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Economic Impacts of Hog Operations

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For some time there has been concern regarding the net economic impact on rural communities of new and expanding livestock production facilities. As with many controversial issues, there are often "winners" and "losers" associated with local changes in the livestock industry. The purpose of this bulletin is to succinctly summarize the current literature regarding associated economic impacts.

Often the first question raised is how new livestock facilities impact local property values. This question is difficult to answer easily or universally because each situation will have a significant number of unique factors involved that ultimately drive resulting property valuation adjustments. Similarly, extrapolating the results from site-specific studies is complicated, since the characteristics of different locations and different livestock facilities vary widely. Nevertheless, recent research has provided some evidence about property value impacts of livestock operations. Some main points include:

- Separate analyses of residential sales in rural Pennsylvania between 1998-2002 and in southeast North Carolina in 1992-1993 suggest that the impact of livestock operations on property values declines with distance from livestock facilities (Ready and Abdalla; Palmquist, Roka, and Vukina).
- Ready and Abdalla found livestock operations exhibit negative impacts on residential property values. Property valuation reductions are estimated to be 6.4% and 1.6% for homes within 500 and 1,200 meters, respectively, of livestock facilities. This study of property valuations in rural Pennsylvania also found that the size of negative property value impacts do not necessarily increase as livestock operations increase in size.
- Research of residential property sales during 1992-2002 in Iowa concludes that moderately sized operations negatively affect neighboring property values, but also that the moderate-sized operations have a larger impact than larger-sized operations. The authors hypothesize that management, facility age, and types of manure handling systems of larger operations may mitigate negative effects. The estimated average property valuation decrease was 8-9% for introduction of a moderately sized livestock facility one-half mile upwind from a home previously located at least three miles from the nearest livestock facility (Herriges, Secchi, and Babcock).
- An evaluation of residential property sales during 1993-1994 in rural Minnesota revealed that the existence of nearby livestock facilities positively impacts property values. The estimated average property value

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What's Inside ...

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increase was 6.6% (Taff, Tiffany, and Weisberg).

- Examination of 1979-1999 Illinois farmland transactions reveals that as swine operations increase in size, the more positive influence they have on nearby farmland values. Higher concentrations of farms (more farms in a given geographic area) exhibit negative impacts on farmland valuation (Huang, Miller, Sherrick, and Gomez).
- Mixed evidence exists of differences in impacts across livestock species. In a Colorado study, Park, Seidl and Davis found existence of nearby beef and dairy cattle operations to be positively correlated with residential sales prices while swine and sheep operations were found to be negatively correlated. However, Ready and Abdalla assessment of impacts in Pennsylvania suggests no significant difference in impacts across species.

A second issue of importance is how the broader local community is economically impacted by introduction of a new livestock operation. It is important to appreciate that the hog industry consists of a series of activities spanning from production of feed inputs, through actual hog production, to the processing and distribution of pork products. Hence the total economic effect of the hog industry is much larger than direct employment and activity on swine farms. Local economies that are more heavily involved in the different stages of the industry (for example growing the feed inputs, raising the hogs, and operating slaughtering facilities) stand to reap a higher portion of the total economic benefits than communities that are less involved in the cumulative industry activities. As such, it is important to again note that each case tends to have a significant number of unique factors involved that ultimately drive resulting economic impacts. Some main points available from current research include:

- A study of hog operations in Iowa suggests that wages per worker (table 1) and that net fiscal benefit to local communities increases with operation size (table 2) (Otto, Orazem, and Huffman).
- Thompson and Haskins suggests that operation of one 3,400 sow unit employs 11 less people than twenty-three 150 sow units would employ. However, this analysis incorrectly assumes that operation size has no impact on firm competitiveness or likelihood of survival in the future.
- In an examination of swine operations in Minnesota, Lazarus et al. found that over 85% of the inputs

Table 1. Employment and Earnings Sumary

	Size of Operation			
	150 Sows	300 Sows	1,200 Sows	3,400 Sows
Direct Employment (jobs)	1.4	3.0	10	21
Employee Income	$40,750	$87,100	$294,686	$709.097
Earnings/Worker	$29,107	$29,033	$29,496	$33,767
Earnings/Worker/Sow	$194	$97	$25	$10
Secondary Employment (jobs)	1.3	2.7	9	19
Employee Income	$21,598	$46,163	$156,183	$375,821
Earnings/Worker	$16,614	$17,097	$17,354	$19,780
Earnings Worker/Sow	$111	$57	$14	$6
Total Employment (jobs)	2.7	5.7	19	40
Employee Income	$63,348	$133,263	$450,869	$1,084,918
Earnings/Worker	$23,092	$23,379	$23,730	$27,123
Earnings/Worker/Sow	$154	$78	$20	$8

