30 in 10

$30 BILLION • 10 YEARS

Growing North Carolina's AgBiotech Landscape

A STRATEGIC REPORT AND PROJECT OF STATEWIDE PARTNERS

FINAL REPORT • AUTUMN 2009

CONTENTS

Executive Summary

As North Carolina's economy grows to include high-tech highways, the building blocks of renewable energy and plants that manufacture medicine, its roots in agriculture remain evident. The agriculture sector pumps $70.1 billion annually into the economy, employing 17 percent of the workforce, or 700,000 people.

Agriculture evolved with the history of the state, shaping its culture, economy and landscape. The Industrial Revolution added manufacturing to the state's economic base, and it also changed the way farmers worked. Machinery allowed easier and more efficient farming, less work for more yield. In the 20th century, biotechnology added herbicide-tolerance and pest-resistance, advancements in nutrition, salt and water tolerance for plants, as well as gains in animal health and nutrition to the list of efficiencies. In addition, these advances have reduced the environmental impact of farming.

This technology also promises some astounding new ideas: liquid fuel from the waste of forest products, proteins essential to infants grown in rice and crops that thrive in drought-ravaged regions of the world. Developing these ideas promises a bright economic future for the state while improving the quality of life around the globe.

North Carolina's agricultural biotechnology endeavor, future and gain will spring from many resources. Key among them are our farms, farmers and agricultural lands; biofuels, native plants, niche and specialty crops; animal agriculture; trees and forest products; marine and aquaculture products and resources; business practices rooted in conservation, sustainability and environmental stewardship; an educated public; and an engaged community and state leadership.

To stake North Carolina's claim to leadership in agricultural biotechnology, leaders in farming, research and policy set a goal of* 30 in 10*: adding $30 billion to North Carolina's economy over the next 10 years by combining its traditional agriculture and new technology strengths, focusing attention on agricultural biotechnology.

The committee proposes the following strategies:

1. Create an Agricultural Biotechnology Advisory Committee, managed and staffed by the North Carolina Biotechnology Center
2. Catalog and build upon existing institutional resources and partnerships
3. Coordinate and catalyze commercialization and application of agricultural biotechnology products
4. Develop clusters of marine and animal biotechnology products across the state
5. Educate the public on the issues and benefits of agricultural biotechnology, as well as ensure a trained workforce in this sector
6. Engage community and state leaders to move agricultural biotechnology forward

Project Process and Vision

More than 100 North Carolinians contributed to *Growing North Carolina's AgBiotech Landscape: A Strategic Project of Statewide Partners*. Working from December 2008 until June 2009, participants assembled, discussed and learned in a two-part framework.

1. A 34-member *Steering Committee*, co-chaired by Governor James B. Hunt, Jr., and W. Steven Burke, met five times. Listed on page 13, members represent an unprecedented convening of the state's agricultural leadership.
2. *Six Strategic Work Groups*, pages 14-15, each met twice around their focused topic:
    - Animals
    - Aquaculture and Marine
    - Crops, Trees and Biomass
    - Farming and Rural Advantage
    - Issues, Policies and Implications
    - Niche, Specialty and Value-Added Crops

No single entity can assume effective responsibility for this project and for its outcomes. Rather, a number of appropriate agencies, institutions and entities must come together to shape this agricultural biotechnology endeavor. With a 25-year history of biotechnology industry development, the North Carolina Biotechnology Center is positioned to convene these parties and facilitate the conversations, strategies and activities crucial for the endeavor's success.

Combining behavior and activities, the imperative is clear: key entities, particularly those represented on the Steering Committee, must strongly commit vision, leadership and goals to agricultural biotechnology in coming years. Without this commitment, North Carolina will not gain expected and realistic outcomes from agricultural biotechnology.

STRATEGY 1:

Create an Agricultural Biotechnology Advisory Committee

All parties can benefit from an innovative and responsive team to accelerate initial strategies and outcomes. Responsibility for this team will reside with the North Carolina Biotechnology Center, where a focus on agricultural biotechnology will be created, funded and incorporated.

The Biotechnology Center—in collaboration with partner organizations—will develop and coordinate North Carolina's Agricultural Biotechnology Advisory Committee. The newly formed Advisory Committee will be responsible for supporting and implementing strategies two through six of this report to achieve and maximize the overall goal of **30 in 10**, $30 billion added to the state's agriculture economy in 10 years.

