INTRODUCTION

Facility overview
What began in 1941, as the University of Delaware’s College of Agriculture and Natural Resources southern agricultural experimental “substation” has evolved into an influential, multi-faceted complex that has been vital in supporting Delaware’s 8 billion dollar agricultural industry. The Carvel facility’s 26,000 square feet of offices, labs, meeting, and classroom space is surrounded by 347 acres used for agricultural research (Thurman Adams Jr. Agricultural Research Farm), and the adjacent Lasher Laboratory, a world-class poultry research and diagnostic laboratory. The Jones-Hamilton Environmental Poultry Research house is also a critical facility in evaluating litter management and air quality areas.
In addition, the Warrington Research Farm (130 Acres) located in Harbeson, Delaware serves as a primary irrigation research facility focusing on center pivot (66 acres) and sub-surface (18 acres) irrigation technologies.
The Carvel Research and Education Center (CREC) is also home to Sussex County Cooperative Extension, whose agents, specialists, staff, and volunteers deliver university-based knowledge to a diverse group, continuing the strong tradition of serving the citizens of Delaware and the region. The former office and meeting complex (10,728 square feet) located south east of CREC, now referred to as the REC Annex, serves as supplemental meeting and storage space and is the office of Delmarva Poultry Industries (DPI).

Funding for CREC staff (50), operations, and support comes from federal (Hatch and Smith Lever funds), State, County, and extramural funds. State funds have been instrumental in expanding staff, facility construction, renovations, research equipment and operations, totaling over 15 million dollars since 1991. In addition, County funds since 1991 totaling over 2.5 million dollars have been invaluable in supporting research and extension programs.

With the arrival of Dean Mark Rieger in 2012, the College of Agriculture and Natural Resources initiated the development of a College Master Plan in 2013. The CREC staff was charged with thinking about the future. How will the experiment station, our facility, and staff change in fifteen to twenty-five years (2028-2038) to meet the challenges facing agriculture and our Delaware residents? What will be the priorities for our research, diagnostic, and extension programs? This document provides a brief summary of future trends in Sussex County, programmatic opportunities, facility support and direction, and challenges in meeting these goals. The following information is a summary extracted from Carvel personnel and clientele in response to five questions proposed by the CREC Director:

- Existing/new research and extension personnel needs
- Existing/new facility and capital improvement needs
- Overall facility and research equipment needs
- What role does our facility and staff play in student recruitment and teaching
- Innovative strategies to address limited resources and program expansion

**Strengths of CREC**
The CREC has a long history (72 years) of providing valuable support to the citizens of Delaware and the region, through outstanding applied research and extension programs. The relatively new Carvel building (2006) provides a “state of the art” facility for office, meeting, and teaching space. The design and layout of the building has significantly enhanced the communications and program coordination among staff and volunteers. The Thurman Adams Jr. agricultural research farm provides researchers from main campus, as well as Georgetown, the opportunity to conduct studies throughout the State that directly impact Delaware farmers. This research farm is noted by many in the agricultural industry as one of the most well equipped and operated farms not only in the region, but on the East coast.
Thurman Adams Jr. Agricultural Research Farm

Future Trends

Sussex Demographics

- In the past twenty years, Sussex (population) has grown rapidly. The growth trend is expected to continue although at a slightly slower rate. The growth rate will be influenced by the possible rebound in the real estate sector.
- 68,000 residents not in the labor force. (A large pool)
- Largest increase in population will come from persons age 65+.
  - Demand for healthcare services and the need for jobs in the field.
- Need to attract and retain younger workers to replace “Baby-Boomers” during the next few years.
  - Extend careers and introduce encore careers to our senior population.

[Graph showing population growth from 1990 to 2030 for ages 55+ and under 55]

[Graph showing highest growth in youngest & oldest Sussex 2010 and 2030]

Source: Delaware Population Consortium
• Retention of existing businesses and attraction of new ones depends on qualified work force

(From the summary slide by Ed Simon from the Sussex Conference Demographic Overview)

Technology
Broadband access will continue to improve with significant change seen in 5 years. Last mile access will be wireless for rural users. There continues to be challenges for some Sussex citizens for access to reliable and functional internet capability. Once addressed, the use of the web will become the backbone of information for clientele. In addition, the use of Precision Ag technologies in all aspects of crop production continues to expand.