Source: Otto, Orazem, and Huffman

Table 2. Fiscal Impact Summary

	Size of Operation			
	150 Sows	300 Sows	1,200 Sows	3,400 Sows
County Revenue	$1,474	$3,435	$13,032	$30,522
City Revenue	$1,964	$2,108	$7,024	$14,414
All Revenues to Local Schools	$3,062	$4,168	$13,891	$32,028
Total Local Revenue	$6,501	$2,792	$9,301	$18,592
County Expenditures	$998	$6,732	$24,021	$50,353
City Expenditures	$1,344	$14,336	$50,944	$112,902
Total Local Expenditures	$5,405	$11,631	$40,346	$83,358
Net Benefit	$1,096	$2,704	$10,598	$29,544
Net Revenue to State Gov't	$2,401	$5,157	$17,512	$43,720
Estimated Local Property Taxes Paid by Operators	$1,327	$2,806	$12,516	$27,972

Source: Otto, Orazem, and Huffman

purchased by producers surveyed were purchased within the state. Construction supplies were found to typically be purchased from outside the state and 99% of complete feeds and 89% of premixes were found to be purchased in the state.

A third issue that may arise in evaluating the impact of new livestock facilities is the characteristics of employees likely to be involved in the new operation. A comparison between educational levels of employees in the swine industry and the general U.S. population suggests that swine industry employees are more likely to have completed high school and to have obtained a college degree (table 3). Using data from a national survey of both pork producers and employees, Hurley, Kliebenstein, and Orazem found larger operations pay higher wages, offer more generous benefit packages, and have better work environments. The researchers note this possibly reflects the need for more skilled labor to couple with the newer technology and the higher costs of turnover relative to smaller operations.

Table 3. Education Comparison

Highest Completed	Swine Industry	U.S. Population
No High School	4.2%	19.6%
High School	36.7%	28.6%
Some College	24.8%	27.4%
College Degree	34.2%	24.4%

Source: Hurley, Kliebenstein, Orazem, USDA-ERS

References

United States Department of Agriculture (USDA), Economic Research Service (ERS). 2000 demographic information obtained on March 1, 2007 from: http://www.ers.usda.gov/StateFacts/US.HTM.

Herriges, J.A., S. Secchi, and B.A. Babcock "Living with Hogs in Iowa: The Impact of Livestock Facilities on Rural Residental Property Values." Land Economics. 81:4(2005):530-545.

Huang, H., G. Miller, B. Sherrick, and M. Gomez. "Factors Influencing Illinois Farmland Values." American Journal of Agricultural Economics. 88:2(2006):458-470.

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Hurley, T. J. Kliebenstein, and P. Orazem. "The Structure of Wages and Benefits in the U.S. Pork Industry." American Journal of Agricultural Economics. 81:1(1999):144-163.
Lazarus, W., D. Platas, G. Morse, and S. Guess-Murphy. "Evaluating the Economic Impacts of an Evolving Swine Industry: The Importance of Regional Size and Structure." Review of Agricultural Economics. 24:2(2002):458-473.
Otto, D. P. Orazem, and W. Huffman. "Community and Economic Impacts of the Iowa Hog Industry." Chapter 6 of Iowa's Pork Industry – Dollars and Scents. Department of Economics, Iowa State University. 1998.
Palmquist, R., F. Roka, and T. Vukina. "Hog Operations, Environmental Effects, and Residental Property Values." Land Economics. 73(1997):114-124.
Park, D., A.F. Seidl, and S.P. Davies. "The Effect of Livestock Industry Location on Rural Residental Property Values." Department of Agricultural and Resource Economics, Colorado State University. September 2004-EDR 04-12.
Ready, R. and C. Abdalla. "The Amenity and Disamenity Impacts of Agriculture: Estimates from a Hedonic Pricing Model." American Journal of Agricultural Economics. 87:2(2005):314-326.
Taff, S.J., D.G.Tiffany, and S.Weisberg. "Measured Effects of Feedlots on Residental Property Values in Minnesota: A Report to the Legislature." Department of Applied Economics, University of Minnesota. July 1006. Staff paper P96-12.
Thompson, N. and L. Haskins. Searching for "Sound Science": A Critique of Three University Studies on the Economic Impacts of Large-Scale Hog Operations. Walthill, NE: Center for Rural Affairs, 1998.