Agricultural Biotechnology Advisory Committee members will address areas of attention identified as continually important:

- Product Commercialization and New Company Development
- Niche, Specialty and Value-Added Crops
- Rural and Agricultural Community Development
- Forests, Forestry and Forest Products
- Environmental and Societal Issues
- Partnership Development
- Regulatory Affairs and Policy (at the state, federal and international levels)
- Regional Opportunity Identification
- Animal Agriculture and Biotechnology
- Marine Biotechnology and Aquaculture

Agricultural biotechnology requires problem-solving, assistance and synthesis among the work of diverse parties. A multi-party framework that includes and organizes participants is required, as is non-duplicative coordination. A fluid, trusted and creative group, working in and across sectors, can both initiate projects and speed outcomes. Therefore, the Agricultural Biotechnology Advisory Committee will work to develop a shared vision for agricultural biotechnology and coordinate actions to maintain agriculture's long-term economic position in North Carolina.

STRATEGY 2:

Catalog and Strengthen Existing Resources and Partnerships

Resource Inventory

A disciplined inventory and analysis of agricultural biotechnology resources – natural, institutional, private, policy and educational – must be undertaken, keeping in mind long-term strategy. Responsibility for inventory and analysis will be assigned to the Agricultural Biotechnology Advisory Committee. Taking stock of the state's agricultural and biotechnology resources is a necessary strategy for identifying the resources, partnerships and collaborations necessary for achieving 30 in 10.

Capitalize on Existing Networks of AgBiotech Research Sites

Agricultural research stations and sites across North Carolina can be strengthened in their capabilities for and attention to agricultural biotechnology. Doing so will create an exceptional backbone for activity across the state as well as meet project objectives to strengthen regional and existing resources.

In addition, increased plant, tree and animal breeding capabilities determined to be important to universities and companies can be positioned and implemented at the sites.

STRATEGY 3:

Coordinate Commercialization and Application of Agricultural Biotechnology

Gaining niche, specialty and value-added crops matched to agronomic and regional capabilities is key to North Carolina's agricultural biotechnology future. Two distinct activities, and possibly the Biotechnology Center's Center of Innovation program, will be key in catalyzing development in agriculture and agricultural biotechnology.

New Crops Seed and Stimulus Fund

Niche, value-added and specialty crops, trees, and various fresh and saltwater marine species will be important for expanding markets and strengthening targeted sectors, from biofuels to natural products to aquaculture. Some will be new in genetic traits and output characteristics, growing requirements or markets. Encouraging farmers to grow them is of foundational importance, as is lessening farmers' risk in growing and harvesting.

Various funding programs and projects exist to encourage new seed and crop exploration. Proposals for new funding programs should not duplicate existing programs but should enhance them and enable planting and growing of crops, trees or marine equivalents. Annually, a range of crops, species and agronomic conditions will be displayed. Awardees will meet criteria for following protocols and reporting of results. Responsibility for initial review will be determined by a member of the Agricultural Biotechnology Advisory Committee and shared with partners around the state.

New and Enriched Crops Center: Ensuring North Carolina's Niche, Specialty and Value-Added Varieties

Large agricultural biotechnology companies have spent millions of dollars developing new varieties of crops for high-return, broad-acreage crops. Traits include herbicide tolerance, pest resistance and other useful attributes. Typically, however, companies have not genetically modified specialty crop varieties because sales volumes are too small to support the high cost of bringing new products to market. As a result, farmers growing specialty crops do not have access to new useful traits available in broad-acreage products.

North Carolina may benefit from establishing a program to improve specialty crop varieties with the tools of biotechnology. Traits already available in broad-acreage crops could be licensed from large agricultural biotechnology companies. The program might also license specialty crop rights for new traits discovered by North Carolina research institutions. Functions performed by this proposed program will include transforming traits into new varieties as well as conducting analytical research necessary to support regulatory approvals.

The need is great and the work must be carefully planned. The substantial questions about structure, funding and partnerships require full attention from various agricultural and biotechnology leaders, public and private. For example, responsibility for further exploration and implementation might fall to a collaboration between existing institutional resources.

STRATEGY 4:

Develop Commercialization Opportunities in Marine and Animal Biotechnology

Strengthened Marine Biotechnology Capabilities

Few states are as well positioned as North Carolina to target, develop and gain from fresh- and salt-water resources, land-based and sea-based. Increasing attention to marine biotechnology and aquaculture is good strategy and has not been addressed in proportion to its full economic potential.

Continued development of marine biotechnology and a Biotechnology Center sponsored Center of Innovation will serve all public and private parties statewide working for fresh- and salt-water capabilities development. Development efforts will strengthen commercialization of viable applications built on existing university and private research expertise, infrastructure and technology transfer. This targeted effort serves as a foundation for assisting public and private parties who work for fresh- and salt-water economic development. Areas of attention will include: economic development and marketing studies; a development plan for sectors and areas of application, from aquaculture to marine-based pharmaceuticals; enabling technologies; analysis of markets and international competitiveness; and support of shared resource, policy and funding needs.

