Swine Commodity

STATUS OF THE PORK INDUSTRY

The swine industry has experienced tremendous change over the past two decades. Total swine inventory in the US has increased from 55.5 million pigs in 1988 to 62.2 million in 1998 and 67.4 million in 2008. In NC, this increase in pig inventory has been much more dramatic, with an increase from 2.7 million pigs in 1988 to 9.7 million in 1998. Since then, pig inventory has remained relatively stable with a reported inventory of 10.2 million in 2007. The moratorium on pig production implemented in 1997 is the reason for the slowed growth of the pork industry. North Carolina is second in pig production, with Iowa being first. Even though pig numbers have increased, the number of swine farms in the US have decreased from approximately 325,000 in 1988 to 110,000 in 1998 and 73,150 in 2008. Thus, fewer farms are responsible for a large portion of pig production. Especially in NC, few large integrated pork production companies are responsible for the majority of the pigs produced. Overall, the pork industry in NC was responsible for 22.1% of the total cash receipts from agriculture in 2007, thus representing a significant source of income and tax receipts to the state.

Currently, the U.S. pork industry is experiencing an economic crisis. U.S. pig producers have lost an average of more than $21 per hog marketed since October, 2007. This tremendous loss is a result of several factors. Corn prices have increased, peaking at around $6.50 per bushel in central Illinois. Prices are expected to average between $3.35 and $4.15 per bushel (USDA) through August 2010, which is a 67% to 107% increase compared to 1998. The federal mandate to produce fuel ethanol is primarily responsible for the rise in corn prices. Soybean meal prices have also increased because of increased land use for corn production. Soybean meal prices have increased from an average of $183 per ton from September 1998 through August 2007 to $326 per ton from September 2007 through June 2009. Market prices for hogs in the U.S. have declined since mid-2007. This economic crisis will impact the viability of pork production in North Carolina. Lost income due to a reduction in pig production will decrease income from affiliated industries, result in job losses, capital losses, and reduced pork packing and processing.

SWINE EXTENSION PERSONNEL

There are currently three faculty members with a swine extension appointment, representing a total of 2.07 FTE’s. We have experienced a large reduction in swine extension faculty from 7.73 FTE in 1990 to 4.13 FTE in 1998, to our current level of 2.07 FTE. Part of this regression is consistent with the reduction in the number of swine operations in NC; however it is not in line with the tremendous growth of the swine industry and its economic impact in NC. In addition, the numbers of county extension staff working with swine have decreased, limiting outreach programs. With the consolidation of the pork industry in the US, and particularly in NC, focus of extension programs has changed from traditional approaches to highly technical programs. The current swine extension faculty provides support in the core disciplines of nutrition, waste management and health, but do not represent reproduction, genetics, animal welfare and youth. The Swine Extension program should serve first and foremost as a well respected and unbiased source of information to the industry and, thus, full representation of the core disciplines in the swine extension staffing plan should be a priority to fulfill that mission. Clearly, we are understaffed to properly address the needs of the large swine industry in NC. We have previously identified the need for a position in swine welfare. Similarly, the Department of Animal Science has identified the need for an animal welfare oriented faculty member in its last strategic planning meeting. It is clear that swine welfare is one of the major issues in the pork industry (e.g., ban on gestation crates) and is an area in which NCSU should take a proactive leadership role.

The Swine Extension program currently has one FTE in administrative support and two FTE’s in field technician support. We believe this level of support to be appropriate to maintain our programs.
Table 1. Full time equivalence (FTE) in Swine Extension for 1990, 1998, and 2009.

<table>
<thead>
<tr>
<th>Name</th>
<th>2009</th>
<th>1998</th>
<th>1990</th>
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<tr>
<td>Claeys</td>
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<tr>
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<td>0.75</td>
<td>--</td>
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<tr>
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<tr>
<td>Open/Rozeboom</td>
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<td><strong>TOTAL FTE</strong></td>
<td><strong>2.07</strong></td>
<td><strong>4.13</strong></td>
<td><strong>7.73</strong></td>
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</table>

EXTENSION PROGRAMS

**General**
In general terms, the swine extension program should:
1) Conduct relevant research with immediate or future application in the swine industry
2) Provide unbiased, scientifically based, information to the Pork Industry
3) Provide support to the swine industry through (agent) training, student training, teaching, public relations, community outreach, and 4H.
4) Leading multidisciplinary programs, by including expertise within and outside of NCSU

**Productivity**
Productivity of the swine extension group is very good (Table 2). We have been able to secure significant amounts of funding and have been productive in providing relevant information to the swine industry and the public in the form of written publications and presentations.

Table 2. Funding, publications, and students (trained and current MS or PhD students as advisor or committee member) from 1989 to 2009.

