Future of the Land-Grant University and the College of Agriculture and Life Sciences

VA State Feed Association & Nutritional Management Cow College

February 21, 2013
Land-Grant University

The land-grant university system is built on behalf of the people, who have invested in these public universities their hopes, support, and confidence.” Abraham Lincoln at his signing of the 1862 Morrill Act (Land-Grant College Act)

- Federal legislation of 1862, 1890, and tribal colleges in 1994
- Hatch Act, 1887
- Smith-Lever Act, 1914
Founded in 1872 as a Land Grant University

Land Grant University

TEACHING

RESEARCH

EXTENSION
• Ranks 28th among US public universities and 71st among all US universities (US News & World Report)

• Colleges
  • Agriculture & Life Sciences
  • Architecture & Urban Studies
  • Business
  • Engineering
  • Graduate School
  • Natural Resources & Environment
  • Science
  • Liberal Arts & Human Studies
  • Veterinary Medicine
  • Medical (joint with Carilion Health)

65 bachelor’s degree programs
145 masters and doctoral degree programs
More than 3,100 faculty members and researchers
Enrollment

- 23,690 undergraduate students
- 7,316 graduate & professional students
  - 58% male and 42% female
  - 2,269 international (113 countries)
    - 1,807 graduate; 462 undergraduate
College of Agriculture & Life Sciences

- 2,700 undergraduate students
- 500 graduate students
- Ag Sciences research expenditure is ranked in top 10 nationally by NSF
- Sponsored awards $45M
- Virginia Cooperative Extension and the Agricultural Experiment Station are major components of the College
CALS Academic Departments

- Ag Technology (2 Year)
- Agricultural and Applied Economics
- Agricultural and Extension Education
- Animal and Poultry Sciences
- Biochemistry
- Biological Systems Engineering
- Crop and Soil Environmental Sciences
- Dairy Science
- Entomology
- Food Science and Technology
- Horticulture
- Human Nutrition, Foods and Exercise
- Plant Pathology, Physiology, and Weed Science
Virginia Agricultural Experiment Station and its Agricultural Research and Extension Centers

- Virginia Agricultural Experiment Station - Blacksburg
- Alson H. Smith, Jr. AREC - Winchester
- Eastern Shore AREC - Painter
- Eastern Virginia AREC - Warsaw
- Hampton Roads AREC - Virginia Beach
- Middleburg AREC - Middleburg
- Reynolds Homestead Forestry Resources Research Center - Crizz
- Shenandoah Valley AREC - Steeles Tavern
- Southern Piedmont AREC - Blackstone
- Southwest Virginia AREC - Glade Spring
- Tidewater AREC - Suffolk
- Virginia Seafood AREC - Hampton
Virginia Depends on Agriculture

$55 Billion Industry
357,000 jobs

VA Commodities & Products that rank in top 10 of all U.S. States:

- Tomatoes (fresh market)
- Tobacco (leaf)
- Turkeys
- Apples
- Potatoes (summer)
- Beans (snap)
- Grapes
- Peanuts
- Broilers
- Cucumbers (fresh market)

Cash Receipts

- Poultry & Eggs: 35.3%
- Meat Animals: 15.2%
- Milk: 11.5%
- Misc. Livestock: 5.8%
- Field Crops: 17.9%
- Greenhouse, Nursery: 9.0%
- Vegetables: 3.4%
- Fruits & Nuts: 1.9%

NASS, 2010
VDACS, 2011-12
Grand Challenge - Food, fiber, feed, and fuel for 9 billion people by 2050

- Abundant yields (genetics, technology, improved agronomics....input costs, environmental footprints, efficiency of water use)
- Managing pests, pathogens, and invasive plants
- Adaptation to climate variation
- Producing safe & nutritious food; reducing food waste
- Managing alternative energy production
- Adequate workforce at all levels
CALS Strategic Plan

MISSION:
The College creates, integrates and shares knowledge to enhance:
• life sciences, food and agricultural systems
• the economic prosperity and life quality of the greater community
• the stewardship and health of land, water, and air for future generations
• student learning through diverse, hands-on experiential opportunities

VISION:
We address current and emerging issues in agricultural and life sciences, by building on the land grant commitment of developing leaders and creating and sharing knowledge through diverse hands-on applications.
CALS Strategic Plan

Goal 1: Provide a comprehensive agricultural and life sciences undergraduate and graduate educational experience

Goal 2: Strengthen Discovery capabilities to successfully address local, state, national and global needs

Goal 3: Develop and disseminate science-based knowledge and innovative services through engagement with stakeholders and partners

Goal 4: Create a stable and sustainable resource portfolio for the college and seek continuous improvement in organizational effectiveness
CALS Strategic Plan

Focus Areas:
Agricultural Profitability and Environmental Sustainability
Food, Nutrition, and Health
Biodesign and Bioprocessing
The Green Industry
Infectious Diseases
Community Viability

Emphasis Areas:
Safe and Sustainable Food Systems
Aging Healthfully
Climate-Induced Environmental Change
Bioprocessing/Bioenergy and Bio-Products
Student Enrollment in Major Public Research Universities

Enrolled Students (millions)

NSF, 2012
Growing demand for ag graduates will continue...

