
Discovering a New Indiana Economy: The Role of Higher Education

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America's rural heritage has been the cornerstone of this nation throughout its history. The impact of rural America continues to be great in this new century. But rural America is changing, and our institutions must change to meet these new 21st century needs. Our failure to respond to change could place an important aspect of the American way of life at risk.

Although our businesses and government are headquartered in urban centers, my state, Indiana, like all others, has a strong rural heritage. One of the great songs of our state is "Back Home Again in Indiana." We hear it often from band and choral groups at Purdue University in West Lafayette.

It is interesting to note that in spite of the urbanization that has taken place in Indiana during its 188-year history, Hoosiers do not sing with emotion about their skyscrapers and asphalt highways. They certainly don't sing about their love of traffic jams. Although Indiana is a national leader in manufacturing, they don't romanticize their steel mills or auto plants.

When they long for their Indiana homes, people from my state sing about open fields, gleaming candlelight, sycamores, new-mown hay, and the moonlight on the Wabash River. These are rural images. Indiana is very proud of its rural heritage. And it should be.

This nation is also proud of its rural background—the amber waves of grain, purple mountains, and

fruited plains that Katharine Lee Bates captured forever in "America The Beautiful." Not long ago, a W.K. Kellogg Foundation report surveyed members of the U.S. Congress. The report discovered these national leaders believe there is something special and unique about rural America—something very much worth preserving. They believe it is an incubator of traditional values and vital part of our national life and economy.

The Main Street Economist, a publication of the Center for the Study of Rural America, Federal Reserve Bank of Kansas City has reported: "An informal study asked people where they wanted to live in the future. All their answers were couched in small-town values—a sense of place, of belonging to one another, of interdependence, and responsibility for each other's kids. People sense the nation has lost those values, and now they want them back."

These feelings are especially strong across America, following the events of September 11, and all that has transpired since. Our rural communities are important to our country, to our economy, and to our national sense of who we are. But as it is everywhere in our country today, these are changing, challenging times in rural America.

In Indiana, 35 percent of our 5.8 million people live in rural areas. As reported by the Indiana Rural Development Council, these people expect and need the same services from the government and schools as residents of urban areas. But they sometimes lack the tax base to support these expectations.

They need jobs, but they struggle to recruit and maintain the businesses and industries necessary to sustain economic growth. Rural America has seen a drain in human capital—the very asset that made it so great in the first place. These are all troubling problems. But they are not unsolvable. They are merely challenging.

I believe the time is right for America's research universities, such as Purdue, to step up to the next level in helping rural communities face their economic, social, and environmental issues. That is exactly what Purdue is doing today. And in doing this, we are fulfilling our historic mission as a land-grant university.

Higher education has played a major role in developing rural America for nearly 150 years. The real promise and opportunity that are the hallmarks of America emerged from one of the most remarkable pieces of legislation ever enacted: The Morrill Land-Grant Act. Justin Morrill was a Vermont congressman who believed that higher education should not be limited to the few and elite. Morrill, and others like him, believed higher education should be available to the masses, including those people in rural communities. In fact, Morrill and his supporters were especially interested in opening the benefits of higher education to the rural population that dominated the mid-19th century American landscape.

In 1862, there was a turning point in history when President Abraham Lincoln signed the Morrill Land-Grant Act. The year was a difficult one in American history because there was a solemn realization that the war would be long, that peace would not come easily, and the cost in human lives would be devastating. Yet, that was the very moment in history when our forefathers looked optimistically to the future and approved this landmark piece of legislation. It reshaped education and ultimately changed the face of America.

The Morrill Land-Grant Act provided the means for states to create new universities that were dedicated to serving the public and serving communities through three missions, which today are called learning, discovery, and engagement. With the Morrill Land-Grant Act, a young person growing up on the farm in rural Indiana had as much right and access to a college education as the son of a wealthy banker in Boston or New York. This act further established that, in addition to educating the young people of America, land-grant universities would use their expertise to improve the life, welfare, and economy of their states.