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Splaylegs in Pigs

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Splayleg is the familiar term for myofibrillar hypoplasia of hind leg adductor muscles that is present at birth and increases the likelihood of the piglet being killed by crushing or starvation. A number of factors are associated with splaylegs and these may explain occasional occurrences of the condition, but doesn't adequately explain herd or production system outbreaks that start suddenly, affect all breeding herds in the system and last for several months to a year.

Major factors affecting the occurrence of splayleg are; large litter size, induced farrowing and gilt litters. All of these produce somewhat less mature piglets either by shortening gestation length, or by limiting blood supply to the fetuses. Other factors that have been associated with splaylegs are; ingestion of zearalenone, high stress level in sows or stress sensitivity, cortisone administration, and infection with hog cholera.

The condition is seen more often in males than females, in pigs of low birthweight (<1.2 kg), and in Landrace or German Landrace X Duroc sired litters. Various physiologic findings, of uncertain significance, have been reported in splayleg pigs. Ascorbic acid concentration in plasma of splayleg pigs was 2.3 mg/dl compared to 6.5 mg/dl in normally developed piglets (Kolb et al 1989). Geneticists have identified molecular markers and a candidate gene (CDKN3 gene) which associate with the splayleg condition in pigs. Glucose-6-phosphatase activity and glycogen differ in normal and splaylegged pigs (Anatalikova et al 1996). Slippery floors have been named as an environmental contributing factor. Occasionally, large production systems experience a distinct onset of increase in splaylegs after introduction of many gilts.

While the mortality of untreated splaylegged pigs is usually about 50%, the rate can be considerably lowered by conscientious management. A major benefit is obtained from taping the hind legs together and providing supplemental feed. Pigs usually recover in 3-5 days. Excellent results have been obtained from massaging the hind legs for 30 seconds, 5 times a day. Massage is labor-intensive, but only has to be done for one day.

Gestating Sows in Hoops: Can It Work?

Ronald O. Bates, State Swine Specialist, Michigan State University

Introduction

With two states banning the use of individual stalls for gestating sow housing and the announcement from Smithfield Foods that their production systems will SLOWLY move toward group housing of gestating sows, there is much interest in alternative sow housing systems. It should be said though, that sows housed in individual stalls allows for adequate management of the sow and that there is no welfare advantage for sows housed in groups versus those housed individually in stalls (AVMA Task Force Report. 2005). Nonetheless, different forms of group sow housing are being investigated as possible alternatives to individual sow housing. This article summarizes a report (Lammers et al., 2007) that compared sows that were housed individually during gestation to those that were housed in groups in Hoop Buildings during gestation.

Study Design

This study was conducted near Atlantic IA, at the Lauren Christian Swine Research and Demonstration Farm from March, 2001 to September, 2003. Sow genetic background was ½ Yorkshire: ¼ Hampshire: ¼ Landrace. Sows farrowed and lactated in individual conventional stalls in an environmentally controlled building until weaning. After weaning sows were placed into slatted floored pens in an environmentally controlled building and mated in a common breeding facility and then allocated to one of two gestation housing treatments. All females (weaned sows, gilts, recycles, etc) which had been mated within 9 days after a group of sows were weaned constituted a group (up to 32 females). Sows allocated to the gestation stall treatment were kept in 2' x 7' ft. stalls, in an environmentally controlled building, after mating and throughout gestation. Sows allocated to the group housing treatment, were placed into stalls after mating and then moved into a hoop structure, within the 9 day span mentioned previously. Sows housed in groups were allocated 37 sq. ft. of space per female, of which 25.4 sq ft. was the bedded area and 11.6 sq. ft. was used for feeding stalls. For the group housing treatment, there was a feeding stall for each sow. Feeding stalls were latched while a sow consumed its feed but remained open during non-feeding times. All gilts were gestated in stalls after mating and then placed into one of the two gestation treatments after weaning their first litter and returning to estrus.

