to create a college preparatory high school that educated urban students for professions and careers in agriculture. Bridge programs should also provide greater access for low-income, low-skilled populations, especially immigrant and migrant worker populations to enter entrepreneurship programs

Recommendations:

- Develop and pilot test agricultural bridge programs for expanding access to postsecondary agriculture programs
- Coordinate the implementation of these agriculture bridge programs with entrepreneurship programs to expand access to business opportunities.

Expanding Career Awareness and Outreach Initiatives

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As noted earlier, Illinois has established a strong P-20 education pipeline that has been successful in enrolling thousands of students at the secondary and postsecondary levels. However, Illinois will face major challenges in the future in maintaining these enrollment levels, reaching more minorities and women, attracting more of the top STEM talent, and engaging non-traditional adult populations without exploring new approaches in career awareness and outreach at the state and regional levels.

Illinois has a wide variety of promising career awareness and outreach initiatives at the secondary and postsecondary levels. The task force reviewed some of these initiatives including studies by Illinois State University and the University of Illinois. In addition, Illinois workNet™ is now engaging industry partners in promoting agriculture careers and education programs to a broader population throughout the state. Illinois must now take steps to better integrate and coordinate these efforts at the state and regional levels to improve enrollments in all major agriculture career pathways. Illinois should develop and pilot-test comprehensive career awareness and outreach campaigns in one or more regions. This will allow evaluation of innovative approaches to reaching a wide variety of targeted populations. The findings from these regional efforts can be used to scale up larger statewide efforts.

Recommendations:

- Expand access to information on career and education opportunities through Illinois workNet™.
- Develop comprehensive and innovative approaches to career awareness and outreach and pilot-test these approaches in one or more regions.

VI. Conclusions and Next Steps

Agriculture is a large, diverse economic sector that is critical to the future growth and development of the Illinois economy as well as the quality of life of Illinois citizens. The Agriculture Task Force believes that Illinois must develop a comprehensive economic development strategy to promote the growth and competitiveness of the agriculture sector. One major component of this plan should be maintaining a competitive workforce. But, Illinois must do more. As presented in this report, Illinois must take immediate steps to improve the public image of agriculture, promote business entrepreneurship and improve access to business financing, and reshape business incentives and regulations to support agriculture. Illinois must maintain its leadership in agriculture research and development at our major universities, federal laboratories, and agricultural businesses by reversing the state's trend of disinvestment in agricultural research, education, and extension including the C-FAR program. Illinois must maintain a strong transportation, distribution and broadband infrastructure as well as maintain a strong commitment to

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education funding at the secondary and postsecondary levels. Illinois also must explore new approaches to expand value-added agriculture and green and sustainable agriculture.

In developing a competitive agriculture workforce, the Agricultural Task Force recommends focusing on five major priorities. First, the task force recommends strengthening the linkage between business entrepreneurship and workforce development programs. Second, it recommends expanding STEM and innovation talent. Third, it recommends that Illinois take immediate steps to improve the overall performance of the P-20 education pipeline by conducting a comprehensive baseline analysis and exploring innovative ways to expand postsecondary education capacity. Fourth, the task force recommends expanding access to non-traditional populations through agriculture bridge programs. Finally, the Task Force recommends expanding career awareness and outreach initiatives throughout the state.

Many of these recommendations will require a long-term view and will take multiple years to plan and implement. Illinois should launch some targeted short-term initiatives to gain broader support for these recommendations and show immediate results. In particular, the Task Force recommends that Illinois take immediate steps to launch short-term projects that:

- Expand local food programs at community colleges and non-profit regional and community-based organizations with stronger business entrepreneurship components including business incubators and related entrepreneurial supports.
- Develop and pilot-test a series of innovation talent projects that engage secondary and postsecondary students and agricultural practitioners in addressing agriculture problems within open collaborative networks
- Develop and pilot-test a variety of agriculture bridge program models that expand access to low-income and low-skilled adults including immigrants and migrant workers, particularly involving local partnerships between community colleges and community non-profit organizations.
- Further develop and promote after-school and summer urban, peri-urban, and rural agriculture programs in cooperation with school districts to introduce non-traditional youth, including those at-risk to agriculture careers.
- Conduct a comprehensive P-20 baseline analysis with a focus on identifying opportunities and leading models for improving the P-20 pipeline performance and encouraging more students to enter agriculture careers.
- Develop and pilot a regional career awareness and engagement initiative in one region in Illinois and evaluate its impact on reaching various targeted populations

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These six targeted initiatives will provide valuable opportunities to engage major public and private stakeholders in addressing all five workforce development priorities recommended in this report.