By 1870, 37 states had initiated land-grant institutions, and Indiana was among them, establishing Purdue. Today, there are more than 100 land-grant colleges and universities across the breadth of this great country, offering promise and opportunity to all. The Morrill Land-Grant Act helped to provide the spark this young American republic most needed to flourish—an educated people. It also sparked the American economy by using land-grant institutions as tools of change and progress, taking science out of the laboratories and into the farms and factories. Land-grant universities revolutionized agriculture in the 19th and 20th centuries, and they are about to do it again in the 21st century.

Land-grant universities helped to spark the industrial development that swept through the 20th century, as our learning, discovery, and engagement built manufacturing into the backbone of today's economy. Land-grant colleges and universities played a major role in developing rural America into a vital part of the American landscape. And, today, they have the resources to influence dramatic change to reinvigorate this important national asset.

In 1996, the Kellogg Commission on the Future of State and Land-Grant Universities was created by the National Association of State Universities and Land-Grant Colleges. The commission was charged

not only with defining and bringing to public attention the types of changes occurring at public universities today, but also with analyzing necessary reforms, suggesting ways to accomplish them, and monitoring the results. I was one of 25 university presidents named to the commission, and I served as chair of the Engaged Institution Committee.

Five committees issued written reports. All were well-received, but the “Engagement Report” was far and away the most popular. More copies of it were distributed than of all the other reports combined. It struck a huge chord. We found that universities, states, communities, businesses, industries, and people all wanted higher education to become more involved. The report stated: “The clear evidence is that, with the resources and superbly qualified professors and staff on our campuses, we can organize our institutions to serve both local and national needs in a more coherent and effective way. We can and must do better.”

I believe land-grant universities in the 21st century should partner with government, communities, and private enterprise to help both urban and rural areas manage the economic and social challenges of our times. The new economy that is sweeping the world today is driven by science and technology. Science, technology, and engineering are revolutionizing lives. These are the fields that are driving the development of new products, services, knowledge, and needs. States and regions that are most effectively developing this knowledge-intensive economy are succeeding by partnering with major research universities.

The Massachusetts Institute of Technology (MIT) is responsible for 1,000 companies being headquartered in that state. In Seattle, an amazing 70 percent of all companies have a direct relationship to the University of Washington. We know the impact of Stanford on Silicon Valley and Duke, and the impact of the University of North Carolina and North Carolina State on the Research Triangle. My

state of Indiana has been hard hit in the recent economic slowdown. Since 2000, Indiana has lost more than 136,000 jobs. Manufacturing, the largest sector of economy, has been most severely hit, losing 90,000 jobs. Many of these jobs are not coming back.

In response, several years ago in our state, partnerships were formed between business, government, and research universities. These partnerships began looking at our state’s economy to determine the greatest potentials for growth. For example, in March 2001, the Central Indiana Corporate Partnership in Indianapolis released a study by the Battelle Memorial Institute. That study identified three economic clusters that held great promise for the region’s economic future: First—advanced manufacturing; second—information technology; and third—life sciences. Transportation, distribution, and logistics were later added to the list. A second Battelle study—supported by the Indiana Health Industry Forum and completed in February 2002—confirmed that the life sciences represented an exciting intersection of existing assets and growth potential in central Indiana.

Purdue is playing a leading role in these partnerships, which now are working to foster economic development in these important sectors. The university also is focusing its land-grant missions for learning, discovery, and engagement on these key economic sectors in our state. We believe Purdue must serve as the source of both talent and ideas that will drive Indiana’s economic, social, and cultural progress. To do this, Purdue is realigning itself to help support Indiana’s new economic ambitions. To meet the needs of the 21st century’s knowledge-based economy, Purdue is moving into interdisciplinary and often multi-institutional initiatives.