Environment/Regulations
Due to Sussex County’s location within significant watersheds of national importance, (Chesapeake Bay, Inland Bays and Delaware Bay) water resource management, climate change and regulatory issues remain front and center. Maintaining a productive and profitable agricultural industry in conjunction with environmental quality will be paramount for the States 8 billion industry. This will require a continued strong commitment to research and extension efforts in the areas of nutrient management, irrigation, pest management, and livestock production.

Economic and Community Development
There are twenty-five towns in Sussex with significant infrastructure and revenue challenges. There will be a demand for expertise in managing this ever-changing landscape. Sussex will remain an economy of small business anchoring a significant service and retail tourism market. A recent study states Delaware’s coastal economy is valued at $6 billion dollars. If you couple this with the $8 billion dollar agriculture economy, you understand Sussex County economic engines.

Community resiliency will expand from our coastal communities to our rural communities. Through issue-based forums, town halls, informal discussions, and in-depth research and analysis, our Extension programs work side by side with communities on both short and long term issues that will affect economic and community prosperity.

Education
K-12 will see an increased scrutiny on the disparity of resources between eastern and western Sussex County. There is an expectation of elevated education in the math, science, and engineering curriculum. New charter schools will be in place, expanding school choice options for Sussex residents. Student populations will continue to increase, with a significant increase in the Hispanic population.
Delaware Technical and Community College will continue as a significant County resource. Their 2 year Ag degree with unique concentrations continues to attract Sussex students. An opportunity may exist for our College to expand course offerings and degree concentrations as it pertains to the University of Delaware’s Associate Arts degree program. This will allow transfer students the opportunity to get exposed to agriculture curriculum and possibly aid the College in recruitment of students from southern Delaware.

Programmatic Opportunities

“Continue to do what we are doing only better and more efficiently”

Agriculture & Horticulture

- **IPM/Weed Science**- insects, weeds, and diseases are complex and difficult issues and will continue to be challenging with different combinations of seed traits and herbicides, and the management of resistant species.
- **Irrigation**-irrigation and water usage will become even more important in the future for Sussex County and the State. Focus on improved water management (efficiency and conservation), and enhancing crop production and nutrient management will be critical.
- **Nutrient Management**- environmental issues are going to become even more contentious and litigious. Farmers, homeowners, and the landscape and greens industries continue to look to UD for help and guidance.
- **Variety and fertility trials**- research on new varieties, production methods, and enhancing efficient fertilizer plant use are important areas of emphasis.
- **Organics**- will continue to grow as a popular trend with a limited audience. Organic commodity prices are a minimum of 25% over conventional grain prices. However, current research is demonstrating significant challenges in this area, particularly as it relates to labor and yield.
- **Master Gardener Program**- continues to expand each year.Sussex County Master Gardeners volunteered a total of 6,189.25 hours (average of 80 hours per Master gardener) in 2012 for educational efforts in the following areas: Demonstration gardens, public service, mass media, educational presentations, community projects, exhibits and displays. Hours given by volunteers saved Delaware Cooperative Extension $116,172.22 ($18.77 professional rate). Interest continues to increase for information regarding “victory gardens” and backyard food production for home consumption.

Sussex County Master Gardeners are people who enjoy gardening, have gardening experience, want to learn more about gardening and have a desire to help others in their community. Their volunteer contribution provides a significant economic and environmental service to the local community. In alternate years, Carvel serves as a joint training location for both Kent and Sussex County Master Gardeners. The Demonstration Garden, located directly behind Carvel is the site for self-directed tours and is an open-air classroom for a wide variety of residential horticulture topics. This garden serves host to workshop topics ranging from pruning, composting, hypertufa, starting a vegetable garden, weed and plant ID, encouraging songbirds and butterflies and much more! In recent years Master Gardeners have gained recognition for
their efforts in emphasizing Accessible Gardens. Their Garden Smart/Garden Easy presentations encourage those with physical disabilities to continue to enjoy gardening. In addition, the award-winning puppet show, *The Adventures of Peter Rabbit in Farmer McGregor’s Garden* travels to schools and special events across the state - wherever young children and their parents, may gather. The educational show features garden pests, pollinators, and making healthy food choices.