Appendix A---Agriculture Task Force Members

Co-Chair—Larry Walsh, Will County Executive, Illinois Workforce Investment Board

Co-Chair—Dr. Christopher Merrett, Director, Illinois Institute for Rural Affairs, Western Illinois University

Dave Bender, Illinois Green Industry Association

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Michael E. Massie, Illinois Leadership Council for Ag Education

Bill McCartney, Illinois Grape Growers and Vintners Association

Vern McGinnis, Vision for Illinois Agriculture

Lavon Nelson, Illinois Community College Board

Tom Prinske, CEO, T. Castro Produce

Ann Reed, I-BIO Institute

Delayne Reeves, Bureau of Marketing and Promotion, Illinois Department of Agriculture

Dr. Rob Rhykerd, Department of Agriculture, Illinois State University

Jay Runner, Facilitating Coordination in Agricultural Education Coordinator

Eloy Salazar, Illinois Migrant Council, IWIB

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Richard Vogen, Director of Planning, College of ACES, University of Illinois

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Appendix B---Statewide Agriculture Related Pathway Examples of Occupations and Educational Programs

Agribusiness Systems Pathway: Sales, service, farm/ranch mgmt, entrepreneurship, economies

Standard Occupational Classification(SOC)

Code	Title
11-2022	Sales Managers
11-3071	Transportation, Storage & Dist Mgrs
11-9011	Farm, Ranch & Other Agric. Managers
11-9012	Farmers and Ranchers
13-1021	Purchasing Agents/Buyer, Farm Prods
13-2041	Credit Analysts
13-2051	Financial Analysts
13-2072	Loan Officers
37-1012	1st-Line Svrs/Mgrs, Lndscp/LawnServ
41-3031	Secs, Commdts & Fin Svcs Sales Agts
41-4011	Sales Reps, Whls/Mfg, Tech/SciProds
51-1011	1st-Line Svrs/Mgrs, Prod/Oper Wkrs

Classification Of Instructional Program(CIP)

Code	Title
010101	Agricultural Business and Management, General
010102	Agribusiness/Agricultural Business Operations
010301	Agricultural Production Operations, General
010302	Animal/Livestock Husbandry and Production
010304	Crop Production
010307	Horse Husbandry/Equine Science and Management (NEW)
010603	Ornamental Horticulture
010604	Greenhouse Operations and Management
010605	Landscaping and Groundskeeping
010606	Plant Nursery Operations and Management
010607	Turf and Turfgrass Management
010901	Animal Sciences, General
011101	Plant Sciences, General
011102	Agronomy and Crop Science
011103	Horticultural Science
190203	Consumer Merchandising/Retailing Management (NEW)
440401	Public Administration
490101	Aeronautics/Aviation/Aerospace Science and Technology, General
490104	Aviation/Airway Management and Operations

Animal Systems Pathway: Large/small animals, wildlife animals, and research animals

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Standard Occupational Classification(SOC)

Code	Title
11-9011	Farm, Ranch & Other Agric. Managers
11-9012	Farmers and Ranchers
13-1021	Purchasing Agents/Buyer, Farm Prods
19-1029	Biological Scientists, All Other
25-1041	Agricultural Sciences Faculty
29-1131	Veterinarians
29-2056	Veterinary Technologists/Technicians
31-9096	Vet Assts & Lab Animal Caretakers
37-3012	Pesticide Handlrs/Sprays/Applictrs
41-4011	Sales Reps, Whls/Mfg, Tech/SciProds
45-2011	Agricultural Inspectors
45-2093	Farmworkers, Farm and Ranch Animals

Classification Of Instructional Program(CIP)

Code	Title
010000	Agriculture, General
010101	Agricultural Business and Management, General
010102	Agribusiness/Agricultural Business Operations
010103	Agricultural Economics
010201	Agricultural Mechanization, General
010204	Agricultural Power Machinery Operation
010301	Agricultural Production Operations, General
010302	Animal/Livestock Husbandry and Production
010304	Crop Production
010307	Horse Husbandry/Equine Science and Management (NEW)
010505	Animal Training
010601	Applied Horticulture/Horticultural Operations, General
010603	Ornamental Horticulture
010604	Greenhouse Operations and Management
010605	Landscaping and Groundskeeping
010606	Plant Nursery Operations and Management
010607	Turf and Turfgrass Management
010901	Animal Sciences, General
011001	Food Science
011101	Plant Sciences, General
011102	Agronomy and Crop Science
011103	Horticultural Science
131301	Agricultural Teacher Education
301901	Nutrition Sciences
510808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant
512401	Veterinary Medicine (DVM)
512501	Veterinary Sciences/Veterinary Clinical Sciences, General (Cert, MS, PhD)

Environmental Services Systems Pathway: Pollution prevention, water & air quality

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hazardous materials, solid waste mgmt, health/safety sanitation.