Today’s research increasingly is influenced by the convergence of scientific and technological advances in different academic disciplines. Throughout the university, we are breaking down

barriers that separate disciplines and bringing our researchers together to collaborate on this exciting work. This marks a transforming moment at Purdue. This is an enormous change in the culture at Purdue, and this new approach has attracted top faculty and researchers for our students and state. We are building state-of-the-art facilities to foster this interdisciplinary work in Purdue's signature fields.

I believe the area that provides the single greatest promise for economic development in Indiana is Discovery Park at Purdue. Discovery Park started as a partnership between Purdue and Indiana. It has grown to become a partnership among Purdue, the state, the federal government, philanthropic organizations, Purdue alumni, friends, and the businesses and industries of Indiana. We believe Discovery Park is a model for the kind of economic development that can grow out of solid cooperation between the public and private sectors and research universities.

I arrived at Purdue as its 10th president in August 2000 with a clear mandate from the Board of Trustees to draft and implement strategic plans for the Purdue system—plans that would take the university to the next level in a way that would advance Indiana's economy. The board members already had invested considerable time in a detailed study of the institution. They determined Purdue was in solid shape and ideally situated for a large step to the next level of excellence. Plans and strategies were needed for that success.

Through input from the entire university community, strategic plans, with a vision of preeminence, were proposed, and the board approved them. These plans were based on our land-grant missions for learning, discovery, and engagement. We are increasing faculty by 300; increasing diversity; increasing faculty salaries to attract and retain the best people for our students and state; investing nearly three-quarters of \$1 billion in new and upgraded facilities; increasing engagement with

our state; increasing scholarships and student aid; and investing in programs that will expand our research capacity in interdisciplinary, signature areas that are aligned with the needs of our state.

To help us accomplish all of this, we have launched a \$1.3 billion capital fund drive. In the midst of a sluggish, uncertain economy, we moved forward, and our friends and alumni responded with incredible support. Four years into the seven-year campaign, we have raised more than \$925 million, and that total rises weekly.

Discovery Park is a central focus of our efforts, and it will have an impact not only in urban areas but also in the rural communities of our state. In 2001, we approached our state with plans for Discovery Park. We asked for \$5 million to start us on our way toward building a new nanotechnology center. It would open possibilities for Purdue and Indiana in one of the most exciting areas unfolding in this new century.

We told government leaders that if the state would give us \$5 million, we would at least double that investment through fund-raising for this new center. We were true to our word. In fall 2001, we announced plans for a \$58 million nanotechnology center, named for Michael and Kay Birck, our lead donors. We leveraged the state's investment more than *elevenfold*. Then in fall 2003, we announced that a bioscience center named for William Bindley, its lead donor, would be added to Discovery Park. The \$15 million Bindley Bioscience Center is 100 percent privately funded.

The Birck Nanotechnology Center and Bindley Biosciences Center are now under construction and scheduled for completion in 2005. Already open in Discovery Park is a \$7 million Burton D. Morgan Center for Entrepreneurship. This center is 100 percent privately financed. This facility and its programs are focused on moving Purdue research off the campus and into the marketplace. We believe

we are unique in tying our signature research to a facility focused on transferring our discoveries into the marketplace.

We also are preparing to build a \$10 million e-enterprise center in Discovery Park with private funds. Even as we are completing phase I of this interdisciplinary research area, phase II is already under way. We have partnered with the state on a \$25 million Discovery Park biomedical engineering facility that has enormous economic development potential for the state. We are planning a new \$15 million cancer research center (privately funded) in the park. We are planning a \$30 million structural biology building.

The cluster of centers in Discovery Park is designed to connect faculty and students from many disciplines. Bringing everyone together will foster the discovery of new methods, ideas, technologies, and products. Faculty and students from every school at Purdue are able to participate. Already, a growing number of faculty members is engaged in research projects with faculty and students in other schools and disciplines. Discovery Park research is developing technology that will be moved into the marketplace. Discovery Park is already attracting some of the most talented researchers in the nation, and it is helping attract high-technology business to Indiana, benefiting from the research and development at Purdue.