- **Wildlife Conservation/demonstration area** - public interest in this field may demand more attention. Designated area in Georgetown includes the woodlot and small field plantings.
- **Locally raised livestock** - interest continues to grow in grass-fed/pasture raised, locally produced beef, lamb, and poultry.
- **Poultry production and disease management** - emphasis has greatly increased with informational transfer of applied research for all aspects of poultry production. Primary areas include litter management, ventilation and air quality, overall house management with technology (controllers), bio-security, energy (see below), and manure management. Lasher laboratory is the front line for poultry disease surveillance and diagnostics.
- **Energy** - research in this area has primarily focused on energy savings for poultry production. Emphasis is ventilation, solar, LED lighting, and potential for alternative uses of manure for energy and enhanced nutrient recovery.
- **Vegetables** - research in this area has dramatically increased with the new Vegetable and Fruit Extension Specialist in Georgetown. Emphasis continues in lima bean breeding and production, vine crops, and sweet corn. Additional research includes specialty fruit and Cole crops. Food safety and handling has become critical importance to fresh markets, processing plants, and home owners.
- **Horticulture** - commercial horticulture continues to increase in Sussex. The landscape and greens industry along with homeowners are major areas of emphasis along with business management and marketing.
- **Farm financial and business management** - unique programs like “Annie’s Project” work with farm and agriculture industry wives on business management and touch the importance of family business transitioning (Estate planning).
- **Farm, home, and work place safety** - this program continues to provide outreach to diverse audiences, with emphasis on farm equipment and shop safety, grain handling, protective equipment, and Agrability. Disaster preparedness has also become paramount for Sussex County and the State, especially within the coastal communities.

**4-H Youth leadership and development**

4-H has a long and proud agricultural tradition, but in its 100+ year history, has also focused on important life skills, citizenship, leadership, healthy lifestyles, the arts, science and technology, and engineering. 4-H is really youth in action. The county 4-H Extension agents, with the help of dedicated adult volunteer leadership in all parts of the county and state, make it possible for every boy and girl - regardless of race, creed, economic or cultural background - to take part in 4-H activities. 4-H members learn about science and scientific methods. They explore careers and obtain valuable life skills, such as
programs and to extensive low communication. Now, In and prepared childcare, assist education and consumption, (FCS) public cooperation purchase, the opportunity in public management, Camp Delaware, dairy clubs, and Delaware, 4-H is proud that our family of volunteer educators are screened with background checks and enthusiastically attend trainings and forums throughout the year to enhance an already vibrant leadership force that is committed to the 4-H motto to “make the best, better.”

**Family & Consumer Sciences**

Now more than ever, the disciplines and programs under the umbrella of Family and Consumer Sciences (FCS) contribute relevant and much needed information to individuals and families. As people struggle with balancing budgets, becoming better consumers, worrying about the quality of their family childcare, improve nutrition, reduce obesity, remaining productive as they mature and having the ability to purchase, prepare and consume food safely, FCS Extension agents are providing their constituents with practical use for the latest research and technology. Programs like the Master Food Educators are critical in meeting these demands. This volunteer workforce helps FCS agents staff educational displays, assist or conduct workshops, present nutrition, food safety and wellness curricula to schools and other public groups.

FCS agents and the outreach professionals from EFNEP are committed to help individuals choose healthy food selections and lead a physically active lifestyle. EFNEP nutrition assistance in particular, outreach to low-income families where nutrition resources are most needed, and are a key component of the 4-H Day Camp experience emphasizing healthy eating choices. While a balanced diet of fruits, grains, vegetables, dairy and protein are always emphasized, knowing that the good foods are grown and prepared safely is of vital importance. FCS professionals offer continuous workshops to the commercial and smaller growers who produce the food we eat. It starts at the farm and extends to the table. FCS staff work with Ag agents in teaching our produce growers how to handle food safely through education such as Good Agricultural Practices (GAPs) and Good Handling Practices (GHPs). In addition, food safety programs such as the nationally recognized ServSafe and local short course DineSafe, train the chefs, cooks, waiting staff and anyone who handles food, how to serve it safely.