Establishing a North Carolina Aquaculture Consortium will provide shared focus for a potentially large sector matched to state resources and a worldwide need for marine resources and food. The Consortium will provide economic verification, state policy commitment, coordination and functional assistance to projects, sites and growers. It will assemble and serve as a model for collaborations and partnerships.

Strengthened Animal Biotechnology Capabilities

The intersection of biotechnology with animals – their health, growth, characteristics and products – is still relatively new and unfolding. A state strong in turkey, swine and poultry production, in research and veterinary capabilities, and in company leadership is well advised to capture opportunity and expand gain.

North Carolina has to date not targeted animal agriculture as an area for deliberate policy, economic return and development. Benefit to producers, processors and agricultural communities can accrue, as can leadership in careful biotechnology application, attendant environmental and societal issues and commercialization. Merging need with opportunity and strengthening capabilities requires an organized, multi-party, concerted effort. A two-part framework comparable to that seen above for marine and aquaculture is proposed.

First, convene parties and shape objectives through an Animal Biotechnology Consortium. The convening party can begin the process of evaluating potential ideas for commercialization and development opportunities in animal agriculture and biotechnology.

Second, formulate a new animal biotechnology program – be it project or center – to organize and accelerate the science, policies, application and product outcomes of animal biotechnology. However constituted, the program would work for multi-party projects, partnerships, attention to issues and junctures of animal products with human health, protein production, nutrition and niche markets. Also key to success will be an evaluation and organization of funding mechanisms to potentially fund commercialization models for animal biotechnology industry and sector development.

Responsibility for initial implementation will be determined by a member of the Agricultural Biotechnology Advisory Committee and shared with partners around the state.

STRATEGY 5:

Enhance Education and Public Awareness

The basic nature of agricultural biotechnology compels appropriate and balanced content about its development, issues and applications. The continuum from curriculum-based education to workforce training to general public information must be addressed with different, tailored materials. Strategies will vary, as will conduits, venues and responses.

Objectives specific to agricultural biotechnology require new approaches and thinking. Five are significant:

- Communicating with the general public about the nutritional, environmental and consumer benefits of agricultural biotechnology.
- Informing policy, elected and community leaders about the ongoing significance to North Carolina of agricultural biotechnology.
- Targeting the agricultural community and farmers with information, proven models and sound evidence about agricultural biotechnology.
- Using facts to address reasonable questions about using biotechnology to change crops, animals and ultimately food.
- Bringing a new generation to agriculture and agribusiness by triggering interest in the innovative outcomes, technology and possibilities of agricultural biotechnology.

Responsibility for initial implementation will be determined by a member of the Agricultural Biotechnology Advisory Committee and shared with partners around the state.

STRATEGY 6:

Engage State and Community Leaders

Engaging leadership and stakeholders statewide is critical to maintain commitment to agricultural biotechnology and achieving 30 in 10. Four distinct activities have been identified:

1. North Carolina's AgBiotech Leadership Council:
    - Establish a high-level group co-chaired by the Commissioner of Agriculture and the president and CEO of the North Carolina Biotechnology Center to ensure shared thinking, coordinate activities and goals and induce imaginative long-term thinking.
2. Annual Agricultural Biotechnology Leadership Summits:
    - Under guidance of North Carolina's AgBiotech Leadership Council, large meetings will be held at regular intervals to convene parties around key topics: policy, environmental and sustainability issues, animal agriculture, marine resources, aquaculture, forestry, biofuels, niche and specialty crops, markets and competition, new biotechnology developments, and education.
    - The meetings will document and trigger agricultural biotechnology outcomes. Reports of the Agricultural Biotechnology Advisory Committee will be a lead component. Each Summit will outline current status and recommend new activities. The meetings will also shape strategies for subsequent years of focused attention to agricultural biotechnology in North Carolina.
3. Agricultural Biotechnology Policies Portfolio:
    - Smart policies, whether based in legislation or activity, are the tools by which good ideas can move to reality and responsible behavior. An ongoing consortium of project steering committee members and others will merge needs with vision and craft a package of recommended state polices for responsible economic development of agricultural biotechnology in key areas, likely to include: land use; environment and sustainability; regulations and permitting; grower support; energy, biofuels, and agriculture; company development; commercialization; and rural and community development.
4. Program of Work 2011:
    - Using the work and efforts of the Leadership Council, Leadership Summits and Policies Portfolio, propose agricultural biotechnology as the Institute for Emerging Issues 2011 program of work.

Responsibility for initial implementation will be determined by a member of the Agricultural Biotechnology Advisory Committee and shared with partners around the state.

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