All of the economic sectors that have been shown to have great potential in Indiana are being served by our work in Discovery Park. The needs of advanced manufacturing can be met through our nanotechnology center and e-enterprise centers. The life sciences will be advanced in our bioscience and nanotechnology centers. Information technology will be moved forward in nanotechnology research and our e-enterprise center. The e-enterprise center also will be a key in transportation, distribution, and logistics. This already is having an impact. Thanks to a \$26 million grant from the Lilly

Endowment, our Discovery Park Centers are up and running even before the facilities can be completed. At Discovery Park, we already have a NASA Specialized Center for Research and Training in Advanced Life Support; a NASA Institute for Nanoelectronics and Computing; and a National Science Foundation Network for Computational Nanotechnology.

A combination of many efforts in Indiana—including some tax restructuring—is working. In April, *Site Selection* magazine placed Indiana number one among the 50 states for competitiveness in economic development. We believe what we are doing at Purdue is contributing to this success, and Discovery Park is an essential component of future economic growth.

Developments at Discovery Park will help to attract and create businesses and industries that will benefit urban and rural areas. Rural communities have a great deal to offer emerging businesses and industries, and we are working on economic development plans with counties throughout our state. These plans include technology incubators, modeled after a highly successful program at Purdue.

At Purdue Research Park, we have created 150,000 square feet of incubation space, making our technology centers among the largest in the United States. And we are enlarging them. Last fall, *University Business*, a publication for presidents and senior officers at colleges and universities throughout the United States, cited Purdue as the top business incubator model in the nation.

Our research also has enormous impact on rural, as well as urban areas. For example, a group of Purdue scientists has developed a strain of soybean that resists the soybean cyst nematode. Nationally, this will save farmers \$270 million a year, and \$30 million to \$50 million in Indiana alone.

Our research is helping Indiana businesses in rural areas grow and compete. For example, Red Gold has been an Indiana family-owned and -operated

business for over half a century, specializing in high-quality tomato products. From 1942 to 1986, the company operated seasonally. Few employees were needed during the nonproducing months. In the mid-1980s, Purdue Food Sciences developed container and aseptic processing technologies that allowed Red Gold to purchase tomato paste and keep it yearlong. This allowed it to make products during the off-season. Today, the company has more than 1,100 employees and operates year-round.

Purdue's Technical Assistance Program (TAP) is working at the cutting edge of Indiana economic development. More than 5,550 companies have received help from TAP in areas such as advanced manufacturing and logistics, business management, information technology, product development, quality, manufacturing processes, and human resource issues and interpersonal skills development.

Since its inception 17 years ago, Purdue's Technical Assistance Program has resulted in \$290 million in increased sales by Indiana businesses; \$45.5 million in new capital investments; \$24 million in reduced business costs; and 3,900 Indiana jobs created or saved. That has had a huge impact on our state. More than 90 percent of companies that use TAP services say that the assistance they received helped them to compete and thrive.

At Purdue, we are using our missions to advance the hardwood industry. Hardwood is a major aspect of Indiana agriculture and the state's economy. Indiana's wood products manufacturing is the fifth largest industry in our state—a \$5.7 billion a year industry. It employs 59,000 people. Many rural southern Indiana counties derive more than 50 percent of their revenue and wages from forest product manufacturers. Southern Indiana has the most productive hardwood sites in its region of the United States. But this vital part of Indiana's economy is facing increasing pressure from international markets.

In response, Purdue has partnered with the United States Department of Agriculture Forest Service to establish the Hardwood Tree Improvement and Regeneration Center. This center is using cutting-edge scientific methods to improve the black walnut, red oak, black cherry, and American chestnut species. We are working specifically on these trees because of their vital importance to the forests of Indiana and to the fine hardwood furniture industry in this state. We are learning how to grow better trees, producing the straightest trunks, and doubling growth rates. These results are having tangible, significant economic benefits for the Hoosier hardwood tree industry and to the rural communities of Indiana. The traditional rural industries—agriculture, forestry, and mining—are becoming more concentrated and capital-intensive.