All sows were fed 4.5 lb/day during the first 2/3 of gestation and then increased to 6 lb/day for the final 1/3 of gestation. From November through March, feed fed to sows in gestation stalls was increased 5% while sows in groups in Hoop Barns had their feed increased 25% to offset increased thermal demands for winter.

Results

Sows which gestated in groups in Hoop Barns weighed more at 110 days of gestation (~ 9 lb) and were fatter (~0.05 inch) than sows which gestated in stalls. Sows which gestated in groups in Hoop Barns lost more backfat during lactation (0.02 in) but had similar weight loss while nursing. Though weighing more and being somewhat fatter at the beginning of lactation, sows which gestated in groups in Hoop Barns had similar lactation feed intake to those sows housed in individual stalls.

There were few differences due to gestation housing treatment for reproductive performance. Sows housed in Hoop Barns did have more total pigs born than sows which gestated in stalls (11.7 vs 11.3, respectively) and subsequently had more number born alive (10.9 vs 9.7, respectively). After farrowing, litter size was standard-

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ized across treatments and no difference in number weaned was observed between sows which had gestated in group or individual housing (avg. 8.85 pigs weaned). Sows which gestated in Hoop Barns did take longer to return to estrus after weaning than did sows which gestated in individual stalls (6.0 vs 4.3 days, respectively).

Conclusion

Sow which gestated in groups in a Hoop Building did farrow more pigs but took longer to return to estrus that individually housed sows. Sows gestated in groups in Hoop Buildings were offered more feed during the winter but were just slightly fatter and heavier at farrowing. Overall this demonstrated that sows housed in groups can be managed to obtain similar reproductive performance (i.e. littersize) in comparison to sows housed individually in an environmentally controlled building.

Final Thoughts

The results of this study should be taken at face value without further generalization. Sows which are put into groups quickly after mating (2-5 days) can achieve similar reproductive performance as individually housed sows. In addition, gilts were not placed into group housing with sows which does add to the complexity of the interpretation of the results. Bred gilts included into groups with sows can be at a greater risk of being dominated by older and heavier females which can be detrimental to their reproductive performance and welfare. Furthermore, though Hoop Buildings may be cheaper in construction costs than environmentally controlled buildings with individual sow housing, feed costs per sow may be higher, due to increased feed allocation during winter, as was demonstrated in this study. Group housing of gestating sows can be done in a satisfactory manner; however, several factors including, feeding method, day of gestation after mating when grouped, parity distribution, housing type and square footage allocated must be considered when developing a group housing system.

Literature Cited

AVMA Task Force Report. 2005. A comprehensive review of housing for pregnant. 2005. J. Amer. Vet. Med Assoc. 227: 1580-1590.
Lammers, P.J., M.S. Honeyman, J.W. Mabry, and J.D. Harmon. 2007. Performance of gestating sows in bedded hoop barns and confinement stalls. J. Anim. Sci. 85:1311-1317.

Swine 2007 Small Enterprise Study

In July and August 2007, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service's (APHIS) National Animal Health Monitoring System (NAHMS) will launch its first national study of small-enterprise swine operations. The Swine 2007 Small-Enterprise Study will focus on health and management practices of small swine operations in 31 States, specifically operations with fewer than 100 pigs.

The study will cover States considered at risk for exposure to feral swine and transmission of classical swine fever (CSF) and pseudorabies. Although the United States was declared free of CSF in 1978, the disease remains a threat to the U.S. pork industry and is currently present in neighboring countries, such as Cuba, Haiti, the Dominican Republic, and Mexico. The information gathered in this study will provide a more complete picture of small-enterprise swine operations and the risk of introduction of these diseases. It also will further the understanding of the risks and hazards presented by feral pigs, the role they play in disease transmission, and how

best to minimize the threat they pose to domestic swine.

How You Can Help

By participating in this voluntary study, you will contribute reliable and valuable information to

- Better understand potential risk factors for certain diseases associated with exposure to feral swine,
- Define and summarize current management practices and health conditions present on small-enterprise swine operations,
- Help government and industry represen-tatives make informed decisions, and
- Help university researchers and private enterprises identify and focus on vital issues related to small enterprises.