In cooperation with the State of Delaware Division of Childcare Licensing, FCS staff provides quality, extensive training sessions for those working directly with children to enhance their skills and maintain their licensing.
Lasher Laboratory

**Mission:** To support the poultry industry and maintain its economic viability through poultry disease diagnosis and applied poultry research.

This lab represents the first line of defense against poultry diseases on the Delmarva Peninsula. Diagnostic services provided at Lasher include necropsy and clinical diagnosis, bacteriology, serology, and mycology using molecular diagnostic testing. Virology and histopathology specimens collected at Lasher lab are sent to Newark (Allen Lab) for further testing. As a NALHN approved laboratory, Lasher lab routinely performs surveillance for avian influenza and exotic Newcastle disease as well. In addition, there is close cooperation and collaboration with State Department of Agriculture laboratories in both Delaware and Maryland and along with numerous commercial labs in the two state areas. This keeps all parties abreast of current poultry diseases and related production problems at all levels from the breeder flocks through the processing plants.

The role of Lasher Laboratory as the premier poultry diagnostic laboratory in the Delmarva region is secure. There is a long-term steady demand for diagnostic services and research that support poultry health and food safety (see table below).
Applied research projects in collaboration with the poultry industry, faculty, and allied poultry industry in adapting new technologies, and helping develop best management practices are in place. Among these are:

- Beta-testing new diagnostic PCR commercial kits for Salmonella, Campylobacter, a respiratory viral disease screening panel, which includes a rapid, multiplex-PCR screening for common Infectious Bronchitis subtypes.
- Evaluating the performance of different commercial brands of ELISA and PCR tests for the detection of a number of common poultry diseases.
- Evaluating the effects of on-demand application of poultry litter treatment application in broilers.
- Evaluating the effect of in-house composting and an adapted propane torch flow-through kiln-dryer on poultry disease pathogen inactivation and broiler performance.
- Evaluating various methods of Infectious Bronchitis vaccine application to determine the most optimal mode of administration.
- Evaluating various coccidiosis vaccines for infectivity and shedding patterns.
- Developing disease models for Gangrenous Dermatitis and Necrotic Enteritis, and evaluating the influence of various feed additives on both diseases.
- Surveillance of respiratory diseases and the detection of novel or emerging and/or re-emerging Infectious Bronchitis viruses.
- Discovery of novel variant strains of Infectious Bursal Disease.
- Field Disease Investigations: Developed an integrative model (disease surveillance, environmental evaluation, feed testing) for identifying predisposing factors and major contributors to disease and poor performance.
Distance Learning Classroom

Carvel’s state of the art telecommunication classroom is designed to deliver the best in acoustics and HD imagery to provide students, faculty, and staff distant learning opportunities. This classroom has also been recently upgraded to accommodate Adobe Connect conferencing as well. The classroom provides Carvel staff opportunities to teach courses to main campus in Newark, and allow for expanded meeting capability saving valuable time and travel resources. Course offerings have included vegetable crops, weed science, and Agriculture education. In addition, this classroom provides opportunities for agriculture industry meetings not only within Delaware but globally as well.

General Challenges for Carvel REC

- Long term costs of experiment station, Lasher Laboratory, and facilitygrounds maintenance.
- Limited research and extension dollars available, especially for applied research.
- Appropriate land to accommodate the variety of field research projects.
- Many research projects do not provide any economic return to the experiment station (Cost Recovery).
- Expanding teaching opportunities for students
GROUP DISCUSSION SUMMARY (Note the following bullets are not in order of priority, but reflect written and verbal input from staff)