The traditional rural industries are vital parts of the rural economy, but they are employing fewer and fewer people. Agriculture is entering another period of dramatic and exciting change with advances such as those in proteomics and genomics. This is opening up whole new areas of opportunities, as well as challenges.

Purdue's School of Agriculture is deeply involved in using missions for learning, discovery, and engagement to improve all aspects of agriculture, forestry, and mining in Indiana. We are educating students in these fields. We are helping people in these businesses to grow. We are using our discovery to improve production. Last fall, Purdue received a \$1 million grant from the United States Department of Agriculture to establish an Agricultural Innovation and Commercialization Center. The goal of this center is to aid rural businesses and producers in developing value-added companies that promote greater use of agricultural commodities.

A person interested in establishing or investing in a new agriculture-based industry will be able to work with the Agricultural Innovation and Commercialization Center to help test the

economic potential of the enterprise. For example, Jose Morales, an entrepreneur in Jasonville, Ind., had an idea to transform a dormant industrial facility in Greene County. Morales originally wanted to produce burritos. But with the help of Purdue Extension, he discovered that pizza was the most viable option for him. His first product was personal-size pizzas for the Dade County, Fla., school system. Thirty people in Southwest Indiana now have a job thanks to Morales and Purdue Extension. These are the types of business plans the Agricultural Innovation and Commercialization Center will help evaluate.

Purdue's Extension Service also has a New Ventures team that helps groups and individuals develop sustainable, value-added enterprises in Indiana's food and fiber system. The Extension Service is working in every county of our state, and it is an important aspect of rural economic development. It serves farmers, people, businesses, and communities.

The "Purdue Extension Five-Year Plan" addresses critical issues, such as youth issues, land use, leadership, financial management, career development, agricultural awareness, community and economic development, food safety and quality, nutrition, health and wellness, and environmental stewardship. Doing more through and transforming the Extension Service is important to the future of rural America.

The Land-Grant Extension Service model was developed in 1914. It was created through a partnership between counties, states, and the federal government. It also focused on meeting the traditional needs and concerns of our communities and states in early 20th century America—needs that grew out of agriculture, home economics, and veterinary medicine. America was a rural nation in those days—a nation of small, mostly struggling family farms. Americans needed the training and knowledge that was available at the state land-grant universities. The Extension Service activities

included youth programs such as 4-H, rural development, and other issues of great importance to rural America. This is the same basic model that continues today, almost 100 years later.

But the rural communities that the Extension Service traditionally has served are changing dramatically as the efficiencies of agriculture grow and the demographics of rural communities shift. Rural communities are facing new and difficult issues, such as population decreases, an increasingly diverse population, the loss of business and industry, and jobs and tax revenue. The traditional engagement agenda of agriculture, home economics, veterinary medicine, 4-H, and other Extension activities is becoming inadequate to meet the needs of 21st century urban and rural American communities.

Non-agricultural economic development, management of diversity, and health care are examples of issues that are becoming increasingly important to our rural communities. There is a growing disconnection between the issues and needs in 21st century rural communities and the historic land-grant Extension model. What can we do to reconnect? First, we need to find a new language and begin acting in a new way. We need to replace the traditional model of Extension with the modern engagement model and all that it implies. By engagement, we mean redesigning our research and outreach to become involved even more sympathetically, productively, and broadly with communities.

Additionally, by engagement, we mean working with those outside the university on a two-way street, where ideas and information flow in both directions. The historical outreach model of Extension is one in which the university, in its wisdom, tells people what it knows. When we move to engagement, we are doing something quite different. Engagement is more mutual. It provides an explicit and participatory role for those outside the university. In engagement, the university and

the external groups not only come to a mutual understanding, but, more profoundly, there is recognition by the university that we can learn from those outside the campus. They can influence what we teach, and they can influence the research that we undertake. In a knowledge-driven society, not all knowledge is in the university. We must learn from others. In my view, this is a profound change in the historical model of university outreach.