What Your Participation Involves

USDA's National Agricultural Statistics Service (NASS) will randomly select a sample of small-enterprise swine operations (fewer than 100 pigs). If your operation is selected to participate, NASS will send you a letter during summer 2007 explaining the study. Shortly thereafter, a study questionnaire will be mailed to you. If the questionnaire is not returned, a NASS representative will contact you via telephone and offer you the opportunity to complete the questionnaire at that time. Participation in the study is completely voluntary and strictly confidential. Because of the limited information that currently exists on this segment of the swine industry, participation in the study is very important.

Study Results

Questionnaire data will be entered in a database for analysis and summarization. No individual herd data will be published. Only combined herd results will be published. Study results will be available on the NAHMS Web site, <http://nahms.aphis.usda.gov>, and may be reported in industry trade magazines and newsletters or other media and at association meetings.

Previous NAHMS study results have been widely used by academic researchers, industry representatives, and legislators to better understand research needs and important animal-health issues.

Confidentiality

Because NAHMS studies rely on voluntary participation, APHIS protects the privacy of every participant. Only those collecting the data will know the identity of the respondent. No name or address is ever recorded in any APHIS database. No data will be reported on any individual or in a manner that would allow the identification of an individual.

NAHMS Studies

NAHMS has developed national estimates on disease prevalence and other factors related to the health of U.S. dairy cattle, swine, beef cattle, equine, poultry, catfish, and sheep. The science-based results produced by NAHMS have proven to be of considerable value to the U.S. livestock, poultry, and aquaculture industries. NAHMS studies are national in scope, voluntary and confidential, statistically valid, scientific, and collaborative in nature. For more information about the Small-Enterprise Swine Study 2007 please contact USDA-APHIS, Verterinary Services, Attention: NAHMS, NRRC Building B, Mailstop 2E7, 2150 Centre Avenue, Fort Collins, CO 80526-8117. Phone: (970) 494-700. Email: NAHMS@aphis.usda.gov. Or visit NAHMS on the Web at <http://nahms.aphis.usda.gov>.

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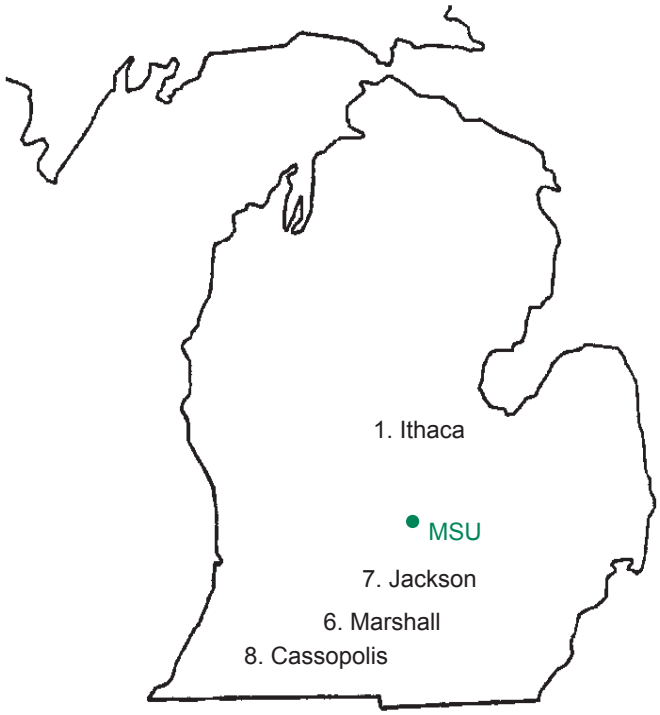

Alternative Sow Housing Conference on the Horizon

Members of the MSUE Pork AoE Team (Beth Franz, Jerry May and Ron Bates) attended the National Pork Board Sow Housing Conference on June 6 in Des Moines, IA. Using information gleaned this conference as a primer, The Pork AoE Team have begun the planning for a Sow Housing Conference for Michigan pork producers. This conference will provide in-depth descriptions of several alternative sow housing options along with an outline on how these types of systems should be managed. In addition, an overview of the economic implications of these different systems will be provided. The Pork AoE Team will announce the dates of this conference soon. For more information contact a member of the AoE Pork Team or check the Pork AoE Team Website (http://web1.msue.msu.edu/msue/aoe/swine).