I – Existing as well as new research and extension personnel needs

- Replace the Experiment Station Associate Scientist Precision Ag Specialist- will help with precision ag technologies and statistical assistance with on-farm demonstrations
- Grant manager/developer/reporter
- Business, marketing and entrepreneurship specialist
  - Legal issues, insurance, contracts, mediation and marketing
- Facility accountant/support Staff (Office, Farm, Infrastructure)
- Full time computer tech /media technology person
- Software application developer (mobile devices)
- Ag Literacy educator (could possibly combine with commodity resource person)
- Resource person for commodity groups – work with college to keep curriculum relevant for industry needs
- Formal partnership with College of Earth, Ocean and Environment Sea-Grant Marine Advisory Service to provide a community and economic development program position
- Lasher Lab – one or two people (lab technicians); one or two poultry farm assistants; secondary vet position
- Volunteer coordinator to oversee all program areas to assist with volunteer support
- Poultry engineer with environmental background to assist with energy and environmental challenges
- Building facility maintenance/security positions (2)
- Additional 4-H Agent (currently have 1 agent for county)
- More research and support staff for professionals (extra help in the field); i.e., vegetable program/technician to help Gordon/Emmalea in field (ie. Spraying and plot maintenance)
- Extension professional for seniors (nutrition/health/gardening); teaching care for themselves or aging family members
- Entomologist position- insect ID/gardening, etc. – homeowner questions will increase with population (extension specialist for this?)
- Small herd livestock personnel, small farms, niche markets; larger farms going to farmettes (livestock person to help)
- Agronomy specialist
- Urban Ag position
II – Existing as well as new capital improvements

Old REC office complex (REC Annex)
- Roof replaced on main building
- Re-locate plant science lab currently in Lasher to old weed science building (needs new heating and AC system)
- Replacement of tables and chairs for meeting rooms
- Water treatment system for old REC and shed will need to be replaced
- Renovate/upgrade
- Possible alternative - REC ANNEX, remodeled, might serve as a 4-H Center. The meeting room could be enlarged, modernized and possibly rented out when 4-H is not using the space, as an income generator. 4-H has an entrepreneurial curriculum – this could be managed by interns and agent oversight for the benefit of all programming, not just 4-H - in the same way creamery interns run the UDairy. Meeting space and break out rooms rented to community and private functions – modeled along the lines of the Virden Center – are very much in demand in this area. Given the high dollar that DTCC fetches for its facility rentals, this could be self-sustaining. A bit of a pipe dream, but there is a very big community need for meeting space, and this location might fill that need. Downside is this would require additional maintenance and custodial staff and would elevate operating costs for Carvel.
- Remove old vegetable research trailer

Carvel building
- Stairwell treads
- Chiller, etc. – pumps and motors will require repairs or replacement
- Roof repair (leak free guaranteed)
- Upgrade in generator capacity

Poultry houses and research buildings
- All roofs will need painting and repairs
- State-of-the-art poultry research houses (commercial scale) for true trial comparisons

Lasher Lab – Total Renovation
- Backup generator
- Poultry research/necropsy – needs to be updated (hatchery included in this); bathroom would be nice
- Re-grade/repave road via necropsy

Farms (Thurman Adams Jr., Dill, and Warrington)
- Replace aging ag research infrastructure (irrigation technology & pivots, add auto steer, yield monitoring)
- Purchase the 5+ acres where home and buildings are at Dill farm and move/demolish existing structure
- Expand/renovate the farm shop
• Expand equipment storage shed (critical for keeping specialized research equipment out of weather)
• Paint room/booth (for farm equipment)
• Experimental Station Road will need to be repaved/gated
• Liquid fertilizer handling facility for safety purposes
• Walk-in coolers on farm and lab for plant science

General
• Parking lots will need to be resurfaced/sealed
• Septic systems will need repairs or replacement
• Grove – take proper steps to ensure health and longevity
• Forest land – continue to manage for harvest
• Clear out debris piles
• Purchase or rent more land adjacent to us
• Storage will always be a huge issue (currently old REC serves this capacity well)
• Improve field drainage/grading issues
• Outside showers
• Classroom space
• Possibility of using solar/wind for energy
• Continue to update fitness facility for Carvel staff
• Demolish old buildings that are becoming eye sores and a drain on resources
• Housing for visiting scientists, grad students, etc.
• Blinking light in front of building (turn lane?)