<table>
<thead>
<tr>
<th>Person</th>
<th>Years at NCSU</th>
<th>Funding</th>
<th>Publications</th>
<th>Other</th>
<th>Students</th>
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<tr>
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<tr>
<td>Stahl*</td>
<td>2</td>
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<td><strong>TOTAL</strong></td>
<td>51</td>
<td>$9,043,749</td>
<td>133</td>
<td>698</td>
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* Contributions from NCSU only

**Individual programs**

Dr. Morgan Morrow. Dr. Morgan Morrow was hired in 1989 with a 100% extension appointment. His appointment currently is 92.3% extension and 7.7% teaching. His program focuses on delivering timely information to all NC pork producers, but primarily to swine veterinary specialists working for the larger producers. This often is in the form of applied research projects undertaken on the stakeholders' farms. His focus is especially in the areas of swine euthanasia and antibiotic resistance.

Dr. Morrow schedules, programs, speaks and moderates a bimonthly meeting of the North Carolina
Pig Veterinary group. This group has responsibility for health, care and welfare of approximately 1.28 million sows and their progeny and the program is registered for CE credits for veterinary registration in the state of North Carolina. Since 1992, Dr. Morrow has organized and spoken at the annual Healthy Hogs Seminar. Proceedings from this conference are available on the web and the site has been accessed 10,548 times since 1998. The complex and highly emotional issues of both steady-state euthanasia and mass-depopulation have been a major component of Dr. Morrow's program leading to national recognition and involvement in setting standards for mass depopulations as well as steady-state swine euthanasia. He is owner of AASV-L, the communication list-serve for American Association of Swine Veterinarians (AASV) members and chair of the AASV Communications Committee. He is Swine Health Domain editor for the Pork Information Gateway since 2007.

Dr. Todd See. Dr. See has served as Interim Head of the Department of Animal Science since July 1, 2008 but has maintained involvement in swine extension. Dr. See provides statewide and national leadership for swine extension programs with a primary focus on swine breeding and genetics. Genetic program areas include breeding programs and selection objectives for commercial and seedstock producers, development and implementation of genetic improvement programs, genotype and management interactions, and genetics of pork quality. General program areas to be covered in addition to genetics include marketing, cooperative development, production management, and nutrient management. Dr. See is responsible for providing leadership in further developing and coordination of Swine Extension programs by working with extension agents, agribusiness representatives and producers in North Carolina and around the world. Dr. See has served the Animal Science Department as Swine Commodity Coordinator since 1998. In this role he provides statewide leadership and coordination for Extension Swine Husbandry Programs, communicates items of interest to swine interest faculty campus-wide, organizes agent in-service training, coordinates educational efforts with the North Carolina Pork Industry and the National Pork Board, and provides swine industry situation and outlook reports to the Cooperative Extension Service and Administration. Dr. See serves as the liaison between North Carolina State University and the North Carolina Pork Council, National Swine Improvement Federation, National Pork Board, National Pork Producers Council and National Swine Registry. He developed and currently serves as the Lead Editor of the Pork Information Gateway a resource of eXtension and the U.S. Pork Center of Excellence. Dr. See is also on the steering committee leading the development of the Swine Online program that will lunch a swine science minor through AgIdea. Dr. See is the PQA Plus Trainer for NC and in this role has trained over 75 PQA advisors in the last year who have trained 3,000+ producers and assessed more than 1,400 farms. Currently there are more swine farms with PQA site assessments in NC than any other state. Along with Dr. Dana Hanson in Food Science, Dr. See conducts 3 to 4 “Pork 101” training programs for employees of Smithfield Foods. This two day training programs describes the interrelationships in all jobs in a vertically integrated food company.

Dr. Chad Stahl. Dr. Chad Stahl’s program is centered in conducting dual-benefit research relating to nutrition and health. His laboratory focuses on two major areas: 1) Mineral nutrition in relation to bone health, and 2) Development of protein based antibiotics. His current mineral nutrition research focus is determining the role of calcium and phosphate nutrition on tissue-specific stem cell activity (mesenchymal stem cells and satellite cells) particularly as it pertains to the developmental programming of the musculoskeletal system. His protein based antibiotic work is centered on utilizing biotechnology to improve the efficacy of colicins for use in both the animal health and the human food safety fields. These programs provide basic research with potential immediate and future practical applications. He has established contacts with the swine nutritionists responsible for the major swine production companies in NC. He has also been involved in the planning of the Carolina Feed Industry Association Swine Nutrition Conference and has given invited presentations at the State, Regional, and International level.

Dr. Eric van Heugten. The focus of Dr. van Heugten’s extension and research program is to integrate applied research with extension and directly address questions from the swine industry and other stakeholders. His program aims to actively involve the swine industry in applied research projects, including meetings or discussions on experimental design and practical application of results. He has
conducted over 70 studies and all of these had direct or indirect involvement by swine production companies. Studies have focused on issues directly relevant to the swine industry, such as nutrient management, meat quality, antibiotic resistance, evaluation of non-traditional ingredients, etc. He has collaborated extensively with various Departments within NCSU and international organizations. He has participated in numerous agent training programs, producer training, and national training programs. Recent programs include the National Swine Nutrition Guide, PorkBridge, and SowBridge. He has been involved in organizing the Carolina Swine Nutrition Conference since 1997, serving as chair since 2003.