Standard Occupational Classification(SOC)

Code	Title
17-2081	Environmental Engineers
17-2111	Health & Safety Enginrs, exc Mining
17-3025	Environmental Enginring Technicians
19-1013	Soil and Plant Scientists
19-2041	Environmental Scientists/Specialsts
19-4091	Environmental Sci & Protectn Techs
25-1053	Environmental Science Faculty
47-4041	Hazardous Materials Removal Workers

Classification Of Instructional Program(CIP)

Code	Title
010000	Agriculture, General
011101	Plant Sciences, General
011102	Agronomy and Crop Science
011103	Horticultural Science
011201	Soil Science and Agronomy, General
030103	Environmental Studies (NEW)
030104	Environmental Science (NEW)
131316	Science Teacher Education/General Science Teacher Education
141401	Environmental/Environmental Health Engineering
150507	Environmental Engineering Technology/Environmental Technology

Food Products & Processing System Pathway: Food processing/preserving, packaging, distribution, gov't monitoring & regulation.

Standard Occupational Classification(SOC)

Code	Title
13-1021	Purchasing Agents/Buyer, Farm Prods
17-2021	Agricultural Engineers
17-2081	Environmental Engineers
19-1012	Food Scientists and Technologists
19-1021	Biochemists and Biophysicists
19-1022	Microbiologists
19-4011	Agricultural and Food Sci Technicians
19-4031	Chemical Technicians
29-1031	Dietitians and Nutritionists
41-4011	Sales Reps, Whls/Mfg, Tech/SciProds
45-2011	Agricultural Inspectors
51-3021	Butchers and Meat Cutters
51-3022	Meat/Poultry/Fish Cutters & Trimmrs
51-3023	Slaughterers and Meat Packers

Classification Of Instructional Program(CIP)

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Code	Title
010000	Agriculture, General
010105	Agricultural/Farm Supplies Retailing and Wholesaling
010302	Animal/Livestock Husbandry and Production
010304	Crop Production
010401	Agricultural and Food Products Processing
010901	Animal Sciences, General
011001	Food Science
011002	Food Technology and Processing (NEW)
011102	Agronomy and Crop Science
120506	Meat Cutting/Meat Cutter
140301	Agricultural/Biological Engineering and Bioengineering
141401	Environmental/Environmental Health Engineering
190501	Foods, Nutrition, and Wellness Studies, General
190505	Foodservice Systems Administration/Management
190599	Foods, Nutrition, and Related Services, Other
260202	Biochemistry
260203	Biophysics
260205	Molecular Biochemistry (NEW)
260210	Biochemistry/Biophysics and Molecular Biology (NEW)
260502	Microbiology, General (NEW)
301901	Nutrition Sciences
410301	Chemical Technology/Technician
513101	Dietetics/Dietitian (RD)
513102	Clinical Nutrition/Nutritionist (NEW)

Natural Resources Systems Pathway: Habitat conservation, forest products, parks & recreation, mining, environmental services, fisheries, soil conservation.

Standard Occupational Classification(SOC)

Code	Title
11-9011	Farm, Ranch & Other Agric. Managers
17-1012	Landscape Architects
19-1031	Conservation Scientists
19-2041	Environmental Scientists/Specialsts
19-4021	Biological Technicians
19-4091	Environmental Sci & Protectn Techs
19-4093	Forest and Conservation Technicians
33-3031	Fish and Game Wardens
37-3011	Landscaping/Groundskeeping Workers
37-3019	Grounds Maintenance Workers, AO
45-4011	Forest and Conservation Workers

Classification Of Instructional Program(CIP)

Code	Title
010101	Agricultural Business and Management, General
010102	Agribusiness/Agricultural Business Operations