III - Facility and research equipment needs (including technical support)
• Maintain ITV capabilities, however need Townsend Hall to partner with complementary equipment and facilities. Have a state of the art room at Carvel and just a poor make do room (007) in Townsend Hall
• Sub-zero commercial or wide freezer
• New refrigerator/ice machine – kitchen
• iPads for staff
• Upgraded phone system
• Replace all copiers
• Motor pool (fleet of vans for use – agents, 4-H, poultry, etc.)
• Updated lab equipment for Lasher and plant science (molecular) including growth chambers

Farm
• Fabrication/project development shop
• Land level many of the fields on the farm.
• Continue critical technical support of the farm crew.
• Equipment for vegetable production, particularly effective cultivators for 30-inch rows as well as new 6-row monosem
• 6-row corn planter
• Welder/plasma cutter
• Continue to upgrade research plot combines
• Small plot harvester/sheller for limas/peas
• Corn stalk cutter
• Rear loading lowboy trailer
• New truck tractor
• New Kruger trailer for top kick truck
• Backhoe
• New sprayer for weed science
• Continue to upgrade tractors
• New computers in farm shop
• RTK Auto steer
• Truck with lift gate
• Zone and vertical tillage equipment
• Advanced irrigation system/equipment
• Mini excavator
• 2 new gator ATVs
• Climate control seed storage
• New irrigation for demo garden & grove
• Vegetable processing research area
• High tunnels/nursery/shade house
• Update computers
• Small plot research combine

Poultry Research

• Access to freezer facilities outside of Lasher Lab
• Establish a poultry emission-testing lab (15 x 15 or larger) to provide evaluation services for the industries that are of interests in evaluating their products on emission control, bird production performance and health.
• Upgrade the environmental house with variable speed 24” fan, scales, controller for actuated attic vent. Update controller software. Add to CT controller feed & bird scales or update present system to advanced controls and internet access.
• Demolish the old large broiler barn that is no longer used and build one or two new broiler houses for broiler environmental and emission research and demonstration, such as tunnel ventilation, attic vent, and different lighting systems.
• Poultry truck and bobcat
• New incubators
• Research pens for poultry
IV - What role does our staff and facilities play in student recruitment and teaching?

- Demos, open houses and tours only. This is not a teaching facility for students
- UD students work in the program on a paid internship type arrangement
  - Main issue for UD students who are not local is housing
  - Use UD housing in Lewes – or provide housing in Georgetown
- Guest Lecturer
  - Local schools
  - Campus
- Extension staff teach introductory level ag-related or science courses.
  - Consider an Associate of Science offered in Sussex – with classes taught at Carvel like introduction to botany (plant science) and entomology and animal science at the Associate of Arts program as an alternative science selection for freshman & sophomores. These courses can qualify for the AA degree and exposes students to the ANR major in our college. In the past, these courses were offered at the AA location at DTCC and had good attendance.
  - Use the farms as teaching labs so students have greater exposure to practical agricultural issues. Other schools are much more “hands-on” then UD and emphasize practical skills
  - It is ok for UD to be a “cow college” again
  - Lab facilities (poultry or plant) can also be used as teaching labs. Joint program w/STEM/high school students, etc.
- Expansion in this area requires a commitment from CANR administration to provide leadership in maintaining ITV; working with Georgetown Campus and Del Tech to be sure that courses are appropriately listed in fliers and catalogs; helping us to navigate through to right channels to maximize our efforts with both campuses
- Develop video content – introduce why we are here
- Have 4-year degree offered down here and stick to it. I think it is still on the books but not supported at all levels. Could pull from eastern shore of MD & VA.
- Reach out to high school recruiters and Del Tech AA program more
- Invite high school teachers for an Ag day
- Field trips from high school/college; FFA; Use ag ambassadors
- Institute employee incentive for recruitment
- Master Gardener program expanding for farmettes or MG doing ag things (free range chickens)
- Better link between UD ag program and Del Tech; some credits don’t transfer, some do
- Extension instructor agent for just teaching; get a degree through them and they could be the recruiter too
- Main campus needs to enhance program (more hands-on) to attract more students so students know more, have more experience, than just being taught from books.
- 4-H members as interns – not just ag but technology, nutrition, horticulture, etc. Also, high school volunteers – community service hours; honor society
- Get university-wide commitment to a Del Valley type of program
- Focus on food production and careers in food production
- Graduate student classes from here
- On-line classes for high school juniors and seniors to get advance college credits
- Tours for middle/high school students….ag jobs

Caution - If we increase our role in these areas, what will we give up? This cannot be an additional task that we add to an already full workload.