**Fruitful Future**

Enrollment in U.S. agriculture colleges has risen, as many agriculture-related occupations are projected to expand despite the nation's shrinking number of farmers.

- **Undergraduate enrollment**: 150 thousand
- **144,805** in 2011

<table>
<thead>
<tr>
<th>Position</th>
<th>Projected change, 2010-2020</th>
<th>Projected jobs in 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm-equipment mechanics and service technicians</td>
<td>13.4%</td>
<td>37,300</td>
</tr>
<tr>
<td>Animal, plant and other agricultural and food scientists</td>
<td>10.4%</td>
<td>37,000</td>
</tr>
<tr>
<td>Agricultural engineers</td>
<td>9.1</td>
<td>2,900</td>
</tr>
<tr>
<td>Agricultural and food-science technicians</td>
<td>7.0</td>
<td>22,800</td>
</tr>
<tr>
<td>Buyers and purchasing agents, farm products</td>
<td>5.5</td>
<td>13,700</td>
</tr>
<tr>
<td>Farmers, ranchers, and other agricultural managers</td>
<td>-8.0</td>
<td></td>
</tr>
</tbody>
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Sources: Virginia Tech (enrollment); Bureau of Labor Statistics (employment projections)

Bloomberg (photo)

The Wall Street Journal

2013
Ag graduates are in demand...

Factors shaping the market:
- Macroeconomic conditions and retirements
- Consumer preferences for nutritious and safe foods
- Food, energy, and environment public policy choices
- Global market shifts in population, income, food, and energy

USDA, 2010
Employment Opportunities

- Agricultural and Forestry Production: 47%
- Education, Communication, and Governmental Services: 11%
- Management and Business: 15%
- Science and Engineering: 27%

USDA, 2010
Student Success

• Recruitment/Development/Retention

• Products:
  – engaged alumni
  – community leaders
  – world citizens

• Contribution to economic development
CALS Students

- 2,700 total undergraduate students
  - 481 incoming Freshmen – Fall 2012
  - 126 transfer students – Fall 2012
- ~500 total graduate students
- Future growth to 3,000 undergraduate and 850 graduate students
Agriculture & Life Science Research Programs

Discovery that expands the realm of knowledge and develops solutions to problems relevant to the agriculture, food, health, and natural resources sectors

Quality of Life

Economic Development

Student Learning Experiences
Discovery to Delivery

- **Infrastructure Investments**
  - People – faculty & staff
    - Established senior scientists vs. Early career high-achievers
  - Facilities
    - An environment conducive for success
    - State-of-the-art facilities
  - Interdisciplinary teams
    - Grand challenges require grand approaches
    - Requires strong single disciplines
    - Removal of barriers at all levels
  - Funding
    - New approaches
    - Industry partnerships
      - R&D outsourcing growth
    - Multi-institutional (domestic & international)
CALS faculty

- **Tenured/tenure-track faculty**
  - July 2010 – 178
  - Currently – 212
    - Includes 26 at ARECs (5 new AREC hires since 2010)
  - August 2013 – anticipate 226
    - Anticipate 27 at ARECs

- **Field extension faculty**
  - July 2010 – 179
  - Currently – 230 (searches underway)
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Examples of Regional Collaboration

• Peanut Variety Quality Evaluation
• Viticulture for the mid-Atlantic
• Irrigation pathogens
• Box Blight
• Pasture-based beef production for Appalachia
• Seafood safety training
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Total U.S. agriculture and food research, development, and extension expenditures by research funder and performer for 2009

Public entities fund 39% and perform 46% of ag research.
Private entities fund 61% and perform 54% of ag research.

PCAST, 2012
Federal funding of agriculture-related research to universities
Lower bound = ag research; Upper bound = both ag and biological research

PCAST, 2012
Distribution of the R&D portfolio across Federal funders of ag research

USDA $2.3B, DOD $68B, DOE $9.9B, DHHS $36B, NASA $5.9B, and NSF $6.1B.

PCAST, 2012
National R&D Investment

percent of GDP

- South Korea
- Japan
- U.S.
- Taiwan
- EU-27
- China

AAAS, 2012
Agricultural Research Spending Slowdown

Pardey & Alston, 2011
State Appropriations as a Share of Total Operating Revenue (percent)

State Appropriations at Public Research Universities

NSF, 2012
State Appropriation has Failed to Keep Pace

State funding per student at Virginia Tech 2013-14
$4,519 in 2000 dollars

Virginia Tech, 2013
CALS Research Expenditure Growth

Year

2006 2007 2008 2009 2010 2011

$ Millions

25.15 29.04 31.96 37.45 38.86 40.03
Sources of CALS Research Awards
FY 2012

- Federal: 30.2M (69%)
- Private/Industry: 10.1M (23%)
- State/Local Gov't: 3.5M (8%)
Addressing the Grand Challenges of Agriculture

Strategically grow the education & research programs at our land-grant universities
Increase the integration of the land-grant missions
Expand partnerships internally and externally
Adopt new funding models
Thank you!