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010301	Agricultural Production Operations, General
010302	Animal/Livestock Husbandry and Production
010304	Crop Production
010307	Horse Husbandry/Equine Science and Management (NEW)
010601	Applied Horticulture/Horticultural Operations, General
010603	Ornamental Horticulture
010604	Greenhouse Operations and Management
010605	Landscaping and Groundskeeping
010606	Plant Nursery Operations and Management
010607	Turf and Turfgrass Management
010699	Applied Horticulture/Horticultural Business Services, Other
010901	Animal Sciences, General
011101	Plant Sciences, General
011102	Agronomy and Crop Science
011103	Horticultural Science
011105	Plant Protection and Integrated Pest Management
011106	Range Science and Management
030103	Environmental Studies (NEW)
030104	Environmental Science (NEW)
030201	Natural Resources Management and Policy
030301	Fishing and Fisheries Sciences and Management
030501	Forestry, General
030511	Forest Technology/Technician (NEW)
030601	Wildlife and Wildlands Science and Management
040401	Environmental Design/Architecture
040601	Landscape Architecture (BS, BSLA, BLA, MSLA, MLA, PhD)

Plant Systems Pathway: Agronomic, horticulture, forestry, turf, viticulture, soils.

Standard Occupational Classification(SOC)

Code	Title
11-3071	Transportation, Storage & Dist Mgrs
11-9011	Farm, Ranch & Other Agric. Managers
11-9012	Farmers and Ranchers
17-1012	Landscape Architects
19-1013	Soil and Plant Scientists
19-1022	Microbiologists
19-1029	Biological Scientists, All Other
19-4021	Biological Technicians
25-1041	Agricultural Sciences Faculty
37-1011	Landscaping/Groundskeeping Workers
37-1012	1st-Line Svrs/Mgrs, Lndscp/LawnServ
37-3012	Pesticide Handlrs/Spraysr/Applictrs
37-3019	Grounds Maintenance Workers, AO
41-3031	Secs, Commdts & Fin Svcs Sales Agts
41-4011	Sales Reps, Whls/Mfg, Tech/SciProds
45-2092	Farmwks/Labrs, Crop/Nursery/Grnhse

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45-2093 Farmworkers, Farm and Ranch Animals
51-1011 1st-Line Svrs/Mgrs, Prod/Oper Wkrs

Classification Of Instructional Program(CIP)

Code	Title
010000	Agriculture, General
010101	Agricultural Business and Management, General
010102	Agribusiness/Agricultural Business Operations
010103	Agricultural Economics
010105	Agricultural/Farm Supplies Retailing and Wholesaling
010201	Agricultural Mechanization, General
010204	Agricultural Power Machinery Operation
010301	Agricultural Production Operations, General
010304	Crop Production
010401	Agricultural and Food Products Processing
010601	Applied Horticulture/Horticultural Operations, General
010603	Ornamental Horticulture
010604	Greenhouse Operations and Management
010605	Landscaping and Groundskeeping
010606	Plant Nursery Operations and Management
010607	Turf and Turfgrass Management
010701	International Agriculture
011001	Food Science
011101	Plant Sciences, General
011102	Agronomy and Crop Science
011103	Horticultural Science
011201	Soil Science and Agronomy, General
040601	Landscape Architecture (BS, BSLA, BLA, MSLA, MLA, PhD)

Power Structural & Technical Systems Pathway: Power, structures, controls, geospatial technology, computer systems, electronics, hydraulics, pneumatics.

Standard Occupational Classification(SOC)

Code	Title
15-1041	Computer Support Specialists
17-3023	Electrical & Electronic Eng Techs
19-4091	Environmental Sci & Protectn Techs
25-1041	Agricultural Sciences Faculty
45-2091	Agricultural Equipment Operators
49-3041	Farm Equipment Mechanics
49-3042	Mobile Heavy Eqpt Mechs, exc Engine

Classification Of Instructional Program(CIP)

Code	Title
010000	Agriculture, General
010101	Agricultural Business and Management, General
010102	Agribusiness/Agricultural Business Operations

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010105	Agricultural/Farm Supplies Retailing and Wholesaling
010106	Agricultural Business Technology (NEW)
010201	Agricultural Mechanization, General
010204	Agricultural Power Machinery Operation
010205	Agricultural Mechanics and Equipment/Machine Technology (NEW)
010301	Agricultural Production Operations, General
030103	Environmental Studies (NEW)
030104	Environmental Science (NEW)
110301	Data Processing and Data Processing Technology/Technician
131301	Agricultural Teacher Education
150303	Electrical, Electronic and Communications Engineering Technology/Technician
150305	Telecommunications Technology/Technician (NEW)
151201	Computer Engineering Technology/Technician
151202	Computer Technology/Computer Systems Technology (NEW)
151204	Computer Software Technology/Technician (NEW)
301601	Accounting and Computer Science (NEW)
470302	Heavy Equipment Maintenance Technology/Technician