V. Innovative strategies to address limited resources
- Staff flexibility-Staff personnel may need to stop being focused upon past job roles and be willing to work with other groups if needed. Staff may be asked to embrace new roles.
- Coordination of field projects to make sure they meet overarching goals – can’t do everything when an idea hits someone. Do we have a threshold criteria or set of goals and objectives that projects should meet? Such as; is there money, land for this project? Is the project worthwhile, or can it be justified? Should we be doing this particular project?
- More on-farm research using GPS/ GIS systems similar to the way Bob Nielsen at Purdue has spoken of at CCA meetings. Would require Precision Ag support.
  - Cost is minimal, and farmers increasingly have all the equipment necessary.
  - Benefit is that by combining many fields and farms, greater data can be gathered. On-farm research using cooperators teamed with UD agronomy team of experts.
- Increase our visibility: How to connect with non-ag here at the REC (is it beneficial that people come to REC and see what we have versus collaborating with other groups at events away from the REC?) This can be a double edge sword as far as demands on Carvel.
- In seeking outside funding we could continue to promote the story about why the research farm is important and what happens here
  - Maintain a list of all of the projects being done on the research farm and required a report of some kind to be submitted on the project.
  - Farm manager could use to show the value of the farm. Many of us who do work on the farm already prepare reports on what we do; it would be a matter of getting someone to compile them in one location e.g. a limited access web-based resource that could include links to reports and publications that are already exist. Preliminary data that is not ready for publication for clients to access could be summarized by the researcher and the report would only be accessible internally. ALSO, as we are going to be implementing a new planning and reporting system there could be a built in check-box to designate, projects and educational events that use REC facilities.
- Full use of technology and distance learning
- Volunteers for research programs (USDA Beltsville has extensive volunteer programs to help with plot maintenance, harvest, etc.). This can present issues in liability and quality control.
• On-line courses to juniors and seniors for college credits – more like Academic Challenge – charge AP/college credits that would generate income to support RBB model.
• Grain storage – work the market. Are costs and risks associated with this and is there enough grain to warrant this cost?
• Any ways to maximize income with chicken houses?
• Major clean-up; salvage metal/old machinery; bring in some money
• Farm market and winery (could use student interns similar to creamery); sell on-farm products, vegetables, honey, etc. (or could have community farm market as well); health concerns
• Donate or sell crops we haven’t been selling to local businesses – “buy local.” Problem if sell then we compete with local producers which could cause bad blood.
• Continue to maximize commodity sales; does pose challenges since some crops are destructed due to research protocol.
• Volunteers work toward providing programmatic support/teaching classes
• Communication Management Systems (social media)
  o Mailing lists for notification of meetings, etc. How to manage
  o Snail mail
  o E-mail
  o Twitter
  o Texting
  o Facebook

Caution - our constituents – rural – do not have access to adequate information technology. Without a good broadband infrastructure – our staff and programs are forced to do things in less-efficient and technological manner, e.g., printing, mailing out. UD is partnering with State to investigate this challenge.
Priority summary of Carvel Research & Education Center

I. Staff
- Facility maintenance and custodial position
- Limited term Research position – maintain Vic Green
- IT/media position
- Accounting position to assist with massive financial management of contracts, grants, and daily expenditures for facility operations

II. Capital improvements/renovations
- Lasher lab renovation
- Plant science lab that is relocating out of Lasher across to the old REC Annex
- Parking lots resealed and striped
- Roofs over at old REC Annex
- Equipment storage shed

III. Equipment needs
- Lasher lab analytical equipment
- Computer upgrades
- Replace irrigation systems (linear and pivot)
- Outside freezers/refrigerator for field research (plants and soils)
- Small plot combine