Second, we need to broaden the engagement agenda beyond agriculture, home economics, and veterinary medicine to a universitywide model. All of our schools and departments should be looking for ways to engage our communities and states. Many people believe that our nation's research universities have lost touch with the communities they exist to serve. The public has become frustrated with what it sees as *ivory tower* unresponsiveness. There is a perception that despite the resources and expertise available on our campuses, we are not bringing them to bear on local problems in a coherent way.

Third, we need to develop a much more entrepreneurial approach to funding our engagement activities. Formula funding won't do it. These are among the suggestions that emerged from the Kellogg Commission on the Future of State Universities and Land-Grant Colleges. What we are talking about in all of this is reconceptualizing engagement as a mechanism for facilitation of access to a broader range of knowledge, rather than serving as the single source of all knowledge to a narrow constituency. As the world becomes more specialized and more complicated, our engagement agents need to see themselves as facilitators to reconnect to the larger university and to others outside the university.

These are all large changes, and there is always a natural resistance by some people toward change. But there is one thing we all know. We cannot get better; we cannot improve; and we cannot meet the new needs of a changing society, unless we change

ourselves. Purdue is addressing the needs of rural Indiana in other ways beyond agricultural production, research, and Extension. Since 1989, Purdue has operated a Center for Rural Development within the School of Agriculture, which is administered by the Department of Agricultural Economics. The center has four objectives:

- Bring university resources together to assist public and private sectors as they work to solve rural development problems;
- Provide a broad range of educational programs that contribute to the development of Indiana's human and physical capital;
- Coordinate and support research that improves our understanding of economic and community development issues, problems, and opportunities; and
- Provide issue-relevant information to individuals and groups interested in rural development.

In addition, the state of Indiana has established a fund to promote economic growth, and Purdue is involved in this work. The Indiana 21st Century Research and Technology Fund, created by the Indiana General Assembly in 1999, is aimed at assisting Indiana ventures that are focused on the commercialization of advanced technologies. In order to be eligible for 21st Century Fund grants, ventures must include both an Indiana company and an Indiana university. Since its inception, the fund now has awarded more than \$110 million in grants to 85 projects. Purdue is involved in 70 percent of these grants.

The fund already has led to existing business expansions. For example, Zimmer Inc., in Warsaw, Ind.—which is surrounded by rural areas—has recently initiated the 15,000-square-foot

Minimally Invasive Solutions Institute to train orthopedic surgeons. The surgeons are being trained in techniques and technology developed through a partnership between Zimmer, Purdue, Notre Dame, and the Indiana University School of Medicine, using a 21st Century Research and Technology Fund grant.

While universities work on economic development, we also must invest our learning, discovery, and engagement efforts to develop human capital. Purdue has a number of programs focused on public schools, improving the reading, math, and science skills of Indiana K-12 students. We have a statewide program that takes technology degree programs to locations throughout Indiana—even into individual businesses and industries that request assistance. This allows people to advance their skills and careers while studying in their home communities and continuing responsibilities (e.g., jobs and families).

Our regional campuses serve urban and rural areas and have strategic plans focused on economic development in their communities. Finally, university involvement is vital in helping rural communities in planning for the future. We play an important role in helping communities identify, develop, and articulate long-term objectives and plans. We can help communities by bringing together their leaders and citizens to look down the road and identify a common vision and the high-priority issues that must be addressed to accomplish that vision.

A great deal is happening in our rural communities today. Even more is being positioned just on the horizon. Land-grant universities have historically had a major impact on the growth and development of these communities. We continue to do so today. But we can do even better and even more. Universities today need to realign themselves to the needs of rural and urban areas. We need to transform the academic culture to meet the needs of states and communities.

British writer W. Somerset Maugham said: “It’s a funny thing about life. If you refuse to accept anything but the best, you very often get it.” We must refuse to accept anything but the best for the people of our states. The future of rural America is tied to the future of higher education, and our ability to transform ourselves to the emerging needs of this new century.