Program Delivery

- North Carolina Pork Conference Seminar
- National Swine Educators Conference
- Healthy Hog Seminars
- Pork 101 Programs
- Regional Pork Conferences
- Swine News (11 issues/year)
- Pork Information Gateway
- Animal Science Factsheets
- Carolina Swine Nutrition Conference
- On-Farm Performance Testing Program
- MARK - NCSU Swine Extension website

STRENGTHS

- The Department of Animal Science has many people working in the swine area (research, extension, and teaching). Thus, there is a critical mass of people that cover all the discipline areas and cover basic to applied areas of expertise. The productivity of this combined group is high and there is a good working relationship amongst people. In addition, there are several faculty members in the College of Veterinary Medicine with a focus in swine with whom we collaborate.
- The swine extension group has close access to the University swine research farm and the University feed mill. The swine research farm (Swine Educational Unit in Raleigh) is a farrow-to-finish operation and is well suited for applied and basic research. The Swine Evaluation Station in Clayton allows us to bring in pigs from genetic companies or pork producers and is well suited for commercially applicable research. Grinnells research laboratory (on-campus) and the Swine Health Building provide an opportunity to conduct basic research with practical application.
- The swine extension group has close access to pork production companies (swine farms), commercial feed mills, and packing plants (small and large). We have good opportunities to conduct on-farm research studies with facilities that are reasonably close.
- We have established great working relationships with pork producers, commercial feed mills, and packing plants and have been able to conduct collaborative programs with them. In addition to being able to conduct applied research at commercial sites, we have been able to actively engage our stakeholders in our programs.
- We have great opportunity for collaboration with others within NCSU and develop strong and competitive programs. For example, we have actively worked with Food Science (e.g. meat quality), Poultry Science, Soil Science, Microbiology, Biological and Agricultural Engineering, Agricultural and Resource Economics, and the College of Veterinary Medicine.
- North Carolina is the second largest pig producer in the U.S. with a technologically advanced swine industry. This provides opportunity to attract allied industry companies for collaborative work.

WEAKNESSES

- The total number of undergraduate and graduate students with an interest in swine is limited.
- The current economic crisis has resulted in very limited support. Thus, support for applied projects at the Swine Educational Unit is non-existent; in fact we are required to pay for all feed
expenses. Similarly, work at the other units is restricted because of budget shortfalls. Operating support and travel support is non-existent, severely limiting outreach programs.

- Although we have access to good facilities, we lack space for research and extension programs that would be valuable to the industry. For example, we lack on-campus slaughter facilities and facilities to conduct work with diseases using environments representative of the industry (Facilities for direct challenge models with limited numbers of pigs are available). Thus, programs are driven in part by access to facilities, rather than industry needs.
- The swine extension program has seen a tremendous reduction in number of FTE’s over the past two decades. To adequately address the needs of the industry we should have strong representation in the core disciplines, including reproduction, behavior, and management. In particular, current issues related to animal welfare that are strongly affecting the industry indicate a strong need for a position in the area of animal behavior and stress physiology.
- Promoting and marketing our work

OPPORTUNITIES
- We have great working relationships with pork production companies and the allied industry, which provides an opportunity to conduct programs at commercial farms (on-farm testing). We are able to directly engage our stakeholders into our programs and leverage support from the allied industry. We are also able to provide direct experiences for students in a practical setting, which contributes people with experience to the potential work force in the future.
- We have the opportunity to be recognized internationally for collaborative work with the industry, because the large integrated industry has an international scope. Recognition of our programs will enhance student recruitment (nationally and internationally) and our ability to obtain competitive and industry funding.
- We have the opportunity to market our programs and research results directly to the large industry with a potentially great impact on the pork industry.
- Our situation with limited funds provides the opportunity to provide more distance education.
- We have the ability to engage other Departments and Colleges into our research and extension programs, thus being able to address problem that are well beyond the expertise within our group. The opportunity to address multidisciplinary problems will enhance our value to the industry and allow us to position ourselves better for industry and competitive funding.

THREATS
- The significant losses in swine extension personnel (including Specialists and Agents) weaken the effectiveness of our overall programs. We will have to choose which issues we can address and which ones we can not.
- The swine industry in NC is in an economic crisis, resulting in a reduction in pork production and a loss of companies involved in pork production. Who will be left and how will this shape our extension programs?
- The lack of funding is a concern. We will have to cut programs or we will have to increase our reliance on extramural funding sources. Reliance on extramural funding may compromise traditional extension programs, direct efforts into areas where money is available, and compromise the integrity of the extension program.
- Funding limitations may limit facilities to conduct more basic research, which is an important component of swine extension programming in an industry which is highly technologically sophisticated.
- The potential loss of support people (due to imminent retirements) is a serious threat if we are not able to hire others in these positions.